

Final

# LOWER SAN JOAQUIN RIVER REACH TS\_30\_L LEVEE IMPROVEMENT PROJECT

Supplemental Environmental Impact Report  
SCH # 2010012027

Prepared by Environmental Science Associates for the San  
Joaquin Area Flood Control Agency

September 2023

<https://www.sjafca.org/maps/lower-san-joaquin-river-project>





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September 2023

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# CHAPTER 1

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## Introduction

### 1.1 Introduction and Background

This Final Supplemental Environmental Impact Report (Final SEIR) is a supplement to the San Joaquin River Basin, Lower San Joaquin River (LSJR) Integrated Interim Feasibility Report/ Environmental Impact Statement/Environmental Impact Report (State Clearinghouse No. 2010012027), which was prepared by the San Joaquin Area Flood Control Agency (SJAFCA), Central Valley Flood Protection Board (CVFPB), and U.S. Army Corps of Engineers (USACE). SJAFCA served as the lead agency under the California Environmental Quality Act (CEQA) for that previous Environmental Impact Report (EIR), which was certified by the SJAFCA Board of Directors on November 8, 2018, and is referred to in this Final SEIR as the “2018 LSJR FR/EIS/EIR.” This Final SEIR incorporates the 2018 LSJR FR/EIS/EIR by reference, which can be found in full at: [https://www.spk.usace.army.mil/lower\\_sj\\_river/](https://www.spk.usace.army.mil/lower_sj_river/). The Department of Water Resources (DWR) and CVFPB are responsible agencies under CEQA for this Final SEIR.

The purpose of the 2018 LSJR FR/EIS/EIR was to investigate the extent of federal interest in a range of alternative plans to reduce flood risk in the cities of Stockton, Lathrop, and Manteca, as well as surrounding urbanizing areas. The objectives were to meet the requirements of California Senate Bill (SB) 5 of 2007, the Central Valley Flood Improvement Act, to achieve a 200-year level of protection for urban and urbanizing areas, focusing on a reduction of flood risk in the City of Stockton. The 2018 LSJR FR/EIS/EIR considered seven alternative plans aimed at reducing flood risk in the City of Stockton and surrounding urbanizing areas. The 2018 LSJR FR/EIS/EIR described a suite of structural levee improvement measures under the various alternatives and, as a joint NEPA/CEQA document, analyzed the alternatives’ potential impacts on the following resource areas: Geology and Geomorphology, Seismicity, Soils and Mineral Resources, Hydrology and Hydraulics, Water Quality, Groundwater, Wetlands and Other Waters of the United States, Air Quality and Greenhouse Gas Emissions, Vegetation, Wildlife, Fisheries, Special-Status Species, Socioeconomics and Environmental Justice, Land Use, Transportation, Utilities and Public Services, Recreation, Aesthetics, Noise, Public Health and Environmental Hazards, and Cultural Resources (including Tribal Cultural Resources).

The 2018 LSJR FR/EIS/EIR identified Alternative 7a as the recommended alternative. The LSJR Reach TS\_30\_L Levee Improvement Project (TS\_30\_L, or Modified Project), evaluated in the Draft SEIR is a sub-reach within Alternative 7a. The structural measures proposed for the Modified Project, which are described in Chapter 2 of the Draft SEIR, *Project Description*, were discussed in the 2018 LSJR FR/EIS/EIR, but certain elements of Alternative 7a, such as staging

areas, haul routes, mitigation sites, and the final project footprint, were not analyzed in the 2018 LSJR FR/EIS/EIR at a project-level of detail, because the specific project design was not available at that time. In addition, impacts to some resource areas in the 2018 LSJR FR/EIS/EIR (e.g., biological and cultural resources) were based on a desktop analysis and required further surveys to be completed prior to the proposed action/description being implemented. Further, certain resource areas were not addressed in the 2018 LSJR FR/EIS/EIR, as they were added to the CEQA Appendix G Guidelines after release of the draft document to the public for review. Therefore, the Draft SEIR addressed the minor additions or changes to the project footprint and added resource-specific analyses, as required. These minor additions or changes, referred to in the Draft and Final SEIR as the “Modified Project,” are described in Chapter 2, *Project Description*, of the Draft SEIR.

## 1.2 Contents and Format of the Final EIR

This Final EIR has been prepared to accompany the Draft SEIR for the Modified Project. The Draft SEIR identified environmental impacts associated with the construction and operation of the Modified Project, and recommended mitigation measures to reduce potential significant impacts. The statutes and Guidelines of the California Environmental Quality Act (CEQA) require the Lead Agency, SJAFCA, to consult with public agencies having jurisdiction over a proposed project, and to provide the public and other interested parties with an opportunity to comment on the Draft SEIR. This “Responses to Comments” document responds to environmental issues raised by the comments on the Draft SEIR.

This document, together with the Draft SEIR, constitutes the Final SEIR. CEQA Guidelines (Section 15132) specify that a final environmental impact report shall consist of:

- The Draft EIR or a revision of the draft;
- Comments and recommendations received on the Draft EIR either verbatim or in summary;
- A list of persons, organizations, and public agencies commenting on the Draft EIR;
- The responses of the Lead Agency to significant environmental points raised in the review and consultation process;
- Any other information added by the Lead Agency.

## 1.3 CEQA Process

SJAFCA has completed the following procedural requirements in compliance with CEQA.

### 1.3.1 Notice of Preparation

In accordance with CEQA Guidelines Sections 15063 and 15082, SJAFCA originally prepared and published a Notice of Preparation (NOP) of an EIR on January 14, 2010 (see Addendum D of the 2018 LSJR FR/EIS/EIR). The NOP was circulated to the public and to federal, state, and local agencies and other interested parties to solicit comments on the proposed Project. The public

comment period for the NOP closed on February 15, 2010. In addition to the public and agency comment period, a public scoping meeting was held on January 27, 2010, at the University of the Pacific's Regents Dining Room.

Concerns raised in response to the NOP and oral comments received at the scoping meetings were considered during preparation of the 2018 LSJR FR/EIS/EIR and the Draft SEIR. The scoping comments were included in Addendum D of the 2018 LSJR FR/EIS/EIR. Preparation of a Draft SEIR does not require the release of another NOP.

### 1.3.2 The Draft Supplemental EIR

SJAFCA made the Draft SEIR available to local, state, and federal agencies and to interested organizations and individuals for review and comment. In accordance with CEQA Guidelines Section 15105, the Draft SEIR was available for a 45-day public review and comment period starting on May 31 and ending July 17, 2023, at 5:00 pm. The Draft SEIR was available for public review at the Cesar Chavez Central Library, located at 605 North El Dorado Street, Stockton, CA 95202-1907. An electronic copy of the document could be viewed on SJAFCA's website via the following link: <https://www.sjafca.org/maps/lower-san-joaquin-river-project>.

SJAFCA also conducted both an in-person and a virtual public meeting on June 26, 2023 in coordination with USACE to receive comments on the adequacy of the analysis included in the Draft SEIR.

### 1.3.3 Completion of the CEQA Process

In order to complete the CEQA process, the SJAFCA Board will formally review and consider this Final SEIR, pursuant to the requirements of Section 15090 of the CEQA Guidelines. After considering the anticipated and potential environmental impacts of the Modified Project, as identified in the Draft SEIR, the SJAFCA Board will then choose whether or not to (1) certify the Final SEIR and (2) approve the Modified Project. Where a significant impact is identified, SJAFCA is required to make one or more findings for each significant effect, and then adopt a statement of overriding conditions as to any significant and unavoidable impacts.

If the SJAFCA Board decides to certify the Final SEIR, then SJAFCA may proceed with the Modified Project. CEQA also requires Lead Agencies to adopt a mitigation monitoring and reporting program for those changes to the Project that it has adopted or made a condition of Project approval in order to mitigate or avoid significant effects on the environment. All adopted mitigation measures have been included in the mitigation monitoring and reporting program (**Appendix A**), to verify compliance.

After certifying the Final SEIR and approving the Project, SJAFCA will file a Notice of Determination (NOD) with both the City Clerk's office and the State Clearinghouse.

## 1.4 Project Description and Objectives

No changes to TS\_30\_L or its objectives have been made following publication of the Draft SEIR. Please refer to Chapter 2, *Project Description*, of the Draft SEIR.

## 1.5 Project Location

No changes to the Project location have been made following publication of the Draft SEIR. Please refer to Chapter 2, *Project Description*, of the Draft SEIR.

## 1.6 Final SEIR Organization

This Final SEIR is organized into the following chapters and appendices:

**Chapter 1, Introduction.** Chapter 1 includes introductory and background information, describes the CEQA process completed to date and procedures to be followed for the completion of CEQA, and summarizes Final SEIR organization.

**Chapter 2, Comments Received and Responses.** Chapter 2 presents comments received on the Draft SEIR, and provides responses to these comments.

**Chapter 3, List of Preparers.** Chapter 3 provides the names of the Final SEIR authors and consultants, and agencies or individuals consulted during preparation of the Final SEIR.

**Appendices.** Appendix A is a Mitigation Monitoring and Reporting Plan prepared in support of the Supplemental EIR. Appendix B is the Public Draft SEIR that was circulated to the public starting on May 31 and ending July 17, 2023.

# CHAPTER 2

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## Comments Received on the Draft SEIR and Responses to Comments

### 2.1 Introduction

This chapter describes changes made to the Modified Project since publication of the Draft SEIR, as well as text changes made to the Draft SEIR either in response to a comment letter, initiated by SJAFCA staff, or in response to a comment.

Under CEQA, recirculation of all or part of an EIR may be required if significant new information is added after public review and prior to certification. According to State CEQA Guidelines Section 15088.5(a), new information is not considered significant “unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project’s proponents have declined to implement.” More specifically, the State CEQA Guidelines define significant new information as including:

- A new significant environmental impact resulting from the project or from a new mitigation measure proposed to be implemented.
- A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
- A feasible project alternative or mitigation measure considerably different from those others previously analyzed would clearly lessen the environmental impacts of the project, but the project proponents decline to adopt it.
- The Draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

The text changes described below update, refine, clarify, and amplify the project information and analyses presented in the Draft EIR. No new significant impacts are identified, and no information is provided that would involve a substantial increase in the severity of a significant impact that would not be mitigated by measures listed in the Draft SEIR. In addition, no new or considerably different alternatives or mitigation measures have been identified. Finally, there are no changes or set of changes that would reflect fundamental inadequacies in the Draft SEIR. Therefore, recirculation of any part of the Draft SEIR is not required.

## 2.2 Text Changes to the Draft SEIR

This section summarizes text changes made to the Draft SEIR either in response to a comment letter, initiated by SJAFCAs staff, or in response to a comment. New text is indicated in double underline and text to be deleted is reflected by ~~strike-through~~. Text changes are presented in the page order in which they appear in the Draft SEIR.

The text revisions provide clarification, amplification, and corrections that have been identified since publication of the Draft SEIR. The text changes do not result in a change in the analysis or conclusions of the Draft SEIR.

### Executive Summary

Minor revisions to four mitigation measures were made, which appear in Table ES-1 of the Executive Summary, as well as in their respective resource sections: Section 3.2.2, *Air Quality and Greenhouse Gas Emissions*; Section 3.5, *Agriculture and Forestry Resources*; Section 3.7, *Cultural and Paleontological Resources*; and Section 3.11, *Transportation*.

Mitigation Measure 3.2.2-1: Reduce Construction-Related NO<sub>x</sub> Emissions, which appears on page ES-8, in Table ES-1, *Summary of Impacts and Mitigation Measures*, and on page 3-3 and page 3-4 of Section 3.2.2, *Air Quality and Greenhouse Gas Emissions*, is revised to read:

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**Impact 3.2.2:**

**Mitigation Measure 3.2.2-1: Reduce Construction-Related NO<sub>x</sub> Emissions.**

The mitigation measure for Alternative 7a outlined in Section 5.8.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:

USACE shall require the use of off-road equipment that meets or exceeds USEPA or California Air Resources Board CARB Tier 4 off-road emission standards for all off-road vehicles greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities. Prior to issuance of a construction permit, the prime contractor(s) shall prepare and submit a Construction Emissions Minimization Plan (Plan) to USACE for review and approval. The Plan shall include estimates of the construction timeline by phase with a description of each piece of equipment required for every construction phase. Equipment descriptions and information shall include: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number and expected fuel usage and hours of operation. The Plan shall be kept by USACE and made available for review by any persons requesting it. Quarterly reports shall be submitted by the prime contractor(s) to USACE indicating the construction phase and equipment information used during each phase for the previous quarter. Prior to construction, USACE will obtain applicable permit(s) from the SJVAPCD. USACE and SJAFCAs would coordinate with the SJVAPCD to ensure compliance with all District rules that may apply to the construction of TS30L and its associated mitigation site, including but not limited to District Rule 9510, District Regulation VII, and District Rule 4641.

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Mitigation Measure 3.5-1: Minimize and Avoid Loss of Special Designated Farmland, which appears on page ES-12, in Table ES-1, *Summary of Impacts and Mitigation Measures*, and on page 3.5-12 and page 3.5-13, under Impact 3.5-1 of Section 3.5, *Agriculture and Forestry Resources*, is revised to read:

**Impact 3.5-1:**

**Mitigation Measure 3.5-1: Minimize and Avoid Loss of Special Designated Farmland.** The following measures shall be implemented before and during construction of the Modified Project to minimize and avoid loss of Prime and Unique Farmland and Farmland of Statewide Importance.

- Biological mitigation sites shall be designed to minimize, to the greatest extent feasible, the loss of agricultural land with the highest values.
- Biological mitigation sites shall be designed to minimize fragmentation or isolation of Special Designated Farmland. Where a biological mitigation site involves acquiring land or easements, any area not needed for biological habitat mitigation, if applicable, shall be of a size sufficient to allow viable farming operations. ~~In such situation, USACE shall be responsible for acquiring easements, making lot line adjustments, and merging affected land parcels into units suitable for continued commercial agricultural management.~~
- Any utility or infrastructure serving agricultural uses shall be reconnected if it is disturbed by biological mitigation site construction. If a biological mitigation site temporarily or permanently cuts off roadway access or removes utility lines, irrigation features, or other infrastructure, USACE shall be responsible for restoring access as necessary to ensure that economically viable farming operations are not interrupted.
- Where applicable to a biological mitigation site, buffer areas shall be established between restoration projects and adjacent agricultural land. The buffers shall be sufficient to protect and maintain land capability and flexibility in agricultural operations. Buffers shall be designed to protect the feasibility of ongoing agricultural operations and reduce the effects of construction-related or operational activities ~~(including the potential to introduce special-status species in the agricultural areas)~~ on adjacent or nearby properties. Buffers shall also serve to protect biological mitigation sites from noise, dust, and the application of agricultural chemicals. The width of each buffer shall be determined on a site-by-site basis to account for variations in prevailing winds, crop types, agricultural practices, ecological restoration, or infrastructure. Buffers can function as drainage swales, trails, roads, linear parkways, or other uses compatible with ongoing agricultural operations.

Mitigation Measure 3.7-4: Preconstruction Training and Paleontological Monitoring, which appears on page ES-21 and ES-22, in Table ES-1, *Summary of Impacts and Mitigation Measures*, and on page 3.7-24, under Impact 3.7-4 of Section 3.7, *Cultural and Paleontological Resources*, is revised to read:

**Impact 3.7-4:**

**Mitigation Measure 3.7-4: Preconstruction Training and Paleontological Monitoring.** ~~Prior to the start of construction activities, USACE shall retain a Qualified Paleontologist who meets the standards of the Society for Vertebrate Paleontology (SVP 2010) to carry out all mitigation measures related to paleontological resources. Prior to the start of any ground-disturbing activities, an Archaeologist (with experience in paleontological resources) the Qualified Paleontologist shall conduct preconstruction worker paleontological resources sensitivity training. The training shall include information on what types of paleontological resources could be encountered during excavations, what to do in case an unanticipated discovery is made by a worker, and laws protecting paleontological resources. All construction personnel shall be informed of the possibility of encountering fossils and instructed to immediately inform the construction foreman or supervisor if any bones or other potential fossils are unexpectedly unearthed in an area where a paleontological monitor is not present. The Applicant shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance.~~

If paleontological resources are unearthed, a ~~The~~ Qualified Paleontologist and/or shall supervise a paleontological monitor meeting the Society for Vertebrate Paleontology standards (SVP 2010) ~~who~~ shall be present during all excavations in the Modesto Formation. Monitoring shall consist of visually inspecting fresh exposures of rock for larger fossil remains and, where appropriate, collecting wet or dry screened standard sediment samples (up to 4.0 cubic yards) of promising horizons for smaller fossil remains (SVP 2010). Depending on the conditions encountered, full-time monitoring can be reduced to part-time inspections or ceased entirely if determined adequate by the Qualified Paleontologist. The Qualified Paleontologist may spot check the excavation on an intermittent basis

and recommend whether the depth of required monitoring should be revised based on his/her observations. Monitoring activities shall be documented in a Paleontological Resources Monitoring Report to be prepared by the Qualified Paleontologist at the completion of construction.

If a paleontological resource is discovered during construction, the Qualified Paleontologist and/or paleontological monitor shall be empowered to temporarily divert or redirect grading and excavation activities in the area of the exposed resource to facilitate evaluation of the discovery. An appropriate buffer area shall be established by the Qualified Paleontologist and/or paleontological monitor around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. All significant fossils shall be collected by the paleontological monitor and/or the Qualified Paleontologist. Collected fossils shall be prepared to the point of identification and catalogued before they are submitted to their final repository. Any fossils collected shall be curated at a public, non-profit institution with a research interest in the materials, such as the University of California Museum of Paleontology at Berkeley, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, maps, photographs, and a technical report shall also be filed at the repository and/or school.

Impact 3.7-5, Significance After Mitigation, which appears on page ES-22, in Table ES-1, *Summary of Impacts and Mitigation Measures*, is revised to read:

<b>Impact 3.7-5:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to cultural and paleontological resources.	PS	None currently available.	SU ( <u>cultural resources</u> ); LTS ( <u>paleontological resources</u> )
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Mitigation Measure 3.11-1: Traffic Safety Plan, subsections (f), (g), and (h), which appear on page ES-25, in Table ES-1, *Summary of Impacts and Mitigation Measures*, and on page 3.11-11, under Impact 3.11-1 of Section 3.11, *Transportation*, is revised to read:

<b>Impact 3.11-1:</b>	<p>(f) Before the start of the first construction season, the construction contractor shall obtain a road encroachment permit with San Joaquin County and the City of Stockton to address permit conditions set for the maintenance and repair of affected roadways resulting from increased truck traffic. The road encroachment permit conditions and requirements shall ensure that the affected roadways are repaired to a level that is equivalent to their pre-project condition. Such an agreement may require the contractor to take <u>dated</u> pre-project photos <u>and videos</u> of existing conditions. <u>A copy of the photos and videos shall be provided to SJAFCA and the City of Stockton.</u> Upon project completion, the City or County shall <u>may</u> develop a punch list of requirements to ensure that pre-project conditions are restored.</p> <p>(g) Before the Modified Project construction begins, the contractor shall provide notification of Modified Project construction to all appropriate emergency service providers in San Joaquin County, <u>and</u> Stockton, <del>Lathrop, and Manteca</del> and shall coordinate with providers throughout the construction period to ensure that emergency access through construction areas is maintained.</p> <p>(h) The contractor shall avoid neighborhoods and school zones to the maximum extent feasible when determining haul routes. When possible, hauling in school zones shall be limited to the period of summer breaks to avoid noise and traffic impacts on the schools. Any damage to residential roadways during construction shall be mitigated per the requirements outlined in the <del>traffic safety and control plan</del> <u>road encroachment permit provisions issued by the City of Stockton.</u></p>
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## Section 3.7 Cultural and Paleontological Resources

Page 3.7-25 of Section 3.7, *Cultural and Paleontological Resources*, is revised to read:

### Impact 3.7-5

As discussed for Alternative 7a in the 2018 LSJR FR/EIS/EIR, cumulative impacts on cultural resources would be related primarily to other construction projects that could occur during the same time frame and within the same vicinity as the Modified Project. Construction activities, including those associated with the Modified Project, could contribute to the progressive loss of cultural and/or paleontological resources and result in significant cumulative impacts, if any such resources were to exist. ~~The same analysis and conclusions apply to paleontological resources.~~

While there are no known cultural resources in the TS\_30\_L levee site, borrow area, barge off-haul site area, or the three project-level mitigation sites, an identification and evaluation effort has not yet been conducted for the Van Buskirk and SJR South proposed mitigation sites. The implementation of the PA, as required by the 2018 LSJR FR/EIS/EIR, would reduce the potential impact on any currently unidentified historical resources; however, this impact to cultural resources would still be significant and unavoidable. Therefore, the Modified Project's cumulatively considerable contribution to this cumulative impact would remain **significant and unavoidable** related to cultural resources, as was determined for Alternative 7a.

The same analysis does not apply for paleontological resources. As described under Impact 3.7-4, paleontological resources may become unearthed through the course of ground disturbance regardless of whether the area was evaluated at a project or program-level; however, Mitigation Measure 3.7-4 will ensure the protection of any unearthed paleontological resources during Modified Project construction, should they be discovered. Impacts from the Modified Project to paleontological resources would be less than significant and the Modified Project's contribution to this cumulative impact would not be cumulatively considerable.

## Section 3.8 Energy

Page 3.8-1 of Section 3.8, *Energy*, is revised to read:

### Page 3.8-1

This section discusses the potential for effects of the Modified Project on energy resources. ~~On December 28, 2018, Appendix G of the California Environmental Quality Act (CEQA) Guidelines was amended by the Governor's Office of Planning and Research so that it now includes an evaluation of impact to energy resources and renewable energy or energy efficiency plans. As such, the~~ The 2018 LSJR FR/EIS/EIR did not evaluate Alternative 7a's impacts related to energy use and no comments by individuals were received during circulation of the Notice of Preparation (NOP) for the 2018 LSJR FR/EIS/EIR relevant to energy. Therefore, this section discusses the potential effects of the Modified Project related to the ~~updated~~ Appendix G standards of significance for energy resources.

## 2.3 Summary of Commenting Parties

The agencies that provided comments on the Draft SEIR are listed in Table 2-1. The table identifies the assigned letter number and the number of individual comments contained in the letter. No comments were received during the public meeting for the Draft SEIR, which was held on June 26, 2023.

**TABLE 2-1  
LIST OF DRAFT SEIR COMMENTING PARTIES**

<b>Commenter</b>	<b>Identifier</b>	<b>Contact</b>	<b>Number of Comments</b>
California Department of Transportation (Caltrans)	Caltrans-1	Tom Dumas	4
California Department of Fish and Wildlife	CDFW-1	Erin Chappell	2
Central Valley Regional Water Quality Control Board (Regional Water Board)	Regional Water Board-1	Peter Minkel	1
San Joaquin Valley Air Pollution Control District	SJVAPCD-1	Mark Montelongo	2
Gunter Konold	Individual-1	Gunter Konold	3

## 2.4 Comments and Responses

The following discussion presents a response to comments. The comments submitted did not result in changes to text in the Draft SEIR, nor did the comments change the findings or conclusions of the Draft SEIR.

California Department of Transportation

OFFICE OF THE DISTRICT 10 DIRECTOR
P.O. BOX 2048 | STOCKTON, CA 95201
(209) 948-7943 | FAX (209) 948-7179 TTY 711
www.dot.ca.gov



July 11, 2023

SJ-Variou-PM Various
Lower San Joaquin River
TS\_30\_L Levee Improvement
DSEIR

Omar Al-Hindi
San Joaquin Area Flood Control Agency
22 E. Weber Avenue, Suite 301
Stockton, CA 95202

Dear Mr. Al-Hindi:

The California Department of Transportation appreciates the opportunity to review the Draft Supplemental EIR for the Lower San Joaquin River Reach TS\_30\_L Levee Improvement Project. The Department has the following comments:

- 1. Further review of the plans is recommended since levee improvements are shown crossing the State right of way. An Encroachment Permit will be required for any work done within the Department's right of way. This work is subject to the California Environmental Quality Act. Therefore, environmental studies may be required as part of the encroachment permits application. A qualified professional must conduct any such studies undertaken to satisfy the Department's environmental review responsibilities. Ground disturbing activities to the site prior to completion and/or approval of required environmental documents may affect the Department's ability to issue a permit for the project. Furthermore, if engineering plans or drawings will be part of your permit application, they should be prepared in standard units.
2. Please submit a hydrology and hydraulic report to Caltrans District 10 for review. This report is required to determine any potential impacts to State facilities, including the nearby I-5 bridges.
3. Caltrans recommends that as part of the project's Traffic Management Plan, most truck trips be scheduled to avoid the peak-hour commute periods along SR 99 and I-5. This will help reduce congestion and emissions.
4. Any oversize vehicles that might be used in construction will require a permit through Caltrans Headquarters Transportation Permits. Instructions on how to

Caltrans 1

Caltrans 2

Caltrans 3

Caltrans 4

Mr. Al-Hindi  
July 11, 2023  
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apply can be found here: <https://dot.ca.gov/programs/traffic-operations/transportation-permits/how-to-apply>

↑  
Caltrans  
4 (cont)

If you have any questions, please contact me at (209) 483-7234 or Nicholas Fung at (209) 986-1552.

Sincerely,



FOR

Tom Dumas  
Chief, Office of Metropolitan Planning

### **Response to Comment Caltrans-1**

Prior to construction, USACE and SJAFCA will coordinate with Caltrans to ensure compliance with all regulatory requirements that may apply to the construction of TS\_30\_L and its associated mitigation site, including but not limited to an Encroachment Permit.

### **Response to Comment Caltrans-2**

USACE will coordinate with Caltrans as needed to ensure there are no impacts to state facilities (such as Interstate 5 bridges); however, USACE does not plan to submit a full hydrology and hydraulic report as project construction will occur over a mile west of Interstate 5. The only project-related activities that will occur along Interstate 5 (or other state roadways) are truck trips hauling construction material from the SEWD borrow site to the TS\_30\_L levee site.

### **Response to Comment Caltrans-3**

As discussed in Section 2.4.6, *TS\_30\_L Construction Schedule*, of the Draft SEIR, the City of Stockton's standard encroachment permit, which is required and will be obtained for work on TS\_30\_L, limits truck haul hours to 8:00 a.m. to 4:00 p.m. This will limit truck trips and construction traffic during peak-hour commute periods along State Route 99 and Interstate 5.

### **Response to Comment Caltrans-4**

Prior to construction, USACE and SJAFCA will coordinate with Caltrans to ensure compliance with all regulatory requirements that may apply to the construction of TS\_30\_L and its associated mitigation site, including but not limited to California Vehicle Code (CVC) legal size and weight requirements and/or a Caltrans Headquarters Transportation Permit.



State of California – Natural Resources Agency

GAVIN NEWSOM, Governor  
CHARLTON H. BONHAM, Director



DEPARTMENT OF FISH AND WILDLIFE

Bay Delta Region  
2825 Cordelia Road, Suite 100  
Fairfield, CA 94534  
(707) 428-2002  
[www.wildlife.ca.gov](http://www.wildlife.ca.gov)

July 24, 2023

Omar Al-Hindi, Executive Project Manager  
San Joaquin Area Flood Control Agency  
22 E. Weber Avenue, Suite 301  
Stockton, CA 95202-2317  
[ceqacomment@sjafca.org](mailto:ceqacomment@sjafca.org)

Subject: Lower San Joaquin River Reach TS\_30\_L Levee Improvement Project, Draft Supplemental Environmental Impact Report, SCH No. 2010012027, City of Stockton, San Joaquin County

Dear Mr. Al-Hindi:

The California Department of Fish and Wildlife (CDFW) received a Notice of Availability of a Draft Supplemental Environmental Impact Report (draft SEIR) from San Joaquin Area Flood Control Agency (SJAFC) for the Lower San Joaquin River Reach TS\_30\_L Levee Improvement Project (Project) located in the City of Stockton, San Joaquin County, California, pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.<sup>1</sup> CDFW has reviewed the draft SEIR and is submitting comments regarding potential impacts to biological resources associated with the proposed Project.

**CDFW ROLE**

CDFW is California’s **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a)). CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802). Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a **Responsible Agency** under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381). CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW’s lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.). Likewise, to the extent

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<sup>1</sup> CEQA is codified in the California Public Resources Code in section 21000 et seq. The “CEQA Guidelines” are found in Title 14 of the California Code of Regulations, commencing with section 15000.

Omar Al-Hindi, Executive Project Manager  
San Joaquin Area Flood Control Agency  
July 24, 2023  
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implementation of the Project as proposed may result in “take” as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

## REGULATORY REQUIREMENTS

### ***California Endangered Species Act***

Please be advised that if the Project has the potential to result in “take” of plants or animals listed or a candidate under CESA, either during construction or over the life of the Project (Fish and Game Code, § 2080 et seq.), the Project must demonstrate compliance with CESA, either through full avoidance measures or obtaining take coverage through a CESA Incidental Take Permit (ITP). Under CESA, take is defined as “to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill.” Issuance of a CESA ITP is subject to CEQA documentation; therefore, the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the Project will impact CESA listed species, early consultation is encouraged, as potential significant modification to the Project and mitigation measures may be required in order to obtain a CESA ITP. If “take” or adverse impacts cannot be avoided, a CESA Permit must be obtained (pursuant to Fish and Game Code section 2080 et seq.). In this case, the draft SEIR acknowledges that the Project may impact the CESA-listed Swainson’s hawk, giant garter snake, and other State listed species that have the potential to be present on the Project site.

### ***Lake and Streambed Alteration***

CDFW requires a Lake and Streambed Alteration (LSA) Notification, pursuant to Fish and Game Code section 1600 et. seq., for activities affecting lakes or streams and associated riparian habitat. LSA notification is required for any activity that may substantially divert or obstruct the natural flow; change or use material from the bed, channel, or bank including associated riparian or wetland resources; or deposit or dispose of material where it may pass into a river, lake or stream. Work within ephemeral streams, washes, watercourses with a subsurface flow, and floodplains are subject to notification requirements. CDFW will consider the CEQA document for the Project and may issue an LSA Agreement. CDFW may not execute the final LSA Agreement (or ITP) until it has complied with CEQA as the responsible Agency.

## PROJECT DESCRIPTION SUMMARY

**Proponent:** San Joaquin Area Flood Control Agency

**Objective:** The objective of the Project is to meet the requirements of California Senate Bill (SB) 5 of 2007, the Central Valley Flood Improvement Act, to achieve a 200-year

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Omar Al-Hindi, Executive Project Manager  
San Joaquin Area Flood Control Agency  
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level of protection for urban and urbanizing areas, while focusing on a reduction of flood risk in the City of Stockton. Primary activities proposed under the Project include one mile of cutoff wall construction, levee reshaping, and runoff erosion protection of the TS\_30\_L levee, development of a borrow site, barge off-haul site, two co-located staging and stockpile areas, haul routes, and mitigation areas. It is anticipated that Project improvements will result in impacts to approximately 0.6 acres of wetland habitat, 2.3 acres of irrigation ditch, and 9 acres of agricultural rice fields. Two staging and stockpile areas are to be co-located adjacent to the northern and southern portions of the site. Three potential borrow sites are under consideration – one at the Stockton East Water District (SEWD) property located approximately nine miles east of the Project site and two commercial borrow sources. One commercial borrow source is Dutra Materials located at Decker Island and the other commercial site is Brown Sand Incorporated located in Lathrop.

The Project will be mitigated at one of five sites. Three mitigation sites were evaluated at a Project-level of detail (14-Mile Slough Pump Station, San Joaquin River (SJR) West Site, and SJR East Site), and two sites were evaluated at a program-level of detail (SJR South Site and Van Buskirk Park). The Project-level mitigation sites were evaluated for existing habitats and species on-site and are described in the draft SEIR. The program-level mitigation sites have not been evaluated and no specific site information is available. Because of this, their suitability as mitigation locations cannot be determined. Therefore, if SJR South Site or Van Buskirk Park (or an alternative biological mitigation site not evaluated in the draft SEIR) is chosen for development, additional environmental review under CEQA will be required prior to construction. Site preparation will include clearance of vegetation, the site(s) will be graded to establish a construction staging/stockpile area, topography will be graded to elevations that support wetland and riparian habitats and cut and fill will be balanced on-site.

**Location:** The Project is located on the northwestern side of the City of Stockton. The levee extends 1.1 mile in length and separates the Brookside residential neighborhood located on Sargent Barnhart Tract on the east and the Wright Elmwood Tract on the west. It is bounded on the south by West March Lane and on the north by White Slough/Fourteen Mile Slough. The Project midpoint is located at Latitude 37.98641, Longitude -121.369155. Staging and stockpile areas, the barge off-haul site, the SJR East Site, SJR West Site, Fourteen Mile Slough Pump Station Site, SJR South, and Van Buskirk Park mitigation sites, and the SEWD borrow site locations.

**Timeframe:** Construction for the Project from September 2024 through March 2026.

**COMMENTS AND RECOMMENDATIONS**

CDFW offers the comments and recommendations below to assist SJAFCA in adequately identifying and/or mitigating the Project’s significant, or potentially



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Omar Al-Hindi, Executive Project Manager  
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significant, direct, and indirect impacts on fish and wildlife (biological) resources. Editorial comments or other suggestions may also be included to improve the document.

### I. Mitigation Measure or Alternative and Related Impact Shortcoming

**Issue:** CDFW has determined that the Project will require an LSA Agreement per Fish and Game Code 1602. On page 2-27, the draft SEIR states that all appropriate environmental permits for vegetation removal and construction activities will be obtained. SJAFCA has stated to CDFW staff that it is no longer pursuing permits from CDFW for the Project. However, via inter-agency communication, the U.S. Army Corps of Engineers (USACE) identified SJAFCA as a non-federal sponsor responsible for a portion of the Project's costs and therefore, State permits (e.g., an LSA Agreement and ITP), if needed, are the responsibility of SJAFCA to obtain. CDFW is concerned that if SJAFCA does not plan on obtaining permits for the Project, then the basis for the avoidance, minimization, and mitigation measures identified in the draft SEIR cannot be relied upon to reduce impacts on biological resources to a level of less-than-significant.

In addition, according to CEQA guidelines, all mitigation must be feasible and fully enforceable, and all feasible mitigation **must be imposed by lead agencies** (see CEQA Guidelines, § 15041). Therefore, the Lead Agency should neither defer identification of mitigation measures pending the findings and determinations from a Responsible Agency, nor should it rely on permits from those Responsible Agencies to reduce the impacts of a project approved by the Lead Agency to reduce the project's impacts to a level of less-than-significant.

**Recommendation:** CDFW recommends that SJAFCA identify enforceable and feasible measures in a revised draft SEIR and obtain an LSA Agreement and an ITP for the Project. CDFW also recommends that SJAFCA engage with CDFW early on during Project planning to develop and incorporate avoidance, minimization, and mitigation measures into the Project and any CEQA environmental documents.

### CONCLUSION

Due to the draft SEIR's reliance on permits issued by Responsible Agencies, CDFW concludes that the draft SEIR does not adequately identify or mitigate the Project's significant, or potentially significant, impacts on biological resources. The draft SEIR should be revised to incorporate specific and enforceable mitigation measures to offset the biological impacts identified that are the responsibility of the CEQA Lead Agency to ensure these impacts are reduced to a level of less-than-significant or less-than-significant with mitigation.

CDFW appreciates the opportunity to comment on the draft SEIR to assist SJAFCA in identifying and mitigating Project impacts on biological resources. Questions regarding



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Omar Al-Hindi, Executive Project Manager  
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this letter or further coordination should be directed to Andrea Boertien, Environmental Scientist, at (707) 317-0388 or [Andrea.Boertien@wildlife.ca.gov](mailto:Andrea.Boertien@wildlife.ca.gov); or Michelle Battaglia, Senior Environmental Scientist (Supervisory), at [Michelle.Battaglia@wildlife.ca.gov](mailto:Michelle.Battaglia@wildlife.ca.gov).

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Sincerely,

DocuSigned by:  
*Erin Chappell*  
B77E9A6211EF486...  
Erin Chappell  
Regional Manager  
Bay Delta Region

cc: State Clearinghouse (SCH No. 2010012027)  
Ashley Lopez, U.S. Army Corps of Engineers – [Ashley.k.lopez@usace.army.mil](mailto:Ashley.k.lopez@usace.army.mil)  
Billie Wilson, CDFW Region 2 – [Billie.Wilson@wildlife.ca.gov](mailto:Billie.Wilson@wildlife.ca.gov)  
Zachary Kearns, CDFW Region 2 – [Zachary.Kearns@wildlife.ca.gov](mailto:Zachary.Kearns@wildlife.ca.gov)

### **Response to Comment CDFW-1**

SJAFCA appreciates CDFW for providing information on CDFW's role as a CEQA Trustee and Responsible Agency and information on the California Endangered Species Act and Lake and Streambed Alteration (LSA) regulatory requirements.

### **Response to Comment CDFW-2**

USACE will be carrying out all project construction and will therefore be solely responsible for related permitting. Prior to the commencement of construction, USACE will coordinate with CDFW to ensure compliance with all regulatory requirements that may apply to the construction of TS\_30\_L and its associated mitigation site.



## Central Valley Regional Water Quality Control Board

12 July 2023

Omar Al-Hindi  
San Joaquin Area Flood Control Agency  
22 East Weber Avenue, Suite 301  
Stockton, CA 95202  
*Omar.Al-Hindi@stocktonca.gov*

### **COMMENTS TO REQUEST FOR REVIEW FOR THE SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT, LOWER SAN JOAQUIN RIVER REACH TS\_30\_L LEVEE IMPROVEMENT PROJECT, SCH#2010012027, SAN JOAQUIN COUNTY**

Pursuant to the State Clearinghouse’s 31 May 2023 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Supplemental Environmental Impact Report* for the Lower San Joaquin River Reach TS\_30\_L Levee Improvement Project, located in San Joaquin County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore, our comments will address concerns surrounding those issues.

#### **I. Regulatory Setting**

##### **Basin Plan**

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State’s water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has

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adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues. For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website:

[http://www.waterboards.ca.gov/centralvalley/water\\_issues/basin\\_plans/](http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/)

### **Antidegradation Considerations**

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at:

[https://www.waterboards.ca.gov/centralvalley/water\\_issues/basin\\_plans/sacsjr\\_2018\\_05.pdf](https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_2018_05.pdf)

In part it states:

*Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.*

*This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.*

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

## **II. Permitting Requirements**

### **Construction Storm Water General Permit**

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For more information on the Construction General Permit, visit the

State Water Resources Control Board website at:

[http://www.waterboards.ca.gov/water\\_issues/programs/stormwater/constpermits.shtml](http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml)

**Clean Water Act Section 404 Permit**

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACE). If a Section 404 permit is required by the USACE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACE at (916) 557-5250.

**Clean Water Act Section 401 Permit – Water Quality Certification**

If an USACE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. For more information on the Water Quality Certification, visit the Central Valley Water Board website at:

[https://www.waterboards.ca.gov/centralvalley/water\\_issues/water\\_quality\\_certification/](https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/)

**Waste Discharge Requirements – Discharges to Waters of the State**

If USACE determines that only non-jurisdictional waters of the State (i.e., “non-federal” waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. For more information on the Waste Discharges to Surface Water NPDES Program and WDR processes, visit the Central Valley Water Board website at: [https://www.waterboards.ca.gov/centralvalley/water\\_issues/waste to surface water/](https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/)

Projects involving excavation or fill activities impacting less than 0.2 acre or 400 linear feet of non-jurisdictional waters of the state and projects involving dredging activities impacting less than 50 cubic yards of non-jurisdictional waters of the state may be eligible for coverage under the State Water Resources Control Board Water Quality Order No. 2004-0004-DWQ (General Order 2004-0004). For more information on the General Order 2004-0004, visit the State Water Resources

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Control Board website at:

[https://www.waterboards.ca.gov/board\\_decisions/adopted\\_orders/water\\_quality/2004/wqo/wqo2004-0004.pdf](https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf)

### **Dewatering Permit**

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:

[http://www.waterboards.ca.gov/board\\_decisions/adopted\\_orders/water\\_quality/2003/wqo/wqo2003-0003.pdf](http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf)

For more information regarding the Low Threat Waiver and the application process, visit the Central Valley Water Board website at:

[https://www.waterboards.ca.gov/centralvalley/board\\_decisions/adopted\\_orders/waivers/r5-2018-0085.pdf](https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2018-0085.pdf)

### **Limited Threat General NPDES Permit**

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order. For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:

[https://www.waterboards.ca.gov/centralvalley/board\\_decisions/adopted\\_orders/general\\_orders/r5-2016-0076-01.pdf](https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2016-0076-01.pdf)

### **NPDES Permit**

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit. For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: <https://www.waterboards.ca.gov/centralvalley/help/permit/>

Lower San Joaquin River Reach TS\_ - 5 -  
\_L Levee Improvement Project  
San Joaquin County

12 July 202330

If you have questions regarding these comments, please contact me at (916) 464-4684  
or Peter.Minkel2@waterboards.ca.gov.

*Peter Minkel*

Peter Minkel  
Engineering Geologist

cc: State Clearinghouse unit, Governor's Office of Planning and Research,  
Sacramento

## **Response to Comment CVRWQCB-1**

SJAFCA appreciates the Regional Water Board for providing information on the regulatory setting and the Regional Water Board's permitting requirements. USACE will be carrying out all project construction and will therefore be solely responsible for related permitting. Prior to construction, USACE will coordinate with the Regional Water Board to ensure compliance with all regulatory requirements that may apply to the construction of TS\_30\_L and its associated mitigation site.



July 26, 2023

Ashley Lopez  
 Department of the Army  
 U.S. Army Corps of Engineers, Sacramento District  
 1325 J Street  
 Sacramento, CA 95814

**Project: San Joaquin River Tenmile Slough Reach 30L Supplemental Environmental Assessment**

**District CEQA Reference No: 20230508**

Dear Ms. Lopez:

The San Joaquin Valley Air Pollution Control District (District) has reviewed the Supplemental Environmental Assessment (SEA) from the U.S. Army Corps of Engineers, Sacramento District (USACE) for the San Joaquin River Tenmile Slough Reach 30L Levee Project. The SEA has been developed per the 2018 Lower San Joaquin River Basin Final Integrated Interim Feasibility Report / Environmental Impact Statement (EIS) / Environmental Impact Report (EIR), which proposes the recommended plan of Alternative 7a. The SEA encompasses only a segment of the entire recommended plan outlined by the EIS/EIR. Specifically, the SEA proposes the following: updated and expanded levee footprint shift towards the waterside, improved road on the waterside easement of the levee, implementing haul routes, two staging areas, the borrow site, and mitigation sites for habitat impacts (Project). The Project is located between Fourteenmile Slough and the San Joaquin River in west side of Stockton, CA. See Figure 1 below.

The District offers the following comments regarding the Project:

**1) Project Related Emissions**

Based on the SEA, Project specific annual criteria pollutant emissions from construction and operation would not exceed any of the significance thresholds for air quality. One of the mitigation measures identified in the SEA to reduce the Project’s related criteria pollutant emissions is the requirement to use off-road equipment that meets or exceeds the Environmental Protection Agency or California Air Resource Board Tier 4 off-road emission standards. The District recommends

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**Samir Sheikh**  
 Executive Director/Air Pollution Control Officer

**Northern Region**  
 4800 Enterprise Way  
 Modesto, CA 95356-8718  
 Tel: (209) 557-6400 FAX: (209) 557-6475

**Central Region (Main Office)**  
 1990 E. Gettysburg Avenue  
 Fresno, CA 93726-0244  
 Tel: (559) 230-6000 FAX: (559) 230-6061

**Southern Region**  
 34946 Flyover Court  
 Bakersfield, CA 93308-9725  
 Tel: (661) 392-5500 FAX: (661) 392-5585

that the SEA provide additional details on the monitoring of such requirement, similar to the description for the Tier 3 mitigation measure identified in 2018 Lower San Joaquin River Basin Final Integrated Interim Feasibility Report /EIS/EIR.

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## 2) **District Rules and Regulations**

The District issues permits for many types of air pollution sources, and regulates some activities that do not require permits. A project subject to District rules and regulations would reduce its impacts on air quality through compliance with the District's regulatory framework. In general, a regulation is a collection of individual rules, each of which deals with a specific topic. As an example, Regulation II (Permits) includes District Rule 2010 (Permits Required), Rule 2201 (New and Modified Stationary Source Review), Rule 2520 (Federally Mandated Operating Permits), and several other rules pertaining to District permitting requirements and processes.

The list of rules below is neither exhaustive nor exclusive. Current District rules can be found online at: [www.valleyair.org/rules/1ruleslist.htm](http://www.valleyair.org/rules/1ruleslist.htm). To identify other District rules or regulations that apply to future projects, or to obtain information about District permit requirements, the project proponents are strongly encouraged to contact the District's Small Business Assistance (SBA) Office at (209) 557-6446.

### 2a) **District Rule 9510 - Indirect Source Review (ISR)**

The purpose of District Rule 9510 is to reduce the growth in both NOx and PM emissions associated with development and transportation projects from mobile and area sources; specifically, the emissions associated with the construction and subsequent operation of development projects. The ISR Rule requires developers to mitigate their NOx and PM emissions by incorporating clean air design elements into their projects. Should the proposed development project clean air design elements be insufficient to meet the required emission reductions, developers must pay a fee that ultimately funds incentive projects to achieve off-site emissions reductions.

In the case the individual development project is subject to District Rule 9510, per Section 5.0 of the rule, an Air Impact Assessment (AIA) application is required to be submitted no later than applying for project-level approval from a public agency so that proper mitigation and clean air design under ISR can be incorporated into the public agency's analysis.

Please contact District staff is available to provide assistance with determining if the Project will be subject to Rule 9510. District staff can be reached by phone at (559) 230-5900 or by email at [ISR@valleyair.org](mailto:ISR@valleyair.org).

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## 2b) District Regulation VIII (Fugitive PM10 Prohibitions)

The project proponent may be required to submit a Construction Notification Form or submit and receive approval of a Dust Control Plan prior to commencing any earthmoving activities as described in Regulation VIII, specifically Rule 8021 – *Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities*.

Should the project result in at least 1-acre in size, the project proponent shall provide written notification to the District at least 48 hours prior to the project proponents intent to commence any earthmoving activities pursuant to District Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities). Also, should the project result in the disturbance of 5-acres or more, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials, the project proponent shall submit to the District a Dust Control Plan pursuant to District Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities). For additional information regarding the written notification or Dust Control Plan requirements, please contact District Compliance staff at (559) 230-5950.

The application for both the Construction Notification and Dust Control Plan can be found online at:

<https://www.valleyair.org/busind/comply/PM10/forms/DCP-Form.docx>

Information about District Regulation VIII can be found online at:

[http://www.valleyair.org/busind/comply/pm10/compliance\\_pm10.htm](http://www.valleyair.org/busind/comply/pm10/compliance_pm10.htm)

## 2c) Other District Rules and Regulations

The Project may also be subject to the following District rules: Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations).

If you have any questions or require further information, please contact Jacob Torrez by e-mail at [Jacob.torrez@valleyair.org](mailto:Jacob.torrez@valleyair.org) or by phone at (559) 230-6558.

Sincerely,

Brian Clements  
Director of Permit Services



For: Mark Montelongo  
Program Manager

SJVAPCD  
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## Response to Comment SJVAPCD-1

Based on SJVAPCD's comments regarding monitoring of Teir 4 off-road emission standards, the Mitigation Measure 3.2.2-1: Reduce Construction-Related N0x Emissions, in Draft SEIR Section 3.2.2, Air Quality and Greenhouse Gas Emissions, has been revised:

**Mitigation Measure 3.2.2-1 Reduce Construction-Related NO<sub>x</sub> Emissions:** The mitigation measure for Alternative 7a outlined in Section 5.8.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:

USACE shall require the use of off-road equipment that meets or exceeds USEPA or California Air Resources Board CARB Tier 4 off-road emission standards for all off-road vehicles greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities. Prior to issuance of a construction permit, the prime contractor(s) shall prepare and submit a Construction Emissions Minimization Plan (Plan) to USACE for review and approval. The Plan shall include estimates of the construction timeline by phase with a description of each piece of equipment required for every construction phase. Equipment descriptions and information shall include: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number and expected fuel usage and hours of operation. The Plan shall be kept by USACE and made available for review by any persons requesting it. Quarterly reports shall be submitted by the prime contractor(s) to USACE indicating the construction phase and equipment information used during each phase for the previous quarter. Prior to construction, USACE will obtain applicable permit(s) from the SJVAPCD. USACE and SJAFCA would coordinate with the SJVAPCD to ensure compliance with all District rules that may apply to the construction of TS30L and its associated mitigation site, including but not limited to District Rule 9510, District Regulation VII, and District Rule 4641.

## Response to Comment SJVAPCD-2

USACE will be carrying out all project construction and will therefore be solely responsible for related permitting. USACE will coordinate with the SJVAPCD to ensure compliance with all District rules that may apply to the construction of TS\_30\_L and its associated mitigation site, including but not limited to District Rule 9510, District Regulation VII, and District Rule 4641.

# Letter Individual-1

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**From:** Gunter Konold <[gwkonold@att.net](mailto:gwkonold@att.net)>  
**Sent:** Wednesday, July 5, 2023 10:34 AM  
**To:** [ceqacomment@sjafca.org](mailto:ceqacomment@sjafca.org); SPK-PAO SPK <[SPK-PAO@usace.army.mil](mailto:SPK-PAO@usace.army.mil)>  
**Subject:** [Non-DoD Source] Draft SEIR and SEA

Thank you for the community meeting on June 26 in refence to the Tenmile Slough project. I have a few additional comments/questions:

I understand that the Tenmile Slough project is intended to reinforce the levee but not add substantially to its height. Does the environmental review address the potential severe weather impacts of climate change that may necessitate the heightening of the levee in the future?

IND-1

March Lane in the Brookside area was extensively repaved just a few years ago. Does the environmental review address the potentially damaging impact of the heavy truck traffic during the construction period, and the possible need for extensive repairs to March Lane?

IND-2

I'm aware that noise and dust impacts are considered, but is there a chance that the heavy truck traffic during construction could cause vibrations that could impact homes and businesses along March Lane?

IND-3

Thank you.

Gunter Konold  
4644 Heron Lakes Drive  
Stockton, CA 95219

[gwkonold@att.net](mailto:gwkonold@att.net)  
(209) 610-2016

## Response to Comment Individual-1

As described in the Hydraulics Addendum to the 2018 LSJR FR/EIS/EIR (available at [https://www.spk.usace.army.mil/lower\\_sj\\_river/](https://www.spk.usace.army.mil/lower_sj_river/)), sea level conditions were analyzed for 2010 (then-present conditions) and 2070. For each project levee (including TS\_30\_L), levee height is based on the authorized design profile, the existing profile, or three feet above the median 0.5% Annual Chance Exceedance water surface profile 2070 sea level conditions, whichever is higher. The median 0.5% Annual Chance Exceedance is sometimes referred to as the 200-year event. At TS\_30\_L, the existing levee height was the highest, therefore, it is expected that a levee raise at TS\_30\_L would not be needed, at least through the year 2070.

## Response to Comment Individual-2

As described in Draft SEIR Section 3.11, *Transportation*, the mitigation measures for Alternative 7a outlined in Section 5.15.10 of the 2018 LSJR FR/EIS/EIR have been updated. Section 3.11.3, *Impact Analysis and Mitigation Measures*, describes Mitigation Measure 3.11-1: Traffic Safety Plan.

With the implementation of the mitigation measure as required, any damage to March Lane (or other roadways along the haul route) would be repaired as needed so that they are not left in a worse condition than the present.

## Response to Comment Individual-3

The potential for and effects of construction-generated vibration are addressed in detail in the 2018 LSJR FR/EIS/EIR. Please see Section 5.19.4 for the potential sources and effects of vibration for Alternative 7a.

As discussed in Draft SEIR Section 3.10, *Noise and Vibration*, Mitigation Measure 3.10-1: Construction Noise Reduction, would be implemented to reduce the effects of noise and vibration from construction activities. However, even with the implementation of mitigation, due to the proximity of noise-sensitive land uses to construction activities, the residual impact of construction noise and vibration would be significant and unavoidable, consistent with the determination in the 2018 LSJR FR/EIS/EIR.

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# CHAPTER 3

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## Preparers of the Draft and Final Supplemental EIR

### 3.1 Lead and Responsible Agencies

#### San Joaquin Area Flood Control Agency

- Omar Al-Hindi – Executive Project Manager

#### Department of Water Resources

- Larry Ito, P.E., PMP – Senior Engineer, Flood Projects Office, Flood Projects Branch
- Kalia Schuster – Environmental Scientist, Division of Flood Management, Environmental Support Unit of the Flood Projects Branch

### 3.2 Consultants

#### Environmental Science Associates

- Meredith Parkin, JD, PMP – Project Manager
- Rachael Carnes – Deputy Project Manager
- Raiyna Villaseñor – Environmental Planner
- Daniel Huang – Biological Resources
- Jessica Orsolini – Biological Resources
- Christy Dawson – Biological Resources
- Heidi Koenig – Cultural Resources
- Robin Hoffman – Cultural Resources
- Brandon Carroll – Paleontological Resources
- Jyothi Iyer – Noise and Air Quality

#### Larsen Wurzel & Associates, Inc.

- Adam Riley, P.E. – Technical Review

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# Appendix A

## **TS\_30\_L Mitigation Monitoring and Reporting Program**



## MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<b>Aesthetics</b>				
<b>Mitigation Measure 3.6-16</b> (See text under Impact 3.6-2)	USACE	USACE	Prior to and during construction activities	
<b>Mitigation Measure 3.6-17</b> (See text under Impact 3.6-2)				
<b>Mitigation Measure 3.6-18</b> (See text under Impact 3.6-2)				
<b>Mitigation Measure 3.6-19</b> (See text under Impact 3.6-2)				
<b>Air Quality and Greenhouse Gas Emissions</b>				
<p><b>Mitigation Measure 3.2.2-1: Reduce Construction-Related NO<sub>x</sub> Emissions.</b> The mitigation measure for Alternative 7a outlined in Section 5.8.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:</p> <ul style="list-style-type: none"> <li>USACE shall require the use of off-road equipment that meets or exceeds USEPA or California Air Resources Board CARB Tier 4 off-road emission standards for all off-road vehicles greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities. Prior to issuance of a construction permit, the prime contractor(s) shall prepare and submit a Construction Emissions Minimization Plan (Plan) to USACE for review and approval. The Plan shall include estimates of the construction timeline by phase with a description of each piece of equipment required for every construction phase. Equipment descriptions and information shall include: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number and expected fuel usage and hours of operation. The Plan shall be kept by USACE and made available for review by any persons requesting it. Quarterly reports shall be submitted by the prime contractor(s) to USACE indicating the construction phase and equipment information used during each phase for the previous quarter. <u>Prior to construction, USACE will obtain applicable permit(s) from the SJVAPCD. USACE and SJAFCA would coordinate with the SJVAPCD to ensure compliance with all District rules that may apply to the construction of TS30L and its associated mitigation site, including but not limited to District Rule 9510, District Regulation VII, and District Rule 4641.</u></li> </ul>	USACE	USACE	Prior to and during construction activities	
<b>Hazards, Hazardous Materials, and Public Safety</b>				
<p><b>Mitigation Measure 3.2.4-1: Reduce Hazards Associated with Potential Exposure to Hazardous Substances.</b> The mitigation measures for Alternative 7a outlined in Section 5.20.10 of the 2018 LSJR FR/EIS/EIR have been slightly modified and shall be applied to the Modified Project:</p> <ul style="list-style-type: none"> <li>The following measures would be implemented before ground-disturbing or demolition activities begin, in order to reduce health hazards associated with potential exposure to hazardous substances: <ul style="list-style-type: none"> <li>Complete a Phase I Environmental Site Assessment (ESA) prior to completing preconstruction designs and initiating construction. Where construction activities would</li> </ul> </li> </ul>	USACE	USACE	Prior to construction activities	

### MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<p>occur in close proximity to sites identified as Recognized Environmental Conditions in the Phase I ESA, a Phase II site investigation will also be conducted.</p> <ul style="list-style-type: none"> <li>○ Prepare a site plan that identifies any necessary remediation activities appropriate for proposed land uses, including excavation and removal of contaminated soils and redistribution of clean fill material on the project site. The plan would include measures that ensure the safe transport, use and disposal of contaminated soil and building debris removed from the site, as well as any other hazardous materials. In the event that contaminated groundwater is encountered during site excavation activities, the</li> </ul>				
<b>Hazards, Hazardous Materials, and Public Safety (cont.)</b>				
<p>contractor would report the contamination to the appropriate regulatory agencies, dewater the excavated area and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The contractor would be required to comply with the plan and applicable Federal, State and local laws.</p> <ul style="list-style-type: none"> <li>○ Notify appropriate Federal, State and local agencies if evidence of previously undiscovered soil or groundwater contamination is encountered during construction. Any contaminated areas would be cleaned up in accordance with the recommendations of the Central Valley Regional Water Quality Control Board (Regional Board), California DTSC or other appropriate Federal, State or local regulatory agencies.</li> <li>○ A worker health and safety plan would be prepared before the start of construction that identifies, at a minimum, all contaminants that could be encountered during construction; all appropriate worker, public health and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan would describe actions to be taken if hazardous materials are encountered on-site, including protocols for handling hazardous materials, preventing their spread and emergency procedures to be taken in the event of a spill.</li> <li>○ Retain licensed contractors to remove all underground storage tanks.</li> </ul>				
<b>Water Quality</b>				
<p><b>Mitigation Measure 3.2.6-1: Water Quality Avoidance and Minimization Measures.</b> The mitigation measures for Alternative 7a outlined in Section 5.5.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project in addition to all requirements of the SWPPP, BSSCP, and SPCCP:</p> <ul style="list-style-type: none"> <li>• The contractor would prepare a spill control plan and a SWPPP prior to initiation of construction in accordance with guidance from the Regional Board, Central Valley Region. These plans would be reviewed and approved by USACE before construction begins.</li> <li>• Implement appropriate measures to prevent debris, soil, rock, or other material from entering the water. Use vacuum sweepers or other appropriate measures to control dust on haul roads, construction areas and stockpiles.</li> </ul>	USACE	USACE	Prior to and during construction activities	

### MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<ul style="list-style-type: none"> <li>• Implement appropriate measures for handling and disposing of concrete and concrete washout water.</li> <li>• Properly dispose of oil or other liquids.</li> <li>• Fuel and maintain vehicles in a specified area that is designed to capture spills. This area cannot be near any ditch, stream or other body of water or feature that may convey water.</li> <li>• Fuels and hazardous materials would not be stored on site.</li> <li>• Inspect and maintain vehicles and equipment to prevent dripping oil and other fluids.</li> </ul>				
<b>Water Quality (cont.)</b>				
<ul style="list-style-type: none"> <li>• Schedule construction to avoid the rainy season as much as possible. If rains are forecasted during construction, erosion control measures would be implemented as described in the Regional Board Erosion and Sediment Control Field Manual.</li> <li>• Maintain sediment and erosion control measures during construction. Inspect the control measures before, during and after a rain event.</li> <li>• Train construction workers in SWPPP and how to respond to, control, contain and clean up spills.</li> <li>• Revegetate disturbed areas in a timely manner to control erosion.</li> <li>• Materials will be covered and protected from wind, rain and runoff to avoid unwarranted dispersal.</li> <li>• Refine operational criteria to ensure that desired Flood Risk Management (FRM) benefits are achieved while avoiding degradation of water quality behind the closure structures.</li> </ul>				
<b>Groundwater</b>				
<p><b>Mitigation Measure 3.2.7-1: Bentonite Slurry Spill Contingency Plan.</b> The mitigation measures for Alternative 7a outlined in Section 5.6.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:</p> <ul style="list-style-type: none"> <li>• Potential impacts to groundwater that could result from construction of the cutoff wall would be mitigated through development and implementation of a BSSCP, also known as a frac-out plan. A BSSCP is typically developed for activities that involve the use of bentonite materials. It is intended to minimize the potential for a frac-out associated with excavation and tunneling activities, provide for timely detection of frac-outs and ensure a “minimum-effect” response in the event of a frac-out and release of excavation fluid.</li> </ul>	USACE	USACE	Prior to construction activities	
<b>Utilities and Service Systems</b>				
<p><b>Mitigation Measure 3.2.8-1: Coordination with Utility Providers &amp; Response Plan.</b> The mitigation measures for Alternative 7a outlined in Section 5.16.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:</p>	USACE	USACE	Prior to construction activities	

**MITIGATION MONITORING AND REPORTING PROGRAM**

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<ul style="list-style-type: none"> <li>• Before beginning construction, coordination with utility providers to implement orderly relocation of utilities that need to be removed or relocated would occur. Coordination would include the following:</li> <li>• Notification of any potential interruptions in service shall be provided to the appropriate agencies and affected landowners.</li> <li>• Before the start of construction, utility locations shall be verified through field surveys and the use of Underground Service Alert services. Any buried utility lines shall be clearly marked where construction activities would take place and on the construction specifications before of any earthmoving activities begin.</li> </ul>				
<ul style="list-style-type: none"> <li>• Before the start of construction, the contractor would be required to coordinate with the local municipality and acquire any applicable permits prior to use of municipal water for construction.</li> <li>• Before the start of construction, a response plan shall be prepared to address potential accidental damage to a utility line. The plan shall identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the public and worker safety. Worker education training in response to such situations shall be conducted by the contractor. The response plan shall be implemented by the contractor during construction activities.</li> <li>• Utility relocations shall be staged to minimize interruptions in service.</li> </ul>				
<b>Agricultural and Forestry Resources</b>				
<p><b>Mitigation Measure 3.5-1: Minimize and Avoid Loss of Special Designated Farmland.</b> The following measures shall be implemented before and during construction of the Modified Project to minimize and avoid loss of Prime and Unique Farmland and Farmland of Statewide Importance.</p> <ul style="list-style-type: none"> <li>• Biological mitigation sites shall be designed to minimize, to the greatest extent feasible, the loss of agricultural land with the highest values.</li> <li>• Biological mitigation sites shall be designed to minimize fragmentation or isolation of Special Designated Farmland. Where a biological mitigation site involves acquiring land or easements, any area not needed for biological habitat mitigation, <u>if applicable</u>, shall be of a size sufficient to allow viable farming operations. <del>In such situation, USACE shall be responsible for acquiring easements, making lot line adjustments, and merging affected land parcels into units suitable for continued commercial agricultural management.</del></li> <li>• Any utility or infrastructure serving agricultural uses shall be reconnected if it is disturbed by biological mitigation site construction. If a biological mitigation site temporarily or permanently cuts off roadway access or removes utility lines, irrigation features, or other infrastructure, USACE shall be responsible for restoring access as necessary to ensure that economically viable farming operations are not interrupted.</li> <li>• Where applicable to a biological mitigation site, buffer areas shall be established between restoration projects and adjacent agricultural land. The buffers shall be sufficient to protect and maintain land capability and flexibility in agricultural operations. Buffers shall be</li> </ul>	USACE	USACE	Prior to and during construction activities	

## MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<p>designed to protect the feasibility of ongoing agricultural operations and reduce the effects of construction-related or operational activities (including the potential to introduce special-status species in the agricultural areas) on adjacent or nearby properties. Buffers shall also serve to protect biological mitigation sites from noise, dust, and the application of agricultural chemicals. The width of each buffer shall be determined on a site-by-site basis to account for variations in prevailing winds, crop types, agricultural practices, ecological restoration, or infrastructure. Buffers can function as drainage swales, trails, roads, linear parkways, or other uses compatible with ongoing agricultural operations.</p>				
<b>Biological Resources</b>				
<p><b>Mitigation Measure 3.6-1: Special-Status Plant Surveys.</b> Before Modified Project construction, surveys for special-status plants with potential to occur shall be conducted by a qualified botanist at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable. Surveys shall be conducted in accordance with specific guidelines described by <i>Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities</i> (CDFW 2018).</p>	USACE	USACE	Prior to construction activities	
<p><b>Mitigation Measure 3.6-2: Special-Status Plant Measures.</b> If special-status plants are found, the following measures shall be implemented:</p> <ul style="list-style-type: none"> <li>• Qualified botanists shall survey the biological study area to document the presence of special-status plants before Modified Project implementation and shall conduct a floristic survey that follows the CDFW botanical survey guidelines (CDFW 2018). All plant species observed will be identified to the level necessary to determine whether they qualify as special-status plants or are plant species with unusual or significant range extensions. The guidelines also require that field surveys be conducted when special-status plants that could occur in the area are evident and identifiable, generally during the reported blooming period. To account for different special-status plant identification periods, one or more series of field surveys may be required in spring and summer. If any special-status plants are identified during the surveys, the botanist shall photograph and map locations of the plants, document the location and extent of the special-status plant population on a CNDDDB survey form, and submit the completed survey form to the CNDDDB. The amount of compensatory mitigation required will be based on the results of these surveys.</li> <li>• If one or more special-status plants is identified in the biological study area during preconstruction surveys, the sponsor shall redesign or modify the Modified Project, including the restoration plans for the biological mitigation site components, to avoid indirect or direct effects on special-status plants wherever feasible. If special-status plants cannot be avoided by redesigning projects, compensatory mitigation shall be implemented to avoid significant effects on special-status plants.</li> <li>• If complete avoidance of special-status plants is not feasible, the effects of the Modified Project on special-status plants shall be mitigated through off-site preservation at the chosen biological mitigation site at a minimum of a 1:1 ratio but shall be negotiated with the resource agencies. Suitable habitat for affected special-status plant species will occur in a conservation area, preserved and managed in perpetuity. Detailed information shall be provided to the agencies on the location and quality of the preservation area, the</li> </ul>	USACE	USACE	Prior to and during construction activities	

**MITIGATION MONITORING AND REPORTING PROGRAM**

<b>Mitigation Measure</b>	<b>Implementing Responsibility</b>	<b>Monitoring Responsibility</b>	<b>Timing</b>	<b>Verification of Compliance (Initials and Date)</b>
feasibility of protecting and managing the area in perpetuity, and the responsible parties. Other pertinent information also shall be provided, to be determined through future coordination with the resource agencies.				
<b>Mitigation Measure 3.6-3: Worker Awareness Training.</b> Before ground disturbance, all construction personnel shall participate in a CDFW-approved worker environmental awareness program. A qualified biologist shall inform all construction personnel about the life history of Swainson’s hawk and the importance of nest sites and foraging habitat.	USACE	USACE	Prior to construction activities	
<b>Mitigation Measure 3.6-4: Breeding-Season Survey.</b> If construction work is to occur during the Swainson’s hawk breeding season, a breeding-season survey for nesting birds shall be conducted for all trees and shrubs that would be removed or disturbed that are located within 500 feet (0.5 mile for Swainson’s hawk) of construction activities, including grading. Swainson’s hawk surveys shall be completed during at least two of the following survey periods: January 1 to March 20; March 20 to April 5; April 5 to April 20; and June 10 to July 30. No fewer than three surveys shall be completed in at least two survey periods and at least one of these surveys shall occur immediately prior to Modified Project initiation (SWHA TAC 2000). Other migratory bird nest surveys could be conducted concurrent with Swainson’s hawk surveys, with at least one survey to be conducted no more than 48 hours from the initiation of Modified Project activities to confirm the absence of nesting. If the biologist determines that the area surveyed does not contain any active nests, construction activities, including removal or pruning of trees and shrubs, could commence without any further mitigation.	USACE	USACE	Prior to construction activities	
<b>Mitigation Measure 3.6-5: Active Nest Buffer.</b> If active nests are found, USACE shall maintain a 0.25-mile buffer between construction activities and the active nest(s). In addition, a qualified biologist shall be present on-site during construction activities to ensure that the buffer distance is adequate and that the birds are not showing any signs of stress. If signs of stress that could cause nest abandonment are noted, construction activities shall cease until a qualified biologist determines that fledglings have left an active nest. With the written permission of the wildlife agencies and under the supervision of the qualified biologist, work within the temporary nest disturbance buffer may occur. The qualified biologist shall be on-site daily while construction-related activities are taking place within the buffer.	USACE	USACE	During construction activities	
<b>Mitigation Measure 3.6-6: Burrowing Owl Preconstruction Surveys.</b> Prior to initiation of any excavation activities at borrow sites, a preconstruction survey for burrowing owls shall be completed in accordance with CDFW guidelines described in the <i>Staff Report on Burrowing Owl Mitigation</i> . If no burrowing owls are located during these surveys, then effects on burrowing owls would be less than significant and no mitigation is required. If burrowing owls are located on or immediately adjacent to the site, then coordination shall occur with CDFW to determine the measures that need to be implemented to ensure that burrowing owls are not affected by the Modified Project. Potential mitigation measures that could be implemented include: <ul style="list-style-type: none"> <li>• A qualified biologist shall conduct appropriate surveys at and around material source sites, to determine the presence/absence of burrowing owls. At least one survey shall be conducted no more than 1 week prior to the onset of any construction activity.</li> </ul>	USACE	USACE	Prior to construction activities	

### MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<ul style="list-style-type: none"> <li>A 250-foot buffer, within which no new activity would be permissible, shall be maintained between Modified Project activities and nesting burrowing owls. This protected area shall remain in effect until August 31 or at CDFW's discretion, until the young owls are foraging independently.</li> </ul>				
<ul style="list-style-type: none"> <li>No burrowing owls shall be evicted from burrows during the nesting season (February 1 through August 31). Eviction outside the nesting season could be permitted pending evaluation of eviction plans and receipt of formal written approval from CDFW authorizing the eviction.</li> <li>Mandatory worker awareness training for construction personnel shall be conducted.</li> </ul>				
<p><b>Mitigation Measure 3.6-7: Nesting Bird Surveys.</b> USACE shall conduct surveys in the spring of each construction year to locate nest sites of the mentioned species in suitable breeding habitats. Surveys shall be conducted by a qualified biologist using survey methods approved by USFWS. Survey results shall be submitted to USFWS before construction is initiated. If nests or young of these species are not located, construction may proceed. If nests or young are located, USACE shall coordinate with USFWS and CDFW to determine what mitigation measures could be implemented to avoid or reduce potential disturbance-related impacts on these species. Measures could include a no-disturbance buffer zone established around the nest site. The width of the buffer zone shall be determined by a qualified biologist in coordination with USFWS. No construction activities shall occur within the buffer zone, which shall be maintained until the young have fledged (as determined by a qualified biologist).</p>	USACE	USACE	Prior to construction activities	
<p><b>Mitigation Measure 3.6-8: Minimization of Effects on Giant Garter Snake.</b> The following measures shall be implemented to minimize effects on giant garter snake habitat that occurs within 200 feet of any construction activity. These measures are based on USFWS guidelines for restoration and standard avoidance measures included as appendices in USFWS (1997).</p> <ul style="list-style-type: none"> <li>Unless approved otherwise by USFWS, construction shall be initiated only during the giant garter snake active period (May 1–October 1, when they are able to move away from disturbance).</li> <li>All construction personnel, including workers and contractors, shall participate in a worker environmental awareness training program conducted by a USFWS-approved biologist prior to commencement of construction activities.</li> <li>A giant garter snake survey shall be conducted 24 hours prior to construction in potential habitat. Should there be any interruption in work for greater than 2 weeks, a biologist shall survey the Modified Project area again no later than 24 hours prior to the restart of work.</li> <li>Giant garter snakes encountered during construction activities shall be allowed to move away from construction activities on their own.</li> <li>Movement of heavy equipment to and from the construction site shall be restricted to established roadways.</li> <li>Giant garter snake habitat within 200 feet of construction activities shall be designated as an environmentally sensitive area and delineated with signs and high-visibility fencing.</li> </ul>	USACE	USACE	Prior to and during construction activities	

**MITIGATION MONITORING AND REPORTING PROGRAM**

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<p>Fencing shall be inspected and maintained as needed daily until completion of each work section of the Modified Project. This area shall be avoided by all construction personnel.</p>				
<ul style="list-style-type: none"> <li>• If USACE elects to use exclusionary fencing in lieu of continuous monitoring, it shall be buried at least 6 inches below the ground to prevent snakes from burrowing and moving under the fence and shall be inspected daily.</li> <li>• If a frac-out is identified, all work shall stop, including the recycling of the bentonite fluid. In the event of a frac-out into water, the location and extent of the frac-out shall be determined and the frac-out shall be monitored for 4 hours to determine whether the fluid congeals (bentonite will usually harden, effectively sealing the frac-out location).</li> <li>• USFWS, NMFS, CDFW, and the Regional Water Quality Control Board shall be notified immediately of any spills and will be consulted regarding clean-up procedures. A Brady barrel will be on-site and shall be used if a frac-out occurs. Containment materials, such as straw bales, also will be on-site prior to and during all operations and a vacuum truck will be on retainer and available to be operational on-site within 2 hours' notice. The site supervisor shall take any necessary follow-up response actions in coordination with agency representatives. The site supervisor shall coordinate the mobilization of equipment stored at staging areas (e.g., vacuum trucks) as needed.</li> <li>• If the frac-out has reached the surface, any material contaminated with bentonite shall be removed by hand to a depth of 1 foot, contained, and properly disposed of, as required by law. The drilling contractor shall be responsible for ensuring that the bentonite is either properly disposed of at an approved Class II disposal facility or properly recycled in an approved manner.</li> <li>• Project-related vehicles shall observe a 10 mph speed limit within construction areas, except on existing paved roads where they shall adhere to the posted speed limits.</li> <li>• Aquatic habitat for the snake that would be affected by construction shall be inspected for the snake, then dewatered and maintained dry and absent of aquatic prey for 5 days before initiation of construction activities. This measure applies primarily to the ditches to be relocated west of the Delta front levee sections. If complete dewatering is not possible, USFWS shall be contacted to determine what additional measures, if any, may be necessary to minimize effects on the snake.</li> </ul>				
<p><b>Mitigation Measure 3.6-9: Giant Garter Snake Compensation.</b> If giant garter snake habitat would be temporarily affected during construction, the following measures shall be implemented to compensate for the habitat loss at the selected biological mitigation site:</p> <ul style="list-style-type: none"> <li>• Habitat (including aquatic and upland) temporarily affected for one construction season (May 1–October 1) shall be restored after construction by applying appropriate erosion control techniques and replanting/seedling with appropriate native plants.</li> <li>• Aquatic habitat permanently affected shall be replaced at a 3:1 ratio through the purchase of credits at a mitigation bank or the establishment of aquatic habitat at one of the mitigation sites.</li> <li>• Upland habitat permanently affected shall be replaced at a minimum of 1:1 ratio.</li> </ul>	USACE	USACE	Prior to and during construction activities	

## MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<ul style="list-style-type: none"> <li>USACE shall work to develop appropriate mitigation prior to or concurrent with any disturbance of giant garter snake habitat. Habitat shall be protected in perpetuity and have an endowment attached for management and maintenance.</li> </ul>				
<p><b>Mitigation Measure 3.6-10: Minimization of Any Potential Effects on VELB or Their Habitat.</b> During construction for the Modified Project, USACE shall implement the measures included in the <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle</i> (USFWS 2017b; see Appendix G) to reduce effects on valley elderberry longhorn beetle. The framework includes avoidance and minimization measures for shrubs that would not be transplanted within 50 meters of the Project, methodologies for transplanting of shrubs, and methodologies for compensatory mitigation guidance for removed habitat.</p>	USACE	USACE	Prior to and during construction activities	
<p><b>Mitigation Measure 3.6-11: VELB Compensation.</b> In accordance with the USFWS 2017 <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle</i> (<i>Desmocerus californicus dimorphus</i>), adverse effects on the VELB shall be compensated for by transplanting the affected elderberries with stems greater than 1 inch in diameter and by planting a mix of native suitable riparian vegetation at a 3:1 ratio. The amount of compensation for VELB shall be based on USFWS review. A suitable transplant site shall be selected and planted with transplanted shrubs and new seedlings and associated riparian habitat, in accordance with the USFWS guidelines.</p>	USACE	USACE	Prior to and during construction activities	
<p><b>Mitigation Measure 3.6-12: Bat and Roosting Habitat Survey.</b></p> <p>In advance of tree removal, a preconstruction survey for special-status bats shall be conducted by a qualified biologist to characterize potential bat habitat and identify active roost sites within the Modified Project site. Should potential roosting habitat or active bat roosts be found in trees and/or structures to be removed under the Modified Project, the following measures shall be implemented:</p> <ul style="list-style-type: none"> <li>Removal of trees and structures shall occur when bats are active, approximately March 1–April 15 and August 15–October 15, and outside of bat maternity roosting season (approximately April 15–August 31) and months of winter torpor (approximately October 15–February 28), to the extent feasible.</li> <li>If removal of trees during the periods when bats are active is not feasible and active bat roosts being used for maternity or hibernation purposes are found on or in the immediate vicinity of the Modified Project where tree removal is planned, a no-disturbance buffer of 100 feet shall be established around these roost sites until they are determined to be no longer active by the qualified biologist.</li> <li>The qualified biologist shall be present during tree removal if active bat roosts that are not being used for maternity or hibernation purposes are present. Trees with active roosts shall be removed only when no rain is occurring or is forecast to occur for 3 days and when daytime temperatures are at least 50 degrees Fahrenheit.</li> </ul>	USACE	USACE	Prior to construction activities	

### MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<ul style="list-style-type: none"> <li>• Removal of trees with active or potentially active roost sites shall follow a two-step removal process:               <ul style="list-style-type: none"> <li>○ On the first day of tree removal and under supervision of the qualified biologist, branches and limbs not containing cavities or fissures in which bats could roost, shall be cut only using chain saws.</li> <li>○ On the following day and under the supervision of the qualified biologist, the remainder of the tree may be removed, using either chain saws or other equipment (e.g., excavator or backhoe).</li> </ul> </li> <li>• Removal of structures containing or suspected to contain active bat roosts, that are not being used for maternity or hibernation purposes, shall be dismantled under the supervision of the qualified biologist in the evening and after bats have emerged from the roost to forage. Structures shall be partially dismantled to significantly change the roost conditions, causing bats to abandon and not return to the roost. If deemed necessary by a qualified biologist, bat exclusion devices may be installed to prevent the re-entry of bats to a roost.</li> </ul>				
<p><b>Mitigation Measure 3.6-13: Hazardous Materials Spill Notification.</b> Given the deleterious effects of numerous chemicals on native resident fish used in construction, if a hazardous materials spill does occur, a detailed analysis shall be performed immediately by a registered environmental assessor or professional engineer to identify the likely cause and extent of contamination. This analysis shall conform to American Society for Testing and Materials standards and shall include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, USACE and its contractors shall select and implement measures to control contamination, with a performance standard that surface water and groundwater quality must be returned to baseline conditions.</p>	USACE	USACE	During construction activities	
<p><b>Mitigation Measure 3.6-14: In-Water Work Windows.</b> In-water construction for the biological mitigation sites shall be restricted to the general estimated work window required for each waterway as described in the NMFS 2016 BO or superseding BO. During preconstruction engineering and design, the work window may be adjusted on a site-specific basis, considering periods of low fish abundance, and in-water construction outside the principal spawning and migration season. The typical construction season generally corresponds to the dry season, but construction may occur outside the limits of the dry season, only as allowed by applicable permit conditions.</p>	USACE	USACE	Prior to and during construction activities	
<p><b>Mitigation Measure 3.6-15: Avoidance and Minimization of Effects on Listed Fish Species.</b> In 2016, NMFS issued a BO for the LSJR Feasibility Study consultation for levee improvements. The NMFS BO evaluated impacts on Central Valley spring-run Chinook salmon, California Central Valley steelhead, and green sturgeon, as well as their critical habitat. The BO evaluated potential impacts based on rough estimates and preliminary designs for the proposed Project. To avoid and minimize effects on listed fish species, the measures from the 2016 NMFS BO or superseding BO shall be implemented.</p>	USACE	USACE	Prior to and during construction activities	

## MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<p><b>Mitigation Measure 3.6-16 Temporary Fencing.</b> To clearly demarcate the Modified Project's boundaries and protect sensitive natural communities, temporary exclusion fencing shall be installed around the Modified Project boundaries (e.g., access roads, staging areas) 1 week prior to the start of construction activities. The temporary fencing shall be continuously maintained until all construction activities are completed so that construction equipment is confined to the designated work areas, including any off-site mitigation areas and access thereto. The exclusion fencing shall be removed only after construction for the year is entirely completed. Exclusionary construction fencing and explanatory signage shall be placed around the perimeter of sensitive vegetation communities that could be affected by construction activities throughout the period during which such effects occur. The signage will explain the nature of the sensitive resource and warn that no effect on the community is allowed. Where feasible, the fencing will include a buffer zone of at least 20 feet between the resource and construction activities. All exclusionary fencing shall be maintained in good condition throughout the construction period.</p>	USACE	USACE	Prior to and during construction activities	
<p><b>Mitigation Measure 3.6-17 Mandatory Contractor/Worker Awareness Training.</b> Before the initiation of any work in the Modified Project area, including grading, a qualified biologist shall conduct mandatory contractor/worker awareness training for all construction personnel. This training shall be provided to brief workers on the need to avoid effects on sensitive biological resources (e.g., riparian habitat, special-status species, wetlands, and other sensitive biological communities) and the penalties for not complying with permit requirements. The biologist shall inform all construction personnel about the life history of special-status species with potential for occurrence on the site, the importance of maintaining habitat, and the terms and conditions of the BO or other authorizing document. Proof of this instruction shall be submitted to USFWS.</p> <p>The training shall also cover the restrictions and guidelines that must be followed by all construction personnel to reduce or avoid effects on sensitive biological communities and special-status species during Modified Project construction. The crew leader shall be responsible for ensuring that crew members adhere to the guidelines and restrictions. Educational training shall be conducted for new personnel as they are brought on the job. General restrictions and guidelines for vegetation and wildlife that must be followed by construction personnel are listed below.</p> <ul style="list-style-type: none"> <li>• Modified Project–related vehicles shall observe the posted speed limit on hard-surfaced roads and a speed limit of 10 miles per hour on unpaved roads during travel on the project site.</li> <li>• Modified Project–related vehicles and construction equipment shall restrict their off-road travel to the designated construction area.</li> <li>• To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel shall not service vehicles or construction equipment outside designated staging areas.</li> </ul>	USACE	USACE	Prior to and during construction activities	

## MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<p><b>Mitigation Measure 3.6-18 Construction Monitoring.</b> A qualified biologist shall monitor construction activities adjacent to sensitive biological resources (e.g., special-status species, riparian habitat, wetlands, elderberry shrubs), as needed. The biologist shall assist the construction crew, as needed, to comply with all Modified Project implementation restrictions and guidelines. In addition, the biologist shall be responsible for ensuring that construction barrier fencing is maintained adjacent to sensitive biological resources.</p>	USACE	USACE	During construction activities	
<p><b>Mitigation Measure 3.6-19: Riparian Compensation.</b> Vegetation impacts that cannot be mitigated through avoidance, minimization, or remediation shall be mitigated through restoration at the selected biological mitigation site. A revegetation plan for the biological mitigation site shall be prepared by a qualified biologist or landscape architect and reviewed by the appropriate agencies. The revegetation plan shall specify the planting stock appropriate for each riparian cover type and each mitigation site, ensuring the use of genetic stock from the Modified Project area, and shall employ the most successful techniques available at the time of planting. The plantings shall be maintained and monitored as necessary for 3–5 years, including weed removal, irrigation, and herbivory protection. For this establishment period, USACE shall submit annual monitoring reports of survival to the regulatory agencies including USFWS, NMFS, and CDFW. Replanting will be necessary if success criteria are not met, with replacement plants subsequently monitored and maintained to meet the success criteria. The mitigation will be considered successful when the plants meet the success criteria and the vegetation no longer requires active management and is arranged in groups that, when mature, replicate the area, natural structure, and species composition of similar plant communities in the region.</p> <p>If mitigation at the selected biological mitigation site is inadequate to fully compensate for the vegetation impacts, the remaining balance of compensation required for riparian, shaded riverine aquatic, wetland, and open water habitats shall be accomplished through the purchase of credits at a mitigation bank or the construction of additional mitigation sites. If an alternative biological mitigation site not evaluated in this SEIR is chosen for development, additional environmental review under CEQA will be required prior to construction.</p>	USACE	USACE	Prior to and during construction activities	
<p><b>Mitigation Measure 3.6-20: No Net Loss of Wetlands/Waters.</b> SJAFCA shall conduct an aquatic resources delineation to identify potential wetlands and other waters that fall under state and federal jurisdiction within mitigation sites and borrow sites.</p> <p>Temporary and permanent impacts on riparian habitat and wetland/waters that cannot be mitigated through avoidance, minimization, or remediation shall be mitigated to ensure no net loss through compensation, by restoring riparian and wetlands/waters habitat at one of the proposed biological mitigation sites or an approved off-site location, mitigation bank, or in-lieu fee program. Riparian and wetlands/waters habitat shall not be restored where it would be removed by future maintenance activities. A revegetation plan shall be prepared by a qualified biologist or landscape architect and reviewed by the appropriate agencies. The revegetation plan will specify the use of beneficial native plants appropriate for each area that provide a diverse variety of grasses and forbs that support native wildlife species.</p>	USACE	USACE	Prior to and during construction activities	

## MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<b>Cultural and Paleontological Resources</b>				
<p><b>Mitigation Measure 3.7-1: Cultural Resources Awareness Training.</b> USACE in consultation with SJAFCA and other interested parties shall provide a cultural resources and tribal cultural resources sensitivity and awareness training program for all personnel involved in Modified Project construction, including field consultants and construction workers. The training shall be developed in coordination with an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology, as well as culturally and geographically affiliated Native American tribes. SJAFCA may invite Native American representatives from interested culturally and geographically affiliated Native American Tribes to participate. The training shall be conducted before any Modified Project-related construction activities begin and shall include relevant information regarding sensitive cultural resources and tribal cultural resources, including applicable regulations, protocols for avoidance, and consequences of violating federal and state laws and regulations.</p> <p>The training shall also describe appropriate avoidance and impact minimization measures for cultural resources and tribal cultural resources that could be located on the Modified Project site and shall outline what to do and whom to contact if any potential cultural resources or tribal cultural resources are encountered. The training shall emphasize the requirement for confidentiality and culturally appropriate treatment of any discovery of significance to Native American Tribes and shall discuss appropriate behaviors and responsive actions, consistent with Native American tribal values.</p>	USACE	USACE	Prior to construction activities	
<p><b>Mitigation Measure 3.7-2: Inadvertent Discovery of Cultural Materials.</b> If an inadvertent discovery of cultural materials (e.g., unusual amounts of shell, animal bone, any human remains, bottle glass, ceramics, building remains), tribal cultural resources, sacred sites, or landscapes is made at any time during Project-related construction activities, USACE in consultation with SJAFCA and other interested parties, and in coordination with an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology and culturally and geographically affiliated Native American tribes, shall develop appropriate protection and avoidance measures where feasible. These procedures shall be developed in accordance with the Lower San Joaquin River Feasibility Study Project PA and associated HPMP, which specifies procedures for post-review discoveries. Additional measures, such as development of a Historic Properties Treatment Plan prepared in accordance with the PA and HPMP, may be necessary if avoidance or protection is not possible.</p>	USACE	USACE	During construction activities	
<p><b>Mitigation Measure 3.7-3: Inadvertent Discovery of Human Remains.</b> In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, USACE shall immediately halt potentially damaging excavation in the area of the burial and notify the County coroner and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (HSC Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, they must contact the NAHC by phone within 24 hours of making that determination (HSC Section 7050[c]). After the</p>	USACE	USACE	During construction activities	

**MITIGATION MONITORING AND REPORTING PROGRAM**

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<p>coroner’s findings have been made, the archaeologist and the NAHC-designated Most Likely Descendant (MLD), in consultation with USACE and SJAFCA, shall determine the ultimate treatment and disposition of the remains.</p> <p>Upon the discovery of Native American human remains, USACE in coordination with SJAFCA, shall require that all construction work stop within 100 feet of the discovery until consultation with the MLD has taken place. The MLD shall have 48 hours to complete a site inspection and make recommendations to the USACE and SJAFCA after being granted access to the site. A range of possible treatments for the remains, including nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. PRC Section 5097.98(b)(2) suggests that the concerned parties may mutually agree to extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. If agreed to by the MLD, SJAFCA or SJAFCA’s authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance. Construction work in the vicinity of the burials shall not resume until the mitigation is completed.</p>				
<p><b>Mitigation Measure 3.7-4: Preconstruction Training and Paleontological Monitoring.</b> <del>Prior to the start of construction activities, USACE shall retain a Qualified Paleontologist who meets the standards of the Society for Vertebrate Paleontology (SVP 2010) to carry out all mitigation measures related to paleontological resources. Prior to the start of any ground-disturbing activities, an Archaeologist (with experience in paleontological resources) the Qualified Paleontologist shall conduct preconstruction worker paleontological resources sensitivity training. The training shall include information on what types of paleontological resources could be encountered during excavations, what to do in case an unanticipated discovery is made by a worker, and laws protecting paleontological resources. All construction personnel shall be informed of the possibility of encountering fossils and instructed to immediately inform the construction foreman or supervisor if any bones or other potential fossils are unexpectedly unearthed in an area where a paleontological monitor is not present. The Applicant shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance.</del></p> <p><u>If paleontological resources are unearthed, a</u> <del>The</del> Qualified Paleontologist <u>and/or</u> shall <del>supervise</del> a paleontological monitor meeting the Society for Vertebrate Paleontology standards (SVP 2010) who shall be present during all excavations in the Modesto Formation. Monitoring shall consist of visually inspecting fresh exposures of rock for larger fossil remains and, where appropriate, collecting wet or dry screened standard sediment samples (up to 4.0 cubic yards) of promising horizons for smaller fossil remains (SVP 2010). Depending on the conditions encountered, full-time monitoring can be reduced to part-time inspections or ceased entirely if determined adequate by the Qualified Paleontologist. The Qualified Paleontologist may spot check the excavation on an intermittent basis and recommend whether the depth of required monitoring should be revised based on</p>	USACE	USACE	Prior to and during construction activities	

**MITIGATION MONITORING AND REPORTING PROGRAM**

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<p>his/her observations. Monitoring activities shall be documented in a Paleontological Resources Monitoring Report to be prepared by the Qualified Paleontologist at the completion of construction.</p> <p>If a paleontological resource is discovered during construction, the <u>Qualified Paleontologist and/or</u> paleontological monitor shall be empowered to temporarily divert or redirect grading and excavation activities in the area of the exposed resource to facilitate evaluation of the discovery. An appropriate buffer area shall be established by the Qualified Paleontologist and/or paleontological monitor around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. All significant fossils shall be collected by the paleontological monitor and/or the Qualified Paleontologist. Collected fossils shall be prepared to the point of identification and catalogued before they are submitted to their final repository. Any fossils collected shall be curated at a public, non-profit institution with a research interest in the materials, such as the University of California Museum of Paleontology at Berkeley, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, maps, photographs, and a technical report shall also be filed at the repository and/or school.</p>				
<b>Noise and Vibration</b>				
<p><b>Mitigation Measure 3.10-1: Construction Noise Reduction.</b></p> <p>The following measures shall be implemented to reduce the effects of construction under the Modified Project:</p> <ul style="list-style-type: none"> <li>• The contractor shall prepare a construction noise and vibration plan prior to construction.</li> <li>• The contractor shall employ vibration-reducing construction practices.</li> <li>• The contractor shall employ noise-reducing construction practices.</li> <li>• All construction equipment shall be equipped with noise-reduction devices such as mufflers to minimize construction noise and all internal combustion engines shall be equipped with exhaust and intake silencers in accordance with manufacturers' specifications.</li> <li>• Equipment that is quieter than standard shall be used, including electrically powered equipment instead of internal combustion equipment, where use of such equipment is a readily available substitute that accomplishes project tasks in the same manner as internal combustion equipment.</li> <li>• The use of bells, whistles, alarms, and horns shall be restricted to safety warning purposes only.</li> <li>• Noise-reducing enclosures shall be used around stationary noise-generating equipment (e.g., compressors and generators at slurry pond locations).</li> </ul>	USACE	USACE	Prior to and during construction activities	
<ul style="list-style-type: none"> <li>• Mobile and fixed construction equipment (e.g., compressors and generators), construction staging and stockpiling areas and construction vehicle routes shall be located at the most distant point feasible from noise-sensitive receptors.</li> </ul>				

### MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<ul style="list-style-type: none"> <li>• When noise-sensitive uses subject to prolonged construction noise are located within 740 feet of construction in Stockton or unincorporated areas of San Joaquin County, noise-attenuating buffers such as structures, truck trailers, or soil piles shall be located between noise-generation sources and sensitive receptors.</li> <li>• Before construction activity begins within 740 feet of one or more residences or businesses, the project proponent shall provide written notification to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. The USACE resident engineer and contractor's project manager shall be designated and contact information shall be provided in the notices and posted near the project area in a conspicuous location that it is clearly visible to nearby receptors most likely to be disturbed. The USACE resident engineer shall manage complaints and concerns resulting from noise-generating activities. The severity of the noise concern shall be assessed by the noise disturbance coordinator and, if necessary, evaluated by a qualified noise control engineer.</li> <li>• The project proponent shall ensure that all heavy trucks are properly maintained and equipped with noise control devices (e.g., muffler) in accordance with manufacturers' specifications at each work site during project construction to minimize construction traffic noise effects on sensitive receptors.</li> <li>• Before haul truck trips are initiated during construction season on roads within 90 feet of residences located along haul routes, written notification shall be provided to potentially affected residents identifying the hours and frequency of haul truck trips. Notifications provide contact information for the USACE resident engineer identified above and also identify a mechanism for residents to register complaints with the appropriate jurisdiction if haul truck noise levels are overly intrusive or occur outside the exempt daytime hours for the applicable jurisdiction.</li> </ul>				
<b>Transportation</b>				
<p><b>Mitigation Measure 3.11-1: Traffic Safety Plan.</b> Before the start of each construction season, the primary contractors for construction shall hire a licensed traffic engineer to develop a coordinated construction traffic safety and control plan in accordance with the latest Manual on Uniform Traffic Control Devices (MUTCD) standards and requirements to minimize the simultaneous use of roadways by different construction contractors for material hauling and equipment delivery to the extent feasible and to avoid and minimize potential traffic hazards on local roadways during construction. Items (a) through (i) of this mitigation measure shall be integrated as terms of the construction contracts.</p> <p>(a) The plan shall outline phasing of activities and the use of multiple routes to and from off-site locations to minimize the daily amount of traffic on individual roadways.</p>	USACE	USACE	Prior to and during construction activities	
<p>(b) The plan shall provide bicycle and pedestrian detours to allow for continued use by bicycle and pedestrian commuters and maintain safe pedestrian and bicyclist access around the construction areas at all times. Construction areas shall be secured as required by the applicable jurisdiction to prevent pedestrians and bicyclists from entering</p>				

## MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementing Responsibility	Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
<p>the work site, and all stationary equipment shall be located as far away as possible from areas where bicyclists and pedestrians are present.</p> <p>(c) The construction contractors shall develop traffic control plans (TCP) for the local roadways that would be affected by construction traffic. The TCP must be designed and stamped by a licensed traffic engineer in accordance with the latest MUTCD requirements. The TCP must be submitted by the contractor with the City's road encroachment permit application for review and approval. Before the initiation of construction-related activity involving high volumes of traffic, the plan shall be submitted for review by the agency of local jurisdiction (San Joaquin County, City of Stockton, or Caltrans [if applicable]) that has responsibility for roadway safety at and between the Modified Project sites. The contractor shall train construction personnel in appropriate safety measures as described in the plan and shall implement the plan. The plan shall include the prescribed locations for staging equipment and parking trucks and vehicles. Provisions shall be made for overnight parking of haul trucks to avoid causing traffic or circulation congestion. The plan shall call for the following elements:</p> <ul style="list-style-type: none"> <li>• Posting warnings about the potential presence of slow-moving vehicles.</li> <li>• Using traffic control personnel when appropriate.</li> <li>• Placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones and in accordance with city/county requirements.</li> <li>• The TCP shall include signs placed on March Lane west of I-5 advising the public of traffic delays due to construction and the tentative timeline of the project. Language to be placed on the signs must be approved by the City's traffic engineer.</li> </ul> <p>(d) All operations shall limit and expeditiously remove, as necessary, the accumulation of Modified Project-generated mud or dirt from adjacent public streets at least once every 24 hours if substantial volumes of soil are carried onto adjacent paved public roadways during construction.</p> <p>(e) If needed to comply with Caltrans requirements, a transportation management plan shall be prepared and submitted to Caltrans to cover any points of access from the state highway system for haul trucks and other construction equipment.</p>				
<p>(f) Before the start of the first construction season, the construction contractor shall obtain a road encroachment permit with San Joaquin County and the City of Stockton to address permit conditions set for the maintenance and repair of affected roadways resulting from increased truck traffic. The road encroachment permit conditions and requirements shall ensure that the affected roadways are repaired to a level that is equivalent to their pre-project condition. Such an agreement may require the contractor to take <u><a href="#">dated pre-project photos and videos</a></u> of existing conditions. <u><a href="#">A copy of the photos and videos shall be provided to SJAFCA and the City of Stockton.</a></u> Upon project completion, the City or County shall <u><a href="#">may</a></u> develop a punch list of requirements to ensure that pre-project conditions are restored.</p>				

**MITIGATION MONITORING AND REPORTING PROGRAM**

<b>Mitigation Measure</b>	<b>Implementing Responsibility</b>	<b>Monitoring Responsibility</b>	<b>Timing</b>	<b>Verification of Compliance (Initials and Date)</b>
<p>(g) Before the Modified Project construction begins, the contractor shall provide notification of Modified Project construction to all appropriate emergency service providers in San Joaquin County, <del>and</del> Stockton, <del>Lathrop, and Manteca</del> and shall coordinate with providers throughout the construction period to ensure that emergency access through construction areas is maintained.</p> <p>(h) The contractor shall avoid neighborhoods and school zones to the maximum extent feasible when determining haul routes. When possible, hauling in school zones shall be limited to the period of summer breaks to avoid noise and traffic impacts on the schools. Any damage to residential roadways during construction shall be mitigated per the requirements outlined in the <del>traffic safety and control plan</del> <u>road encroachment permit provisions issued by the City of Stockton</u>.</p> <p>(i) During preliminary engineering and design, the Modified Project proponent shall provide notification of Modified Project construction to all appropriate railroads in the Modified Project area and shall coordinate with all railroads to minimize freight and passenger service disruptions. Prior to the start of construction, the Modified Project Proponent's contractor shall contact the general manager of affected railroads to coordinate truck haul route traffic and schedule an on-site meeting.</p>				
<b>Wildfire</b>				
<p><b>Mitigation Measure 3.13-1: Worker Health and Safety Plan.</b> A worker health and safety plan shall be prepared before the start of construction that identifies, at a minimum, all contaminants that could be encountered during construction; all appropriate worker, public health, and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan shall describe actions to be taken if hazardous materials are encountered on-site, including protocols for handling hazardous materials, preventing their spread and emergency procedures to be taken in the event of a spill.</p>	USACE	USACE	Prior to construction activities	

Appendix B  
**Public Draft SEIR**



Public Draft

# LOWER SAN JOAQUIN RIVER REACH TS\_30\_L LEVEE IMPROVEMENT PROJECT

Supplemental Environmental Impact Report  
SCH # 2010012027

Prepared by Environmental Science Associates for the  
San Joaquin Area Flood Control Agency

May 2023



Public Draft

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Prepared by Environmental Science Associates for the  
San Joaquin Area Flood Control Agency

May 2023

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- F. Special-Status Species Lists

## Acronyms and Other Abbreviations

A/G	General Agricultural
AADT	average annual daily traffic
AB	Assembly Bill
APE	area of potential effect
B.P.	before present
BMPs	Best Management Practices
BSSCP	Bentonite Slurry Spill Contingency Plan
CAL FIRE	California Department of Forestry and Fire Protection
CAR	Coordination Act Report
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CMP	Congestion Management Program
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRHR	California Register of Historical Resources
CVFPB	Central Valley Flood Protection Board
CWA	Clean Water Act
DSM	deep soil mixing
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Environmental Science Associates
ETL	Engineering Technical Letter
FESA	Federal Endangered Species Act
FHSZ	Fire Hazard Severity Zones
FRM	Flood Risk Management
FRM	Flood Risk Management
GBODR	Geotechnical Basis of Design Report
GHG	greenhouse gas
HBODR	Hydrologic Basis of Design Report
HPMP	Historic Properties Management Plan
HTRW	Hazardous, Toxic, and Radioactive Waste
I-5	Interstate 5
ISO-1	isolated basalt flake
ISO-7	isolated amethyst glass bottle base
ISO-8	isolated ceramic insulator
LOS	level of service
LRA	Local Responsibility Areas

LSJR	Lower San Joaquin River
MBTA	Migratory Bird Treaty Act
MFR	memo to file
MLD	Most Likely Descendant
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NHS	National Highway System
NMFS	National Marine Fisheries Service
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OPR	Governor’s Office of Planning and Research
OS/RC	Open Space/Resource Conservation
PA	Programmatic Agreement
PRC	Public Resources Code
RCMP	Regional CMP
RD	Reclamation District
RTP/SCS	Regional Transportation Plan and Sustainable Communities Strategy
SB	Senate Bill
SEIR	Supplemental Environmental Impact Report
SEWD	Stockton East Water District
SHPO	State Historic Preservation Officer
SJAFCA	San Joaquin Area Flood Control Agency
SJCOG	San Joaquin Council of Governments
SOP	Standard Operating Procedure
SOV	single occupant vehicle
SPCCP	Spill Prevention, Control and Counter Measure Plan
SPK	South Pacific Division
SR	State Route
SRA	State Responsibility Areas
SRs	State Routes
STA	Station
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
TBD	to be determined
UAIC	United Auburn Indian Community
UCMP	University of California Museum of Paleontology
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMT	vehicle miles traveled

# EXECUTIVE SUMMARY

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## ES.1 Introduction

This Draft Supplemental Environmental Impact Report (SEIR) is a supplement to the San Joaquin River Basin, Lower San Joaquin River (LSJR) Integrated Interim Feasibility Report/Environmental Impact Statement/Environmental Impact Report (State Clearinghouse No. 2010012027). That previous environmental impact report (EIR), which was certified by the San Joaquin Area Flood Control Agency (SJAFCA) Board of Directors on November 8, 2018, is referred to in this Draft SEIR as the “2018 LSJR FR/EIS/EIR.” The 2018 LSJR FR/EIS/EIR evaluated the environmental impacts of seven alternative plans aimed at reducing flood risk in the Stockton area and ultimately identified Alternative 7a as the recommended alternative, which would repair and enhance the levees that surround Stockton (mitigating flood risk from the Delta Front, the Calaveras River, and the San Joaquin River). Alternative 7a was divided into sub-reaches, with one of the sub-reaches being the LSJR Reach TS\_30\_L Levee Improvement Project (TS\_30\_L, or Modified Project) evaluated in this Draft SEIR.

The structural measures proposed for the Modified Project, which are described in Chapter 2, *Project Description*, were discussed in the 2018 LSJR FR/EIS/EIR, but certain elements of Alternative 7a, such as staging areas, haul routes, biological mitigation sites, and the final project footprint, were not analyzed in the 2018 LSJR FR/EIS/EIR at a project-level of detail. In addition, impacts to some resource areas were based on a desktop analysis (e.g., biological and cultural resources) and required further surveys to be completed prior to the proposed action/description being implemented. Other resource areas were not addressed (i.e., Energy, Wildfire) in the 2018 LSJR FR/EIS/EIR, as they were added to the CEQA Appendix G Guidelines after release of the draft document to the public for review. Therefore, this Draft SEIR addresses the minor additions or changes to the project footprint and adds resource-specific analyses, as required.

In accordance with CEQA Guidelines Sections 15063 and 15082, SJAFCA originally prepared and published a Notice of Preparation (NOP) of an EIR on January 14, 2010 (see Addendum D of the 2018 LSJR FR/EIS/EIR). The NOP was circulated to the public and to federal, state, and local agencies and other interested parties to solicit comments on the proposed Project. The public comment period for the NOP closed on February 15, 2010. In addition to the 45-day public and agency comment period, a public scoping meeting was held on January 27, 2010, at the University of the Pacific’s Regents Dining Room.

Concerns raised in response to the NOP and oral comments received at the scoping meetings were considered during preparation of the 2018 LSJR FR/EIS/EIR and this Draft SEIR. The

scoping comments were included in Addendum D of the 2018 LSJR FR/EIS/EIR. Preparation of this Draft SEIR does not require the release of another NOP.

This Draft SEIR is available to federal, state, and local agencies and interested organizations and individuals who may want to review and comment on the analysis in this document. Publication of the Draft SEIR marks the beginning of a 45-day public review period. The 45-day public review period for the Project extends from May 31, 2023, through July 17, 2023, ending at 5 p.m. During the public comment period, written comments should be delivered to:

Omar Al-Hindi, Executive Project Manager  
San Joaquin Area Flood Control Agency (SJAFCFA)  
22 E. Weber Avenue, Suite 301  
Stockton, CA 95202-2317  
209.937.8525  
[ceqacomment@sjafca.org](mailto:ceqacomment@sjafca.org)

The Draft SEIR is available for public review at the Cesar Chavez Central Library, located at 605 North El Dorado Street, Stockton, CA 95202-1907. An electronic copy of the document is available on SJAFCFA's website via the following link:

<https://www.sjafca.org/maps/lower-san-joaquin-river-project>

SJAFCFA will also conduct both an in-person and a virtual public meeting in coordination with USACE to receive comments on the adequacy of the analysis included in the Draft SEIR. The meetings will be held on:

**Date:** June 26, 2023  
**Time:** 11:30 a.m. (virtual); 06:30 p.m. (in-person)  
**Location:** *Virtual public meeting information:*  
URL: <https://bit.ly/LSJRP-TS30L>  
Phone call-in (audio only): +1 (669)-444-9171  
Meeting ID: 898 6149 4998  
Passcode: 172773  
  
*Physical address of in-person public meeting:*  
Residence Inn by Marriott, Conference Room  
3240 W March Lane  
Stockton, CA 95219-2341

## ES.2 Objectives

The purpose of the 2018 FS/EIS/EIR, of which Alternative 7a was the preferred alternative, was to investigate the extent of federal interest in a range of alternative plans to reduce flood risk in the cities of Stockton, Lathrop, and Manteca and in surrounding urbanizing areas. The objectives were to meet the requirements of California Senate Bill (SB) 5 of 2007, the Central Valley Flood Improvement Act, to achieve a 200-year level of protection for urban and urbanizing areas, focusing on a reduction of flood risk in the City of Stockton. The Modified Project's goals and objectives are the same as those described for Alternative 7a.

## ES.3 Project Description

The 2018 LSJR FR/EIS/EIR evaluated the components of Alternative 7a (referred to as structural measures) and construction methods. Alternative 7a includes a suite of structural levee improvement measures, and those relevant to the Modified Project (i.e., cutoff wall construction, levee reshaping, and erosion protection installation) are described in Chapter 2 of this SEIR, *Project Description*, Section 2.3.3, *Alternative 7a Structural Measures and Construction Methods*.

The Modified Project is one of six sub-reaches identified within Alternative 7a's Delta Front reach. It includes approximately 1 mile of cutoff wall construction, levee reshaping, and runoff erosion protection of the TS\_30\_L levee, as well as development of a borrow site, barge off-haul site, two co-located staging and stockpile areas, and haul routes. As described in the 2018 LSJR FR/EIS/EIR, initial site preparation would require clearing and grubbing of vegetation and stripping of topsoil along the TS\_30\_L Levee. The levee would be degraded to provide a sufficient working surface, and then the 5,850-linear-foot soil bentonite slurry cutoff wall would be constructed using an open slurry trench with a maximum depth of 42 feet below sea level. Also as described in the 2018 LSJR FR/EIS/EIR, levee reshaping would take place over the cutoff wall installation areas to provide the minimum slope and required height and crest width to meet USACE levee design criteria. In order to attain the required slopes and levee configuration, the levee centerline must be shifted approximately 20 feet toward the waterside (due to the presence of homes directly adjacent to the Modified Project site on the landside). The 2018 LSJR FR/EIS/EIR described levee reshaping activities as occurring mainly on the landside of levees (e.g., topsoil stripping, fill placement), but the local context for the TS\_30\_L reach requires these activities to occur on the waterside. However, as TS\_30\_L is a dry land levee, these changes to the levee configuration would not change the construction footprint, intensity or methods of construction, or equipment as analyzed in the 2018 LSJR FR/EIS/EIR. Finally, similar to what is described in the 2018 LSJR FR/EIS/EIR, rock riprap would be placed to a thickness of 2 feet and crushed rock would be placed to a thickness of 3 inches along the waterside and landside of the levee, respectively, to act as erosion control.

The 2018 LSJR FR/EIS/EIR stated that if Alternative 7a were to be authorized and funded, detailed evaluation of staging areas and borrow requirements, and identification and detailed technical evaluation of potential materials sources, would be completed during preconstruction engineering and design. Two staging and stockpile areas for the Modified Project are to be co-located adjacent to the northern and southern portions of the site, at the areas depicted in Figures 2-3 and 2-5. Haul routes to and from the staging/stockpile areas for the levee degrade and cutoff wall construction would use West March Lane as an access point to the TS\_30\_L levee road (Brookside Road) and the parallel agricultural road on the west side of the waterside levee toe.

There are three potential borrow sites under consideration for the Modified Project, based on proximity and availability of appropriate materials. One is at the SEWD property located approximately 9 miles east of the Modified Project site (Figure 2-3). The haul route from the SEWD property would follow a private road on the west side of the SEWD property to either State Route (SR) 26 or East Main Street in order to cross the Stockton Diverting Canal, and then follows one of these roads to SR 99 until its interchange with SR 4. SR 4 leads to

Interstate 5 (I-5), which would be followed north and west to West March Lane, which leads directly onto the south end of the Modified Project Site.

Two commercial borrow sources are under consideration as well. One is Dutra Materials at Decker Island, located approximately 20 miles northwest of the Modified Project site. For this option, materials would be delivered via barge to a site just southwest of the Modified Project site (Figure 2-3). The other commercial option is Brown Sand Incorporated, located approximately 20 miles south of the Modified Project site in Lathrop. Locations of the commercial borrow sources for levee material and the barge off-haul site, along with commercial sources of rock riprap and crushed rock material for erosion control, and haul routes are shown on Figure 2-6.

The Modified Project requires mitigation for impacts to certain biological resources via the creation of habitat to compensate for habitat loss caused by the Project, as discussed in Chapter 3, Section 3.6, *Biological Resources*. The 2018 LSJR FR/EIS/EIR evaluated Alternative 7a based on the assumption that a combination of on-site mitigation and purchase of credits at local mitigation banks would fulfill this obligation. However, the 2018 LSJR FR/EIS/EIR did not evaluate potential impacts associated with the development of biological mitigation sites at a project-level of detail, and mitigation bank credits for certain habitats impacted by the Modified Project are not currently available for purchase. Therefore, this Draft SEIR evaluates five potential biological mitigation sites to fulfill the Modified Project's compensatory mitigation requirements; three sites are evaluated at a project-level of detail (14-Mile Slough Pump Station, San Joaquin River (SJR) West Site, and SJR East Site), and two sites are evaluated at a program-level of detail (SJR South Site and Van Buskirk Park). If one of the program-level sites (or an alternative biological mitigation site not evaluated in this SEIR) is chosen for development, additional environmental review under CEQA at a project-level of detail would be required prior to construction.

Operation of the Modified Project would require levee and levee road maintenance and repair and post-seismic event inspection. These activities are consistent with existing operations of the TS\_30\_L Levee. Operation would also consist of monitoring and adaptively managing the chosen mitigation site until success criteria are met.

## ES.4 Significant and Unavoidable Effects

The analysis in the 2018 LSJR FR/EIS/EIR determined that significant and unavoidable impacts may occur in the following resource areas, for the reasons summarized below, which remain relevant as significant and unavoidable impacts under the Modified Project:

- **Aesthetics:** Removal of trees and shrubs would reduce shade and expose the area to sunlight throughout the day and to glare and light at sunrise and sunset. Vegetation removal would alter the experience and the quality of views for nearby sensitive receptors and would greatly reduce or eliminate riparian habitat, which contributes to scenic vistas and the existing visual character of the site. The 2018 LSJR FR/EIS/EIR states that no mitigation is feasible for this impact, other than seeking opportunities during the design phase to maintain or re-plant vegetation where feasible, but that impacts would remain significant and unavoidable.
- **Biological Resources:** Vegetation removal required for construction of the structural flood risk reduction features and maintenance of the easement would result in a loss of nesting,

resting, and foraging habitat, and potentially the loss of migratory corridors, impacting resident and migratory birds or other wildlife. The 2018 LSJR FR/EIS/EIR requires mitigation as outlined in Sections 5.12.10 (for special-status species) and 5.9.10 (for vegetation); however, there would remain a temporal loss to habitat due to the time it would take for new plantings to establish and a permanent loss of tree and shrub cover that would result in a significant and unavoidable impact to wildlife and/or wildlife movement.

- **Noise:** Project construction would exceed the applicable daytime standards of San Joaquin County and the City of Stockton. Vibration could exceed the FTA standard for human annoyance at nearby receptors, although no nighttime hauling or construction activities would occur and sleep would not be disturbed. The 2018 LSJR FR/EIS/EIR requires mitigation measures as listed in Section 5.19.10; however, it was determined that even with implementation of these measures, noise and vibration levels would not be reduced to less than significant levels due to the close proximity of noise-sensitive receptors, and this impact would remain significant and unavoidable.
- **Recreation:** Vegetation removal required for levee improvement measures would reduce opportunities for bird watching and wildlife viewing. The 2018 LSJR FR/EIS/EIR requires mitigation measures to minimize, avoid, remediate, or compensate for vegetation loss as outlined in Section 5.9.10, but determined the impact to bird and wildlife viewing would remain significant and unavoidable.
- **Transportation:** Project construction could result in temporary delays in emergency response time, temporary railroad service disruptions, hauling materials through residential neighborhoods and school zones, and potential interference with evacuation routes. The 2018 LSJR FR/EIS/EIR requires mitigation measures as laid out in Section 5.15.10, but determined impacts would remain significant and unavoidable.

All mitigation measures discussed above would be implemented in development of the Modified Project, and potential impacts of the Modified Project would be comparable to those of Alternative 7a as identified in the 2018 LSJR FR/EIS/EIR. The Modified Project would not result in new or more severe significant impacts to aesthetics, biological resources, noise, recreation, or transportation.

## ES.5 Summary of Impacts and Mitigation Measures

The Modified Project includes all mitigation measures listed in the 2018 LSJR FR/EIS/EIR, including the Environmental Commitments (contained in Table 8-2 on pages 8-8 and 8-9 of the 2018 LSJR FR/EIS/EIR) and the 2018 LSJR FR/EIS/EIR Mitigation, Monitoring, and Reporting Program (included as Appendix A to this Draft SEIR). In addition, the 2018 LSJR FR/EIS/EIR relied upon certain resource area-specific Environmental Commitments, listed throughout sections 5.1 through 5.21, to reduce the impacts analyzed in that previous document to a less than significant level. These commitments would apply to the Modified Project, herein included as project design features, and are listed below:

- Storm Water Pollution Prevention Plan (SWPPP)
- Bentonite Slurry Spill Contingency Plan (BSSCP)
- Spill Prevention, Control and Counter Measure Plan (SPCCP)

According to CEQA Guidelines Section 15163, this Draft SEIR needs to contain only the information needed to analyze the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR are sufficient to evaluate the impacts of the Modified Project, no additional environmental review is warranted. Section 3.2, *Environmental Issues Not Requiring Further Analysis*, summarizes environmental issues for which potential impacts of the Modified Project are adequately addressed in the certified 2018 LSJR FR/EIS/EIR and no further analysis is required.

The Modified Project would not result in new or more severe potentially significant impacts, and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts on the following resource areas: Aesthetics; Air Quality and Greenhouse Gas Emissions; Geology and Geomorphology, Soils and Mineral Resources, and Seismicity; Hazards and Hazardous Materials and Public Safety; Hydrology and Hydraulics; Water Quality; Groundwater; Utilities, Service Systems, and Public Services; and Recreation.

In light of the environmental issues not addressed further, the following CEQA resource areas are considered in greater detail in a revised impact analysis in this Draft SEIR:

- Agriculture and Forestry Resources (Section 3.5)
- Biological Resources (Section 3.6)
- Cultural and Paleontological Resources (Section 3.7)
- Energy (Section 3.8)
- Land Use (Section 3.9)
- Noise and Vibration (Section 3.10)
- Transportation (Section 3.11)
- Tribal Cultural Resources (Section 3.12)
- Wildfire (Section 3.13)

However, impacts from the Modified Project resulted in less than significant impacts, less than significant impacts with mitigation incorporated, or would remain significant and unavoidable as consistent with determinations made in the 2018 LSJR FR/EIS/EIR for these resource areas.

## **ES.6 Summary of Cumulative Impacts**

Potential cumulative impacts of the Modified Project on agriculture and forestry resources, air quality, biological and cultural resources, energy, greenhouse gas emissions, land use, noise, transportation, tribal cultural resources, and wildfire are discussed in Sections 3.5 through 3.15. Other direct impacts of the Modified Project would be limited, mitigable, or very localized, or would not cause or contribute to additional cumulative impacts beyond those described for Alternative 7a in the 2018 LSJR FR/EIS/EIR.

Therefore, the Modified Project would not result in additional cumulatively considerable impacts, and the 2018 LSJR FR/EIS/EIR adequately addresses potential cumulative impacts. In addition,

the Modified Project includes minor additions or changes to the project footprint for the TS\_30\_L Levee area and would not cause any significant irreversible environmental changes beyond those identified for Alternative 7a in the 2018 LSJR FR/EIS/EIR.

## **ES.7 Summary of Alternatives**

The Modified Project would entail constructing and operating levee improvements along the TS\_30\_L Levee similar to those described under Alternative 7a in the 2018 LSJR FR/EIS/EIR. Therefore, the alternatives evaluated and conclusions regarding the alternatives' ability to meet Project objectives, the consistency of the alternatives with local, state, and federal plans and policies, and their impacts compared to the Project impacts, as described in the 2018 LSJR FR/EIS/EIR, are still applicable for the Modified Project.

Therefore, no additional analysis is warranted, and the analysis of Alternatives 1, 7a, 7b, 8a, 8b, 9a, and 9b presented in the 2018 LSJR FR/EIS/EIR is adequate.

## **ES.8 Areas of Controversy**

Areas of controversy, including issues raised by agencies and the public, for the Modified Project would be the same as those identified in the 2018 LSJR FR/EIS/EIR, including those associated with property acquisition, construction-related effects, vegetation removal on levees, and growth inducement.

**TABLE ES-1**  
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.2.1 Aesthetics</b>			
<b>Impact 3.2.1:</b> The Modified Project would have a substantial effect on a scenic vista; substantially damage scenic resources; substantially degrade the existing visual character of public views of the site; and/or create a new source of substantial light or glare.	PS	<b>Mitigation Measure 3.6-16</b> (See text under Impact 3.6-2) <b>Mitigation Measure 3.6-17</b> (See text under Impact 3.6-2) <b>Mitigation Measure 3.6-18</b> (See text under Impact 3.6-2) <b>Mitigation Measure 3.6-19</b> (See text under Impact 3.6-2)	SU
<b>3.2.2 Air Quality and Greenhouse Gas Emissions</b>			
<b>Impact 3.2.2:</b> The Modified Project could result in a cumulatively considerable net increase of any criteria air pollutant for which the region is in nonattainment; generate GHG emissions that may have a significant impact on the environment; conflict with or obstruct implementation of the applicable air quality plan or an applicable plan, policy or regulation adopted for reducing the emissions of GHGs; expose sensitive receptors to substantial pollutant concentrations; or create objectionable odors.	PS	<b>Mitigation Measure 3.2.2-1: Reduce Construction-Related NO<sub>x</sub> Emissions.</b> The mitigation measure for Alternative 7a outlined in Section 5.8.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project: <ul style="list-style-type: none"> <li>• USACE shall require the use of off-road equipment that meets or exceeds USEPA or California Air Resources Board CARB Tier 4 off-road emission standards for all off-road vehicles greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities. Prior to issuance of a construction permit, the prime contractor(s) shall prepare and submit a Construction Emissions Minimization Plan (Plan) to USACE for review and approval. The Plan shall include estimates of the construction timeline by phase with a description of each piece of equipment required for every construction phase. Equipment descriptions and information shall include: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number and expected fuel usage and hours of operation. The Plan shall be kept by USACE and made available for review by any persons requesting it. Quarterly reports shall be submitted by the prime contractor(s) to USACE indicating the construction phase and equipment information used during each phase for the previous quarter.</li> </ul>	LTS
<b>3.2.3 Geology and Geomorphology, Soils and Mineral Resources, and Seismicity</b>			
<b>Impact 3.2.3:</b> The Modified Project could substantially alter regional geologic or local geomorphologic resources or processes; substantially alter natural river meandering, bank erosion and deposition; expose people or structure to potential substantial adverse effects involving rupture of a known earthquake fault or seismic-related ground failure; result in substantial erosion of soil or loss of topsoil; be located on expansive soil; have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems; result in the loss of availability of known mineral resources.	LTS	None required.	LTS

LTS = less than significant; NA = Not applicable; NI = no impact; PS = potentially significant; SU = significant and unavoidable.

**TABLE ES-1**  
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.2.4 Hazards, Hazardous Materials and Public Safety</b>			
<p><b>Impact 3.2.4:</b> The Modified Project could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; emit hazardous emissions or involve the handling of hazardous or acutely hazardous materials within one-quarter mile of a school; or be located within a Hazardous, Toxic, and Radioactive Waste (HTRW) site.</p>	PS	<p><b>Mitigation Measure 3.2.4-1: Reduce Hazards Associated with Potential Exposure to Hazardous Substances.</b> The mitigation measures for Alternative 7a outlined in Section 5.20.10 of the 2018 LSJR FR/EIS/EIR have been slightly modified and shall be applied to the Modified Project:</p> <ul style="list-style-type: none"> <li>• The following measures would be implemented before ground-disturbing or demolition activities begin, in order to reduce health hazards associated with potential exposure to hazardous substances: <ul style="list-style-type: none"> <li>○ Complete a Phase I Environmental Site Assessment (ESA) prior to completing preconstruction designs and initiating construction. Where construction activities would occur in close proximity to sites identified as Recognized Environmental Conditions in the Phase I ESA, a Phase II site investigation will also be conducted.</li> <li>○ Prepare a site plan that identifies any necessary remediation activities appropriate for proposed land uses, including excavation and removal of contaminated soils and redistribution of clean fill material on the project site. The plan would include measures that ensure the safe transport, use and disposal of contaminated soil and building debris removed from the site, as well as any other hazardous materials. In the event that contaminated groundwater is encountered during site excavation activities, the contractor would report the contamination to the appropriate regulatory agencies, dewater the excavated area and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The contractor would be required to comply with the plan and applicable Federal, State and local laws.</li> <li>○ Notify appropriate Federal, State and local agencies if evidence of previously undiscovered soil or groundwater contamination is encountered during construction. Any contaminated areas would be cleaned up in accordance with the recommendations of the Central Valley Regional Water Quality Control Board (Regional Board), California DTSC or other appropriate Federal, State or local regulatory agencies.</li> <li>○ A worker health and safety plan would be prepared before the start of construction that identifies, at a minimum, all contaminants that could be encountered during construction; all appropriate worker, public health and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan would describe actions to be taken if hazardous materials are encountered on-site, including protocols for handling hazardous materials, preventing their spread and emergency procedures to be taken in the event of a spill.</li> <li>○ Retain licensed contractors to remove all underground storage tanks.</li> </ul> </li> </ul>	LTS

LTS = less than significant; NA = Not applicable; NI = no impact; PS = potentially significant; SU = significant and unavoidable.

**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.2.5 Hydrology and Hydraulics</b>			
<p><b>Impact 3.2.5:</b> The Modified Project could substantially alter the existing drainage patterns of the site in a manner that would result in substantial erosion or siltation; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; place housing or other structures that would impede or redirect flood flows within a 1 percent annual chance event (ACE) special flood hazard area; or expose people or structures to a significant risk of loss, injury or death involving flooding.</p>	LTS	None required.	LTS
<b>3.2.6 Water Quality</b>			
<p><b>Impact 3.2.6:</b> The Modified Project could violate a water quality standard or waste discharge requirement or otherwise substantially degrade water quality, or create or contribute runoff water that would provide substantial additional sources of non-point-source related runoff.</p>	PS	<p><b>Mitigation Measure 3.2.6-1: Water Quality Avoidance and Minimization Measures.</b> The mitigation measures for Alternative 7a outlined in Section 5.5.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project in addition to all requirements of the SWPPP, BSSCP, and SPCCP:</p> <ul style="list-style-type: none"> <li>• The contractor would prepare a spill control plan and a SWPPP prior to initiation of construction in accordance with guidance from the Regional Board, Central Valley Region. These plans would be reviewed and approved by USACE before construction begins.</li> <li>• Implement appropriate measures to prevent debris, soil, rock, or other material from entering the water. Use vacuum sweepers or other appropriate measures to control dust on haul roads, construction areas and stockpiles.</li> <li>• Implement appropriate measures for handling and disposing of concrete and concrete washout water.</li> <li>• Properly dispose of oil or other liquids.</li> <li>• Fuel and maintain vehicles in a specified area that is designed to capture spills. This area cannot be near any ditch, stream or other body of water or feature that may convey water.</li> <li>• Fuels and hazardous materials would not be stored on site.</li> <li>• Inspect and maintain vehicles and equipment to prevent dripping oil and other fluids.</li> <li>• Schedule construction to avoid the rainy season as much as possible. If rains are forecasted during construction, erosion control measures would be implemented as described in the Regional Board Erosion and Sediment Control Field Manual.</li> <li>• Maintain sediment and erosion control measures during construction. Inspect the control measures before, during and after a rain event.</li> <li>• Train construction workers in SWPPP and how to respond to, control, contain and clean up spills.</li> <li>• Revegetate disturbed areas in a timely manner to control erosion.</li> <li>• Materials will be covered and protected from wind, rain and runoff to avoid unwarranted dispersal.</li> <li>• Refine operational criteria to ensure that desired Flood Risk Management (FRM) benefits are achieved while avoiding degradation of water quality behind the closure structures.</li> </ul>	LTS

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**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.2.7 Groundwater</b>			
<p><b>Impact 3.2.7:</b> The Modified Project could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level or substantially affect the quality of the groundwater supply.</p>	PS	<p><b>Mitigation Measure 3.2.7-1: Bentonite Slurry Spill Contingency Plan.</b> The mitigation measures for Alternative 7a outlined in Section 5.6.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:</p> <ul style="list-style-type: none"> <li>• Potential impacts to groundwater that could result from construction of the cutoff wall would be mitigated through development and implementation of a BSSCP, also known as a frac-out plan. A BSSCP is typically developed for activities that involve the use of bentonite materials. It is intended to minimize the potential for a frac-out associated with excavation and tunneling activities, provide for timely detection of frac-outs and ensure a “minimum-effect” response in the event of a frac-out and release of excavation fluid.</li> </ul>	LTS
<b>3.2.8 Utilities, Service Systems, and Public Services</b>			
<p><b>Impact 3.2.8:</b> The Modified Project could result in substantial adverse physical impacts associated with the need for new or physically altered public service facilities; substantially increase need for new or physically altered public services facilities; require new or expanded entitlements to provide sufficient water supplies; require or result in the construction of new stormwater drainage or wastewater treatment facilities or expansion of existing facilities; or be served by a landfill with insufficient permitted capacity to accommodate the project’s solid waste disposal needs.</p>	PS	<p><b>Mitigation Measure 3.2.8-1: Coordination with Utility Providers &amp; Response Plan.</b> The mitigation measures for Alternative 7a outlined in Section 5.16.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:</p> <p>Before beginning construction, coordination with utility providers to implement orderly relocation of utilities that need to be removed or relocated would occur. Coordination would include the following:</p> <ul style="list-style-type: none"> <li>• Notification of any potential interruptions in service shall be provided to the appropriate agencies and affected landowners.</li> <li>• Before the start of construction, utility locations shall be verified through field surveys and the use of Underground Service Alert services. Any buried utility lines shall be clearly marked where construction activities would take place and on the construction specifications before of any earthmoving activities begin.</li> <li>• Before the start of construction, the contractor would be required to coordinate with the local municipality and acquire any applicable permits prior to use of municipal water for construction.</li> <li>• Before the start of construction, a response plan shall be prepared to address potential accidental damage to a utility line. The plan shall identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the public and worker safety. Worker education training in response to such situations shall be conducted by the contractor. The response plan shall be implemented by the contractor during construction activities.</li> <li>• Utility relocations shall be staged to minimize interruptions in service.</li> </ul>	LTS
<b>3.2.9 Recreation</b>			
<p><b>Impact 3.2.9:</b> The Modified Project could increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated, or result in substantial adverse physical impacts associated with the need for new or physically altered parks or recreational facilities.</p>	PS	<p><b>Mitigation Measure 3.6-16</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-17</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-18</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-19</b> (See text under Impact 3.6-2)</p>	SU

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**TABLE ES-1**  
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.5 Agricultural and Forestry Resources</b>			
<b>Impact 3.5-1:</b> The Modified Project could convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Special Designated Farmland) to non-agricultural use, or conflict with existing zoning for agricultural use or a Williamson Act contract.	PS	<p><b>Mitigation Measure 3.5-1: Minimize and Avoid Loss of Special Designated Farmland.</b> The following measures shall be implemented before and during construction of the Modified Project to minimize and avoid loss of Prime and Unique Farmland and Farmland of Statewide Importance.</p> <ul style="list-style-type: none"> <li>• Biological mitigation sites shall be designed to minimize, to the greatest extent feasible, the loss of agricultural land with the highest values.</li> <li>• Biological mitigation sites shall be designed to minimize fragmentation or isolation of Special Designated Farmland. Where a biological mitigation site involves acquiring land or easements, any area not needed for biological habitat mitigation shall be of a size sufficient to allow viable farming operations. In such situation, USACE shall be responsible for acquiring easements, making lot line adjustments, and merging affected land parcels into units suitable for continued commercial agricultural management.</li> <li>• Any utility or infrastructure serving agricultural uses shall be reconnected if it is disturbed by biological mitigation site construction. If a biological mitigation site temporarily or permanently cuts off roadway access or removes utility lines, irrigation features, or other infrastructure, USACE shall be responsible for restoring access as necessary to ensure that economically viable farming operations are not interrupted.</li> <li>• Where applicable to a biological mitigation site, buffer areas shall be established between restoration projects and adjacent agricultural land. The buffers shall be sufficient to protect and maintain land capability and flexibility in agricultural operations. Buffers shall be designed to protect the feasibility of ongoing agricultural operations and reduce the effects of construction-related or operational activities (including the potential to introduce special-status species in the agricultural areas) on adjacent or nearby properties. Buffers shall also serve to protect biological mitigation sites from noise, dust, and the application of agricultural chemicals. The width of each buffer shall be determined on a site-by-site basis to account for variations in prevailing winds, crop types, agricultural practices, ecological restoration, or infrastructure. Buffers can function as drainage swales, trails, roads, linear parkways, or other uses compatible with ongoing agricultural operations.</li> </ul>	SU
<b>Impact 3.5-2:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to agriculture and forestry resources.	PS	<b>Mitigation Measure 3.5-1</b> (See text under Impact 3.5-1)	SU
<b>3.6 Biological Resources</b>			
<b>Impact 3.6-1:</b> The Modified Project 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.	PS	<b>Mitigation Measure 3.6-1: Special-Status Plant Surveys.</b> Before Modified Project construction, surveys for special-status plants with potential to occur shall be conducted by a qualified botanist at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable. Surveys shall be conducted in accordance with specific guidelines described by <i>Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities</i> (CDFW 2018).	LTS

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**TABLE ES-1**  
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.6 Biological Resources (cont.)</b>			
Impact 3.6-1 (cont.)		<p><b>Mitigation Measure 3.6-2: Special-Status Plant Measures.</b> If special-status plants are found, the following measures shall be implemented:</p> <ul style="list-style-type: none"> <li>• Qualified botanists shall survey the biological study area to document the presence of special-status plants before Modified Project implementation and shall conduct a floristic survey that follows the CDFW botanical survey guidelines (CDFW 2018). All plant species observed will be identified to the level necessary to determine whether they qualify as special-status plants or are plant species with unusual or significant range extensions. The guidelines also require that field surveys be conducted when special-status plants that could occur in the area are evident and identifiable, generally during the reported blooming period. To account for different special-status plant identification periods, one or more series of field surveys may be required in spring and summer. If any special-status plants are identified during the surveys, the botanist shall photograph and map locations of the plants, document the location and extent of the special-status plant population on a CNDDDB survey form, and submit the completed survey form to the CNDDDB. The amount of compensatory mitigation required will be based on the results of these surveys.</li> <li>• If one or more special-status plants is identified in the biological study area during preconstruction surveys, the sponsor shall redesign or modify the Modified Project, including the restoration plans for the biological mitigation site components, to avoid indirect or direct effects on special-status plants wherever feasible. If special-status plants cannot be avoided by redesigning projects, compensatory mitigation shall be implemented to avoid significant effects on special-status plants.</li> <li>• If complete avoidance of special-status plants is not feasible, the effects of the Modified Project on special-status plants shall be mitigated through off-site preservation at the chosen biological mitigation site at a minimum of a 1:1 ratio but shall be negotiated with the resource agencies. Suitable habitat for affected special-status plant species will occur in a conservation area, preserved and managed in perpetuity. Detailed information shall be provided to the agencies on the location and quality of the preservation area, the feasibility of protecting and managing the area in perpetuity, and the responsible parties. Other pertinent information also shall be provided, to be determined through future coordination with the resource agencies.</li> </ul> <p><b>Mitigation Measure 3.6-3: Worker Awareness Training.</b> Before ground disturbance, all construction personnel shall participate in a CDFW-approved worker environmental awareness program. A qualified biologist shall inform all construction personnel about the life history of Swainson's hawk and the importance of nest sites and foraging habitat.</p> <p><b>Mitigation Measure 3.6-4: Breeding-Season Survey.</b> If construction work is to occur during the Swainson's hawk breeding season, a breeding-season survey for nesting birds shall be conducted for all trees and shrubs that would be removed or disturbed that are located within 500 feet (0.5 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys shall be completed during at least two of the following survey periods: January 1 to March 20; March 20 to April 5; April 5 to April 20; and June 10 to July 30. No fewer than three surveys shall be completed in at least two survey periods and at least one of these surveys shall occur immediately prior to Modified Project initiation (SWHA TAC 2000). Other migratory bird nest surveys could be conducted concurrent with Swainson's hawk surveys, with at least one survey to be conducted no more than 48 hours from the initiation of Modified Project activities to confirm the absence of nesting. If the biologist determines that the area surveyed does not contain any active nests, construction activities, including removal or pruning of trees and shrubs, could commence without any further mitigation.</p>	

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**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.6 Biological Resources (cont.)</b>			
Impact 3.6-1 (cont.)		<p><b>Mitigation Measure 3.6-5: Active Nest Buffer.</b> If active nests are found, USACE shall maintain a 0.25-mile buffer between construction activities and the active nest(s). In addition, a qualified biologist shall be present on-site during construction activities to ensure that the buffer distance is adequate and that the birds are not showing any signs of stress. If signs of stress that could cause nest abandonment are noted, construction activities shall cease until a qualified biologist determines that fledglings have left an active nest. With the written permission of the wildlife agencies and under the supervision of the qualified biologist, work within the temporary nest disturbance buffer may occur. The qualified biologist shall be on-site daily while construction-related activities are taking place within the buffer.</p> <p><b>Mitigation Measure 3.6-6: Burrowing Owl Preconstruction Surveys.</b> Prior to initiation of any excavation activities at borrow sites, a preconstruction survey for burrowing owls shall be completed in accordance with CDFW guidelines described in the <i>Staff Report on Burrowing Owl Mitigation</i>. If no burrowing owls are located during these surveys, then effects on burrowing owls would be less than significant and no mitigation is required. If burrowing owls are located on or immediately adjacent to the site, then coordination shall occur with CDFW to determine the measures that need to be implemented to ensure that burrowing owls are not affected by the Modified Project. Potential mitigation measures that could be implemented include:</p> <ul style="list-style-type: none"> <li>• A qualified biologist shall conduct appropriate surveys at and around material source sites, to determine the presence/absence of burrowing owls. At least one survey shall be conducted no more than 1 week prior to the onset of any construction activity.</li> <li>• A 250-foot buffer, within which no new activity would be permissible, shall be maintained between Modified Project activities and nesting burrowing owls. This protected area shall remain in effect until August 31 or at CDFW's discretion, until the young owls are foraging independently.</li> <li>• No burrowing owls shall be evicted from burrows during the nesting season (February 1 through August 31). Eviction outside the nesting season could be permitted pending evaluation of eviction plans and receipt of formal written approval from CDFW authorizing the eviction.</li> <li>• Mandatory worker awareness training for construction personnel shall be conducted.</li> </ul> <p><b>Mitigation Measure 3.6-7: Nesting Bird Surveys.</b> USACE shall conduct surveys in the spring of each construction year to locate nest sites of the mentioned species in suitable breeding habitats. Surveys shall be conducted by a qualified biologist using survey methods approved by USFWS. Survey results shall be submitted to USFWS before construction is initiated. If nests or young of these species are not located, construction may proceed. If nests or young are located, USACE shall coordinate with USFWS and CDFW to determine what mitigation measures could be implemented to avoid or reduce potential disturbance-related impacts on these species. Measures could include a no-disturbance buffer zone established around the nest site. The width of the buffer zone shall be determined by a qualified biologist in coordination with USFWS. No construction activities shall occur within the buffer zone, which shall be maintained until the young have fledged (as determined by a qualified biologist).</p> <p><b>Mitigation Measure 3.6-8: Minimization of Effects on Giant Garter Snake.</b> The following measures shall be implemented to minimize effects on giant garter snake habitat that occurs within 200 feet of any construction activity. These measures are based on USFWS guidelines for restoration and standard avoidance measures included as appendices in USFWS (1997).</p> <ul style="list-style-type: none"> <li>• Unless approved otherwise by USFWS, construction shall be initiated only during the giant garter snake active period (May 1–October 1, when they are able to move away from disturbance).</li> </ul>	

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**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.6 Biological Resources (cont.)</b>			
Impact 3.6-1 (cont.)		<ul style="list-style-type: none"> <li>• All construction personnel, including workers and contractors, shall participate in a worker environmental awareness training program conducted by a USFWS-approved biologist prior to commencement of construction activities.</li> <li>• A giant garter snake survey shall be conducted 24 hours prior to construction in potential habitat. Should there be any interruption in work for greater than 2 weeks, a biologist shall survey the Modified Project area again no later than 24 hours prior to the restart of work.</li> <li>• Giant garter snakes encountered during construction activities shall be allowed to move away from construction activities on their own.</li> <li>• Movement of heavy equipment to and from the construction site shall be restricted to established roadways.</li> <li>• Giant garter snake habitat within 200 feet of construction activities shall be designated as an environmentally sensitive area and delineated with signs and high-visibility fencing. Fencing shall be inspected and maintained as needed daily until completion of each work section of the Modified Project. This area shall be avoided by all construction personnel.</li> <li>• If USACE elects to use exclusionary fencing in lieu of continuous monitoring, it shall be buried at least 6 inches below the ground to prevent snakes from burrowing and moving under the fence and shall be inspected daily.</li> <li>• If a frac-out is identified, all work shall stop, including the recycling of the bentonite fluid. In the event of a frac-out into water, the location and extent of the frac-out shall be determined and the frac-out shall be monitored for 4 hours to determine whether the fluid congeals (bentonite will usually harden, effectively sealing the frac-out location).</li> <li>• USFWS, NMFS, CDFW, and the Regional Water Quality Control Board shall be notified immediately of any spills and will be consulted regarding clean-up procedures. A Brady barrel will be on-site and shall be used if a frac-out occurs. Containment materials, such as straw bales, also will be on-site prior to and during all operations and a vacuum truck will be on retainer and available to be operational on-site within 2 hours' notice. The site supervisor shall take any necessary follow-up response actions in coordination with agency representatives. The site supervisor shall coordinate the mobilization of equipment stored at staging areas (e.g., vacuum trucks) as needed.</li> <li>• If the frac-out has reached the surface, any material contaminated with bentonite shall be removed by hand to a depth of 1 foot, contained, and properly disposed of, as required by law. The drilling contractor shall be responsible for ensuring that the bentonite is either properly disposed of at an approved Class II disposal facility or properly recycled in an approved manner.</li> <li>• Project-related vehicles shall observe a 10 mph speed limit within construction areas, except on existing paved roads where they shall adhere to the posted speed limits.</li> <li>• Aquatic habitat for the snake that would be affected by construction shall be inspected for the snake, then dewatered and maintained dry and absent of aquatic prey for 5 days before initiation of construction activities. This measure applies primarily to the ditches to be relocated west of the Delta front levee sections. If complete dewatering is not possible, USFWS shall be contacted to determine what additional measures, if any, may be necessary to minimize effects on the snake.</li> </ul>	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.6 Biological Resources (cont.)</b>			
Impact 3.6-1 (cont.)		<p><b>Mitigation Measure 3.6-9: Giant Garter Snake Compensation.</b> If giant garter snake habitat would be temporarily affected during construction, the following measures shall be implemented to compensate for the habitat loss at the selected biological mitigation site:</p> <ul style="list-style-type: none"> <li>• Habitat (including aquatic and upland) temporarily affected for one construction season (May 1–October 1) shall be restored after construction by applying appropriate erosion control techniques and replanting/seeding with appropriate native plants.</li> <li>• Aquatic habitat permanently affected shall be replaced at a 3:1 ratio through the purchase of credits at a mitigation bank or the establishment of aquatic habitat at one of the mitigation sites.</li> <li>• Upland habitat permanently affected shall be replaced at a minimum of 1:1 ratio.</li> <li>• USACE shall work to develop appropriate mitigation prior to or concurrent with any disturbance of giant garter snake habitat. Habitat shall be protected in perpetuity and have an endowment attached for management and maintenance.</li> </ul> <p><b>Mitigation Measure 3.6-10: Minimization of Any Potential Effects on VELB or Their Habitat.</b> During construction for the Modified Project, USACE shall implement the measures included in the <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle</i> (USFWS 2017b; see Appendix G) to reduce effects on valley elderberry longhorn beetle. The framework includes avoidance and minimization measures for shrubs that would not be transplanted within 50 meters of the Project, methodologies for transplanting of shrubs, and methodologies for compensatory mitigation guidance for removed habitat.</p> <p><b>Mitigation Measure 3.6-11: VELB Compensation.</b> In accordance with the USFWS 2017 <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)</i>, adverse effects on the VELB shall be compensated for by transplanting the affected elderberries with stems greater than 1 inch in diameter and by planting a mix of native suitable riparian vegetation at a 3:1 ratio. The amount of compensation for VELB shall be based on USFWS review. A suitable transplant site shall be selected and planted with transplanted shrubs and new seedlings and associated riparian habitat, in accordance with the USFWS guidelines.</p> <p><b>Mitigation Measure 3.6-12: Bat and Roosting Habitat Survey.</b></p> <p>In advance of tree removal, a preconstruction survey for special-status bats shall be conducted by a qualified biologist to characterize potential bat habitat and identify active roost sites within the Modified Project site. Should potential roosting habitat or active bat roosts be found in trees and/or structures to be removed under the Modified Project, the following measures shall be implemented:</p> <ul style="list-style-type: none"> <li>• Removal of trees and structures shall occur when bats are active, approximately March 1–April 15 and August 15–October 15, and outside of bat maternity roosting season (approximately April 15–August 31) and months of winter torpor (approximately October 15–February 28), to the extent feasible.</li> <li>• If removal of trees during the periods when bats are active is not feasible and active bat roosts being used for maternity or hibernation purposes are found on or in the immediate vicinity of the Modified Project where tree removal is planned, a no-disturbance buffer of 100 feet shall be established around these roost sites until they are determined to be no longer active by the qualified biologist.</li> </ul>	

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**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.6 Biological Resources (cont.)</b>			
Impact 3.6-1 (cont.)		<ul style="list-style-type: none"> <li>• The qualified biologist shall be present during tree removal if active bat roosts that are not being used for maternity or hibernation purposes are present. Trees with active roosts shall be removed only when no rain is occurring or is forecast to occur for 3 days and when daytime temperatures are at least 50 degrees Fahrenheit.</li> <li>• Removal of trees with active or potentially active roost sites shall follow a two-step removal process:               <ul style="list-style-type: none"> <li>○ On the first day of tree removal and under supervision of the qualified biologist, branches and limbs not containing cavities or fissures in which bats could roost, shall be cut only using chain saws.</li> <li>○ On the following day and under the supervision of the qualified biologist, the remainder of the tree may be removed, using either chain saws or other equipment (e.g., excavator or backhoe).</li> </ul> </li> <li>• Removal of structures containing or suspected to contain active bat roosts, that are not being used for maternity or hibernation purposes, shall be dismantled under the supervision of the qualified biologist in the evening and after bats have emerged from the roost to forage. Structures shall be partially dismantled to significantly change the roost conditions, causing bats to abandon and not return to the roost. If deemed necessary by a qualified biologist, bat exclusion devices may be installed to prevent the re-entry of bats to a roost.</li> </ul> <p><b>Mitigation Measure 3.6-13: Hazardous Materials Spill Notification.</b> Given the deleterious effects of numerous chemicals on native resident fish used in construction, if a hazardous materials spill does occur, a detailed analysis shall be performed immediately by a registered environmental assessor or professional engineer to identify the likely cause and extent of contamination. This analysis shall conform to American Society for Testing and Materials standards and shall include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, USACE and its contractors shall select and implement measures to control contamination, with a performance standard that surface water and groundwater quality must be returned to baseline conditions.</p> <p><b>Mitigation Measure 3.6-14: In-Water Work Windows.</b> In-water construction for the biological mitigation sites shall be restricted to the general estimated work window required for each waterway as described in the NMFS 2016 BO or superseding BO. During preconstruction engineering and design, the work window may be adjusted on a site-specific basis, considering periods of low fish abundance, and in-water construction outside the principal spawning and migration season. The typical construction season generally corresponds to the dry season, but construction may occur outside the limits of the dry season, only as allowed by applicable permit conditions.</p> <p><b>Mitigation Measure 3.6-15: Avoidance and Minimization of Effects on Listed Fish Species.</b> In 2016, NMFS issued a BO for the LSJR Feasibility Study consultation for levee improvements. The NMFS BO evaluated impacts on Central Valley spring-run Chinook salmon, California Central Valley steelhead, and green sturgeon, as well as their critical habitat. The BO evaluated potential impacts based on rough estimates and preliminary designs for the proposed Project. To avoid and minimize effects on listed fish species, the measures from the 2016 NMFS BO or superseding BO shall be implemented.</p>	

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**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.6 Biological Resources (cont.)</b>			
<p><b>Impact 3.6-2:</b> The Modified Project would have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.</p>	PS	<p><b>Mitigation Measure 3.6-16 Temporary Fencing.</b> To clearly demarcate the Modified Project's boundaries and protect sensitive natural communities, temporary exclusion fencing shall be installed around the Modified Project boundaries (e.g., access roads, staging areas) 1 week prior to the start of construction activities. The temporary fencing shall be continuously maintained until all construction activities are completed so that construction equipment is confined to the designated work areas, including any off-site mitigation areas and access thereto. The exclusion fencing shall be removed only after construction for the year is entirely completed. Exclusionary construction fencing and explanatory signage shall be placed around the perimeter of sensitive vegetation communities that could be affected by construction activities throughout the period during which such effects occur. The signage will explain the nature of the sensitive resource and warn that no effect on the community is allowed. Where feasible, the fencing will include a buffer zone of at least 20 feet between the resource and construction activities. All exclusionary fencing shall be maintained in good condition throughout the construction period.</p> <p><b>Mitigation Measure 3.6-17 Mandatory Contractor/Worker Awareness Training.</b> Before the initiation of any work in the Modified Project area, including grading, a qualified biologist shall conduct mandatory contractor/worker awareness training for all construction personnel. This training shall be provided to brief workers on the need to avoid effects on sensitive biological resources (e.g., riparian habitat, special-status species, wetlands, and other sensitive biological communities) and the penalties for not complying with permit requirements. The biologist shall inform all construction personnel about the life history of special-status species with potential for occurrence on the site, the importance of maintaining habitat, and the terms and conditions of the BO or other authorizing document. Proof of this instruction shall be submitted to USFWS.</p> <p>The training shall also cover the restrictions and guidelines that must be followed by all construction personnel to reduce or avoid effects on sensitive biological communities and special-status species during Modified Project construction. The crew leader shall be responsible for ensuring that crew members adhere to the guidelines and restrictions. Educational training shall be conducted for new personnel as they are brought on the job. General restrictions and guidelines for vegetation and wildlife that must be followed by construction personnel are listed below.</p> <ul style="list-style-type: none"> <li>• Modified Project–related vehicles shall observe the posted speed limit on hard-surfaced roads and a speed limit of 10 miles per hour on unpaved roads during travel on the project site.</li> <li>• Modified Project–related vehicles and construction equipment shall restrict their off-road travel to the designated construction area.</li> <li>• To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel shall not service vehicles or construction equipment outside designated staging areas.</li> </ul> <p><b>Mitigation Measure 3.6-18 Construction Monitoring.</b> A qualified biologist shall monitor construction activities adjacent to sensitive biological resources (e.g., special-status species, riparian habitat, wetlands, elderberry shrubs), as needed. The biologist shall assist the construction crew, as needed, to comply with all Modified Project implementation restrictions and guidelines. In addition, the biologist shall be responsible for ensuring that construction barrier fencing is maintained adjacent to sensitive biological resources.</p>	

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Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.6 Biological Resources (cont.)</b>			
Impact 3.6-2 (cont.)		<p><b>Mitigation Measure 3.6-19: Riparian Compensation.</b> Vegetation impacts that cannot be mitigated through avoidance, minimization, or remediation shall be mitigated through restoration at the selected biological mitigation site. A revegetation plan for the biological mitigation site shall be prepared by a qualified biologist or landscape architect and reviewed by the appropriate agencies. The revegetation plan shall specify the planting stock appropriate for each riparian cover type and each mitigation site, ensuring the use of genetic stock from the Modified Project area, and shall employ the most successful techniques available at the time of planting. The plantings shall be maintained and monitored as necessary for 3–5 years, including weed removal, irrigation, and herbivory protection. For this establishment period, USACE shall submit annual monitoring reports of survival to the regulatory agencies including USFWS, NMFS, and CDFW. Replanting will be necessary if success criteria are not met, with replacement plants subsequently monitored and maintained to meet the success criteria. The mitigation will be considered successful when the plants meet the success criteria and the vegetation no longer requires active management and is arranged in groups that, when mature, replicate the area, natural structure, and species composition of similar plant communities in the region.</p> <p>If mitigation at the selected biological mitigation site is inadequate to fully compensate for the vegetation impacts, the remaining balance of compensation required for riparian, shaded riverine aquatic, wetland, and open water habitats shall be accomplished through the purchase of credits at a mitigation bank or the construction of additional mitigation sites. If an alternative biological mitigation site not evaluated in this SEIR is chosen for development, additional environmental review under CEQA will be required prior to construction.</p>	
<b>Impact 3.6-3:</b> The Modified Project would have a substantial adverse effect on state or federally protected wetlands (including but not limited to marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means.	PS	<p><b>Mitigation Measure 3.6-20: No Net Loss of Wetlands/Waters.</b> SJAFCA shall conduct an aquatic resources delineation to identify potential wetlands and other waters that fall under state and federal jurisdiction within mitigation sites and borrow sites.</p> <p>Temporary and permanent impacts on riparian habitat and wetland/waters that cannot be mitigated through avoidance, minimization, or remediation shall be mitigated to ensure no net loss through compensation, by restoring riparian and wetlands/waters habitat at one of the proposed biological mitigation sites or an approved off-site location, mitigation bank, or in-lieu fee program. Riparian and wetlands/waters habitat shall not be restored where it would be removed by future maintenance activities. A revegetation plan shall be prepared by a qualified biologist or landscape architect and reviewed by the appropriate agencies. The revegetation plan will specify the use of beneficial native plants appropriate for each area that provide a diverse variety of grasses and forbs that support native wildlife species.</p>	LTS
<b>Impact 3.6-4:</b> The Modified Project would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site.	PS	<p><b>Mitigation Measure 3.6-16</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-17</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-18</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-19</b> (See text under Impact 3.6-2)</p>	SU
<b>Impact 3.6-5:</b> The Modified Project would conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	PS	<p><b>Mitigation Measure 3.6-16</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-17</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-18</b> (See text under Impact 3.6-2)  <b>Mitigation Measure 3.6-19</b> (See text under Impact 3.6-2)</p>	LTS

LTS = less than significant; NA = Not applicable; NI = no impact; PS = potentially significant; SU = significant and unavoidable.

**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.6 Biological Resources (cont.)</b>			
<b>Impact 3.6-6:</b> The Modified Project 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.	LTS	None required.	NA
<b>Impact 3.6-7:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to biological resources.	LTS	None required.	NA
<b>3.7 Cultural and Paleontological Resources</b>			
<b>Impact 3.7-1:</b> The Modified Project may cause a substantial adverse change in the significance of a historical resource.	NI (project-level components); PS (program-level components)	None currently available.	NI (project-level components); SU (program-level components)
<b>Impact 3.7-2:</b> The Modified Project could cause a substantial adverse change in the significance of an archaeological resource.	PS	<p><b>Mitigation Measure 3.7-1: Cultural Resources Awareness Training.</b> USACE in consultation with SJAFCA and other interested parties shall provide a cultural resources and tribal cultural resources sensitivity and awareness training program for all personnel involved in Modified Project construction, including field consultants and construction workers. The training shall be developed in coordination with an archaeologist meeting the Secretary of the Interior’s Professional Qualifications Standards for Archeology, as well as culturally and geographically affiliated Native American tribes. SJAFCA may invite Native American representatives from interested culturally and geographically affiliated Native American Tribes to participate. The training shall be conducted before any Modified Project–related construction activities begin and shall include relevant information regarding sensitive cultural resources and tribal cultural resources, including applicable regulations, protocols for avoidance, and consequences of violating federal and state laws and regulations.</p> <p>The training shall also describe appropriate avoidance and impact minimization measures for cultural resources and tribal cultural resources that could be located on the Modified Project site and shall outline what to do and whom to contact if any potential cultural resources or tribal cultural resources are encountered. The training shall emphasize the requirement for confidentiality and culturally appropriate treatment of any discovery of significance to Native American Tribes and shall discuss appropriate behaviors and responsive actions, consistent with Native American tribal values.</p>	LTS (project-level components); SU (program-level components)

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**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.7 Cultural and Paleontological Resources (cont.)</b>			
Impact 3.7-2 (cont.)		<b>Mitigation Measure 3.7-2: Inadvertent Discovery of Cultural Materials.</b> If an inadvertent discovery of cultural materials (e.g., unusual amounts of shell, animal bone, any human remains, bottle glass, ceramics, building remains), tribal cultural resources, sacred sites, or landscapes is made at any time during Project-related construction activities, USACE in consultation with SJAFCA and other interested parties, and in coordination with an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology and culturally and geographically affiliated Native American tribes, shall develop appropriate protection and avoidance measures where feasible. These procedures shall be developed in accordance with the Lower San Joaquin River Feasibility Study Project PA and associated HPMP, which specifies procedures for post-review discoveries. Additional measures, such as development of a Historic Properties Treatment Plan prepared in accordance with the PA and HPMP, may be necessary if avoidance or protection is not possible.	
<b>Impact 3.7-3:</b> The Modified Project could disturb human remains, including those interred outside of formal cemeteries.	PS	<b>Mitigation Measure 3.7-3: Inadvertent Discovery of Human Remains.</b> In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, USACE shall immediately halt potentially damaging excavation in the area of the burial and notify the County coroner and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (HSC Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, they must contact the NAHC by phone within 24 hours of making that determination (HSC Section 7050[c]). After the coroner's findings have been made, the archaeologist and the NAHC-designated Most Likely Descendant (MLD), in consultation with USACE and SJAFCA, shall determine the ultimate treatment and disposition of the remains.  Upon the discovery of Native American human remains, USACE in coordination with SJAFCA, shall require that all construction work stop within 100 feet of the discovery until consultation with the MLD has taken place. The MLD shall have 48 hours to complete a site inspection and make recommendations to the USACE and SJAFCA after being granted access to the site. A range of possible treatments for the remains, including nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. PRC Section 5097.98(b)(2) suggests that the concerned parties may mutually agree to extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. If agreed to by the MLD, SJAFCA or SJAFCA's authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance. Construction work in the vicinity of the burials shall not resume until the mitigation is completed.	LTS
<b>Impact 3.7-4:</b> The Modified Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	PS	<b>Mitigation Measure 3.7-4: Preconstruction Training and Paleontological Monitoring.</b> Prior to the start of construction activities, USACE shall retain a Qualified Paleontologist who meets the standards of the Society for Vertebrate Paleontology (SVP 2010) to carry out all mitigation measures related to paleontological resources. Prior to the start of any ground-disturbing activities, the Qualified Paleontologist shall conduct preconstruction worker paleontological resources sensitivity training. The training shall include information on what types of paleontological resources could be encountered during excavations, what to do in case an unanticipated discovery is made by a worker, and laws protecting paleontological resources. All construction personnel shall be informed of the possibility of encountering fossils and instructed to immediately inform the construction foreman or supervisor if any bones or other potential fossils are unexpectedly unearthed in an area where a paleontological monitor is not present. The Applicant shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance.	LTS

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**TABLE ES-1**  
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.7 Cultural and Paleontological Resources (cont.)</b>			
Impact 3.7-4 (cont.)		<p>The Qualified Paleontologist shall supervise a paleontological monitor meeting the Society for Vertebrate Paleontology standards (SVP 2010) who shall be present during all excavations in the Modesto Formation. Monitoring shall consist of visually inspecting fresh exposures of rock for larger fossil remains and, where appropriate, collecting wet or dry screened standard sediment samples (up to 4.0 cubic yards) of promising horizons for smaller fossil remains (SVP 2010). Depending on the conditions encountered, full-time monitoring can be reduced to part-time inspections or ceased entirely if determined adequate by the Qualified Paleontologist. The Qualified Paleontologist may spot check the excavation on an intermittent basis and recommend whether the depth of required monitoring should be revised based on his/her observations. Monitoring activities shall be documented in a Paleontological Resources Monitoring Report to be prepared by the Qualified Paleontologist at the completion of construction.</p> <p>If a paleontological resource is discovered during construction, the paleontological monitor shall be empowered to temporarily divert or redirect grading and excavation activities in the area of the exposed resource to facilitate evaluation of the discovery. An appropriate buffer area shall be established by the Qualified Paleontologist around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. All significant fossils shall be collected by the paleontological monitor and/or the Qualified Paleontologist. Collected fossils shall be prepared to the point of identification and catalogued before they are submitted to their final repository. Any fossils collected shall be curated at a public, non-profit institution with a research interest in the materials, such as the University of California Museum of Paleontology at Berkeley, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, maps, photographs, and a technical report shall also be filed at the repository and/or school.</p>	
<b>Impact 3.7-5:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to cultural and paleontological resources.	PS	None currently available.	SU
<b>3.8 Energy</b>			
<b>Impact 3.8-1:</b> The Modified Project could result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	None required.	NA
<b>Impact 3.8-2:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative energy impacts.	LTS	None required.	NA

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**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.9 Land Use</b>			
<b>Impact 3.9-1:</b> The Modified Project would not physically divide an established community.	NI	None required.	NA
<b>Impact 3.9-2:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative land use impacts.	NI	None required.	NA
<b>3.10 Noise and Vibration</b>			
<b>Impact 3.10-1:</b> Construction activities associated with the Modified Project could lead to a temporary increase in ambient noise levels in the vicinity of the Modified Project in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.	PS	<p><b>Mitigation Measure 3.10-1: Construction Noise Reduction.</b></p> <p>The following measures shall be implemented to reduce the effects of construction under the Modified Project:</p> <ul style="list-style-type: none"> <li>• The contractor shall prepare a construction noise and vibration plan prior to construction.</li> <li>• The contractor shall employ vibration-reducing construction practices.</li> <li>• The contractor shall employ noise-reducing construction practices.</li> <li>• All construction equipment shall be equipped with noise-reduction devices such as mufflers to minimize construction noise and all internal combustion engines shall be equipped with exhaust and intake silencers in accordance with manufacturers' specifications.</li> <li>• Equipment that is quieter than standard shall be used, including electrically powered equipment instead of internal combustion equipment, where use of such equipment is a readily available substitute that accomplishes project tasks in the same manner as internal combustion equipment.</li> <li>• The use of bells, whistles, alarms, and horns shall be restricted to safety warning purposes only.</li> <li>• Noise-reducing enclosures shall be used around stationary noise-generating equipment (e.g., compressors and generators at slurry pond locations).</li> <li>• Mobile and fixed construction equipment (e.g., compressors and generators), construction staging and stockpiling areas and construction vehicle routes shall be located at the most distant point feasible from noise-sensitive receptors.</li> <li>• When noise-sensitive uses subject to prolonged construction noise are located within 740 feet of construction in Stockton or unincorporated areas of San Joaquin County, noise-attenuating buffers such as structures, truck trailers, or soil piles shall be located between noise-generation sources and sensitive receptors.</li> <li>• Before construction activity begins within 740 feet of one or more residences or businesses, the project proponent shall provide written notification to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. The USACE resident engineer and contractor's project manager shall be designated and contact information shall be provided in the notices and posted near the project area in a conspicuous location that it is clearly visible to nearby receptors most likely to be disturbed. The USACE resident engineer shall manage complaints and concerns resulting from noise-generating activities. The severity of the noise concern shall be assessed by the noise disturbance coordinator and, if necessary, evaluated by a qualified noise control engineer.</li> </ul>	SU

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**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.10 Noise and Vibration (cont.)</b>			
Impact 3.10-1 (cont.)		<ul style="list-style-type: none"> <li>The project proponent shall ensure that all heavy trucks are properly maintained and equipped with noise control devices (e.g., muffler) in accordance with manufacturers' specifications at each work site during project construction to minimize construction traffic noise effects on sensitive receptors.</li> <li>Before haul truck trips are initiated during construction season on roads within 90 feet of residences located along haul routes, written notification shall be provided to potentially affected residents identifying the hours and frequency of haul truck trips. Notifications provide contact information for the USACE resident engineer identified above and also identify a mechanism for residents to register complaints with the appropriate jurisdiction if haul truck noise levels are overly intrusive or occur outside the exempt daytime hours for the applicable jurisdiction.</li> </ul>	
<b>Impact 3.10-2:</b> Construction activities associated with the Modified Project could generate excessive groundborne vibration or groundborne noise levels in the vicinity of the Modified Project.	PS	<b>Mitigation Measure 3.10-1</b> (See text under Impact 3.10-1)	SU
<b>Impact 3.10-3:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative noise impacts.	LTS	None required.	NA
<b>3.11 Transportation</b>			
<b>Impact 3.11-1:</b> Construction of the Modified Project could conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.	PS	<p><b>Mitigation Measure 3.11-1: Traffic Safety Plan.</b> Before the start of each construction season, the primary contractors for construction shall hire a licensed traffic engineer to develop a coordinated construction traffic safety and control plan in accordance with the latest Manual on Uniform Traffic Control Devices (MUTCD) standards and requirements to minimize the simultaneous use of roadways by different construction contractors for material hauling and equipment delivery to the extent feasible and to avoid and minimize potential traffic hazards on local roadways during construction. Items (a) through (i) of this mitigation measure shall be integrated as terms of the construction contracts.</p> <p>(a) The plan shall outline phasing of activities and the use of multiple routes to and from off-site locations to minimize the daily amount of traffic on individual roadways.</p> <p>(b) The plan shall provide bicycle and pedestrian detours to allow for continued use by bicycle and pedestrian commuters and maintain safe pedestrian and bicyclist access around the construction areas at all times. Construction areas shall be secured as required by the applicable jurisdiction to prevent pedestrians and bicyclists from entering the work site, and all stationary equipment shall be located as far away as possible from areas where bicyclists and pedestrians are present.</p> <p>(c) The construction contractors shall develop traffic control plans (TCP) for the local roadways that would be affected by construction traffic. The TCP must be designed and stamped by a licensed traffic engineer in accordance with the latest MUTCD requirements. The TCP must be submitted by the contractor with the City's road encroachment permit application for review and approval. Before the initiation of construction-related activity involving high volumes of traffic, the plan shall be submitted for review by the agency of local jurisdiction (San Joaquin County, City of Stockton, or Caltrans [if applicable]) that has responsibility for roadway safety at and between the Modified Project sites. The contractor shall train construction personnel in appropriate safety measures as described in the plan and shall</p>	SU

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**TABLE ES-1  
SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.11 Transportation (cont.)</b>			
Impact 3.11-1 (cont.)		<p>implement the plan. The plan shall include the prescribed locations for staging equipment and parking trucks and vehicles. Provisions shall be made for overnight parking of haul trucks to avoid causing traffic or circulation congestion. The plan shall call for the following elements:</p> <ul style="list-style-type: none"> <li>○ Posting warnings about the potential presence of slow-moving vehicles.</li> <li>○ Using traffic control personnel when appropriate.</li> <li>○ Placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones and in accordance with city/county requirements.</li> <li>○ The TCP shall include signs placed on March Lane west of I-5 advising the public of traffic delays due to construction and the tentative timeline of the project. Language to be placed on the signs must be approved by the City's traffic engineer.</li> </ul> <p>(d) All operations shall limit and expeditiously remove, as necessary, the accumulation of Modified Project-generated mud or dirt from adjacent public streets at least once every 24 hours if substantial volumes of soil are carried onto adjacent paved public roadways during construction.</p> <p>(e) If needed to comply with Caltrans requirements, a transportation management plan shall be prepared and submitted to Caltrans to cover any points of access from the state highway system for haul trucks and other construction equipment.</p> <p>(f) Before the start of the first construction season, the construction contractor shall obtain a road encroachment permit with San Joaquin County and the City of Stockton to address permit conditions set for the maintenance and repair of affected roadways resulting from increased truck traffic. The road encroachment permit conditions and requirements shall ensure that the affected roadways are repaired to a level that is equivalent to their pre-project condition. Such an agreement may require the contractor to take pre-project photos of existing conditions. Upon project completion, the City or County shall develop a punch list of requirements to ensure that pre-project conditions are restored.</p> <p>(g) Before the Modified Project construction begins, the contractor shall provide notification of Modified Project construction to all appropriate emergency service providers in San Joaquin County, Stockton, Lathrop, and Manteca and shall coordinate with providers throughout the construction period to ensure that emergency access through construction areas is maintained.</p> <p>(h) The contractor shall avoid neighborhoods and school zones to the maximum extent feasible when determining haul routes. When possible, hauling in school zones shall be limited to the period of summer breaks to avoid noise and traffic impacts on the schools. Any damage to residential roadways during construction shall be mitigated per the requirements outlined in the traffic safety and control plan.</p> <p>(i) During preliminary engineering and design, the Modified Project proponent shall provide notification of Modified Project construction to all appropriate railroads in the Modified Project area and shall coordinate with all railroads to minimize freight and passenger service disruptions. Prior to the start of construction, the Modified Project Proponent's contractor shall contact the general manager of affected railroads to coordinate truck haul route traffic and schedule an on-site meeting.</p>	
Impact 3.11-2: Construction of the Modified Project could conflict or be inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b).	LTS	None required.	NA

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**TABLE ES-1**  
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.11 Transportation (cont.)</b>			
<b>Impact 3.11-3:</b> Construction of the Modified Project could result in inadequate emergency access.	PS	<b>Mitigation Measure 3.11-1</b> (See text under Impact 3.11-1)	SU
<b>Impact 3.11-4:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative transportation impacts.	LTS	None required.	NA
<b>3.12 Tribal Cultural Resources</b>			
<b>Impact 3.12-1:</b> The Modified Project could cause a substantial adverse change in the significance of a tribal cultural resource as defined in PRC Section 21074.	PS	<b>Mitigation Measure 3.12-1: Cultural Resources Awareness Training</b> (See text under Section 3.7, Cultural and Paleontological Resources, Impact 3.7-2, Mitigation Measure 3.7-1) <b>Mitigation Measure 3.12-2: Inadvertent Discovery of Cultural Materials</b> (See text under Section 3.7, Cultural and Paleontological Resources, Impact 3.7-2, Mitigation Measure 3.7-2) <b>Mitigation Measure 3.12-3: Inadvertent Discovery of Human Remains</b> (See text under Section 3.7, Cultural and Paleontological Resources, Impact 3.7-3. Mitigation Measure 3.7-3)	SU
<b>Impact 3.12-2:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts on tribal cultural resources.	PS	None currently available.	SU
<b>3.13 Wildfire</b>			
<b>Impact 3.13-1:</b> The Modified Project could substantially impair an adopted emergency response plan or emergency evacuation plan.	LTS	None required.	NA
<b>Impact 3.13-2:</b> The Modified Project could, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.	PS	<b>Mitigation Measure 3.13-1: Worker Health and Safety Plan.</b> A worker health and safety plan shall be prepared before the start of construction that identifies, at a minimum, all contaminants that could be encountered during construction; all appropriate worker, public health, and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan shall describe actions to be taken if hazardous materials are encountered on-site, including protocols for handling hazardous materials, preventing their spread and emergency procedures to be taken in the event of a spill.	LTS
<b>Impact 3.13-3:</b> The Modified Project could require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.	LTS	None required.	NA

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**TABLE ES-1**  
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
<b>3.13 Wildfire (cont.)</b>			
<b>Impact 3.13-4:</b> The Modified Project could expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.	LTS	None required.	NA
<b>Impact 3.13-5:</b> The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to wildfire.	LTS	None required.	NA

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# CHAPTER 1

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## Introduction

### 1.1 Introduction and Background

This Draft Supplemental Environmental Impact Report (SEIR) is a supplement to the San Joaquin River Basin, Lower San Joaquin River (LSJR) Integrated Interim Feasibility Report/Environmental Impact Statement/Environmental Impact Report (State Clearinghouse No. 2010012027), which was prepared by the San Joaquin Area Flood Control Agency (SJAFC), Central Valley Flood Protection Board (CVFPB), and U.S. Army Corps of Engineers (USACE). SJAFC served as the lead agency under the California Environmental Quality Act (CEQA) for that previous Environmental Impact Report (EIR), which was certified by the SJAFC Board of Directors on November 8, 2018, and is referred to in this Draft SEIR as the “2018 LSJR FR/EIS/EIR.” This Draft SEIR incorporates the 2018 LSJR FR/EIS/EIR by reference, which can be found in full at: [https://www.spk.usace.army.mil/lower\\_sj\\_river/](https://www.spk.usace.army.mil/lower_sj_river/). The Department of Water Resources (DWR) and CVFPB are responsible agencies under CEQA for this Draft SEIR.

The purpose of the 2018 LSJR FR/EIS/EIR was to investigate the extent of federal interest in a range of alternative plans to reduce flood risk in the cities of Stockton, Lathrop, and Manteca, as well as surrounding urbanizing areas. The objectives were to meet the requirements of California Senate Bill (SB) 5 of 2007, the Central Valley Flood Improvement Act, to achieve a 200-year level of protection for urban and urbanizing areas, focusing on a reduction of flood risk in the City of Stockton. The 2018 LSJR FR/EIS/EIR considered seven alternative plans aimed at reducing flood risk in the City of Stockton and surrounding urbanizing areas. The 2018 LSJR FR/EIS/EIR described a suite of structural levee improvement measures under the various alternatives and, as a joint NEPA/CEQA document, analyzed the alternatives’ potential impacts on the following resource areas: Geology and Geomorphology, Seismicity, Soils and Mineral Resources, Hydrology and Hydraulics, Water Quality, Groundwater, Wetlands and Other Waters of the United States, Air Quality and Greenhouse Gas Emissions, Vegetation, Wildlife, Fisheries, Special-Status Species, Socioeconomics and Environmental Justice, Land Use, Transportation, Utilities and Public Services, Recreation, Aesthetics, Noise, Public Health and Environmental Hazards, and Cultural Resources (including Tribal Cultural Resources).

The 2018 LSJR FR/EIS/EIR identified Alternative 7a as the recommended alternative. The LSJR Reach TS\_30\_L Levee Improvement Project (TS\_30\_L, or Modified Project), evaluated in this SEIR is a sub-reach within Alternative 7a. The structural measures proposed for the Modified Project, which are described in Chapter 2, *Project Description*, were discussed in the 2018 LSJR FR/EIS/EIR, but certain elements of Alternative 7a, such as staging areas, haul routes, mitigation sites, and the final project footprint, were not analyzed in the 2018 LSJR FR/EIS/EIR at a project-

level of detail, because the specific project design was not available at that time. In addition, impacts to some resource areas in the 2018 LSJR FR/EIS/EIR (e.g., biological and cultural resources) were based on a desktop analysis and required further surveys to be completed prior to the proposed action/description being implemented. Further, certain resource areas (i.e., Energy, Wildfire) were not addressed in the 2018 LSJR FR/EIS/EIR, as they were added to the CEQA Appendix G Guidelines after release of the draft document to the public for review. Therefore, this Draft SEIR addresses the minor additions or changes to the project footprint and adds resource-specific analyses, as required.

## 1.2 Type of EIR

The lead agency for a project under CEQA may prepare a supplement to a previously certified EIR if certain conditions are met. Specifically, if the requirements to prepare a subsequent EIR are met, then a supplemental EIR may be prepared if “only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation” (*Guidelines for Implementation of the California Environmental Quality Act* [CEQA Guidelines] Section 15163).

In accordance with these requirements, this Draft SEIR supplements the previously certified 2018 LSJR FR/EIS/EIR and addresses proposed modifications, changed circumstances, and new information not described in that prior environmental document.

This Draft SEIR provides additional information needed to make the 2018 LSJR FR/EIS/EIR, as supplemented, adequate for the Modified Project. Consistent with CEQA Guidelines Section 15163, this Draft SEIR contains only the information needed to analyze the Modified Project, including changed circumstances and new information requiring additional environmental review. Where information and analysis provided in the 2018 LSJR FR/EIS/EIR is applicable to the Modified Project, it is summarized and/or incorporated by reference. An electronic version of the 2018 LSJR FR/EIS/EIR and addenda is available at:

[https://www.spk.usace.army.mil/lower\\_sj\\_river/](https://www.spk.usace.army.mil/lower_sj_river/)

## 1.3 Purpose of This Supplemental EIR

The operational characteristics of Alternative 7a as described in the 2018 LSJR FR/EIS/EIR — the structural measures, construction methods, and construction footprint proposed to improve the levee—are not substantively changed for the Modified Project, with the exception of additional project-specific details related to the location of mitigation, staging, and borrow sites and associated haul routes to the Modified Project site. This Draft SEIR provides information about and an impact analysis for the elements of the Modified Project, which include additional project-specific modifications required for the levee improvement activities described for the TS\_30\_L

levee reach and required biological mitigation under Alternative 7a. This Draft SEIR does all of the following:

- Addresses the potential new or potentially more severe environmental impacts related to developments in project design (e.g., details related to the location of staging and borrow sites, mitigation sites, and haul routes) and project-level, resource-area-specific surveys.
- Recommends mitigation measures to avoid or minimize any new or substantially more severe environmental impacts, if applicable, to reduce them to less-than-significant levels.
- Updates the Alternative 7a impact analyses and mitigation measures where environmental or regulatory conditions have changed since certification of the 2018 LSJR FR/EIS/EIR.

### 1.3.1 Intended Uses of this Supplemental EIR

SJAFCA is the lead agency for complying with CEQA (Public Resources Code Section 21000 et seq., as amended) and the CEQA Guidelines (California Code of Regulations, Title 14). SJAFCA has prepared this Draft SEIR to provide the public and responsible and trustee agencies with information about the potential environmental effects of the Modified Project. Chapter 2 presents a list of all anticipated permits and approvals required for the Modified Project.

As described in CEQA Guidelines Section 15121(a), an EIR is a public information document that assesses potential environmental effects of a proposed project and identifies mitigation measures and alternatives to the proposed project that would reduce or avoid adverse environmental impacts. CEQA requires state and local government agencies to consider the environmental consequences of projects over which they have discretionary authority. As lead agency, SJAFCA will consider certifying the Final SEIR for the Modified Project in accordance with CEQA requirements.

This Draft SEIR tiers from and incorporates by reference the 2018 LSJR FR/EIS/EIR, which provided program-level environmental review of Alternative 7a. This Draft SEIR therefore focuses solely on the new effects related to project-specific modifications to levee design, project-level resource-specific surveys, and project-level details of three potential biological mitigation sites required for the TS\_30\_L levee improvements. In addition, this Draft SEIR provides program-level analysis of two additional potential biological mitigation sites that could be developed as mitigation for biological impacts related to the TS\_30\_L levee reach or related to a future phase of work under Alternative 7a. A future environmental document may be needed to assess project-level impacts related to these two program-level biological mitigation sites; however, that future environmental document would tier from and incorporate by reference any applicable elements of this SEIR, such as direct and indirect impacts, mitigation measures, cumulative impacts, alternatives, or a statement of overriding considerations.

## 1.4 Environmental Review and Approval Process

Preparation of an SEIR involves multiple steps, during which the public is provided the opportunity to review and comment on the content of the SEIR, the scope of the analyses, results and conclusions presented, and the overall adequacy of the document to meet the substantive requirements of CEQA and provide full disclosure of the potential environmental consequences

of implementing the Modified Project and alternatives. The following discussion describes the major steps in the environmental review process that are applicable to this Draft SEIR.

### 1.4.1 Notice of Preparation

In accordance with CEQA Guidelines Sections 15063 and 15082, SJAFCA originally prepared and published a Notice of Preparation (NOP) of an EIR on January 14, 2010 (see Addendum D of the 2018 LSJR FR/EIS/EIR). The NOP was circulated to the public and to federal, state, and local agencies and other interested parties to solicit comments on the proposed Project. The public comment period for the NOP closed on February 15, 2010. In addition to the public and agency comment period, a public scoping meeting was held on January 27, 2010, at the University of the Pacific's Regents Dining Room.

Concerns raised in response to the NOP and oral comments received at the scoping meetings were considered during preparation of the 2018 LSJR FR/EIS/EIR and this Draft SEIR. The scoping comments were included in Addendum D of the 2018 LSJR FR/EIS/EIR. Preparation of this Draft SEIR does not require the release of another NOP.

### 1.4.2 Draft Supplemental EIR

This Draft SEIR is available to federal, state, and local agencies and interested organizations and individuals who may want to review and comment on the analysis in this document. Publication of the Draft SEIR marks the beginning of a 45-day public review period. The 45-day public review period for the Modified Project extends from May 31, 2023, through July 17, 2023, ending at 5 p.m. During the public comment period, written comments should be delivered to:

Omar Al-Hindi, Executive Project Manager  
San Joaquin Area Flood Control Agency (SJAFCA)  
22 E. Weber Avenue, Suite 301  
Stockton, CA 95202-2317  
209.937.8525  
[ceqacomments@sjafca.org](mailto:ceqacomments@sjafca.org)

The Draft SEIR is available for public review at the Cesar Chavez Central Library, located at 605 North El Dorado Street, Stockton, CA 95202-1907. An electronic copy of the document is available on SJAFCA's website via the following link:

<https://www.sjafca.org/maps/lower-san-joaquin-river-project>

SJAFCA will also conduct both an in-person and a virtual public meeting in coordination with USACE to receive comments on the adequacy of the analysis included in the Draft SEIR. The meetings will be held on:

**Date:** June 26, 2023  
**Time:** 11:30 a.m. (virtual); 06:30 p.m. (in-person)  
**Location:** *Virtual public meeting information:*  
URL: <https://bit.ly/LSJRP-TS30L>  
Phone call-in (audio only): +1 (669)-444-9171

Meeting ID: 898 6149 4998  
Passcode: 172773

*Physical address of in-person public meeting:*

Residence Inn by Marriott, Conference Room  
3240 W March Lane  
Stockton, CA 95219-2341

### 1.4.3 Final Supplemental EIR

After this Draft SEIR has been circulated and the public comments and responses to comments have been incorporated, SJAFCA will publish a Final SEIR, which will be submitted to SJAFCA's Board of Directors for formal review and consideration. The Final SEIR will also be made available to the public for review. The Board of Directors will review the Modified Project and its anticipated or potential environmental impacts, as identified in the SEIR, and will decide whether or not to certify the Final SEIR and approve the Modified Project.

If the Board of Directors decides to certify the SEIR, SJAFCA may proceed with the Modified Project. CEQA requires that the lead agency neither approve nor implement a project unless the project's significant environmental effects have been reduced to less-than-significant levels, essentially "eliminating, avoiding, or substantially lessening" the expected impacts, unless specific findings are made. If the lead agency approves the project despite residual significant adverse impacts that cannot be mitigated to less-than-significant levels, the agency must state the reasons for its action in writing. This "Statement of Overriding Considerations" must be included in the record of project approval.

### 1.4.4 Mitigation Monitoring and Reporting Program

CEQA Section 21081.6(a) requires lead agencies to "adopt a reporting and mitigation monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment." All mitigation measures identified in the Final SEIR for the Modified Project, including the applicable mitigation measures from the 2018 LSJR FR/EIS/EIR, will be included in a mitigation monitoring and reporting program, which will identify all compliance measures and responsible parties.

## 1.5 Scope of This Supplemental EIR

### 1.5.1 Level of Review

As discussed in greater detail in Chapter 2, *Project Description*, of this SEIR, the proposed construction and operational aspects of TS\_30\_L are largely the same as those described for Alternative 7a in the 2018 LSJR FR/EIS/EIR. Additional project-specific details have since been developed related to the location of staging and borrow sites and associated haul routes to the Modified Project site. This Draft SEIR supplements the previously certified 2018 LSJR FR/EIS/EIR; it therefore contains only the information needed to analyze the Modified Project, including changed circumstances, proposed modifications, and new information requiring additional environmental review.

## 1.5.2 Summary of Issues Not Addressed Further

According to CEQA Guidelines Section 15163, this Draft SEIR needs to contain only the information needed to analyze the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR are sufficient to evaluate the impacts of the Modified Project, no additional environmental review is warranted. Section 3.2, *Environmental Issues Not Requiring Further Analysis*, summarizes environmental issues for which potential impacts of the Modified Project are adequately addressed in the certified 2018 LSJR FR/EIS/EIR and no further analysis is required.

The Modified Project would not result in new or more severe potentially significant impacts, and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts for many of the resource areas, including: Aesthetics; Air Quality and Greenhouse Gas Emissions; Geology and Geomorphology, Soils and Mineral Resources, and Seismicity; Hazards and Hazardous Materials and Public Safety; Hydrology and Hydraulics; Water Quality; Groundwater; Utilities, Service Systems, and Public Services; and Recreation.

A discussion on how potential impacts from the Modified Project are addressed in the 2018 LSJR FR/EIS/EIR is provided in Chapter 3. In addition, the alternatives analysis, cumulative impacts assessment, and other CEQA issues, as described in the 2018 LSJR FR/EIS/EIR, are still adequate for the Modified Project as described in Chapter 3.

## 1.5.3 List of Issues Considered for Additional Impact Analysis

In light of the environmental issues not addressed further, the following CEQA resource areas are considered in greater detail in a revised impact analysis in this Draft SEIR:

- Agriculture and Forestry Resources
- Biological Resources
- Cultural and Paleontological Resources
- Energy
- Land Use
- Noise and Vibration
- Transportation
- Tribal Cultural Resources
- Wildfire

## 1.6 Assembly Bill 52

On October 1, 2021, Assembly Bill (AB) 52 Tribal Consultation Notices were sent to the following tribes: Buena Vista Me-Wuk, California Valley Miwok, Confederated Villages of Lisjan, Ione Band of Miwok, Muwekma Ohlone, Nototomne/North Valley Yokuts, South Sierra Miwok, Tule River Indian Tribe, United Auburn Indian Community (UAIC), Wilton Rancheria, and Wuksache Eshom. One response was received within 30 days of certified receipt of notices; Ms. Anna Cheng of the United Auburn Indian Community's (UAIC's) Tribal Historic Preservation Department wrote on October 21, 2021 that the majority of the project falls outside the UAIC's geographic area of traditional and cultural affiliations.

## 1.7 Supplemental EIR Organization

This Draft SEIR is organized as follows:

- **Executive Summary.** This chapter presents a summary of the Modified Project description, a description of issues to be resolved, the significant environmental impacts that would result from implementation of the Modified Project, and mitigation measures proposed to reduce or eliminate those impacts.
- **Chapter 1, Introduction.** Chapter 1 includes background information on the Modified Project and describes the intended uses of this SEIR, the environmental review and approval process, and document organization.
- **Chapter 2, Project Description.** Chapter 2 presents an overview of the Modified Project, outlines its objectives, and summarizes the components of the Modified Project and how they relate to Alternative 7a as analyzed in the 2018 LSJR FR/EIS/EIR. The project description also describes subsequent development and approvals for which this Draft SEIR may be used.
- **Chapter 3, Environmental Setting, Impacts, and Mitigation Measures.** This chapter presents a summary of the resource areas for which potential impacts of the Modified Project are adequately addressed in the certified 2018 LSJR FR/EIS/EIR and no further analysis is required. This chapter also provides information about the resource area topics requiring additional CEQA analysis beyond the analysis in the 2018 LSJR FR/EIS/EIR.
- **Chapter 4, References.** This chapter lists all references cited in this Draft SEIR.
- **Chapter 5, Preparers of the Supplemental EIR.** Chapter 5 provides the names of the Draft SEIR authors and consultants, and agencies or individuals consulted during preparation of this Draft SEIR.
- **Appendices.** The appendices include materials that support the findings and conclusions presented in the text of this Draft SEIR.

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# CHAPTER 2

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## Project Description

### 2.1 Background

The City of Stockton and surrounding areas rely upon the Lower San Joaquin River (LSJR) levee system to prevent flooding during high-water events. The 2018 San Joaquin River Basin, Lower San Joaquin River Integrated Interim Feasibility Report/Environmental Impact Statement/Environmental Impact Report (2018 LSJR FR/EIS/EIR), prepared by the San Joaquin Area Flood Control Agency (SJAFCA), Central Valley Flood Protection Board (CVFPB), and U.S. Army Corps of Engineers (USACE), considered in detail seven alternative plans aimed at reducing flood risk in the City of Stockton and surrounding urbanizing areas. The 2018 LSJR FR/EIS/EIR described the environmental resources in the original study area; evaluated the direct, indirect, and cumulative environmental effects of the seven alternative plans; and identified avoidance, minimization, and compensatory mitigation measures. The 2018 LSJR FR/EIS/EIR identified Alternative 7a as the recommended alternative. An electronic version of the 2018 LSJR FR/EIS/EIR and addenda is available at:

[https://www.spk.usace.army.mil/lower\\_sj\\_river/](https://www.spk.usace.army.mil/lower_sj_river/)

Alternative 7a, described further in Section 2.3, proposed to improve flood risk management in the Stockton area by repairing and enhancing the levees that surround Stockton (mitigating flood risk from the Delta Front, the Calaveras River, and the San Joaquin River), and by constructing and operating closure structures on Fourteenmile Slough and Smith Canal. Alternative 7a was divided into five major levee reaches for construction sequencing:

- Calaveras River (Right Bank)
- Calaveras River (Left Bank) and San Joaquin River (Right Bank, North Port)
- Delta Front and Fourteenmile Slough Control Structure
- North Stockton
- Smith Canal Control Structure

The Delta Front represents the greatest risk; therefore, USACE, SJAFCA, and CVFPB determined that the Delta Front levee improvements would be constructed first. Six sub-reaches were identified within the Delta Front reach, with one of the sub-reaches being the LSJR Reach TS\_30\_L Levee Improvement Project (TS\_30\_L, or Modified Project) evaluated in this Draft Supplemental Environmental Impact Report (SEIR).

This chapter is organized as follows:

- Section 2.1, *Background*, gives a brief synopsis of the Modified Project’s background.
- Section 2.2, *Previous Approvals*, discusses the prior approvals for the 2018 LSJR FR/EIS/EIR.
- Section 2.3, *2018 LSJR FR/EIS/EIR Alternative 7a*, discusses Alternative 7a, including the location, purpose and objectives, structural measures and construction methods, staging and borrow sites, and mitigation measures and environmental commitments.
- Section 2.4, *Modified Project: TS\_30\_L*, describes the Modified Project location; purpose and objectives; structural measures, construction methods, and a comparison of the Modified Project to the 2018 LSJR FR/EIS/EIR Alternative 7a; staging areas, borrow and off-haul sites, and access routes; construction schedule; and operations and maintenance.
- Section 2.5, *Required Permits and Approvals for the Modified Project*, discusses the permits and approvals needed for implementation of the Modified Project.

## 2.2 Previous Approvals

The Record of Decision for the Final LSJR FR/EIS/EIR was released by USACE, as the federal lead agency, on February 8, 2019. The SJAFCA Board of Directors certified the document as the California Environmental Quality Act (CEQA) lead agency on November 8, 2018 (SCH No. 2010012027). USACE conducted formal consultation on Alternative 7a with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), receiving Biological Opinions from USFWS on June 13, 2016 (08ESMF00-2015-F-0206) and from NMFS on June 7, 2016 (WCR-2015-3809). For the National Historic Preservation Act Section 106 Consultation, a Programmatic Agreement for Alternative 7a was signed by USACE on May 11, 2016, in coordination with the State Historic Preservation Officer, CVFPB, and SJAFCA. Alternative 7a was also found to be the Least Environmentally Damaging Practicable Alternative under the Clean Water Act. Alternative 7a was authorized for construction in America’s Water Infrastructure Act of 2018 (P.L. 115-270).

## 2.3 2018 LSJR FR/EIS/EIR Alternative 7a

### 2.3.1 Alternative 7a Project Location

Alternative 7a is located in the lower (northern) portion of the San Joaquin River system in the Central Valley of California (**Figure 2-1**). The San Joaquin River originates on the western slope of the Sierra Nevada, emerges from the foothills at Friant Dam, and flows west to the Central Valley, where it is joined by the Fresno, Chowchilla, Merced, Tuolumne, Stanislaus, and Calaveras Rivers as it flows north to the Sacramento–San Joaquin Delta (Delta). Alternative 7a includes levee improvement activities on the western side of north and central Stockton, along Mosher Slough, the Delta Front, the Lower Calaveras River, the Stockton Deep Water Ship Channel, and the San Joaquin River (**Figure 2-2**).

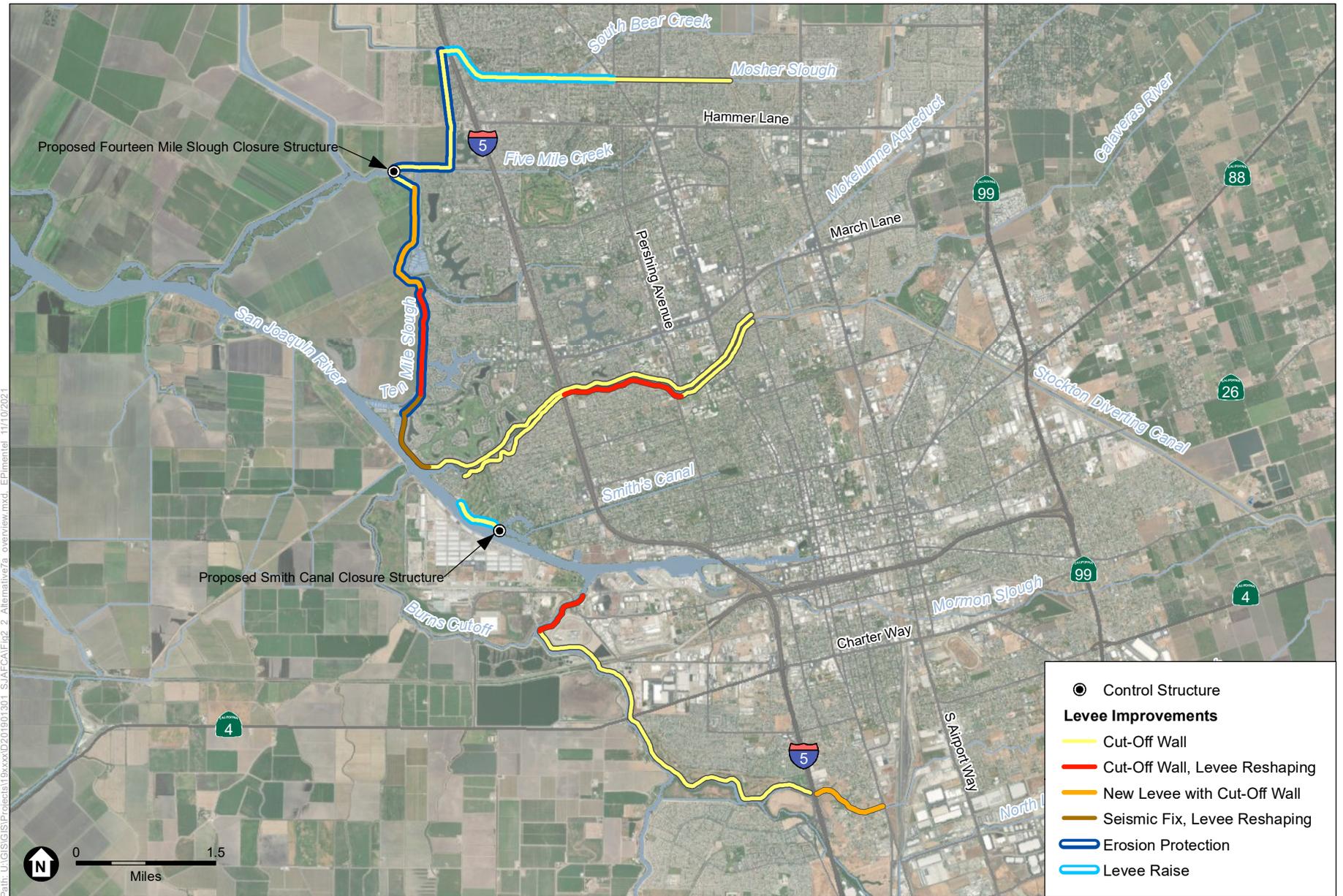


SOURCE: ESRI, 2021; CA DWR, 2021; ESA, 2021

LSJR Reach TS\_30\_L Levee Improvement Project

**Figure 2-1**  
Alternative 7a Regional Project Setting





SOURCE: Maxar, 2020; Esri, 2012; CA DWR, 2021; ESA, 2021

LSJR Reach TS\_30\_L Levee Improvement Project

**Figure 2-2**  
2018 LSJR FR/EIS/EIR Alternative 7a

## 2.3.2 Alternative 7a Purpose and Objectives

The purpose of the 2018 FS/EIS/EIR, of which Alternative 7a was the preferred alternative, was to investigate the extent of federal interest in a range of alternative plans to reduce flood risk in the cities of Stockton, Lathrop, and Manteca and in surrounding urbanizing areas. The objectives were to meet the requirements of California Senate Bill (SB) 5 of 2007, the Central Valley Flood Improvement Act, to achieve a 200-year level of protection for urban and urbanizing areas, focusing on a reduction of flood risk in the City of Stockton.

## 2.3.3 Alternative 7a Structural Measures and Construction Methods

The 2018 LSJR FR/EIS/EIR evaluated the components of Alternative 7a (referred to as structural measures) and construction methods. As seen in Figure 2-2, Alternative 7a includes a suite of structural levee improvement measures (e.g., levee reshaping, erosion protection, levee raising, seismic fixes). Full descriptions of each structural measure along with construction methods, equipment, and site preparation needs for each structural measure are included in the 2018 LSJR FR/EIR/EIR, Sections 4.3.1 through 4.3.12, incorporated here by reference. As defined in the 2018 LSJR FR/EIS/EIR, the structural measures and relevant construction methods applicable to the Modified Project are summarized below.

### **Levee Reshaping**

Also referred to as levee slope reshaping or a “geometric fix” in the 2018 LSJR FR/EIS/EIR, levee reshaping involves grading high levee areas, placing additional soil in depressions, increasing or decreasing levee slope gradients, and compacting existing and new levee material in order to meet USACE levee design criteria for side-slope ratios and crown width. Alternative 7a includes 6 miles of levee reshaping, which occurs both as its own structural measure and as post-cutoff wall installation to rebuild the levee.

### **Site Preparation**

Prior to construction, the waterside levee crest edge would be cleared and grubbed, and the crown and existing landside slope would be stripped to remove up to 2 feet of material, depending on local conditions.

### **Construction**

Suitable material would be placed along the landside levee slope, extending the area of the toe up to 30 feet, to provide the minimum slope and required height and crest width to meet USACE levee design criteria. Extension of the toe may require relocation of landside toe drains and ditches or removal of erosion protection features, which would be reestablished or replaced landward of the improved levee toe and would continue to function as they did before levee improvements were constructed. After completion of construction, levee slopes would be hydro-seeded for erosion control as well.

### ***Equipment***

A hitched scraper, hitched discs, or hitched ripper would be used to loosen existing material in order to achieve a bond between new soil material and the existing levee. Other equipment would include a water truck, a grader, belly dump trucks, a bulldozer, a manual compactor, and a sheepsfoot roller.

### **Cutoff Wall Construction**

Seepage cutoff walls are vertical walls made of material with very low permeability, constructed through the levee crown and embankment and into the levee foundation, to cut off potential through- and under-seepage, as well as reduce seepage forces in the levee embankment. To be effective in reducing under-seepage, cutoff walls usually tie into an impervious sub-layer at a depth of approximately 20 to 70 feet. Alternative 7a includes 20.1 miles of cutoff wall installation.

### ***Site Preparation***

Prior to cutoff wall construction, the site and any staging areas would be cleared, grubbed, and stripped (which would have already occurred prior to levee reshaping activities). The levee would be degraded by approximately one-half its height to provide at least a 30-foot-wide working surface and reduce the risk of hydraulically fracturing the levee embankments with slurry insertion.

### ***Construction***

The levee cutoff walls would be installed by one of two methods under Alternative 7a: one being a conventional open slurry trench and the other being deep soil mixing (DSM). The method chosen for each reach would depend on the depth of the cutoff wall required to address seepage issues.

Conventional slurry methods would require excavating an open trench approximately 3 feet wide to a maximum depth of 80 feet. The trench would then be filled with a bentonite-water slurry mixture to keep it stable prior to backfilling with the permanent wall material, which is created by mixing soil with bentonite. The soil-bentonite is then pushed into the trench, displacing the bentonite-water slurry. After a settlement period, an impervious clay cap is constructed above the cutoff wall and the levee is reconstructed using suitable material to the correct design elevation and slope criteria.

For cutoff walls requiring a depth greater than 80 feet, the DSM method would be used. The DSM method would require large quantities of cement bentonite grout, necessitating development of an on-site batch plant that would receive deliveries of concrete aggregate obtained from local sources, concrete sand, bentonite, and cement to mix the grout on-site. The grout would be transported from the batch plant to the cutoff wall construction areas through high-pressure hoses. Two to four crane-supported mixing augers would then be used to drill through the levee crown and subsurface to a maximum depth of 140 feet, injecting cement bentonite grout and mixing it with native soils. An overlapping series of columns would be drilled (and mixed) with the augers, creating a continuous seepage cutoff wall. The slurry would harden and would then be capped and the levee embankment reconstructed with impervious or semi-impervious soil.

With the use of either cutoff wall installation method, the levee would be hydroseeded once construction was completed.

### ***Equipment***

Equipment used in construction includes a water/bentonite slurry mixing facility, a backhoe or long-reach trench excavator, a bulldozer for moving soil and mixing slurry material, and a water line to produce the slurry product. The water/bentonite slurry is mixed on-site with soil as the final product used during the trench excavation.

### **Erosion Protection Installation**

The purpose of erosion protection measures is to protect levees from erosion that can occur on either the waterside or landside of a levee from high-water events. In the North Stockton area, erosion measures would protect the waterside of Alternative 7a levees against wind and wave runup erosion that could occur if Delta levees to the west were to fail. In central Stockton, erosion measures would protect the landside of the levee on Duck Creek from erosion that could occur if floodwaters moving from the south to the northeast were to wrap around the levee and back up against it. Riprap revetments would be placed from the levee toe to above the water line on approximately 5 miles of appropriate levee reaches under Alternative 7a.

### ***Site Preparation***

No site preparation activities related to erosion protection are described in the 2018 LSJR FR/EIS/EIR.

### ***Construction***

Approximately 75,000 tons of imported quarry stone would be placed to a thickness of 2 feet along the waterside of the Delta Front levee reach. A sand filter would be placed prior to the riprap layer to prevent instability and decreased erosion protection performance.

### ***Equipment***

A dump truck or belly dump would be used to transport rock, and a hydraulic excavator would be used to settle the rock into place. Rock can also be placed from a barge using a hydraulic excavator. A dozer may be necessary following the barge unloading to settle the rock into place.

## **2.3.4 Alternative 7a Staging and Borrow Sites**

Alternative 7a would require a maximum of 1.4 million cubic yards of borrow material and could require 138 acres of borrow lands. The LSJR FR/EIS/EIR stated that detailed studies of Alternative 7a borrow sites had not been completed (as specific volumes to be exported from any single site would be adjusted to match final demands for fill), but that excavation limits on the sites would be in accordance with local regulations and provide a minimum buffer of 50 feet from the edge of the borrow site boundary. From this setback, the excavated slope from existing grade down to the bottom of the excavation would be no steeper than 3H:1V.

Excavated and borrow material created and/or needed for construction activities would be stockpiled at staging areas. For Alternative 7a, it was estimated that 1 acre of staging area would

be required for every mile of levee construction, and that a maximum area of 33 acres would be needed. In addition to construction equipment, staging areas would be used to store materials, including soil and rock and to construct slurry batch plants, where necessary.

Haul trucks, front end loaders, and scrapers would bring materials from borrow and staging areas to the construction site to be spread evenly and compacted according to levee design plans.

### 2.3.5 Alternative 7a Mitigation Measures and Environmental Commitments

The 2018 LSJR FR/EIS/EIR identified a suite of mitigation measures required to reduce the potential impacts of the recommended plan, Alternative 7a. These measures are listed by relevant resource area throughout sections 5.1 through 5.21 in the 2018 LSJR FR/EIS/EIR. In addition, a list of Environmental Commitments, defined as “standardized and compulsory best practices that represent sound and proven methods to avoid or reduce potential effects,” are provided in Table 8-2 on pages 8-8 and 8-9 of the 2018 LSJR FR/EIS/EIR. The 2018 LSJR FR/EIS/EIR also included a Mitigation Monitoring and Reporting Program (see **Appendix A** of this Draft SEIR). However, certain circumstances have changed since publication of the 2018 LSJR FR/EIS/EIR that require revisions and updates to specific mitigation measures.

The 2018 LSJR FR/EIS/EIR identified a number of mitigation measures relevant to Alternative 7a based on an assumption that levees would be determined suitable for a vegetation variance to USACE Engineering Technical Letter (ETL) 1110-2-583 that would allow 25 percent of the trees and shrubs on the lower levee slope and within the waterside easement to remain in place. ETL 1110-2-583 has since been superseded by ETL 1110-2-18, Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures, in which USACE provides its current approach to vegetation on levees. ETL 1110-2-18 requires that levees be clear of woody vegetation that might impair levee integrity or maintenance access; this vegetation free zone (VFZ) extends 15 feet from the waterside and 10 feet from the landside toes of a levee and includes the levee slopes and crown. Variances to these vegetation standards (now referred to as “design deviations” per ETL 1110-2-18) may be granted, but one was not sought for the Modified Project because, during the design phase, it was determined that all vegetation would need to be removed for placement of riprap. This Draft SEIR revisits impact analyses and mitigation measures, as appropriate, to account for this change in design and circumstances.

The 2018 LSJR FR/EIS/EIR also identified a range of potential impacts to biological resources as a result of Alternative 7a, including permanent impacts to giant garter snake upland and aquatic habitat, riparian habitat, shaded riverine aquatic habitat, valley elderberry longhorn beetle habitat, and wetlands, as well as temporary impacts to open water habitat. The mitigation strategy for these impacts is described in Chapter 8, *Recommended Plan*, Section 8.1.2, *Mitigation* in the 2018 LSJR FR/EIS/EIR. Table 8-3 outlines that compensatory mitigation would be required to mitigate these impacts, most of which would be accomplished through the purchase of credits at local mitigation banks, with the exception of elderberry shrubs, which would be transplanted to a 14-acre site adjacent and to the north of the TS\_30\_L levee (which would be acquired in fee for

Alternative 7a mitigation purposes). However, the 2018 LSJR FR/EIS/EIR did not evaluate potential impacts associated with the development of biological mitigation sites at a project-level of detail, and the 14-acre site identified in the 2018 LSJR FR/EIS/EIR is under private ownership. Further, mitigation bank credits for riparian habitat and wetlands impacted by Alternative 7a are not readily available for purchase. Therefore, this Draft SEIR evaluates five potential biological mitigation sites to fulfill the compensatory mitigation requirements of the current and future phases of Alternative 7a. Further details regarding development of compensatory mitigation sites are included in Section 2.4.5, *TS\_30\_L Biological Mitigation Sites*, of this Draft SEIR. The mitigation measures and Environmental Commitments identified in the 2018 LSJR FR/EIS/EIR throughout sections 5.1 through 5.21 and in Chapter 8 would be applied to the Modified Project, as updated and revised in this Draft SEIR. In addition, the 2018 LSJR FR/EIS/EIR relied upon certain resource area-specific Environmental Commitments, listed throughout sections 5.1 through 5.21, to reduce the impacts analyzed in that previous document to a less than significant level. These commitments would also apply to the Modified Project, herein included as project design features, and are listed below:

- Storm Water Pollution Prevention Plan (SWPPP)
- Bentonite Slurry Spill Contingency Plan (BSSCP)
- Spill Prevention, Control and Counter Measure Plan (SPCCP)

## 2.4 Modified Project: TS\_30\_L

The LSJR Reach TS\_30\_L Levee Improvement Project (Modified Project, or TS\_30\_L) is one of six sub-reaches identified within Alternative 7a's Delta Front reach. It includes approximately 1 mile of cutoff wall construction, levee reshaping, and runoff erosion protection of the TS\_30\_L levee, as well as development of a borrow site, barge off-haul site, one of five potential biological mitigation sites, two co-located staging/stockpile areas, and haul routes.

### 2.4.1 TS\_30\_L Project Location

The TS\_30\_L levee is situated within the Alternative 7a project area, approximately 1.25 miles south of the proposed Fourteenmile Slough closure structure (Figure 2-2). The TS\_30\_L levee is a dry-land levee located on the northwestern side of Stockton, bordering North and Central Stockton. It extends just over 1 mile in length and separates the Brookside residential development on the east (landside) and the Wright Elmwood Tract, also known as the Sargent Barnhart Tract, on the west (waterside). The TS\_30\_L levee is bounded on the south by West March Lane and on the north by White Slough/Fourteenmile Slough. In addition to the construction activities at the TS\_30\_L levee, the Modified Project would require development of a borrow site, barge off-haul site, two staging/stockpile areas, haul routes, and one of five potential biological mitigation sites. Collectively, the TS\_30\_L levee, borrow site, barge off-haul site, staging/stockpile areas, haul routes, and potential biological mitigation sites compose the Modified Project site (**Figure 2-3**).

## 2.4.2 TS\_30\_L Purpose and Objectives

The purpose, need, and objectives for the Modified Project remain consistent with those of Alternative 7a: to meet the requirements of SB 5 of 2007, the Central Valley Flood Improvement Act, to achieve a 200-year level of protection for urban and urbanizing areas, focusing on a reduction of flood risk in the City of Stockton.

## 2.4.3 TS\_30\_L Structural Measures and Construction Methods

The Modified Project includes improving approximately 1.1 miles of existing TS\_30\_L levee geometry to: (1) meet current levee design and operation standards (levee reshaping), (2) provide seepage mitigation measures (cutoff wall installation), and (3) add rock riprap and crushed rock slope protection (runoff erosion protection). In addition to the construction activities at the TS\_30\_L levee, the Modified Project would require development of a borrow site, barge off-haul site, two staging/stockpile areas, haul routes, and one of five potential biological mitigation sites. The main components of the Modified Project include the following, which are depicted in **Figures 2-3, 2-4, 2-5, and 2-6**:

- Construction of a 5,850-linear-foot soil bentonite (SB) slurry cutoff wall to mitigate through- and under-seepage and landside instability from Station (STA) 2+50 to STA 61+00.
- Levee reshaping (converting from 2H:1V to 3H:1V slopes on landside and from 3H:1V to 2.5H:1V on waterside) to mitigate landside instability from STA 4+50 to STA 61+00.
- Placement of a 3-inch-thick layer of crushed rock along the existing levee's landside slope and a 2-foot-thick layer of rock riprap on the waterside slope up from the levee toe to the existing top of levee to serve as runoff erosion protection.
- Development of two co-located staging and stockpile areas immediately adjacent to the north and south sides of the Modified Project site.
- Development of a barge off-haul site to allow borrow material to be stored.
- Development of an approximately 124-acre borrow site at Stockton East Water District (SEWD) 9 miles east of the TS\_30\_L site.
- Use of haul routes to/from the staging/stockpile areas and borrow sites, as well as commercial crushed rock sources.
- Development of one of five potential biological mitigation sites to compensate for Modified Project impacts to wetlands and riparian habitat.

The 2018 LSJR FR/EIS/EIR evaluated site preparation activities and construction methods for each structural measure proposed for Alternative 7a; however, further details related to precise design have since been developed for the TS\_30\_L reach. In addition, some elements of the 2018 LSJR FR/EIS/EIR proposed action/description (e.g., staging/stockpile areas, haul routes, biological mitigation sites, final project footprint) were not analyzed in the 2018 LSJR FR/EIS/EIR at a project-level of detail because the specific project design was not available at that time. Further, impacts to some resource areas in the 2018 LSJR FR/EIS/EIR (e.g., biological and



SOURCE: Maxar, 2022; CA DWR, 2022; ESA, 2023

LSJR Reach TS\_30\_L Levee Improvement Project

\* The exact location of the barge off-haul site is yet to be determined.  
The boundary depicted in this figure is a rough estimate based on draft PDF markups.

**Figure 2-3a**  
Modified Project Site



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SOURCE: Maxar, 2022; CA DWR, 2022; ESA, 2023

LSJR Reach TS\_30\_L Levee Improvement Project

\* The exact location of the barge off-haul site is yet to be determined.  
The boundary depicted in this figure is a rough estimate based on draft PDF markups.

**Figure 2-3b**  
Modified Project Site





SOURCE: Maxar, 2021; CA DWR, 2022; ESA, 2022

LSJR Reach TS\_30\_L Levee Improvement Project

**Figure 2-4**  
TS\_30\_L Levee Design Station Numbers

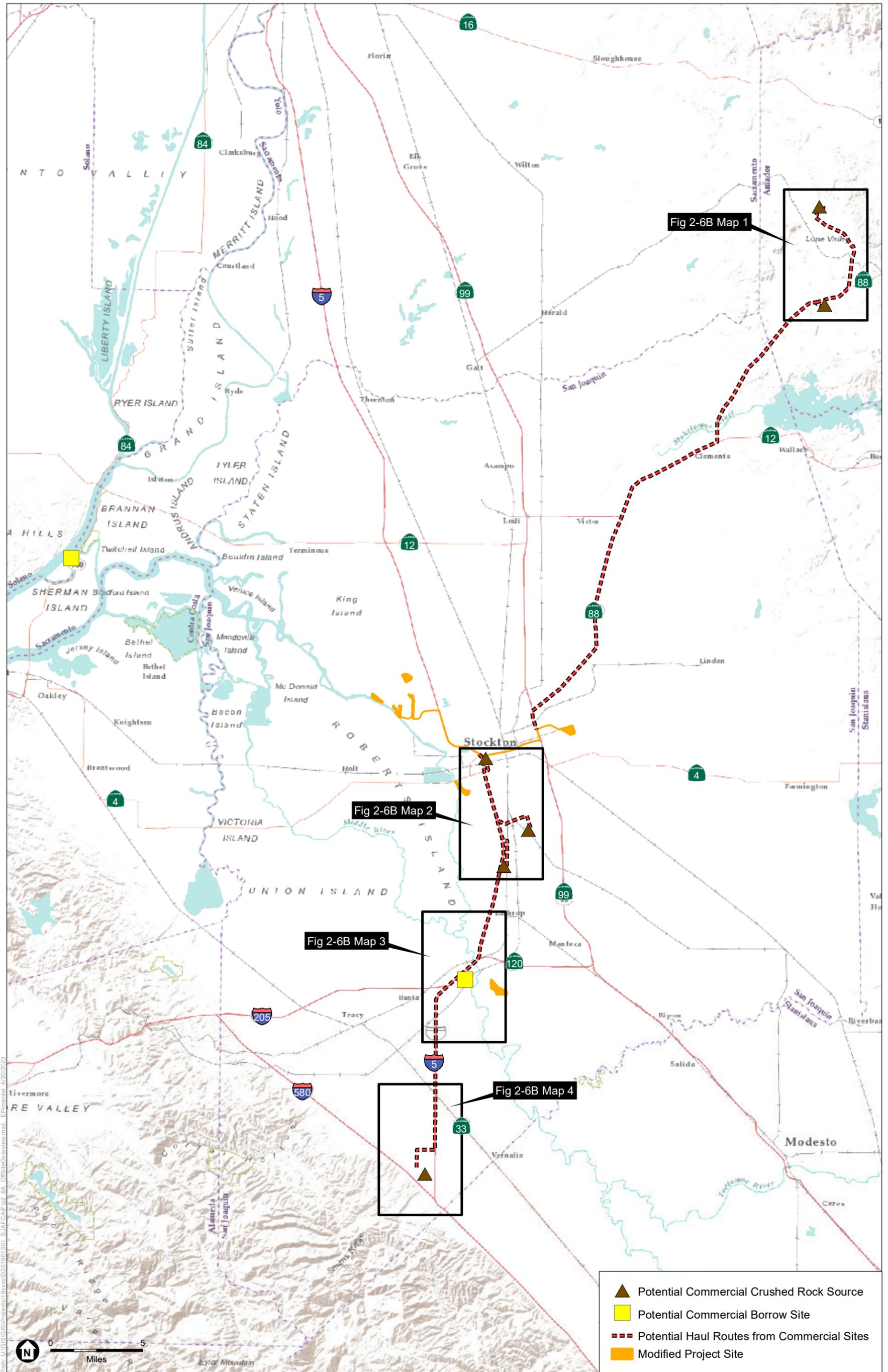


Path: U:\GIS\GIS\Projects\19xxxx\101\_SJA\FCA\Fig2\_5\_Modified Project Components\Structural Measures.mxd, E:\P\m\m\2117\2022

SOURCE: Maxar, 2021; CA DWR, 2022; ESA, 2022

LSJR Reach TS\_30\_L Levee Improvement Project

**Figure 2-5**  
TS\_30\_L Levee Structural Measures

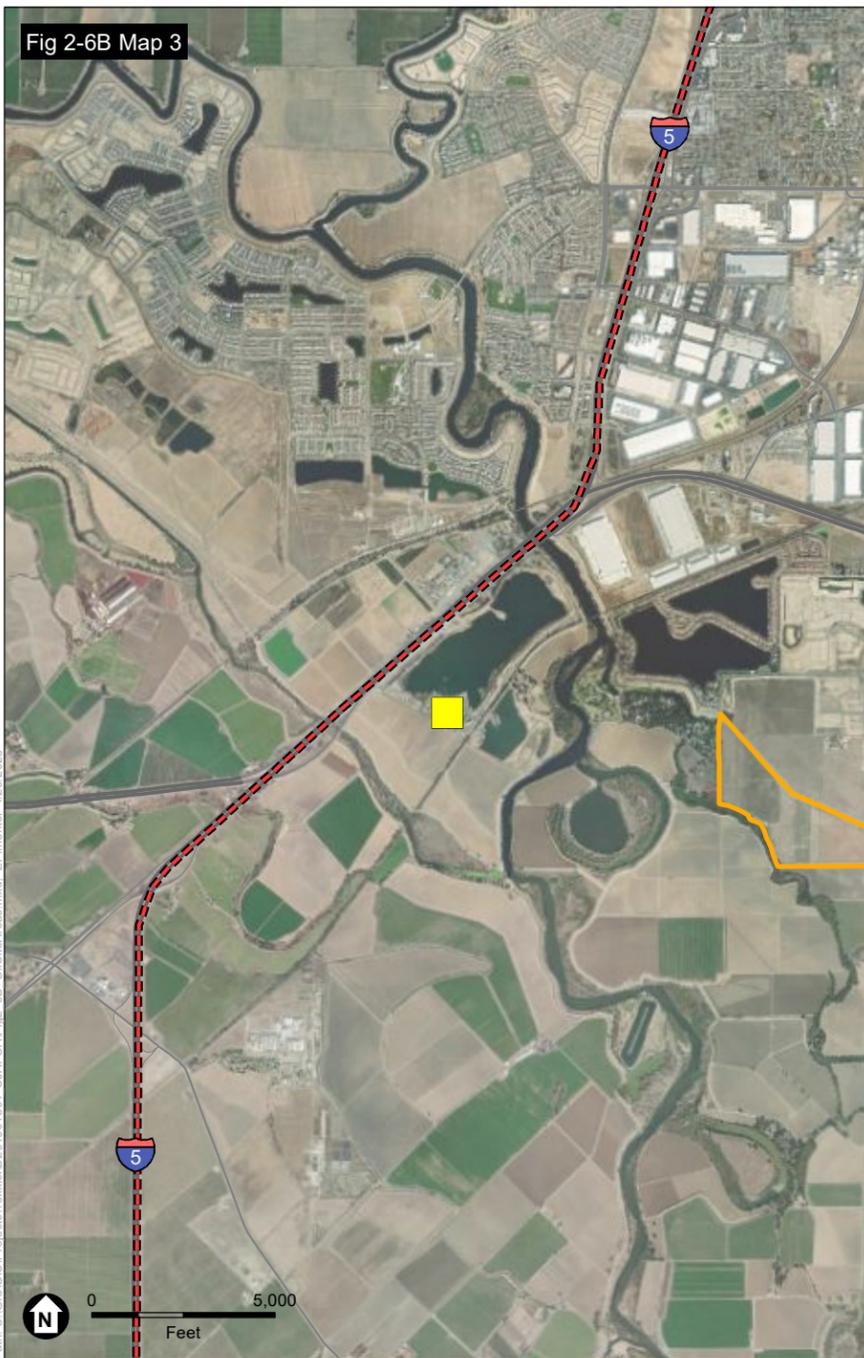
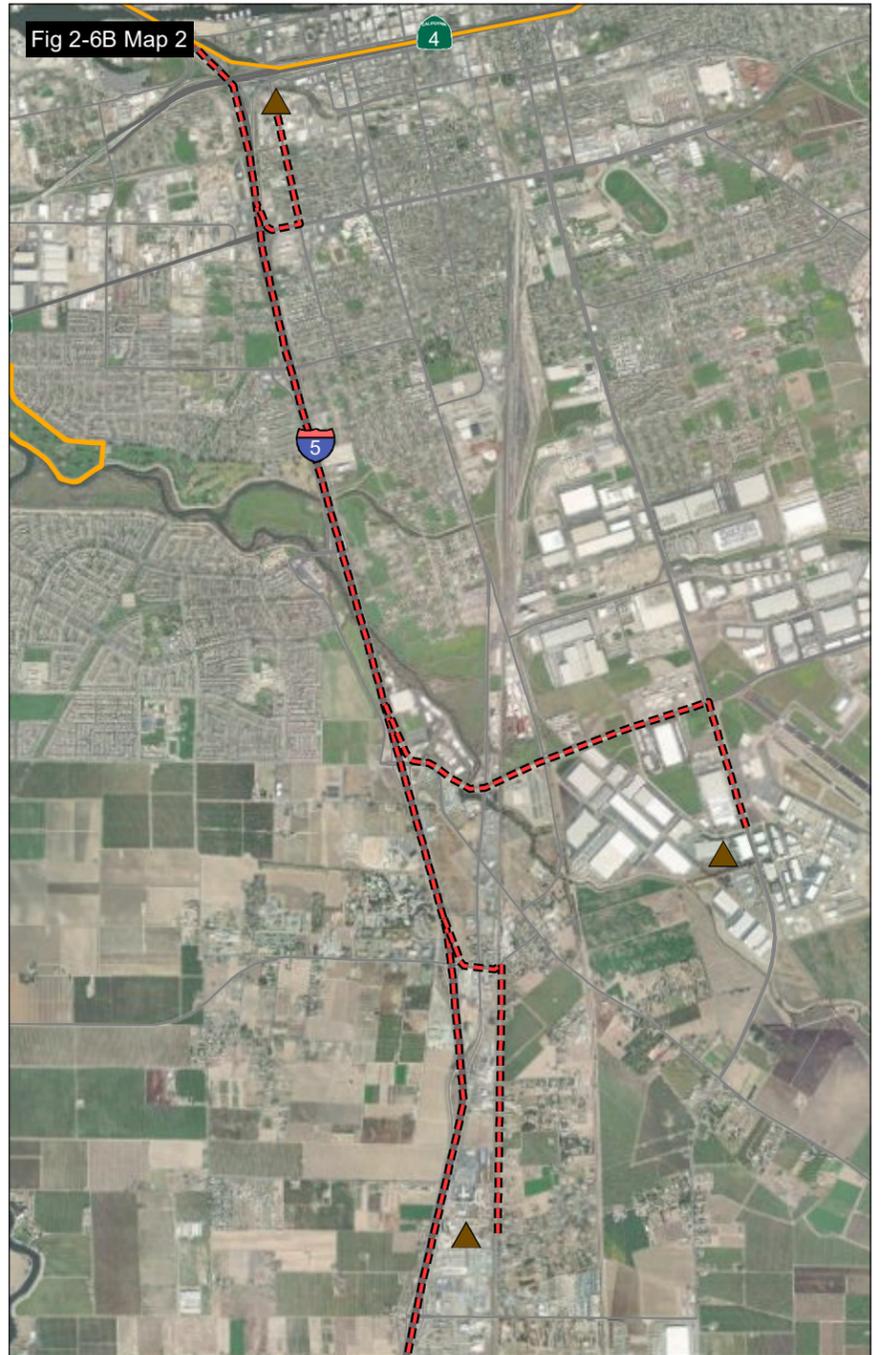
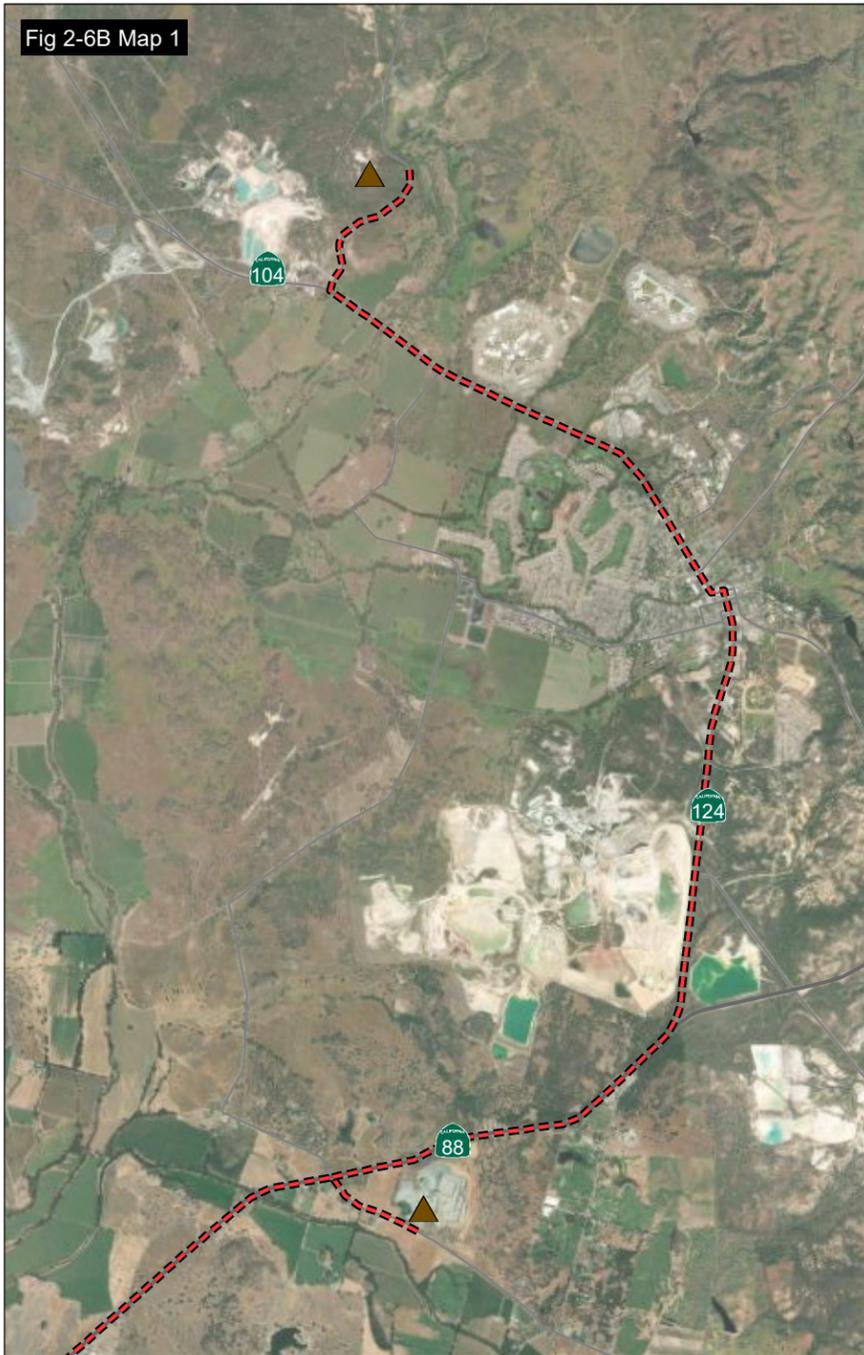


SOURCE: ESRI, 2021; CA DWR, 2022; ESA, 2023

LSJR Reach TS\_30\_L Levee Improvement Project

**Figure 2-6A**  
Potential Commercial Borrow and Crushed Rock Sources and Estimated Haul Routes





- ▲ Potential Commercial Crushed Rock Source
- Potential Commercial Borrow Site
- - - Potential Haul Routes from Commercial Sites
- Modified Project Site

SOURCE: MAXAR, 2022; ESRI, 2012; CA DWR, 2022; ESA, 2023

LSJR Reach TS\_30\_L Levee Improvement Project

**Figure 2-6B**  
Potential Commercial Borrow and Crushed Rock Sources and Estimated Haul Routes



cultural resources) were based on a desktop analysis and required further surveys to be completed prior to the proposed action/description being implemented. The sections below therefore describe design and construction-related details of the Modified Project elements, while incorporating by reference the definitions, descriptions, and construction methods and equipment discussed in the 2018 LSJR FR/EIS/EIR. In addition, for each component of the Modified Project, there is a comparison to Alternative 7a, as applicable, as described in the 2018 LSJR FR/EIS/EIR.

## Levee Reshaping

### **Site Preparation**

The 2018 LSJR FR/EIS/EIR describes site preparation activities, including clearing and grubbing of the waterside levee crest edge and up to 2 feet of topsoil stripping (along with vegetation clearing) on the crown and landside slope. Similarly, the Modified Project would require clearing all vegetation and stripping topsoil on both the waterside and landside levee slopes within the TS\_30\_L levee site boundary depicted in Figure 2-5. This would include removing 25 native trees, a buttonbush thicket and a willow thicket, 15 nonnative trees, and 13 walnut trees (Figure 2-7). Prior to or concurrent with vegetation removal, approximately 10 elderberry shrubs would be transplanted from the Modified Project site to a suitable nearby location (Figure 2-8).

### **Construction**

Levee reshaping activities would take place over cutoff wall installation areas and along the waterside and landside slopes along 5,650 feet of the levee reach (from Station 4+50 to Station 61+00). Based on geotechnical studies that evaluated through- and under-seepage conditions along the existing levee, as well as subsurface soil stability, levee geometry, and existing utilities (see **Appendix B** for the Design Documentation Report), the waterside slope is proposed to be 2.5H:1V and the landside slope 3H:1V north of Station 4+50. South of Station 4+50 the existing levee alignment would remain unaltered in order to protect in place the Sanitary Sewer Force Main. The levee cutoff wall described later in this section (under the heading *Cutoff Wall Construction*) would extend to these locations to ensure the levee remains stable at each respective slope gradient.

The existing levee slopes are 3H:1V on the waterside and 2H:1V on the landside, so reshaping the levee to design standards would require an increased levee footprint. As there are homes directly adjacent to the Modified Project site on the landside, the new levee configuration would require shifting the levee centerline approximately 20 feet toward the waterside. This proposed 20-foot shift to the levee configuration would require realignment of the existing waterside irrigation ditch and would move the landside levee toe 10 feet toward the waterside (providing 15 feet of separation between the landside levee toe and the existing property line). The waterside irrigation ditch would be realigned at six discrete locations to maintain 15 feet from the waterside toe.

In order to attain the required slopes and levee configuration, material would be removed from the landside of the levee to flatten the slope. This material would be stockpiled and reused, and augmented as needed with suitable levee fill material from one of the borrow site locations described in Section 2.4.4, for placement on the levee's waterside to reshape the slope to required design standards. Fill placement for levee reshaping may cause a rise in pore pressures, and as a

result, a reduction in shear strength and potential waterside slope failure during construction. Piezometers would be installed approximately every 500 feet to a depth of -16 feet, generally near the new waterside toe within the near-surface soft foundation soils of the TS\_30\_L levee. Piezometers would be monitored to verify satisfactory levels of soil pore water pressures are not exceeded during grading.

Once complete, the reshaped levee would provide a levee crown width of 20 feet per USACE Sacramento District (SPK) Standard Operating Procedure (SOP)-03. The design levee height would match the existing levee height at 18.6 feet above sea level. In order to meet federal and state levee design criteria, it was determined the levee height for improvements at the TS\_30\_L reach should be the highest elevation between the existing levee height (18.6 feet), the minimum top of levee elevation<sup>1</sup> (14.9 feet), and the elevation of a 200-year flood event plus 3 feet of freeboard<sup>2</sup> (16.6 feet). The existing levee profile is the highest of these possible design elevations and therefore is the recommended levee height for the levee improvements at TS\_30\_L.

A levee road would be reconstructed at the crown to replace the removed road described later in this section (under the heading *Cutoff Wall Construction*), surfaced with a triple chip seal over a 6-inch-thick aggregate base, materials for which would come from a supplier within 30 miles of the Modified Project site. Additional levee access roads, surfaced with 4 feet of aggregate base, would be constructed within both the waterside and landside levee easements, in alignment with the requirements of USACE ETL 1110-2-18, which states that the primary purpose of the VFZ is to provide reliable access for levee maintenance and flood-fighting purposes. The waterside levee access road would require additional levee fill material in order to raise the road elevation above that of the waterside irrigation ditch.

It is anticipated that all soil materials excavated for the levee degrade and cutoff wall trenches would be reused onsite for the creation of the bentonite-soil mixture and placement of material for levee reshaping and would therefore not require disposal. A shortage of soil materials is anticipated, requiring additional materials from a borrow site.

### **Equipment**

The type and usage of equipment for the Modified Project is the same as that described in the 2018 LSJR FR/EIS/EIR, including hitched scrapers, hitched discs, or hitched rippers; water trucks; graders; belly dump trucks; manual compactors; etc.

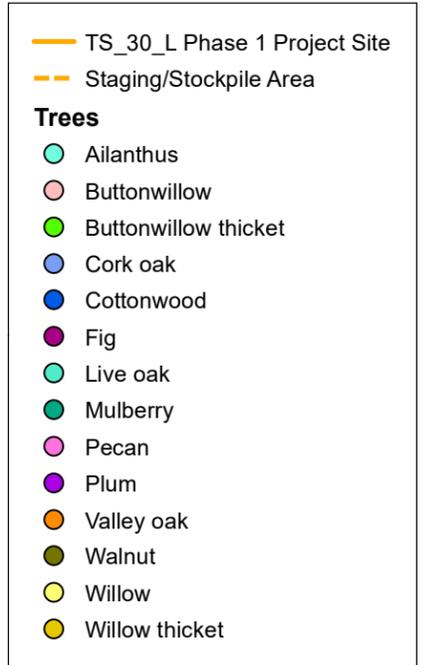
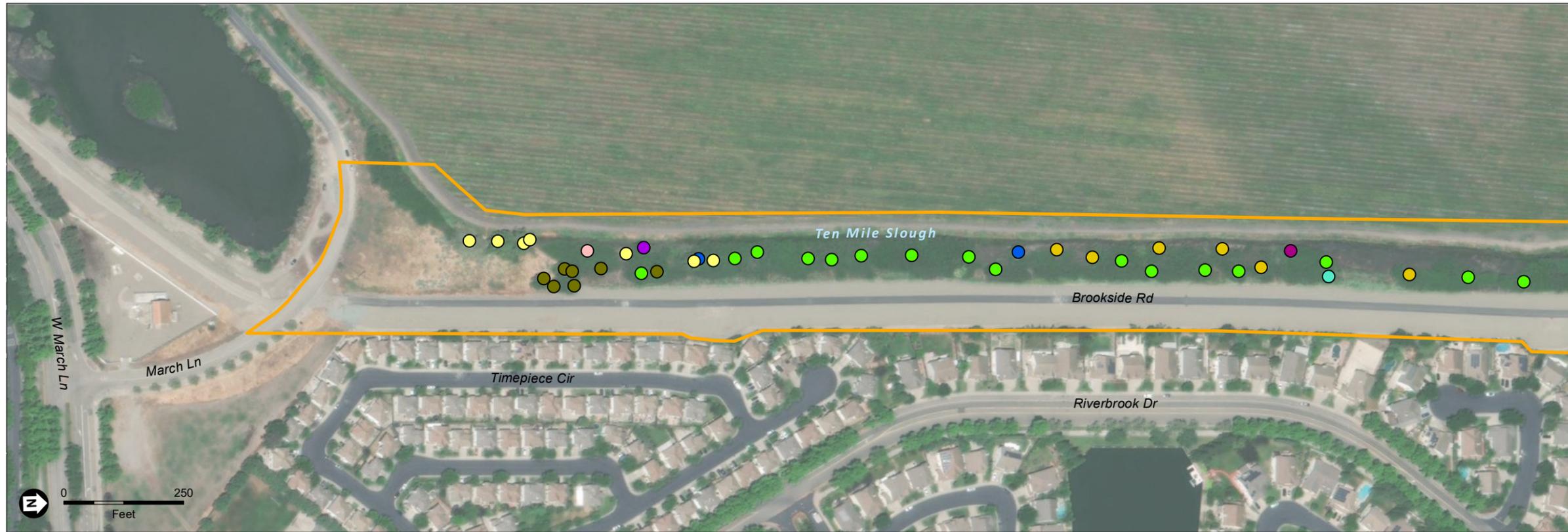
### **Comparison to 2018 LSJR FR/EIS/EIR Alternative 7a**

The 2018 LSJR FR/EIS/EIR described levee reshaping activities as occurring mainly on the crest and landside of levees (e.g., vegetation removal, topsoil stripping, fill placement), but the local context for the TS\_30\_L reach, including a change to the existing levee slopes and the location of nearby homes, requires these activities to occur on the waterside. As TS\_30\_L is a dry land levee,

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<sup>1</sup> Minimum top of levee (MTOL) refers to a levee height based on the USACE-authorized design profile and would maximize the net benefits of the project. A levee over this height would, by nature, provide even more flood protection than is required.

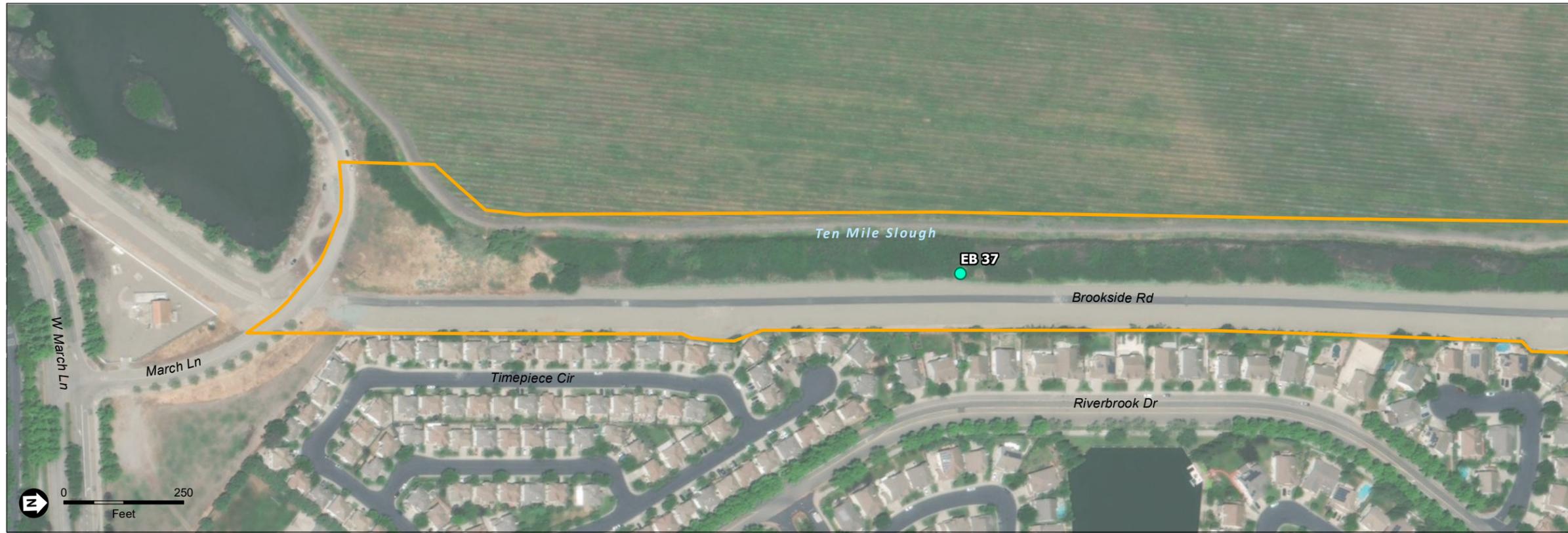
<sup>2</sup> A 200-year flood is a flood event with a magnitude that has a 1 in 200 chance (0.5 percent probability) of occurring in any given year. Adding three feet of freeboard provides for potential estimated sea level rise conditions to the year 2070.



SOURCE: Maxar, 2020; CA DWR, 2021; ESA, 2021

LSJR Reach TS\_30\_L Levee Improvement Project

**Figure 2-7**  
Tree Locations Proposed for Removal



- TS\_30\_L Phase 1 Project Site
- - - Staging/Stockpile Area
- Elderberry Shrub Location

SOURCE: Maxar, 2020; CA DWR, 2021; ESA, 2021

LSJR Reach TS\_30\_L Levee Improvement Project

**Figure 2-8**  
Elderberry Shrubs Proposed for Transplantation

the construction equipment, intensity, and methods would not change whether this work happens on the landside or waterside. In addition, development of levee access roads was not discussed in the 2018 LSJR FR/EIS/EIR, which would require additional material (triple chip seal and aggregate) but would not change the footprint of the work or equipment used. These minor modifications would occur within the levee easement and would not change the extent of the footprint analyzed for the levee reshaping activities as described in the 2018 LSJR FR/EIS/EIR.

## Cutoff Wall Construction

### **Site Preparation**

As described in the 2018 LSJR FR/EIS/EIR, for the Modified Project, the work area would be cleared, grubbed, and stripped prior to construction activities. The existing levee road would be removed, and the levee would be degraded to provide a sufficient working surface and reduce the risk of hydraulically fracturing the levee embankment from the insertion of slurry fluids. Materials created from levee degrade activities would be hauled to the staging/stockpile area on the north side of the Modified Project site, shown in Figures 2-3 and 2-5. The entire length of the levee would be degraded at once to an elevation of 10.5 feet above sea level<sup>3</sup> from the levee's current height of 18.6 feet above sea level (which equates to an approximate one-third degrade of the levee's current height). The levee degrade would provide a minimum working surface width of 55 feet, along with two truck turnouts at the degrade elevation, each 50 feet long and 35 feet wide. Slurry ponds (areas for preparation, storage, and pumping of the slurry material) would be installed on the waterside of the levee within the construction footprint.

### **Construction**

Cutoff wall design was based on geotechnical studies that evaluated through- and under-seepage conditions along the existing levee, as well as subsurface soil stability, levee geometry, and existing utilities (Appendix B). Based on this information, the cutoff wall would be located at the centerline of the existing levee from Station 2+50 to 4+50 and would be located 10 feet towards the water side from the existing levee centerline from Station 4+50 to 61+00. The seepage cutoff walls would be constructed using an open slurry trench (as described in Section 2.3.3). An initial clay clap would be installed to homogenize and stabilize the working surface for the slurry trench, 3 feet deep and 12 feet wide, with 1H:1V side slopes. An open trench for the slurry material would then be excavated to 30 inches wide, to a maximum depth of 42 feet below sea level (-42 feet). Trench material would be stored at the staging/stockpile areas and impervious levee fill materials (i.e., materials to create a temporary bentonite-water slurry and permanent bentonite-soil mixture, as described in Section 2.3.3) would be hauled to the site from the staging/stockpile areas and/or one of the borrow site locations described in Section 2.4.4, *TS\_30\_L Staging, Borrow Sites, Barge Off-Haul Site, and Access/Haul Routes*, to backfill the trench. The cutoff wall from Station 2+50 to 4+50 would be 30 inches wide, 200 feet in length, and installed to a depth of -21 feet. The cutoff wall from Station 4+50 to Station 51+50 would be 30 inches wide, 4,700 feet in length, and installed to a depth of -42 feet. The cutoff wall from Station 51+50 to 61+00 would be 30 inches wide, 950 feet in length, and installed to a depth of -25 feet.

<sup>3</sup> All vertical measurements for the Modified Project components (e.g., levee heights, cutoff wall depths) presented in this document are based on the North American Vertical Datum of 1988 (NAVD88), which is the datum established for surveying vertical height above mean sea level in the United States of America.

Following construction of the soil bentonite cutoff wall, a permanent clay cap would be installed, materials for which would be hauled from the stockpile area or borrow site, prior to rebuilding and reconfiguring the levee and reinstalling the levee road, as described in Section 3.2.

### **Equipment**

The type and usage of equipment for the Modified Project is similar to that described in the 2018 LSJR FR/EIS/EIR, including a water/bentonite slurry mixing facility, concrete pumps, backhoes, long-reach trench excavators and/or hydraulic excavators, and bulldozers.

### **Comparison to 2018 LSJR FR/EIS/EIR Alternative 7a**

The 2018 LSJR FR/EIS/EIR described two potential cutoff wall construction methods, one being a conventional open slurry trench, and the other being DSM. Under the Modified Project, the former of these two methods would be used in a similar fashion as described in the previous document with a couple of exceptions. The initial clay cap proposed for current work was not described in the 2018 LSJR FR/EIS/EIR, but disturbance to the same amount of area was described in the form of the levee degrade. Also, location of slurry ponds was not addressed in the 2018 LSJR FR/EIS/EIR, but these would remain within the overall construction footprint and easement described in the previous document. All other construction methods, equipment, and cutoff wall dimensions for the Modified Project are consistent with the range of activities and dimensions described in the LSJR FR/EIS/EIR.

## **Erosion Protection Installation**

### **Site Preparation**

No additional site preparation is needed for erosion protection installation activities, as vegetation removal and stripping would have already occurred for levee reshaping and cutoff wall construction work.

### **Construction**

To protect against runoff erosion, the waterside of the levee would be covered with 2 feet of 12-inch rock riprap and the landside of the levee would be covered with 3 inches of  $\frac{3}{4}$ -inch crushed rock from the existing levee crown hinge point down to the new levee toe. The current levee slopes are graveled for the same purpose, so the existing crushed rock would be stored at the staging/stockpile areas for reuse. Any additional crushed rock required for landside protection and rock riprap required for waterside protection would be hauled in via truck from a commercial source within approximately 50 miles of the Modified Project site, as described in Section 2.4.4. The levee slopes would not be hydroseeded for erosion control, as was discussed in the 2018 LSJR FR/EIS/EIR and summarized in Section 2.3.3, under the heading *Cutoff Wall Construction*.

### **Equipment**

The type and usage of equipment for the Modified Project is the same as that described in the 2018 LSJR FR/EIS/EIR, including long-reach trench excavators and/or hydraulic excavators and bulldozers, etc.

### **Comparison to 2018 LSJR FR/EIS/EIR Alternative 7a**

Erosion protection measures discussed in the 2018 LSJR FR/EIS/EIR included placement of quarry stone to a thickness of 2 feet along the waterside of the Delta Front levee reach, as well as placement of a sand filter prior to the riprap rock layer, from the toe of the levee to above the water line. Existing crushed rock on the levee slopes is to be stockpiled and reused to the extent feasible, so placement of crushed rock to a depth of 3 inches on the landside and importation and placement of rock riprap to a depth of 2 feet on the waterside, along the entire levee slope (from toe to crown), is not anticipated to require additional equipment or truck trips when compared to the activities analyzed in the 2018 LSJR FR/EIS/EIR.

#### **2.4.4 TS\_30\_L Staging, Borrow Sites, Barge Off-Haul Site, and Access/Haul Routes**

The 2018 LSJR FR/EIS/EIR stated that if Alternative 7a is authorized and funded, detailed evaluation of staging areas and borrow requirements, and identification and detailed technical evaluation of potential materials sources, would be completed during preconstruction engineering and design, including appropriate literature review, site visits, informal consultation with resource agencies, and surveys to determine the presence or potential presence of federally or state-listed species and their designated critical habitat. It also states that potential sites with listed species occurrences or with the potential for occurrences would be avoided. Details related to development of staging areas, borrow sites, and access routes have since been developed for TS\_30\_L.

Staging and stockpile areas are to be co-located at the areas depicted in Figure 2-5. Haul routes to and from the staging and stockpile areas for the levee degrade and cutoff wall construction would use West March Lane as an access point to the TS\_30\_L levee site work area and would then utilize the levee road (Brookside Road) and the parallel agricultural road on the west side of the waterside levee toe.

There are three potential borrow sites under consideration for the Modified Project, based on proximity and availability of appropriate materials. One is at the SEWD property located approximately 9 miles east of the TS\_30\_L levee site (Figure 2-3). The haul route from the SEWD property would follow a private road on the west side of the SEWD property to either State Route (SR) 26 or East Main Street in order to cross the Stockton Diverting Canal, and then follows one of these roads to SR 99 until its interchange with SR 4. SR 4 leads to Interstate 5 (I-5), which would be followed north and west to West March Lane, which leads directly onto the south end of the Modified Project Site. Biological and cultural evaluations have been completed at this borrow site location to allow for geotechnical investigation, and soil hazards testing would be required for all borrow materials from the site. For this borrow site, the excavation would be left in place to facilitate future uses of the site planned by SEWD.

Two commercial borrow sources are under consideration as well. One is Dutra Materials at Decker Island, located approximately 20 miles northwest of the Modified Project site. For this option, materials would be delivered via barge to a site just southwest of the TS\_30\_L levee site (Figure 2-3). The barge would be stationed near the bank of the San Joaquin River and a conveyer belt extending from the barge to land would offload materials directly onto trucks waiting on

Brookside Road. The trucks would then transport materials directly to the construction site or to the staging/stockpile areas using the haul route along an agricultural road depicted in Figure 2-3. The other commercial option is Brown Sand Incorporated, located approximately 20 miles south of the Modified Project site in Lathrop, from which materials would be hauled by truck on I-5 until it joins with the haul route proposed from the SEWD borrow site option. Locations of the commercial borrow sites and haul routes are shown on Figure 2-6.

The haul routes for other construction materials (e.g., rock riprap for runoff erosion protection) are based on the location of the material source. All riprap and crushed rock source options are commercial sites within 50 miles of the Modified Project site and all haul routes would use local roads and major state and interstate highways to access West March Lane and would then follow the haul route proposed for the SEWD borrow site materials (Figure 2-6). Any deviation from the approved routes would be approved by the City of Stockton and the State for the use of off-ramps and on-ramps.

### 2.4.5 TS\_30\_L Biological Mitigation Sites

As discussed in Section 2.3.5, *Alternative 7a Mitigation Measures and Environmental Commitments*, the 2018 LSJR FR/EIS/EIR identified a range of potential impacts to biological resources requiring compensatory mitigation. The mitigation strategy proposed by the 2018 LSJR FR/EIS/EIR included purchase of mitigation bank credits for riparian, wetland, and giant garter snake habitat, while elderberry shrubs were to be transplanted to a 14-acre site adjacent and to the north of the TS\_30\_L levee. However, the 14-acre site identified in the 2018 LSJR FR/EIS/EIR is under private ownership (and not available for purchase) and mitigation bank credits for riparian habitat and wetlands impacted by Alternative 7a are not readily available for purchase.

It is anticipated that the TS\_30\_L levee improvements would result in permanent impacts to approximately 11.4 acres of riparian habitat and 0.6 acres of wetland, requiring either the purchase of private land for development of compensatory mitigation sites or placement of a conservation easement on public land, or both. Additional impacts to biological resources (e.g., giant garter snake, valley elderberry longhorn beetle) resulting from TS\_30\_L would still be mitigated through the purchase of credits at appropriate, approved local mitigation banks (see further discussion in Section 3.6, *Biological Resources*, of this Draft SEIR).

Due to the changes in circumstance since publication of the 2018 LSJR FR/EIS/EIR, and the resulting changes to the mitigation strategy, this Draft SEIR evaluates five potential biological mitigation sites to fulfill the compensatory mitigation requirements of TS\_30\_L and potential future phases of Alternative 7a. Three sites are evaluated at a project-level of detail (14-Mile Slough Pump Station, San Joaquin River (SJR) West Site, and SJR East Site), and two sites are evaluated at a program-level of detail (SJR South Site and Van Buskirk Park). If one of the program-level sites (or an alternative biological mitigation site not evaluated in this SEIR) is chosen for development, additional environmental review under CEQA at a project-level of detail would be required prior to construction. Additional details regarding each of the five sites are discussed below and their locations are shown on Figure 2-3.

## Potential Biological Mitigation Sites Evaluated at a Project-level

The following biological mitigation sites were evaluated at a project-level of detail in this Draft SEIR:

- The 14-Mile Slough Pump Station Site (APN 071-140-17) consists of approximately 114 acres of land owned by the City of Stockton, approximately 75 of which would be acquired for mitigation (either purchased in fee, or held by the City under a conservation easement, and protected in perpetuity). It is located on the Wright-Elmwood Tract, adjacent to a wastewater pump station at the confluence of 14-Mile Slough and White Slough, approximately 1 mile north of the TS\_30\_L levee. The parcel was formerly used as aeration ponds in the 1960s but is now covered in grass and shrub vegetation, consisting mainly of annual grassland and riparian woodland and scrub habitat types, as well as a small (0.30 acre) potential seasonal wetland feature. High-voltage power lines run across the western portion of the parcel, with the associated Western Area Power Administration (WAPA) and Pacific Gas and Electric (PG&E) easements. Development of this biological mitigation site would include establishing approximately 7 acres of wetland habitat within the powerline easements and 63 acres of riparian habitat on the remaining area. The site could also provide giant garter snake habitat (to fulfill mitigation needs of future phases of Alternative 7a) and valley elderberry habitat (to reduce the number of credits needed for purchase).
- The San Joaquin River (SJR) West Site (APN 071-140-01) consists of approximately 257 acres of privately owned land, approximately 59 of which would be purchased in fee for development of a biological mitigation site and protected in perpetuity. It is located on the Wright-Elmwood Tract, approximately 1.7 miles west of the TS\_30\_L levee, at the confluence of White Slough and the San Joaquin River, but it is separated from those waterbodies by a levee. Portions of the site are currently used as hay fields, but the portions closest to the levee are fallow and have converted to a mixture of annual grassland, fresh emergent wetland, and riparian scrub habitat, including some valley elderberry shrubs. Numerous irrigation ditches run through the site. Development of this biological mitigation site would include establishing approximately 2 acres of wetland habitat and 42 acres of riparian habitat. The site could also provide giant garter snake habitat to fulfill mitigation needs of future phases of Alternative 7a.
- The SJR East Site (APN 071-150-09) consists of approximately 50 acres of privately owned land that would be purchased in fee for development of a biological mitigation site and protected in perpetuity. The parcel is u-shaped and surrounds the Pace Preserve, a 40-acre mitigation site managed by the Center for Natural Lands Management. The SJR East Site is located on the Wright-Elmwood Tract, approximately 0.7 mile west of the TS\_30\_L levee, along the San Joaquin River. The site is currently planted with young olive trees, but it contains annual grassland habitat and valley elderberry shrubs adjacent to the river, as well as an area of riparian woodland (0.75 acre) and additional valley elderberry shrubs dispersed along and adjacent to the Pace Preserve. High-voltage power lines run across the eastern portion of the site. The area beneath the power lines contains WAPA and PG&E easements, which would not be able to contain tree plantings. A levee separates the southwest edge of this parcel from the San Joaquin River. Development of this biological mitigation site would entail removing the olive trees, establishing wetland habitat (approximately 18 acres) within the easement area, and establishing riparian habitat (approximately 20 acres) in the non-easement areas. The site could also provide giant garter snake habitat to fulfill mitigation needs of future phases of Alternative 7a.

## Potential Biological Mitigation Sites Evaluated at a Program-level

The following biological mitigation sites were evaluated at a program-level of detail in this Draft SEIR because the precise details of the mitigation sites are unknown. Therefore, the analysis is programmatic, focusing on the types of reasonably foreseeable changes due to construction of biological mitigation sites in the future.

- The SJR South Site (APN 241-240-03) consists of approximately 170 acres of privately owned land located along Walthall Slough in Manteca, California, approximately 15 miles southeast of the TS\_30\_L levee. The site is currently in agricultural production and could be purchased in fee for development of a biological mitigation site. Parcels adjacent to this site have their own berms and, in addition, an improved levee has been constructed along the Dredger Cut, which would serve newly constructed urban areas. Therefore, the berms on this site could be notched to restore hydrology. The site currently provides riparian and shaded riverine aquatic habitat and contains large, mature valley elderberry shrubs. Development as a biological mitigation site could provide approximately 6.5 acres of riparian habitat to compensate for the impacts of the TS\_30\_L levee improvements, as well as shaded riverine aquatic, shallow water, giant garter snake, valley elderberry, and delta smelt habitat for mitigation needs of future phases of Alternative 7a.
- Van Buskirk Park (APN 163-070-36) consists of approximately 192 acres of land owned by the City of Stockton located at the confluence of French Camp Slough and the San Joaquin River, approximately 4.3 miles southeast of the TS\_30\_L levee, approximately 50 acres of which would be placed under a conservation easement and protected in perpetuity. The site has previously been developed as a golf course, but the golf course was closed by the City in 2019. The area would be transitioned to other recreational uses as part of a strategic design and reuse project by the City, though the specifics are undetermined. French Camp Mitigation Bank, which provides credits for valley elderberry longhorn beetle, is located on the opposite side of French Camp Slough. The site currently provides wetland, riparian, and shaded riverine aquatic habitat. Development as a biological mitigation site could provide approximately 10 acres of wetland and 27 acres (9,600 linear feet) of riparian habitat, as well as giant garter snake, valley elderberry, and delta smelt habitat (to fulfill mitigation needs of future phases of Alternative 7a).

Site preparation and construction for any of the five potential biological mitigation sites would require a similar process. Vegetation would be cleared and the site would be graded to establish a construction staging/stockpile area, protecting in place and enhancing any existing wetland and riparian features or valley elderberry shrubs. Topography would be graded to elevations that support wetland and riparian habitats, and cut and fill would be balanced on-site. Appropriate vegetation would be planted as needed, including the transplanting of valley elderberry shrubs where appropriate (to reduce the amount of mitigation bank credits required).

In addition to the above, construction of the Van Buskirk Site would entail setting back the levee from its current configuration to restore hydrology and removing rock from the remnant levee. The SJR South Site would entail notching the site's existing berm to restore hydrology to the site.

The general type and usage of equipment required for development of the TS\_30\_L biological mitigation site is the same as that described in the 2018 LSJR FR/EIS/EIR related to levee improvements, including excavators, loaders, dozers, rollers, drill seeders, as well as a hauling

truck, water truck, and foreman truck. Staging areas would be located within the biological mitigation site footprint and would not conflict with any of the existing utility easements.

### 2.4.6 TS\_30\_L Construction Schedule

Construction for the Modified Project (except for the biological mitigation site), is anticipated to take place over two construction seasons, September 2024 through March 2025 and September 2025 through March 2026, requiring a construction crew of approximately 20 workers. Work would occur between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday. The City of Stockton's standard encroachment permit, which would be required for work on the Modified Project, further limits truck haul hours to 8:00 a.m. to 4:00 p.m. unless special approval is granted. Prior to that time, all appropriate environmental permits for vegetation removal and construction activities would be obtained. Construction of the selected biological mitigation site is anticipated to occur over two seasons, from May through August of 2024 and 2025, requiring 15 construction workers and approximately the same work hours as stated above.

### 2.4.7 TS\_30\_L Operations and Maintenance

Levee and levee road maintenance or repair, as well as post-seismic event inspection, would be completed as recommended by the 95 percent Geotechnical Basis of Design Report, included as **Appendix C**. USACE transfers O&M responsibility to the non-Federal Sponsor (NFS), DWR and SJAFCA, who transmit the requirements to a local maintaining agency (LMA), which include Reclamation District (RD) 2074 and RD 2119 for the TS\_30\_L reach. RDs 2074 and 2119, as the responsible LMAs, would be responsible for the efficient operation and maintenance of all structures and facilities constructed under the Modified Project during flood periods and for continuous inspection and maintenance of the Modified Project facilities during periods of low water. USACE would provide an Operation and Maintenance (O&M) Manual to the NFS, who would in turn provide the O&M manual to the LMAs to assist in carrying out obligations under federal rules and regulations. The O&M manual must be approved by the LMAs and would outline specifically what the LMAs own and are responsible for maintaining, as well as outlining the funding agency responsible for maintenance costs. The NFS would submit a semi-annual report to the USACE District Engineer covering inspection, maintenance, and operation of the Modified Project facilities.

The LMAs would provide maintenance as required to ensure serviceability of the Modified Project facilities in times of flood. Measures would be taken to promote the growth of sod, exterminate burrowing animals, and provide for routine mowing of the grass and weeds, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures would be taken to prevent bank erosion, such as planting of willows or other suitable growth on the waterside of the levee or placing riprap or other erosion resistive materials. The LMAs would periodically inspect the Modified Project site to ensure that maintenance measures are being effectively carried out. Requirements for operations, maintenance, repair, replacement, and rehabilitation (OMRR&R) are provided by USACE and may contain such elements as:

1. No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place.

2. No caving has occurred on either the land side or the river side of the levee which might affect the stability of the levee section.
3. No seepage, saturated areas, or sand boils are occurring.
4. Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged.
5. Drains through the levees and gates on said drains are in good working condition.
6. No revetment work or riprap has been displaced, washed out, or removed.
7. No action is being taken, such as burning grass and weeds during inappropriate seasons, that will retard or destroy the growth of sod.
8. Access roads to and on the levee are being properly maintained.
9. Cattle guards and gates are in good condition.
10. Crown of levee is shaped so as to drain readily, and roadway thereon, if any, is well shaped and maintained.
11. There is no unauthorized grazing or vehicular traffic on the levees.
12. Encroachments are not being made on the levee right-of-way that might endanger the structure or hinder its proper and efficient functioning during times of emergency.
13. During extreme high-water events, the LMA will patrol the levees continuously around the clock.
14. If there is seepage or a boil in the levee, the LMA will bring in sandbags or other equipment.
15. If there are more severe issues, the LMA will bring in trucks with rock or other fill material, bull dozers, or excavators to address the issue.

These inspections would be made immediately prior to the beginning of the flood season, immediately following each major high-water period, and at intervals not exceeding 90 days, and such intermediate times as necessary to ensure the best possible care of the levee. Immediate steps would be taken to correct dangerous conditions discovered during inspection. Regular maintenance repair measures would be taken during the appropriate season as scheduled by the LMAs.

During flood periods, the levee would also be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope and to be certain that:

1. There are no indications of slides or sloughs developing.
2. Wave wash or scouring action is not occurring.
3. No low reaches of levee exist which may be overtopped.
4. No other conditions exist which might endanger the structure.

Appropriate advance measures would be taken to ensure the availability of adequate labor and materials to meet all contingencies. Immediate steps would be taken to control any condition that endangers the levee and to repair the damaged section.

Operation of TS\_30\_L would also consist of monitoring and adaptively managing the chosen biological mitigation site until success criteria are met, as described in Chapter 2 of the Mitigation, Monitoring, and Adaptive Management Plan included as Addendum J of the 2018 LSJR FR/EIS/EIR (incorporated here by reference). The O&M Manual developed by USACE will include long-term operational plans for the biological mitigation sites and identify maintenance responsibilities. A performance period of three to five years will be required for the mitigation sites, during which USACE will be responsible for plant establishment and monitoring and reporting on success criteria outlined in the O&M Manual. After the performance period concludes, the NFS will take on maintenance responsibility of the established habitat within the biological mitigation sites.

## 2.5 Required Permits and Approvals for TS\_30\_L

The Modified Project would require local, state, and federal approvals. **Table 2-1** lists those agencies that would, or could, have some form of involvement in the Modified Project approval. Permits issued by these agencies for the Modified Project would identify requirements for TS\_30\_L operation, monitoring, and reporting.

**TABLE 2-1  
RESPONSIBLE AGENCIES AND PERMITS AND APPROVALS**

<b>Regulatory Agency</b>	<b>Type of Permit or Approval/ Regulatory Authority</b>	<b>Reason for Permit or Approval or Reason why Permit or Approval is not needed for the Modified Project</b>
SJAFCA	Modified Project and CEQA Approval	SJAFCA and CVFPB Board of Directors are the approving authority for SEIR certification and the proposed modifications to Alternative 7a.
USACE	Modified Project and NEPA Approval	USACE is the approving authority for the memo to file (MFR) for NEPA compliance consistent with the 2018 FS/EIS/EIR.
USACE	Clean Water Act Section 404	The Modified Project may not meet the definition of 33 Code of Federal Regulations (CFR) 328.3 (B) (5) and may be deemed non-jurisdictional features under Section 404 of the Clean Water Act. This is to be confirmed by USACE.
Central Valley Regional Water Quality Control Board	Clean Water Act Section 401	It is assumed the Modified Project is not waters of the State per the State Water Board's 2019 <i>State Definition and Procedures for Discharges of Dredged or Fill Materials to Waters of the State</i> (TBD).
Central Valley Regional Water Quality Control Board	Waste Discharge Requirement	The Modified Project may be subject to Regional Board approval under the Porter-Cologne Act; therefore, SJAFCA may need to submit application materials pursuant to waste discharge requirement (WDR) processes. This will be confirmed through consultation with the Central Valley Regional Water Quality Control Board.
Central Valley Regional Water Quality Control Board	Limited Threat Discharge and Dewatering NPDES Permit	The Modified Project may require dewatering during construction, requiring a Limited Threat Discharge and Dewatering Permit.
California Department of Fish and Wildlife	CA Fish and Game Code 1602	CDFW is the approving authority for any activity that may substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake (TBD).
Delta Stewardship Council (DSC)	Determination of Consistency with the Delta Plan	The Modified Project is a "covered action" under the Delta Plan; therefore, SJAFCA, as the local agency, must prepare and file a certification of consistency demonstrating the project is consistent with the policies of the Delta Plan.

**TABLE 2-1  
RESPONSIBLE AGENCIES AND PERMITS AND APPROVALS**

<b>Regulatory Agency</b>	<b>Type of Permit or Approval/ Regulatory Authority</b>	<b>Reason for Permit or Approval or Reason why Permit or Approval is not needed for the Modified Project</b>
City of Stockton	Encroachment Permit	Use of March Lane, a City road, may require an encroachment permit from the City.
San Joaquin County	Encroachment Permit	Use of Cardinal Avenue, a County road, may require an encroachment permit from the County.
Caltrans	Encroachment Permit	Use of State Highway 26, 99, and I-5 may require a road encroachment permit from Caltrans.

NOTES: CEQA = California Environmental Quality Act; SJAFCFA = San Joaquin Area Flood Control Agency; USACE = United States Army Corps of Engineers; SEIR = supplemental environmental impact report; State Water Board = State Water Resources Control Board; TBD= to be determined

SOURCE: Data compiled by Environmental Science Associates in 2021

# CHAPTER 3

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## Environmental Setting, Impacts, and Mitigation Measures

### 3.1 Introduction

This chapter presents a summary of the resource areas for which potential impacts of the Modified Project are adequately addressed in the certified 2018 LSJR FR/EIS/EIR and no further analysis is required. This chapter also provides information on other CEQA considerations; alternatives; definitions and section format regarding resource area topics; and resources requiring additional CEQA analysis beyond the analysis in the 2018 LSJR FR/EIS/EIR. While the Modified Project is a component of Alternative 7a, the Modified Project does not include construction at Fourteenmile Slough Gate or Smith Canal Gate, therefore impacts associated with these components of Alternative 7a are not discussed below.

### 3.2 Environmental Issues Not Requiring Further Analysis

According to CEQA Guidelines Section 15163, this Draft SEIR is required to contain only the information needed to analyze the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR are sufficient to evaluate the impacts of the Modified Project, no additional environmental review is warranted. The following discussion summarizes environmental issues for which potential impacts of the Modified Project are adequately addressed in the certified 2018 LSJR FR/EIS/EIR and no further analysis is required.

#### 3.2.1 Aesthetics

The analysis in the 2018 LSJR FR/EIS/EIR determined that aesthetics impacts would be significant and unavoidable with construction of Alternative 7a.

The 2018 LSJR FR/EIS/EIR analyzed full vegetation removal within the Alternative 7a construction footprint in relation to aesthetic impacts and determined this would not create any new sources of light or glare with implementation of Alternative 7a. However, it was determined removal of trees and shrubs with implementation of Alternative 7a would reduce shade and expose the area to sunlight throughout the day and to glare and light at sunrise and sunset. In addition, it was determined that, with implementation of Alternative 7a, complete removal of waterside vegetation would alter the experience and the quality of views for nearby sensitive receptors and vegetation removal would greatly reduce or eliminate riparian habitat, which

contributes to scenic vistas and the existing visual character of the site. Post-project foreground views would be drastically different from pre-project foreground views. While mitigation measures related to minimizing vegetation impacts would reduce these aesthetic impacts, no other mitigation would be feasible for the complete removal of waterside vegetation; therefore, it was determined that aesthetic impacts would be significant and unavoidable with implementation of Alternative 7a.

The Modified Project includes clearing all vegetation and stripping topsoil on both the waterside and landside levee slopes within the TS\_30\_L levee site, as well as vegetation clearing and grading and/or excavation in the SEWD borrow site and potential biological mitigation sites, including removal of trees and shrubs and riparian vegetation. As with Alternative 7a, the aesthetic impacts of these activities would be reduced with the implementation of mitigation measures related to minimizing loss of vegetation (which are included in this document as Mitigation Measures 3.6-16 through 3.6-19). However, the aesthetic impacts of the Modified Project would remain similar as described in the 2018 LSJR FR/EIS/EIR.

Construction activities for the Modified Project could require the use of nighttime lighting if work were to extend into hours past sundown (e.g., when the days are short); however, the nighttime lighting would be temporary in nature and would not last past 7 p.m., Monday through Saturday. Therefore, the nighttime lighting would not create a new source of substantial light or glare which would adversely affect nighttime views in the area and this impact would be less than significant.

Therefore, the Modified Project is consistent with and would not result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to aesthetics.

### 3.2.2 Air Quality and Greenhouse Gas Emissions

The analysis in the 2018 LSJR FR/EIS/EIR determined that impacts related to air quality and greenhouse gas (GHG) emissions would be less than significant with mitigation measures incorporated with construction of Alternative 7a.

Criteria air pollutants were modeled for the analysis in the 2018 LSJR FR/EIS/EIR using the Road Construction Emission Model (RCEM). This model is used to estimate emissions from linear construction projects and estimates emissions for both vehicle exhaust and fugitive dust. For each project alternative, emissions were estimated using RCEM for each year of construction and for each phase (e.g., vegetation clearing, excavation, cutoff wall construction, fill, riprap placement, etc.) within each year. Modeled scenarios estimated fugitive dust based on the maximum area of land disturbed daily and accounted for fugitive dust reductions required by San Joaquin Valley Air Pollution Control District (SJVAPCD) Regulation VIII (Fugitive PM<sub>10</sub> Prohibitions). Since RCEM estimates CO<sub>2</sub> emissions but not CO<sub>2e</sub> emissions (for evaluation of GHG emissions), CO<sub>2</sub> emissions estimates were conservatively increased by 5 percent to represent total CO<sub>2e</sub> emissions for the 2018 LSJR FR/EIS/EIR analysis.

The 2018 LSJR FR/EIR/EIS used quantitative criteria developed by the SJVAPCD to evaluate the significance of criteria air pollutants generated by Alternative 7a. For GHG emissions,

because no local significance standards had been validated, the 2018 LSJR FR/EIS/EIR evaluated emissions against a threshold of 25,000 metric tons of CO<sub>2e</sub> per year (based on draft National Environmental Policy Act [NEPA] guidance). Table 5-9 in Section 5.8.10 of 2018 LSJR FR/EIS/EIR displays the quantitative results of this evaluation and shows that emissions from Alternative 7a construction would be below significance thresholds for all pollutants except NO<sub>x</sub>, which would exceed SJVAPCD's significance thresholds in certain years. This impact was found to be potentially significant. However, the 2018 LSJR FR/EIS/EIR determined that with implementation of the mitigation measure outlined in Section 5.8.10, which calls for the use of all Tier 3 vehicles, this impact would be reduced to a less-than-significant level. Table 5-11 in Section 5.8.10 displays the reduction in Alternative 7a NO<sub>x</sub> emissions from the use of all Tier 3 vehicles against the SJVAPCD NO<sub>x</sub> conformity threshold.

As described in Chapter 2, *Project Description*, the Modified Project would require construction methods similar to Alternative 7a, and the Modified Project would also have to comply with SJVAPCD Regulation VIII; therefore, construction emissions generated by the Modified Project are anticipated to be consistent with those modeled and evaluated in the 2018 LSJR FR/EIS/EIR. For those emissions calculated in the 2018 LSJR FR/EIS/EIR that were below evaluated significance criteria thresholds for Alternative 7a as a whole (including all GHG emissions and criteria air pollutants), this existing information and analysis was found sufficient to evaluate the impacts of the Modified Project. Therefore, the air quality modeling for the Modified Project (included as **Appendix D**) and this analysis focus on potential NO<sub>x</sub> emissions.

As described for Alternative 7a in the 2018 LSJR FR/EIS/EIR, the Modified Project has the potential to generate NO<sub>x</sub> emissions over the SJVAPCD conformity threshold of 10 tons per year. Using Tier 0 equipment, construction of the TS\_30\_L levee improvements could generate up to 11.29 tons of NO<sub>x</sub> per year, and if construction of the selected biological mitigation site overlapped this levee work, potential NO<sub>x</sub> emissions would increase. However, as with Alternative 7a, the Modified Project would include mitigation measures, including a requirement to use Tier 4 equipment, that would reduce NO<sub>x</sub> emissions below 10 tons per year.

**Mitigation Measure 3.2.2-1 Reduce Construction-Related NO<sub>x</sub> Emissions:** The mitigation measure for Alternative 7a outlined in Section 5.8.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:

- USACE shall require the use of off-road equipment that meets or exceeds USEPA or California Air Resources Board CARB Tier 4 off-road emission standards for all off-road vehicles greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities. Prior to issuance of a construction permit, the prime contractor(s) shall prepare and submit a Construction Emissions Minimization Plan (Plan) to USACE for review and approval. The Plan shall include estimates of the construction timeline by phase with a description of each piece of equipment required for every construction phase. Equipment descriptions and information shall include: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number and expected fuel usage and hours of operation. The Plan shall be kept by USACE and made available for review by any persons requesting it. Quarterly reports shall be submitted by the prime contractor(s) to

USACE indicating the construction phase and equipment information used during each phase for the previous quarter.

Just as for Alternative 7a, using Tier 4 equipment reduces potential NO<sub>x</sub> emissions from the Modified Project below the significance threshold (to 1.88 tons over the course of levee improvements and mitigation site development, combined). Therefore, the Modified Project is consistent with and would not result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to air quality and GHG emissions.

### 3.2.3 Geology and Geomorphology, Soils and Mineral Resources, and Seismicity

The analysis in the 2018 LSJR FR/EIS/EIR determined that impacts on geology and geomorphology, soils and mineral resources, and seismicity would be less than significant with environmental commitments incorporated, less than significant, or no impact with construction of Alternative 7a.

The analysis in the 2018 LSJR FR/EIS/EIR determined the construction for Alternative 7a would be limited to borrow site activities and improvements along levees within a relatively small project area as compared with the geologic and regional geomorphologic conditions in the broader San Joaquin Valley and adjacent foothills. Therefore, it was determined there would be no impact on the geology or regional geologic resources or processes, due to the nature of the proposed work and regional extent of existing geologic resources. However, as it relates to local geomorphology in the project area, the analysis in the 2018 LSJR FR/EIS/EIR determined short-term impacts from construction of Alternative 7a would result in substantial soil disturbance and could include temporary disruptions in patterns of bank erosion and downstream deposits of sediments caused by wind or early-season rainfall events. However, erosion control Best Management Practices (BMPs) and a Storm Water Pollution Prevention Plan (SWPPP) (as part of the National Pollutant Discharge Elimination System [NPDES] general permit) would reduce these short-term impacts to less than significant.

The analysis in the 2018 LSJR FR/EIS/EIR determined Alternative 7a would have no effect on the soil types or their characteristics on the alluvial fan. However, they would have short-term effects on soils in the Alternative 7a area during construction related to disturbing soils at staging areas; clearing and excavating soils during site preparation; excavating, stockpiling, and/or removing soil material at borrow sites; and depositing and shaping soils at the work site. These activities could result in the potential for surface water to carry sediment into stormwater and local waterways or increase airborne dust due to erosion. In addition, the ground-disturbing activities associated with vegetation clearing would require vegetation be cleared on levee slopes and 15 feet out from the waterside and landside levee toes, potentially resulting in significant erosion and sedimentation. However, the erosion control Best Management Practices (BMPs) and SWPPP discussed related to Alternative 7a geomorphologic impacts would reduce these short-term impacts to less than significant. Further, the 2018 LSJR FR/EIS/EIR stated that construction of all Alternative 7a project elements would be supported by a site-specific geotechnical investigation, which would include an evaluation of site soils and recommendations to ensure Alternative 7a

elements are appropriately designed and constructed, consistent with the current California Building Code earthwork standards and USACE and Central Valley Flood Protection Board standards.

The analysis in the 2018 LSJR FR/EIS/EIR determined Alternative 7a would have no short-term or long-term effects on the acquisition, mining, or processing of the mineral resources in the project area, as none of the existing sand and gravel mining or processing operations common in the vicinity are located at the work sites. It was further determined that implementation of Alternative 7a would not reduce or eliminate availability of mineral resources for future use, and therefore impacts would be less than significant.

The analysis in the 2018 LSJR FR/EIS/EIR determined Alternative 7a would have no effect on known seismic faults or cause ground movement along faults, because work would be limited to borrow site activities and improvements along surface waterways.

The analysis in the 2018 LSJR FR/EIR/EIS found there are no identified active faults in the Alternative 7a area. In addition, the 2018 LSJR FR/EIS/EIR stated the design, construction and maintenance of Alternative 7a must comply with the regulatory standards of USACE, including requirements for seismic design. The analysis in the 2018 LSJR FR/EIS/EIR determined the design and construction of the cutoff walls, floodwalls, and/or levees required under Alternative 7a would meet or exceed applicable design standards for static and dynamic stability, seismic ground shaking, liquefaction, subsidence, and seepage, minimizing the potential for significant damage. Therefore, the 2018 LSJR FR/EIS/EIR found Alternative 7a would have no impact to the existing geology and seismicity of the area or expose people or structures to potential risk or injury.

In addition, geotechnical investigations were completed for Alternative 7a and these investigations did not indicate evidence of instability due to landslides, subsidence, or collapse. The 2018 LSJR FR/EIS/EIR found that liquefaction analysis indicated some existing levees within Alternative 7a were constructed over alluvial deposits that could be susceptible to liquefaction or degradation due to a seismic event. However, design recommendations to address this condition were provided in the Geotechnical Investigation (USACE 2016) completed for the LSJR FR/EIS/EIR and would be implemented for Alternative 7a. In addition, standard grading and soil engineering practices would be implemented for Alternative 7a to ensure that foundations are adequately supported and do not settle or otherwise fail. This includes excavating the existing soils and replacing them with compacted engineered fill.

Because erosion control BMPs and a SWPPP would be implemented for Alternative 7a and Alternative 7a facilities would be designed, constructed, and maintained in accordance with applicable standards, impacts associated with geology, geomorphology, soils, mineral resources, and seismicity would be less than significant.

As with Alternative 7a, the Modified Project would include erosion control BMPs and a SWPPP would be implemented for the Modified Project as part of the NPDES permitting process. In addition, the Modified Project facilities (including the biological mitigation sites, which were not specifically analyzed in the 2018 LSJR FR/EIS/EIR) would be designed, constructed, and maintained in accordance with applicable standards and would not result in new or more severe potentially significant impacts. Therefore, the Modified Project is consistent with and would not

result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to geology, soils, and seismicity.

### 3.2.4 Hazards, Hazardous Materials and Public Safety

The analysis in the 2018 LSJR FR/EIS/EIR determined that no impacts or less than significant impacts with mitigation measures incorporated would occur related to hazards and hazardous materials with construction and operation of Alternative 7a.

The analysis in the 2018 LSJR FR/EIS/EIR determined fuels and lubricants could be accidentally released into the environment at the Alternative 7a construction site and along haul routes, causing environmental or human exposure to these hazards. However, construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, State and local regulations during Alternative 7a construction and operation.

In addition, the 2018 LSJR FR/EIS/EIR stated that the implementation of environmental commitments, including a SWPPP, Bentonite Slurry Spill Contingency Plan (BSSCP), Spill Prevention, Control and Counter Measure Plan (SPCCP), and the implementation of avoidance, minimization, and mitigation measures (below), would ensure minimal risk of accidental spills and releases into the environment. Any hazardous substance encountered during construction would be removed and properly disposed of by a licensed contractor in accordance with Federal, State, and local regulations. Compliance with applicable regulations would reduce the potential for accidental release of hazardous materials during Alternative 7a transport and construction activities.

The analysis in the 2018 LSJR FR/EIS/EIR determined there is the potential that known or previously undocumented hazardous materials could be encountered at Alternative 7a work sites. Excavation and construction activities at or near areas of currently unrecorded soil or groundwater contamination could result in the exposure of construction workers, the general public, and the environment to hazardous materials such as petroleum hydrocarbons, pesticides, herbicides, fertilizers, contaminated debris, or elevated levels of other chemicals that could be hazardous. There are known sites within the Alternative 7a area that contain hazardous materials. All known Hazardous, Toxic, and Radioactive Waste (HTRW) sites are required to be remediated in accordance with Federal, State, and local laws by the non-Federal sponsor prior to project construction. No construction activities would occur in proximity to these sites until they have been completely remediated and meet all regulatory requirements. Construction activities in the vicinity of known or potentially unknown, recognized environmental concerns could result in public health hazards if they are not properly addressed prior to construction.

Implementation of Alternative 7a would result in post-construction operations and maintenance (O&M) activities conducted per the approved USACE O&M manual applicable to the reach. Such activities include hand and mechanical (mower) removal of weeds, spraying of weeds with approved pesticides, minimal tree or shrub trimming up to four times a year, monthly control of burrowing rodent activity by baiting with pesticide, and reconditioning of levee slopes and roads with a bulldozer as needed. Normal O&M activities under Alternative 7a would be short-term and

small scale; therefore, impacts to HTRW sites from Alternative 7a operations were determined to be less than significant.

The risk of incidental release of hazardous materials during their transport and use in Alternative 7a construction activities was also found to be low. Because normal O&M activities would be short-term and small scale, and because implementation of avoidance, minimization, and mitigation measures would reduce impacts from Alternative 7a construction activities in the vicinity of known or potentially unknown recognized environmental concerns, it was found that potential hazard and hazardous material impacts would be reduced to a less-than-significant level.

The Modified Project would include similar construction methods and O&M procedures as described for Alternative 7a. In addition, environmental commitments (including SWPPP, BSSCP, and SPCCP) and the implementation of avoidance, minimization, and mitigation measures would ensure minimal risk of accidental spills and releases into the environment due to the Modified Project. In addition, the Modified Project is not located within a HTRW site.

As with Alternative 7a, the Modified Project would include mitigation measures for hazards and hazardous materials impacts.

**Mitigation Measure 3.2.4-1 Reduce Hazards Associated with Potential Exposure to Hazardous Substances:** The mitigation measures for Alternative 7a outlined in Section 5.20.10 of the 2018 LSJR FR/EIS/EIR have been slightly modified and shall be applied to the Modified Project:

- The following measures would be implemented before ground-disturbing or demolition activities begin, in order to reduce health hazards associated with potential exposure to hazardous substances:
  - Complete a Phase I Environmental Site Assessment (ESA) prior to completing preconstruction designs and initiating construction. Where construction activities would occur in close proximity to sites identified as Recognized Environmental Conditions in the Phase I ESA, a Phase II site investigation will also be conducted.
  - Prepare a site plan that identifies any necessary remediation activities appropriate for proposed land uses, including excavation and removal of contaminated soils and redistribution of clean fill material on the project site. The plan would include measures that ensure the safe transport, use and disposal of contaminated soil and building debris removed from the site, as well as any other hazardous materials. In the event that contaminated groundwater is encountered during site excavation activities, the contractor would report the contamination to the appropriate regulatory agencies, dewater the excavated area and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The contractor would be required to comply with the plan and applicable Federal, State and local laws.
  - Notify appropriate Federal, State and local agencies if evidence of previously undiscovered soil or groundwater contamination is encountered during construction. Any contaminated areas would be cleaned up in accordance with the recommendations of the Central Valley Regional Water Quality Control

Board (Regional Board), California DTSC or other appropriate Federal, State or local regulatory agencies.

- A worker health and safety plan would be prepared before the start of construction that identifies, at a minimum, all contaminants that could be encountered during construction; all appropriate worker, public health and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan would describe actions to be taken if hazardous materials are encountered on-site, including protocols for handling hazardous materials, preventing their spread and emergency procedures to be taken in the event of a spill.
- Retain licensed contractors to remove all underground storage tanks.

Therefore, the Modified Project is consistent with and would not result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to hazards and hazardous materials.

### 3.2.5 Hydrology and Hydraulics

The analysis in the 2018 LSJR FR/EIS/EIR determined that no impacts or less than significant impacts related to hydrology and hydraulics would occur with construction and operation of Alternative 7a.

The analysis in the 2018 LSJR FR/EIS/EIR determined Alternative 7a would not contribute runoff water in excess of current baseline conditions and would not exceed the capacity of existing or planned stormwater drainage systems, and so would have no effect. In addition, the analysis in the 2018 LSJR FR/EIS/EIR determined Alternative 7a would not substantially alter the existing drainage patterns of the site or area, including through alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off site. Therefore, these impacts would be less than significant.

As described in Chapter 2, *Project Description*, the Modified Project would include construction methods and O&M procedures similar to Alternative 7a. Therefore, the Modified Project is consistent with and would not result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to hydrology and hydraulics.

### 3.2.6 Water Quality

The analysis in the 2018 LSJR FR/EIS/EIR determined that less than significant impacts with environmental commitments incorporated or less than significant impacts would occur related to water quality with construction and operation of Alternative 7a.

The analysis in the 2018 LSJR FR/EIS/EIR determined Alternative 7a would require extensive ground-disturbing activities, including borrow site activities, deep soil mixing, and cutoff walls. Much of the construction activities would occur near local drainages and waterways that could be

contaminated by soil or construction substances. These waterways include the agricultural drainage ditch adjacent to the TS\_30\_L levee.

The analysis in the 2018 LSJR FR/EIS/EIR determined temporary impacts from Alternative 7a could result from construction of the cutoff walls and seismic remediation. Cutoff walls and seismic remediation would be constructed using soil-bentonite slurry, which has a fluid consistency during installation. The cutoff walls were described in Section 5.5, *Water Quality*, of the 2018 LSJR FR/EIS/EIR as being installed through the existing levee and extending to depths 50 to 70 feet below the levee crown. Seismic remediation involves installation of a grid of drilled soil-cement mixed columns, aligned longitudinally with and transverse to the alignment of the levee, extending beyond the levee prism. Improper handling or storage of the slurry or soil-cement material could result in releases to nearby surface water, degrading water quality. Further, seepage berms and realignment of the levee would require relocation of agricultural ditches and other permanent structures that could result in release of soil or other discharges to surface water.

The 2018 LSJR FR/EIS/EIR stated that before Alternative 7a construction begins, a SWPPP, BSSCP, and SPCCP would be prepared and water quality certification from the Regional Board would be obtained. BMPs would be implemented to avoid, minimize, and mitigate effects on water quality during construction. Therefore, the potential for release of soil or construction-related materials in the waterways and local agricultural drainage canals under Alternative 7a would have a less-than-significant impact on water quality.

As described in Chapter 2, *Project Description*, the Modified Project includes construction of a deep soil bentonite (SB) slurry cutoff wall and project-specific borrow, staging, and barge off-haul sites, as well as biological mitigation sites, with construction methods and intensity similar to those described in Alternative 7a.

Preparation of a SWPPP, BSSCP, and SPCCP as required under Alternative 7a have been included as design features of the Modified Project, as described in Chapter 2, *Project Description*, Section 2.3.5, *Alternative 7a Mitigation Measures and Environmental Commitments*. In addition, as with Alternative 7a, the Modified Project would include mitigation measures for water quality impacts.

**Mitigation Measure 3.2.6-1 Water Quality Avoidance and Minimization Measures:**

The mitigation measures for Alternative 7a outlined in Section 5.5.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project in addition to all requirements of the SWPPP, BSSCP, and SPCCP:

- The contractor would prepare a spill control plan and a SWPPP prior to initiation of construction in accordance with guidance from the Regional Board, Central Valley Region. These plans would be reviewed and approved by USACE before construction begins.
- Implement appropriate measures to prevent debris, soil, rock, or other material from entering the water. Use vacuum sweepers or other appropriate measures to control dust on haul roads, construction areas and stockpiles.

- Implement appropriate measures for handling and disposing of concrete and concrete washout water.
- Properly dispose of oil or other liquids.
- Fuel and maintain vehicles in a specified area that is designed to capture spills. This area cannot be near any ditch, stream or other body of water or feature that may convey water.
- Fuels and hazardous materials would not be stored on site.
- Inspect and maintain vehicles and equipment to prevent dripping oil and other fluids.
- Schedule construction to avoid the rainy season as much as possible. If rains are forecasted during construction, erosion control measures would be implemented as described in the Regional Board Erosion and Sediment Control Field Manual.
- Maintain sediment and erosion control measures during construction. Inspect the control measures before, during and after a rain event.
- Train construction workers in SWPPP and how to respond to, control, contain and clean up spills.
- Revegetate disturbed areas in a timely manner to control erosion.
- Materials will be covered and protected from wind, rain and runoff to avoid unwarranted dispersal.
- Refine operational criteria to ensure that desired Flood Risk Management (FRM) benefits are achieved while avoiding degradation of water quality behind the closure structures.

Based on USACE’s “Memorandum for Record, Aquatic Resource Delineation for Lower San Joaquin River at Tenmile Slough” (**Appendix E**) the USACE has determined the canal is non-waters of the United States. If it is determined that the Modified Project is located in waters of the state per the framework outlined in the State Water Board’s 2019 *State Definition and Procedures for Discharges of Dredged or Fill Materials to Waters of the State*, a water quality certification from the Regional Board would be obtained.

Therefore, the Modified Project is consistent with and would not result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to water quality.

### 3.2.7 Groundwater

The analysis in the 2018 LSJR FR/EIS/EIR determined that less than significant impacts related to groundwater quality or supply would occur with construction and operation of Alternative 7a.

Under Alternative 7a, cutoff walls would be installed along levees around north and central Stockton. This alternative would reduce the flood risk to areas behind the levee. The areas

receiving increased protection are urban and mostly built out. Therefore, the current pattern of groundwater recharge and extraction would be expected to continue.

The analysis in the 2018 LSJR FR/EIS/EIR determined that the use of cutoff walls with Alternative 7a would introduce the potential for groundwater contamination during construction. Primary construction-related contaminants include sediment, oil and grease, and hazardous materials. The slurry wall material is relatively benign and would not remain in a liquid state long enough to allow for significant lateral movement within the aquifer. Nevertheless, the release of contaminants into groundwater would be a significant impact.

In the 2018 LSJR FR/EIS/EIR, it was determined that potential impacts to groundwater that could result from construction of the cutoff walls required under Alternative 7a would be mitigated through development and implementation of a BSSCP, also known as a frac-out plan. A BSSCP is typically developed for activities that involve the use of bentonite materials. It is intended to minimize the potential for a frac-out associated with excavation and tunneling activities, provide for timely detection of frac-outs, and ensure a “minimum-effect” response in the event of a frac-out and release of excavation fluid.

In addition, Alternative 7a cutoff walls could restrict the movement of groundwater towards and away from adjacent rivers, streams and canals, which could change localized near-surface groundwater levels in areas immediately adjacent to the cutoff walls. Shallow wells adjacent to the cutoff walls could be affected by changes in radial flow, either increasing yields or pumping costs. If yields decrease, a corresponding decrease in water quality could occur as the aquifer lowers and pumps take in more sediment. Although some shallow wells near the cutoff walls could be affected, the 2018 LSJR FR/EIS/EIR found that recharge and overall flow to supply wells would not be appreciably affected. The proposed cutoff walls as analyzed for Alternative 7a would reach depths of up to 70 feet. Since the upper water-bearing zone in the vicinity, the Victor Formation, extends from the ground surface to a maximum depth of 150 feet and is hydraulically connected to the underlying Laguna Formation, the cutoff walls would not isolate any portion of the shallow water-bearing zone. The cutoff walls should not affect the utility of existing or future water supply wells.

The analysis in the 2018 LSJR FR/EIS/EIR determined that, based on prior studies in the Central Valley, groundwater elevation would not change by more than 3 feet and that changes to groundwater elevations would occur at 10 to 50 feet (or more) below ground surface in the project area. In addition, it was determined that implementation of Alternative 7a would not change land use such that the rate of groundwater recharge would decrease the effective well yields. Therefore, it was determined that impacts to groundwater quality or supply would be less than significant.

Consistent with the description of Alternative 7a in the 2018 LSJR FR/EIS/EIR, and as described in Chapter 2, *Project Description*, the Modified Project includes construction of cutoff walls: from Station 2+50 to 4+50 cutoff walls would be installed to a depth of -21 feet, from Station 4+50 to Station 51+50 cutoff walls would be installed to a depth of -42 feet, and from Station 51+50 to 61+00 cutoff walls would be installed to a depth of -25 feet. Additional groundwater studies have

not been conducted beyond those cited in the 2018 LSJR FR/EIS/EIR; therefore, consistent with the description of Alternative 7a in the 2018 LSJR FR/EIS/EIR, the change in groundwater elevation with the Modified Project is anticipated to be 3 feet or less. Static groundwater was found during geotechnical explorations (Appendix C). Based on those explorations, groundwater is estimated to be around elevation -5 to -12 feet, with an average elevation of -9 feet, in the vicinity of the Modified Project; however, the groundwater level fluctuates with time of year (wet versus dry season) and the level of precipitation in a given year or group of years.

As with Alternative 7a, the Modified Project would include mitigation measures for groundwater impacts.

**Mitigation Measure 3.2.7-1 Bentonite Slurry Spill Contingency Plan:** The mitigation measures for Alternative 7a outlined in Section 5.6.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:

- Potential impacts to groundwater that could result from construction of the cutoff wall would be mitigated through development and implementation of a BSSCP, also known as a frac-out plan. A BSSCP is typically developed for activities that involve the use of bentonite materials. It is intended to minimize the potential for a frac-out associated with excavation and tunneling activities, provide for timely detection of frac-outs and ensure a “minimum-effect” response in the event of a frac-out and release of excavation fluid.

Therefore, the Modified Project is consistent with and would not result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to groundwater quality and supply.

### 3.2.8 Utilities, Service Systems, and Public Services

The analysis in the 2018 LSJR FR/EIS/EIR determined that no impact or less than significant impacts with mitigation measures incorporated would occur related to utilities, service systems, and public services with construction and operation of Alternative 7a.

The analysis in the 2018 LSJR FR/EIS/EIR determined implementation of Alternative 7a would encroach on multiple types of utility equipment and facilities, including storm drains, irrigation lines, electric power lines and gas pipelines. Alternative 7a construction activities, including grading and excavation, would require removal or reconnection of facilities and could damage identified and unidentified utility equipment and facilities. Substantial temporary interruptions of irrigation drip lines would occur at the SEWD borrow site if irrigation infrastructure is damaged or otherwise rendered inoperable at a time when it is needed (e.g., if reconnections to water supply sources are not completed by the time crop irrigation must begin). In addition, required relocation of existing electrical lines and gas pipelines could interrupt service. Alternative 7a project design would include consultation with all known service providers to identify infrastructure locations and appropriate protection measures and consultation would continue during construction to ensure that facilities are avoided and protected to minimize service disruptions as construction proceeds. Construction of Alternative 7a would not require the construction of new or expanded utility systems, including water supply facilities. Any

connections to the municipal utility system would be coordinated with the appropriate utility provider prior to construction. The extent and intensity of Alternative 7a construction activities, however, may affect service providers' abilities to quickly repair damage and/or restore interrupted service. Therefore, it was determined that Alternative 7a impacts to utilities or service systems would be significant. However, implementation of mitigation measures would reduce potential impacts to a less than significant level.

The analysis in the 2018 LSJR FR/EIS/EIR also found that Alternative 7a would not add new residents or change land uses, and therefore, would not generate any new demands for fire protection, police protection, schools, parks, or related services. Therefore, there would be no impacts to public services.

Similar to Alternative 7a, the Modified Project area contains utility equipment and facilities, including electric power lines and an existing 30-inch Sanitary Sewer Force Main. An existing PG&E guy cable is currently mounted in the levee embankment and would require relocation. The Sanitary Sewer Force Main runs along the TS\_30\_L levee and is owned by the City of Stockton and maintained by the City of Stockton Municipal Utility Department. Utility easements within the potential biological mitigation sites would be maintained, and access to utilities would be incorporated into design plans.

In addition, as described in Chapter 2, *Project Description*, the Modified Project would require shifting the TS\_30\_L levee centerline approximately 20 feet towards the waterside. This proposed 20-foot shift to the levee configuration would require realignment of the existing waterside irrigation ditch and would move the landside levee toe 10 feet toward the waterside (providing 15 feet of separation between the landside levee toe and the existing property line). The waterside irrigation ditch would be realigned at six discrete locations to maintain 15 feet from the waterside toe. Therefore, substantial temporary interruptions of the existing waterside irrigation ditch would occur. The relocation of the irrigation ditch would not interfere or require movement of the Sanitary Sewer Force Main.

As with Alternative 7a, the Modified Project would include mitigation measures for utility and service system impacts.

**Mitigation Measure 3.2.8-1 Coordination with Utility Providers & Response Plan:**

The mitigation measures for Alternative 7a outlined in Section 5.16.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project:

Before beginning construction, coordination with utility providers to implement orderly relocation of utilities that need to be removed or relocated would occur. Coordination would include the following:

- Notification of any potential interruptions in service shall be provided to the appropriate agencies and affected landowners.
- Before the start of construction, utility locations shall be verified through field surveys and the use of Underground Service Alert services. Any buried utility lines shall be clearly marked where construction activities would take place and on the construction specifications before of any earthmoving activities begin.

- Before the start of construction, the contractor would be required to coordinate with the local municipality and acquire any applicable permits prior to use of municipal water for construction.
- Before the start of construction, a response plan shall be prepared to address potential accidental damage to a utility line. The plan shall identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the public and worker safety. Worker education training in response to such situations shall be conducted by the contractor. The response plan shall be implemented by the contractor during construction activities.
- Utility relocations shall be staged to minimize interruptions in service.

In addition, Mitigation Measure 3.11-1 outlined in Section 3.11, *Transportation*, calls for preparation of a Traffic Safety Plan, which includes a requirement that the contractor contact all utilities service providers affected by the construction at least 48 hours prior to starting work, as well as a requirement to provide notification of construction to all appropriate emergency service providers to ensure emergency access through construction areas is maintained.

As with Alternative 7a, the design of the Modified Project included consultation with known service providers to ensure facilities are avoided and protected to minimize disruptions during construction. In addition, construction of the Modified Project would not require the construction of new or expanded utility systems, including water supply facilities.

As with Alternative 7a, the Modified Project would not add new residents or changes in land uses, and therefore, would not generate any new demands for fire protection, police protection, schools, parks, or related services.

Therefore, the Modified Project is consistent with and would not result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to utilities, service systems, and public services.

### 3.2.9 Recreation

The analysis in the 2018 LSJR FR/EIS/EIR determined that impacts on recreation would be significant and unavoidable with construction and operation of Alternative 7a.

The analysis in the 2018 LSJR FR/EIS/EIR determined Alternative 7a construction activities such as grading, removing vegetation, trenching, and constructing cutoff walls would affect the scenery and thus passive recreational activities (e.g., walking, photography, bird watching). Most impacts would be temporary because construction-related equipment that would be visible from recreational facilities (i.e., open space) would be removed after completion of construction activities. The 2018 LSJR FR/EIS/EIR also points to mitigation measures in Section 5.9.10 related to minimizing and compensating for the loss of vegetation (which are included in Section 3.6 of this SEIR) that would minimize impacts to recreation. However, due to short and long-term impacts of vegetation removal on bird watching and wildlife viewing opportunities, it was determined that impacts to recreation would be significant and unavoidable.

Similarly, the Modified Project would include construction activities such as grading, removing vegetation, trenching, and constructing cutoff walls that would affect the scenery and thus passive recreational activities (e.g., walking, photography, bird watching). As with Alternative 7a, most impacts to passive recreational activities would be temporary and removed after completion of the construction activities for the Modified Project. In addition, the mitigation measures applied in the 2018 LSJR FR/EIS/EIR for Alternative 7a related to reducing vegetation impacts apply to the Modified Project as well and are included in this document as Mitigation Measures 3.6-16 through 3.6-19; however, the impacts of vegetation removal on bird and wildlife viewing remain consistent with the 2018 LSJR FR/EIS/EIR.

In addition, the Modified Project does not add new residents, cause changes in land uses that could affect recreational facilities, or preclude recreation activities at parks, including those designated as a park and recreation district. The Modified Project would also not increase the use of existing recreational facilities or cause the expansion of recreational facilities.

Therefore, the Modified Project is consistent with and would not result in new or more severe potentially significant impacts than identified in the 2018 LSJR FR/EIS/EIR and the 2018 LSJR FR/EIS/EIR adequately addresses potential impacts related to recreation.

### 3.2.10 Other CEQA Issues

Other CEQA issues were addressed in Chapter 5 of the 2018 LSJR FR/EIS/EIR, including Section 5.22, *Growth Inducement*, Section 5.23, *Cumulative Effects*, and Section 5.24, *Unavoidable Significant Environmental Impacts*.

### Direct and Indirect Growth Effects, including Population and Housing

The analysis in the 2018 LSJR FR/EIS/EIR determined that construction activities associated with implementation of Alternative 7a would generate short-term employment. It is anticipated that there is sufficient workforce in the Stockton Metropolitan Area to support construction and, because the existing labor force would be used, there would be no need for additional housing to be constructed and no new demand for public services, facilities, or infrastructure. O&M of Alternative 7a would not result in an increase in employees beyond current levels. If additional employees were needed, those jobs would be anticipated to be filled by the existing labor force. Therefore, it was determined that implementation of Alternative 7 would not directly induce growth as a result of an increase in population, or indirectly induce growth due to construction of new housing and associated support infrastructure. As described in the 2018 LSJR FR/EIS/EIR, Alternative 7a does not include protection of currently undeveloped land in RD 17.

As described for Alternative 7a in the 2018 LSJR FR/EIS/EIR, and again in Chapter 2, *Project Description*, of this Draft SEIR, the objectives of the Modified Project are to meet the requirements of SB 5 of 2007, the Central Valley Flood Improvement Act, to achieve a 200-year level of protection for urban and urbanizing areas, focusing on a reduction of flood risk in the city of Stockton. Therefore, the same lack of potential for direct and indirect impacts related to growth inducement described in the 2018 LSJR FR/EIS/EIR are applicable to the Modified Project.

## Cumulative and Significant and Unavoidable Impacts

The Modified Project would not result in additional cumulatively considerable or significant and unavoidable impacts, and the 2018 LSJR FR/EIS/EIR adequately addresses potential cumulative and significant and unavoidable impacts.

Potential cumulative and significant and unavoidable impacts of the Modified Project are addressed by resource area in the following sections:

- Section 3.5 Agriculture and Forestry Resources
- Section 3.6 Biological Resources
- Section 3.7 Cultural and Paleontological Resources
- Section 3.8 Energy
- Section 3.9 Land Use and Planning
- Section 3.10 Noise
- Section 3.11 Transportation
- Section 3.12 Tribal Cultural Resources
- Section 3.13 Wildfire

Potentially significant and unavoidable impacts to aesthetics are described in Section 3.2.1, *Aesthetics*. Potentially significant and unavoidable impacts to recreation resources are described in Section 3.2.9, *Recreation*.

Other impacts of the Modified Project would be limited, mitigable, or very localized, or would not cause or contribute to additional cumulative impacts beyond those described for the original Project in the 2018 LSJR FR/EIS/EIR.

In addition, the Modified Project includes similar construction and operation activities as described for Alternative 7a in the 2018 LSJR FR/EIS/EIR and would not cause any significant irreversible environmental changes beyond those identified for Alternative 7a in the 2018 LSJR FR/EIS/EIR.

## 3.3 2018 LSJR FR/EIS/EIR Program Alternatives

This section briefly summarizes the alternatives considered in the 2018 LSJR FR/EIS/EIR, and discusses the potential for the Modified Project to change the previous alternatives analysis. For the reasons described below, no additional analysis of these alternatives is warranted, and the alternatives analysis in the 2018 LSJR FR/EIS/EIR remains adequate.

### 3.3.1 Alternative 1—No Action

The analysis of the No Action (or No Project) Alternative, Alternative 1, in the 2018 LSJR FR/EIS/EIR evaluated what would reasonably have been expected to occur in the foreseeable future if USACE would not participate in improvements to the existing FRM in the study area.

As with the No Action Alternative, operational processes (e.g., through and under seepage, slope stability, overtopping and erosion) would continue and likely become worse, increasing the risk of future levee failure during high flows. Existing environmental resources, particularly native vegetation, wildlife, special status species, and water quality would be at risk from levee failure and flooding. Adverse effects could include future loss or damage to terrestrial and/or aquatic habitats.

The Modified Project would not change this conclusion. Thus, the Modified Project would not alter any of the findings in the 2018 LSJR FR/EIS/EIR impact analysis for the No Action Alternative. No additional analysis is warranted, and the analysis of the No Project Alternative in the 2018 LSJR FR/EIS/EIR remains adequate.

### 3.3.2 Water Supply Alternatives 2–5

The 2018 LSJR FR/EIS/EIR also considered additional alternatives:

- **Alternative 7b—North and Central Stockton, Delta Front, Lower Calaveras River, San Joaquin River Levee Improvements and RD 17 Levee Improvements**, which included the same levee improvement measures as with Alternative 7a, with the addition of RD 17 levee improvements.
- **Alternatives 8a and 8b— North and Central Stockton, Delta Front, Lower Calaveras River, San Joaquin River, Stockton Diverting Canal Levee Improvements, and RD 17 Levee Improvements (Alternative 8b Only)**, which included the same levee improvements as Alternatives 7a and 7b, respectively, and would also include additional improvements along the Lower Calaveras River and Stockton Diverting Canal.
- **Alternative 9a and 9b— North and Central Stockton, Delta Front, Lower Calaveras River, San Joaquin River Levee Improvements, Mormon Island Channel Bypass and RD 17 Levee Improvements (Alternative 9b Only)**, which included the same levee improvements as 7a and 7b, respectively, and would also include construction of a flood bypass and diversion structure in Old Mormon Slough.

The Modified Project would include construction activities and O&M procedures similar to those described for Alternative 7a in the 2018 LSJR FR/EIS/EIR. Therefore, the alternatives evaluated and conclusions regarding the alternatives' ability to meet Project objectives, the consistency of the alternatives with the existing plans and policies, and their impacts compared to Alternative 7a impacts, as described in the 2018 LSJR FR/EIS/EIR, are still applicable for the Modified Project.

Therefore, no additional analysis is warranted, and the analysis of Alternatives 7b – 9b presented in the 2018 LSJR FR/EIS/EIR is adequate.

## 3.4 Additional CEQA Impact Analysis

### 3.4.1 Introduction to the Analysis

This SEIR evaluates the physical environmental effects that have the potential to be affected by the implementation of the Modified Project. In light of Section 3.2, *Environmental Issues and*

*Alternatives Not Requiring Further Analysis*, this Draft SEIR considers the following CEQA resource areas in greater detail in a revised impact analysis:

- Section 3.5 Agriculture and Forestry Resources
- Section 3.6 Biological Resources
- Section 3.7 Cultural and Paleontological Resources
- Section 3.8 Energy
- Section 3.9 Land Use
- Section 3.10 Noise and Vibration
- Section 3.11 Transportation
- Section 3.12 Tribal Cultural Resources
- Section 3.13 Wildfire

## Definitions of Terms Used in This SEIR

This SEIR uses a number of terms that have specific meaning under CEQA. Among the most important of the terms used are those that refer to the significance of environmental impacts. The following terms are used to describe environmental effects of the Modified Project:

- **Significance Criteria:** A set of criteria used by the lead agency to determine the level or threshold at which an impact would be considered significant. Standards of significance used in this SEIR include those standards provided in Appendix G of the CEQA Guidelines. In determining the level of significance, the analysis assumes that the Modified Project would comply with relevant federal, state, and local regulations and ordinances.
- **Significant Impact:** The level of significance identified for an impact of the Modified Project that would result in a substantial adverse change in the physical conditions of the environment. Significant impacts are identified by comparing the evaluation of a project-related physical change to specified significance criteria. A significant impact is defined as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Modified Project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance” (CEQA Guidelines Section 15382).
- **Potentially Significant Impact:** The level of significance identified for an impact of the Modified Project that may cause a substantial adverse change in the environment, depending on certain unknown conditions related to the Modified Project or the affected environment. For CEQA purposes, a potentially significant impact is treated as if it were a significant impact.
- **Less-than-Significant Impact:** The level of significance identified when the physical change caused by the Modified Project would not exceed the applicable significance criterion.
- **Significant and Unavoidable Impact:** The level of significance identified if the Modified Project would result in a substantial adverse physical change in the environment that cannot be feasibly avoided or mitigated to a less-than-significant level.
- **Cumulative Impact:** As defined in CEQA, “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts” (CEQA Guidelines Section 15355). Like any other significant impact, a significant cumulative impact is one in which the cumulative adverse physical change would exceed the

applicable significance criterion and Alternative 7a's contribution is "cumulatively considerable" (CEQA Guidelines Section 15130(a)).

- **Mitigation Measure:** An action that could be taken that would avoid or reduce the magnitude of a significant impact. CEQA Guidelines Section 15370 defines mitigation as:
  - Avoiding the impact altogether by not taking a certain action or parts of an action;
  - Minimizing impacts by limiting the degree of magnitude of the action and its implementation;
  - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
  - Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
  - Compensating for the impact by replacing or providing substitute resources or environments.

## Section Format

After this section, the remainder of Chapter 3 is divided into technical sections (e.g., Section 3.5, *Agriculture and Forestry Resources*) that present for each environmental resource issue area the physical environmental setting, regulatory setting, significance criteria, methodology and assumptions, and impacts on the environment. Where required, potentially feasible mitigation measures are identified to lessen or avoid significant impacts. Each section includes an analysis of Project-specific and cumulative impacts for each issue area.

The technical environmental sections each begin with a description of the Modified Project's **environmental setting** and the **regulatory setting** as it pertains to a particular issue. The environmental setting provides a point of reference for assessing the environmental impacts of the Modified Project. The environmental setting discussion addresses the conditions that exist before implementation of the Modified Project. This setting establishes the baseline by which the Modified Project is measured for environmental impacts. The regulatory setting discussion presents relevant information about federal, state, regional, and/or local laws, regulations, plans, or policies that pertain to the environmental resources addressed in each section.

Next, each section presents **significance criteria**, which identify the standards used to determine the significance of effects of the Modified Project. The significance criteria used for this analysis were derived from Appendix G of the CEQA Guidelines.

A **methodology and assumptions** description in each section presents the analytical methods and key assumptions used in the evaluation of Modified Project effects, and is followed by an **impacts and mitigation measures** discussion. The impacts and mitigation measures portion of each section includes impact statements, prefaced by a number in boldfaced type. An explanation of each impact is followed by an analysis of its significance. The subsection then includes a statement that the impact, following implementation of the mitigation measure(s) and/or the continuation of existing policies and regulations, would be reduced to a less-than-significant level

or would be significant and unavoidable. The subsection concludes with a discussion of cumulative impacts.

The analysis of environmental impacts considers both the construction and operational phases of the Modified Project. As required by CEQA Guidelines Section 15126.2(a), direct, indirect, short-term, long-term, onsite, and/or offsite impacts are addressed, as appropriate, for the environmental issue area being analyzed. Under CEQA, economic or social changes by themselves are not considered significant impacts but may be considered in linking the implementation of a plan to a physical environmental change, or in determining whether an impact would be significant.

Where enforcement exists and compliance can be reasonably anticipated, this SEIR assumes that the Modified Project would meet the requirements of applicable laws and other regulations.

Mitigation measures pertinent to each individual impact, if available, appear after the impact discussions. The magnitude of reduction of an impact and the potential effect of that reduction in magnitude on the significance of the impact is also disclosed.

## 3.5 Agricultural and Forestry Resources

This section discusses the potential for effects of the Modified Project on agricultural and forestry resources. The 2018 LSJR FS/EIS/EIR did not have a separate agricultural and forestry resource section. Therefore, sections 5.4, *Hydrology and Hydraulics*; 5.5, *Water Quality*; 5.7, *Wetlands and other Waters of the United States*; 5.9, *Vegetation*; and 5.14, *Land Use* of the 2018 LSJR FR/EIS/EIR described the applicable environmental and regulatory setting and standards of significance for agriculture and forestry resources, which are incorporated by reference and summarized below, as appropriate.

No comments by individuals were received during circulation of the Notice of Preparation (NOP) for the 2018 LSJR FR/EIS/EIR relevant to agricultural and forestry resources.

The analysis in this section was developed based on the construction and operational features of the Modified Project and current regulatory requirements.

### 3.5.1 Environmental Setting

The Modified Project is located within San Joaquin County and the Cities of Stockton and Manteca. The TS\_30\_L levee footprint, staging/stockpile areas, barge off-haul site, and three potential biological mitigation sites (14-Mile Slough Pump Station Site, SJR West Site, and SJR East Site) are located to the west of the City of Stockton within San Joaquin County. The other components of the Modified Project are located to the east of the city (Stockton East Water District [SEWD] borrow site), within the City of Stockton (haul routes and Van Buskirk biological mitigation site), and within the City of Manteca (SJR South biological mitigation site). San Joaquin County is California's 7<sup>th</sup> largest producer of agriculture and includes 920,000 acres of agriculturally productive land (SJCOG 2021). The Cities of Stockton and Manteca sit along the southeastern edge of the Delta and important historical themes from the Delta (i.e., agriculture, irrigation, and reclamation) are mirrored in the development of the city. The area surrounding the Cities of Stockton and Manteca are predominantly irrigated row crops, orchards and vineyards, and rural residential land uses (San Joaquin County 2014). The Modified Project's location consists primarily of agricultural uses and urban areas with a mix of residential open space and recreational land uses.

### Agricultural Communities

As discussed in the 2018 LSJR FR/EIS/EIR, Section 5.9, *Vegetation*, agricultural lands within the Alternative 7a area include row and field crops, fallow and disked agricultural fields, orchards, and vineyards. Within the location of the Modified Project, agricultural vegetation is comprised mainly of row crops with some parcels in orchard. Typical farming practices result in monotypic strands of vegetation for the growing season and bare ground in the fall and winter. The Modified Project site also includes irrigation ditches that are a component of most of the agricultural fields.

### Mapped Farmland and Other Land Uses

The California Department of Conservation (DOC) administers the Farmland Mapping and Monitoring Program (FMMP), California's Statewide agricultural land inventory. The DOC

classifies farmland into Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, and Other Lands.

**Figure 3.5-1** displays FMMP lands within the Modified Project site. The Modified Project site contains: Prime Farmland (within the TS\_30\_L levee footprint, northern staging/stockpile area, barge off-haul site, and SEWD borrow site, as well as within the SJR West, SJR East, and SJR South biological mitigation sites), Farmland of Statewide Importance (within the SEWD borrow site and SJR South Site), Farmland of Local Importance (within the 14-Mile Slough Pump Station Site), and Unique Farmland (within the TS\_30\_L levee footprint, northern staging/stockpile area, and SJR South Site).

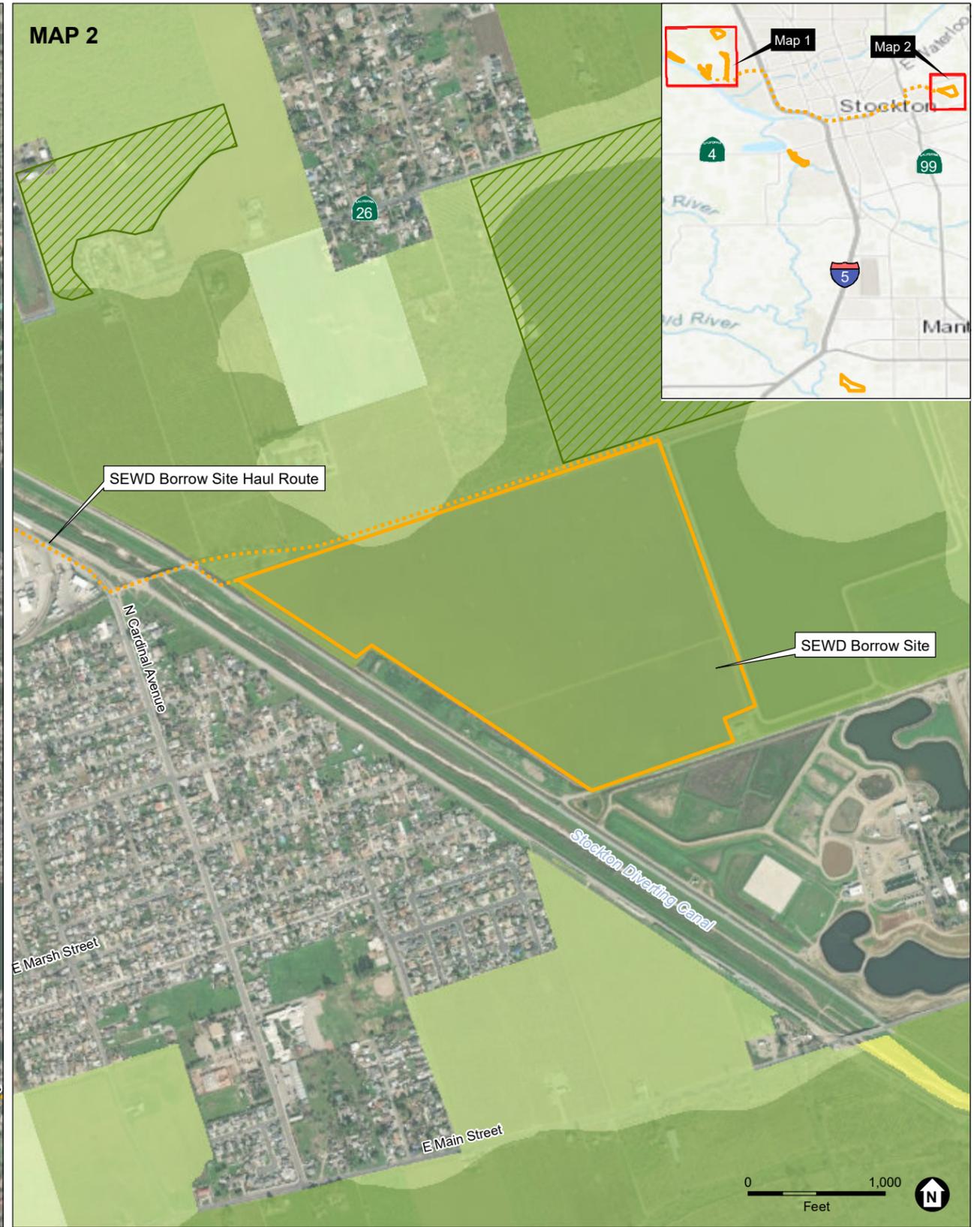
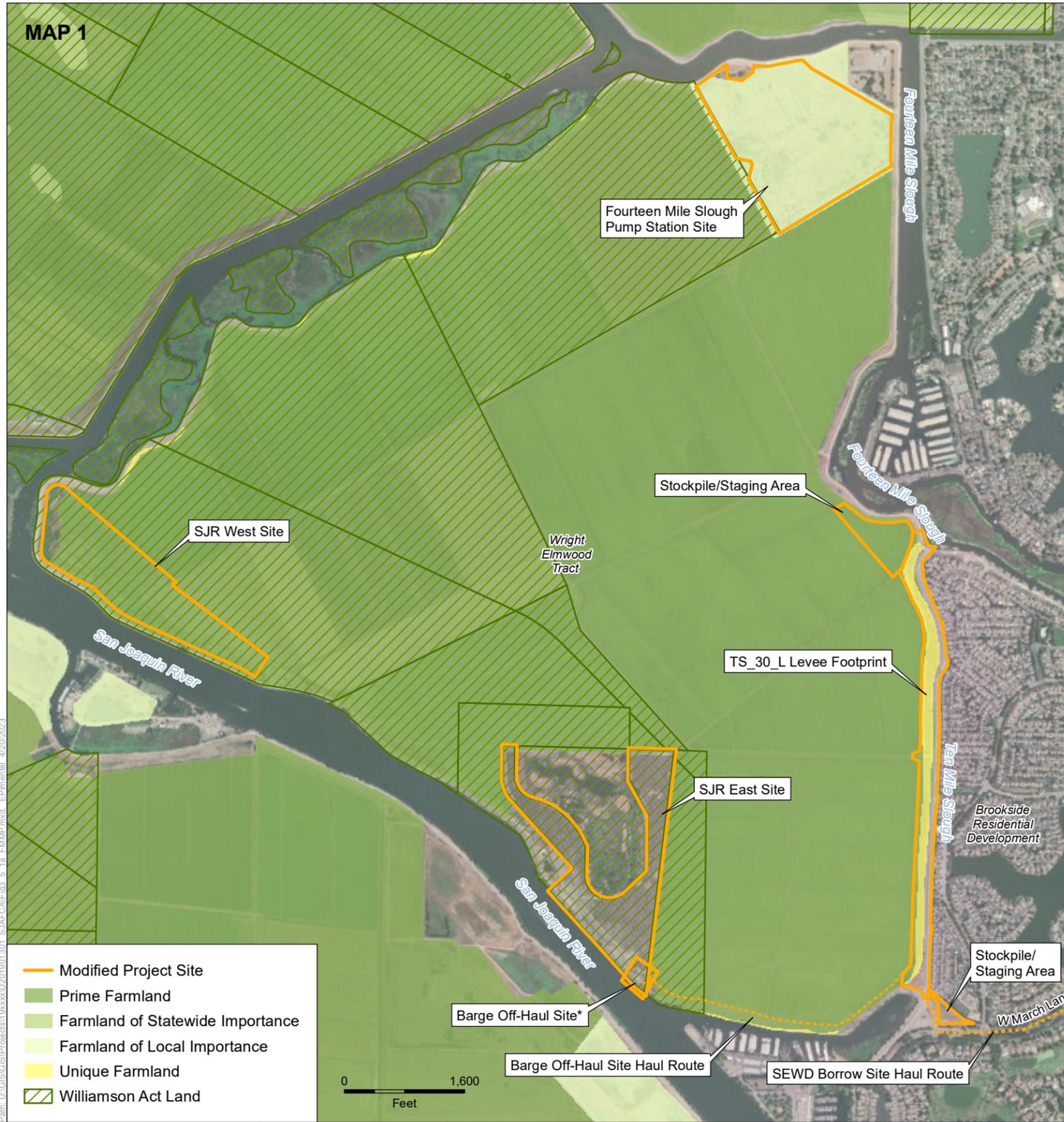
For the total acres of Prime Farmland, Unique Farmland, and Farmland of Local and Statewide Importance in San Joaquin County, the City of Stockton, and the City of Manteca, see **Table 3.5-1** below.

**TABLE 3.5-1  
 TOTAL ACRES OF PRIME FARMLAND, UNIQUE FARMLAND, AND FARMLAND OF LOCAL AND STATEWIDE IMPORTANCE IN SAN JOAQUIN COUNTY, CITY OF STOCKTON, AND CITY OF MANTECA**

<b>In Acres</b>	<b>San Joaquin County</b>	<b>City of Stockton</b>	<b>City of Manteca</b>
Prime Farmland	381,959.17	2,220.13	925.29
Farmland of Local Importance	60,929.47	2,338.06	621.77
Farmland of Statewide Importance	82,160.86	1,615.99	2,986.92
Unique Farmland	85,678.22	55.61	0.87
<b>Total</b>	<b>610,727.72</b>	<b>6,229.78</b>	<b>4,534.85</b>

Source: FFMP 2020

The amount of total acreage converted to urban and built-up land by farmland type in San Joaquin County (including the cities of Stockton and Manteca) from 1992-2016 is represented in **Figures 3.5-2 and 3.5-3**.

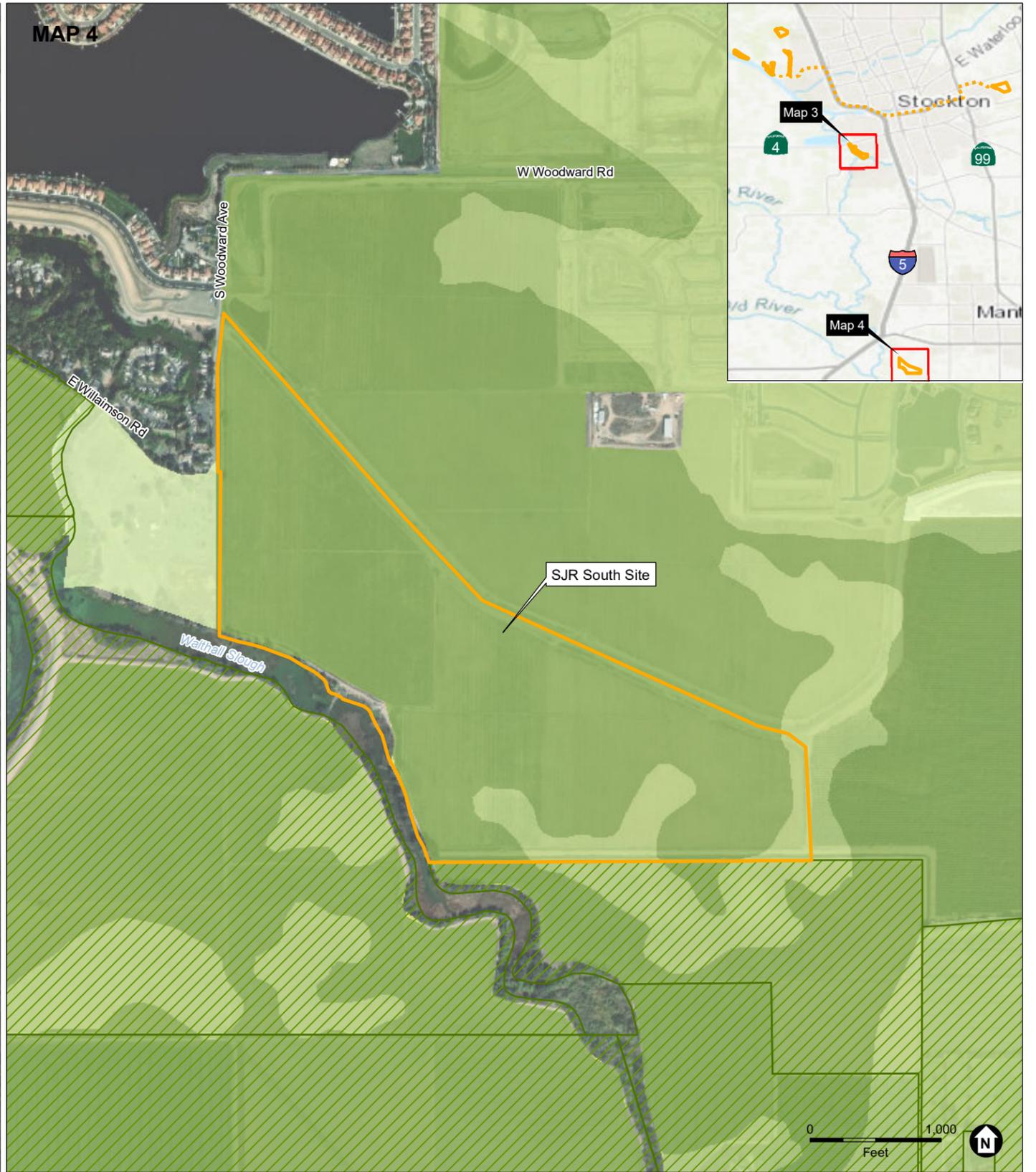


SOURCE: Maxar, 2022; FMMP, 2018; San Joaquin County, 2020; CA DWR, 2022; ESA, 2023

LSJR Reach TS\_30\_L Levee Improvement Project

\* The exact location of the barge off-haul site is yet to be determined.  
The boundary depicted in this figure is a rough estimate based on draft PDF markups.

**Figure 3.5-1a**  
Modified Project Farmland Mapping and Monitoring Program (FMMP) Designations



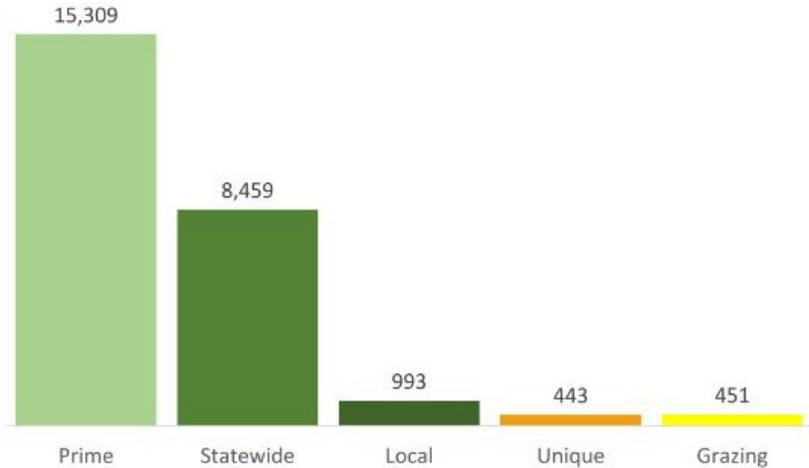
Path: U:\GIS\GIS\Projects\19xxxx\1901\001\_SJAFCAL\Fig 3.5-1b\_FMMP.mxd; EP:metbl; 4/20/2023

SOURCE: Maxar, 2022; FMMP, 2018; San Joaquin County, 2020; CA DWR, 2022; ESA, 2023

LSJR Reach TS\_30\_L Levee Improvement Project

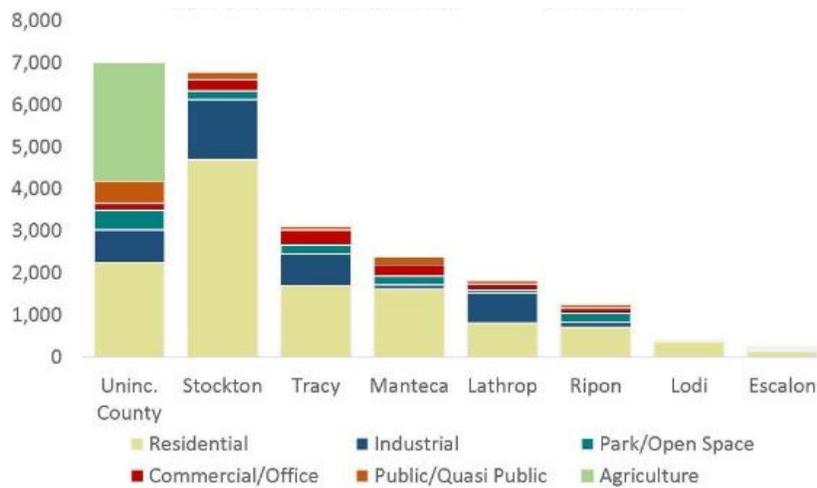
\* The exact location of the barge off-haul site is yet to be determined.  
The boundary depicted in this figure is a rough estimate based on draft PDF markups.

**Figure 3.5-1b**  
Modified Project Farmland Mapping and Monitoring Program (FMMP) Designations



Source: San Joaquin Council of Governments 2023

**Figure 3.5-2**  
 Farmland Acreage Converted to Urban and Built-up Land by Farmland Type in San Joaquin County (1992-2016)



Source: San Joaquin Council of Governments 2023

**Figure 3.5-3**  
 Current Land Use in Acres of Converted Farmland by Jurisdiction in San Joaquin County (1992-2016)

### Williamson Act Land

The Williamson Act enables governments to enter into contracts with private landowners to restrict specific parcels of land to agricultural or related open space use. There are active Williamson Act contracts within the Modified Project area, including on the barge off-haul site and SJR West and SJR East biological mitigation sites.

## Forestry

The 2018 LSJR FR/EIS/EIR did not discuss forestry resources; however, there is no land zoned for forestry or timberland within or immediately adjacent to the Modified Project area.

### 3.5.2 Regulatory Setting

The following federal, state, and local regulations would apply to the Modified Project.

#### Federal

##### ***Noxious Weed Act of 1974***

The Noxious Weed Act (7 U.S.C. § 2801 et seq.) was authorized to control and manage the spread of nonnative plant species that may have adverse effects on agriculture, commerce wildlife resources, or public health. It inhibits the transport, trade, or sales of noxious plant species in the U.S. and gave the Secretary of Agriculture authority to determine noxious plant species, and to establish measures to control them. As amended, the Act requires all Federal agencies to establish a management plan to control the spread of noxious plant species in their jurisdiction. A management plan would be developed and implemented for the construction phase of this project and included in the O&M Manual, after which the Modified Project would be in compliance with this Act.

##### ***Central Valley Project Improvement Act***

The U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and the U.S. Bureau of Land Management, in coordination with the State of California, participating CALFED Bay-Delta Program agencies, and other partners, have implemented numerous programs, projects, and actions to meet the goals of the Central Valley Project Improvement Act (CVPIA), many of which have affected land use and agriculture throughout the Central Valley, especially in the Sacramento–San Joaquin Delta watershed.

To achieve the CVPIA's purposes and the identified goals and objectives, numerous provisions for agriculture were incorporated into the statute. Specific programs, measures, and operational and management directives address water, habitat, and land management. Among these are directives for the retirement of drainage-impaired farmlands through the Land Retirement Program and implementation of an Agricultural Waterfowl Incentives Program. The goal of the Land Retirement Program is to retire 15,000 acres of agricultural lands characterized by low productivity and poor drainage through a willing seller program (Reclamation and BLM 2013). In the Agricultural Waterfowl Incentives Program, farmers are paid to keep private agricultural fields flooded during the winter months when doing so would increase the amount of habitat and the availability of food for waterfowl.

#### State

##### ***California Farmland Conservancy Program***

DOC's California Farmland Conservancy Program was established in 1996 to encourage the permanent conservation of productive agricultural lands in collaboration with local entities. In creating this program, the California Legislature recognized the important contribution made by

farmland to the state's food supply and the additional benefits of farmland: conserving wildlife habitat, protecting wetlands, and preserving scenic open space.

The California Farmland Conservancy Program supports local efforts to conserve farmland by providing grant funds for the purchase of agricultural conservation easements. These easements are deed restrictions intended to ensure that a given piece of agricultural land can never be used for purposes that would interfere with farming, leaving farmers free to make all ongoing agricultural management decisions on their land.

### ***California Farmland Mapping and Monitoring Program***

In 1980, DOC started a system of mapping and monitoring important farmland in California based on soil and climatic characteristics, the Farmland Mapping and Monitoring Program. CEQA lead agencies are required to evaluate agricultural resources in environmental assessments based at least in part on the Farmland Mapping and Monitoring Program. The State's system was designed to document the amount of agricultural land in California that was being converted to non-agricultural land or transferred into Williamson Act contracts.

### ***Williamson Act Contract***

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments that are much lower than normal, because they are based on farming and open space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the State via the Open Space Subvention Act of 1971.

The Williamson Act was amended in August 1998 to establish Farmland Security Zones. Under this Farm Bureau-sponsored Super Williamson Act, landowners can receive an additional 35 percent reduction in the land's value for property tax purposes. This additional tax reduction can be earned only if farmers and ranchers keep their property in the conservation project for at least 20 years. Farmland Security Zone contracts are comparable to the Williamson Act contracts in that each year, another year is added to the agreement unless the landowner or county does not renew the contract. The legislation prohibits the annexation of land enrolled in a 20-year contract to a city, or a special district that provides nonagricultural services, or for use as a public school site.

Of California's 58 counties, 52 adopted the Williamson Act Project. San Joaquin County is included in those that adopted the act. The location of these lands in the project vicinity is discussed in Chapter 5 of the 2018 LSJR FR/EIS/EIR. The Modified Project would establish biological mitigation sites (the SJR West Site and SJR East Site) on lands currently covered under the Williamson Act.

## Local

### **City of Stockton General Plan (2018)**

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since release of that document the City of Stockton has updated their general plan to the Envision Stockton 2040 General Plan (City of Stockton 2018). Chapter 3, *Land Use*, of the updated plan outlines the following goals and applicable policies related to analysis of potential impacts to agricultural and forestry resources from the Modified Project:

**Policy LU-5.3:** Define discrete and clear city edges that preserve agriculture, open space, and scenic views.

*Action LU-5.3A:* At the interface between development and rural landscapes, use landscaping and other attractive edging instead of soundwalls and similar utilitarian edges of developments to maintain the visual integrity of open space.

*Action LU-5.3B:* Coordinate with San Joaquin County and property owners in unincorporated areas to preserve agricultural land and open space areas in the unincorporated county that contribute to maintaining clear boundaries between cities.

*Action LU-5.3C:* Maintain the City's agricultural conservation program that requires either dedication of an agricultural conservation easement at a 1:1 ratio or payment of an in-lieu agricultural mitigation fee for the conversion of prime farmland, farmland of statewide importance, or unique farmland, as defined by the State Farmland Monitoring and Mapping Program.

### **City of Manteca General Plan (2013)**

The 2018 LSJR FR/EIS/EIR evaluated the 2013 plan, which remains the City's current guiding document for land use decisions. The City of Manteca is in the process of updating the general plan, but the revised general plan and revised general plan EIR are still in the public review phase.

### **San Joaquin County General Plan (2016)**

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since release of that document San Joaquin County has updated their general plan (San Joaquin County 2016). Chapter 3.1, Community Development Element, of the updated plan outlines the following goals and applicable policies related to analysis of potential impacts to agricultural and forestry resources from the Modified Project:

**Policy LU-1.7 Farmland Preservation:** The County shall consider information from the State Farmland Mapping and Monitoring Program when designating future growth areas in order to preserve prime farmland and limit the premature conversion of agricultural lands.

**Policy LU-2.15 Agricultural Conversions:** When reviewing proposed General Plan amendments to change a land use diagram or zoning reclassification to change from an agricultural use to non-agricultural use, the County shall consider the following:

- potential for the project to create development pressure on surrounding agricultural lands;

- potential for the premature conversion of prime farmland, farmland of statewide importance, unique farmland, farmland of local importance, and confined animal agriculture;
- potential for impacts on surrounding farming operations and practices;
- provision of infrastructure and services to the new use and the potential impact of service demands or on the surrounding area; and
- protecting habitat restoration opportunities.

**Policy LU-2.16 Agricultural-Urban Reserve Designation:** The County shall require a General Plan amendment to permit urban development on lands the County designates Agriculture-Urban Reserve.

**Policy LU-7.5: Right to Farm:** The County shall strive to protect agricultural land against nuisance complaints from nonagricultural land uses through the implementation of the San Joaquin County Right to Farm ordinance and, if necessary, other appropriate regulatory and land use planning mechanisms.

**Policy LU-7.7: Agricultural Buffers:** The County shall ensure non-agricultural land uses at the edge of agricultural areas incorporate adequate buffers (e.g., fences and setbacks) to limit conflicts with adjoining agricultural operations.

**Policy C-4.9 Farmland Preservation:** The County shall discourage San Joaquin LAFCo from approving city annexations and city SOI expansions onto Prime Farmland if farmland of lesser quality is available and suitable for expansion elsewhere. The County shall encourage the long-term preservation of productive agricultural lands and operations when San Joaquin LAFCo considers such proposals.

### 3.5.3 Impact Analysis and Mitigation Measures

#### Significance Criteria

For the purpose of this analysis, the relevant standards of significance from the 2018 LSJR FR/EIS/EIR have been updated to the current CEQA Guidelines Appendix G thresholds to determine whether implementing the Modified Project would result in a significant impact. An agricultural and forestry resource impact is considered significant if implementation of the proposed Modified Project would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural uses;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
- Result in the loss of forest land or conversion of forest land to non-forest use; or

- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

## Methodology and Assumptions

The following impact analysis considers the potential impacts of the proposed changes included in the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR is considered sufficient to evaluate the impacts of the Modified Project, no additional environmental review is provided.

## Issues Not Analyzed Further in this SEIR

Forestland, timberland, and timberland zoned Timberland production was not discussed in the 2018 LSJR FR/EIS/EIR. However, the Modified Project would have no impact with regards to the following significance criteria:

- Result in a conflict with existing zoning for forestland, timberland, or timberland zoned Timberland Production, or result in the loss of forestland or conversion of forestland to non-forest use.

The Modified Project is not located within or adjacent to zoned forest land, timberland, or Timber Production. Therefore, implementation of the Modified Project would not conflict with existing zoning or result in the conversion of forest land to non-forest use and there would be no impact.

## Impacts and Mitigation Measures

### **Impact 3.5-1: The Modified Project could convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Special Designated Farmland) to non-agricultural use, or conflict with existing zoning for agricultural use or a Williamson Act contract.**

As explained in the 2018 LSJR FR/EIS/EIR, implementation of Alternative 7a would include the conversion of 1 acre of farmland along the Calaveras River. The 2018 LSJR FR/EIS/EIR determined that the removal of 1 acre of farmland within the Alternative 7a area would be less than significant because of the abundance of farmland that would remain in the study area. Additionally, the 2018 LSJR FR/EIS/EIR determined that the removal of 1 acre of farmland to construct the project would be significantly less than the loss of farmland that could occur during a flood event. The 2018 LSJR FR/EIS/EIR also stated that Alternative 7a would comply with Federal and State regulations to compensate the landowners for the loss of their properties (urban and agricultural) and to relocate them, as feasible. The Modified Project does not include work along the Calaveras River.

Implementation of the Modified Project would include approximately 1 mile of cutoff wall construction, levee reshaping, and runoff erosion protection of the TS\_30\_L levee, as well as development of a borrow site, barge off-haul site, two co-located staging and stockpile areas, haul routes, and one of five potential biological mitigation sites. As described previously, the Modified Project site contains: Prime Farmland (within the TS\_30\_L levee footprint, northern staging/stockpile area, barge off-haul site, and SEWD borrow site, as well as within the SJR West,

SJR East, and SJR South biological mitigation sites), Farmland of Statewide Importance (within the SEWD borrow site and SJR South Site), and Unique Farmland (within the TS\_30\_L levee footprint, northern staging/stockpile area, and SJR South Site).

Impacts resulting from the development of a barge off-haul site, co-located stockpile and staging areas, and haul routes would be temporary in nature and would be returned to pre-construction conditions once construction is completed. Therefore, these activities would not result in conversion of agricultural land to non-agricultural use or conflict with existing zoning. The SEWD borrow site will remain an open excavation to facilitate future plans the SEWD has for the property; however, this excavation does not preclude future agricultural use of the property and would therefore not constitute conversion of agricultural land to non-agricultural use.

The Modified Project includes shifting and reshaping the levee, as described in Chapter 2, which will require an increased levee footprint. This proposed 20-foot westward shift to the levee configuration would require realignment of the existing waterside irrigation ditch and would move the landside levee toe 10 feet toward the waterside (providing 15 feet of separation between the landside levee toe and the existing property line). The levee shifting and replacement would alter Prime Farmland and Unique Farmland located in the existing levee toe and easement with development of the Modified Project's reshaped levee's waterside slope and levee access road and relocation of the irrigation ditch. However, as this area of land was already located within the existing levee's easement and would remain in the reshaped levee's easement, this alteration would not constitute a change from agricultural to non-agricultural use. In addition, the Modified Project's relocation of the irrigation ditch along the TS\_30\_L levee would be considered a compatible agricultural use and would still serve agricultural irrigation customers. Therefore, impacts related to conversion of Special Designated Farmland to a non-agricultural use due to the TS\_30\_L levee improvements would be **less than significant**.

However, development of biological mitigation sites at the SJR West Site, SJR East, and SJR South Site would result in Prime and Unique Farmland and Farmland of Statewide Importance being converted from Special Designated Farmland to wetland and riparian habitat, a non-agricultural use. The SJR West Site currently contains approximately 49 acres of Prime Farmland; the SJR East Site currently contains approximately 3.1 acres of Prime Farmland; and the SJR South Site currently contains approximately 159 acres of Prime Farmland, 0.1 acre of Unique Farmland, and 16.5 acres of Farmland of Statewide Importance.

The Modified Project would support flood control, which would provide significant additional protection to agricultural lands in the region; however, because it would convert Special Designated Farmland to non-agricultural use, this impact would be **potentially significant**.

First, there are mitigating circumstances related to the Modified Project that would lessen this impact. For instance, development of biological mitigation sites under the Modified Project would not impact the underlying soil quality or characteristics that are considered when designating Prime or Unique Farmland or Farmland of Statewide Importance. Accordingly, unlike a conversion to commercial or residential development, the Modified Project would not affect the site's potential quality as an agricultural site. In addition, development of the biological

mitigation sites would not fragment surrounding agricultural lands or disrupt drainage or irrigation of surrounding agricultural lands. To the contrary, the Modified Project, including the creation of biological mitigation sites, would improve the productivity, quality, and resiliency of surrounding farmland by facilitating drainage and flood control on a regional basis and by improving the ecological quality and biodiversity of surrounding habitats.

As stated above, the 2018 LSJR FR/EIS/EIR found that Alternative 7a would comply with Federal and State regulations to compensate the landowners for the loss of their properties (urban and agricultural) and to relocate them, as feasible, but specific mitigation measures were not listed for potentially significant agricultural impacts. The Modified Project includes the mitigation measure listed below (3.5-1) to minimize impacts to Special Designated Farmland and to improve the quality and productivity of agricultural lands on a regional basis.

However, the prescribed mitigation measure improves the quality and productivity of land that is already in agricultural use and would not create new farmland; therefore, the mitigation measure does not fully offset the conversion of Special Designated Farmland to a nonagricultural use. Fully offsetting the conversion of agricultural land in San Joaquin County is not feasible. The supply of land in the region that is suitable for agricultural use but not currently being used for agriculture and commercially available is extremely limited. SJAFCA was not able to locate a financially feasible property (or properties) to accomplish the required offset. Therefore, despite the significant regional benefits associated with the Modified Project, the permanent conversion of Special Designated Farmland from the construction of the Modified Project would be **significant and unavoidable**.

The barge off-haul site is located in an active Williamson Act contract area. However, activities at the barge off-haul site would be temporary in nature and would be returned to pre-construction conditions once construction is completed and would not result in a conflict with the Williamson Act. The barge off-haul site will only be used if borrow material is supplied by Dutra Materials at Decker Island (as described in Chapter 2, *Project Description*). The SJR West Site and SJR East Site (for biological mitigation) are also located on lands under Williamson Act contract. Development of these lands as wetland and riparian habitat would maintain open space uses and would therefore be considered allowable uses under the Williamson Act. Therefore, the potential impact on Williamson Act contracts for the Modified Project would be **less than significant**.

**Mitigation Measure 3.5-1: Minimize and Avoid Loss of Special Designated Farmland.** The following measures shall be implemented before and during construction of the Modified Project to minimize and avoid loss of Prime and Unique Farmland and Farmland of Statewide Importance.

- Biological mitigation sites shall be designed to minimize, to the greatest extent feasible, the loss of agricultural land with the highest values.
- Biological mitigation sites shall be designed to minimize fragmentation or isolation of Special Designated Farmland. Where a biological mitigation site involves acquiring land or easements, any area not needed for biological habitat mitigation shall be of a size sufficient to allow viable farming operations. In such situation, USACE shall be responsible for acquiring easements, making lot line adjustments,

and merging affected land parcels into units suitable for continued commercial agricultural management.

- Any utility or infrastructure serving agricultural uses shall be reconnected if it is disturbed by biological mitigation site construction. If a biological mitigation site temporarily or permanently cuts off roadway access or removes utility lines, irrigation features, or other infrastructure, USACE shall be responsible for restoring access as necessary to ensure that economically viable farming operations are not interrupted.
- Where applicable to a biological mitigation site, buffer areas shall be established between restoration projects and adjacent agricultural land. The buffers shall be sufficient to protect and maintain land capability and flexibility in agricultural operations. Buffers shall be designed to protect the feasibility of ongoing agricultural operations and reduce the effects of construction-related or operational activities (including the potential to introduce special-status species in the agricultural areas) on adjacent or nearby properties. Buffers shall also serve to protect biological mitigation sites from noise, dust, and the application of agricultural chemicals. The width of each buffer shall be determined on a site-by-site basis to account for variations in prevailing winds, crop types, agricultural practices, ecological restoration, or infrastructure. Buffers can function as drainage swales, trails, roads, linear parkways, or other uses compatible with ongoing agricultural operations.

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## Cumulative Impacts

**Impact 3.5-2: The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to agriculture and forestry resources.**

The following potential cumulative impacts related to agriculture were analyzed in Section 5.23.5 of the 2018 LSJR FR/EIS/EIR,

Construction and/or implementation of Alternative 7a, as discussed in the 2018 LSJR FR/EIS/EIR, was determined to have a significant cumulative effect as a result of the irreversible conversion of farmland to urban development. Furthermore, it was determined that while Alternative 7a would implement mitigation measures to reduce the effects of the project to less than significant levels, implementation of Alternative 7a would still result in significant cumulative effects to agriculture in the region as a result of the conversion of farmland to urban development.

The potential impacts of the Modified Project, when considered together with similar impacts from other probable future projects in the vicinity, could result in a **significant and unavoidable** cumulative impact on agricultural resources.

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## 3.6 Biological Resources

This section discusses the potential for effects of the Modified Project on biological resources, including effects on wetland and other aquatic resources. Chapter 5 of the 2018 LSJR FR/EIS/EIR described the environmental regulatory framework and standards of significance for biological resources, which are incorporated by reference and summarized below as appropriate. In the 2018 LSJR FR/EIS/EIR, the analysis of biological resources was based on a desktop review without further site-based biological surveys. The analysis in this section was developed based on the TS\_30\_L construction details, which have been developed and assessed further than in the 2018 LSJR FR/EIS/EIR; current regulatory requirements; and the results of special-status species surveys conducted for the Modified Project.

Several comments submitted by individuals during circulation of the Notice of Preparation (NOP) for the 2018 LSJR FR/EIS/EIR are relevant to biological resources. All applicable comment letters are contained in the 2018 LSJR FR/EIS/EIR. Certain issues of continuing concern to the public related to biological resources include levee encroachment and vegetation, and the effects of the Modified Project on fish and wildlife during and after construction.

A Coordination Act Report (CAR) was prepared by the U.S. Fish and Wildlife Service (USFWS) in coordination with the California Department of Fish and Wildlife (CDFW) and was included as Addendum D, “Environmental Planning and Compliance,” in the 2018 LSJR FR/EIS/EIR. A Supplemental CAR was received for the TS\_30\_L levee improvements in 2022. This CAR describes the environmental resources and the potential effects of Alternative 7a on these resources. It also includes recommendations developed by USFWS in plan formulation and mitigation development. The USFWS recommendations include determining vegetation impacts, conducting ground-level biological evaluation of existing vegetation and habitat evaluation, and developing habitat enhancement and restoration opportunities for incorporation into the Modified Project to the maximum extent possible.

As described in the 2018 LSJR FR/EIS/EIR, a biological assessment was previously submitted to formally consult with USFWS regarding federally listed threatened and endangered species and designated critical habitat under its jurisdiction. Formal consultation with the USFWS concluded with the issuance of a biological opinion (BO) in June 2016, which included incidental take statements and non-discretionary terms and conditions. Formal consultation also took place with the National Marine Fisheries Service (NMFS) and a biological opinion (BO) with Essential Fish Habitat considerations was issued in 2016. Based on the minor additions and modifications required by the Modified Project, USACE has reinitiated consultation with USFWS.

### 3.6.1 Environmental Setting

The TS\_30\_L levee site, barge off-haul site, and stockpile/staging areas (jointly referred to in this section as the “TS\_30\_L levee improvement work area”) are surrounded by high-density residential development to the east, Buckley Cove to the south, Fourteenmile Slough to the north, and agricultural land to the west. The residential development to the east includes ornamental landscape trees including coast redwood (*Sequoia sempervirens*) and Italian cypress (*Cupressus sempervirens*). During a survey conducted August 18, 2021, the southern half of the agricultural

land to the west of the TS\_30\_L levee was observed to be fallow and contained scattered weedy species, while the northern half of the agricultural land to the west of the TS\_30\_L levee (including the northern stockpile/staging area) was planted with rice fields. Land cover types within the TS\_30\_L levee improvement work area include riparian woodland, agricultural, irrigation ditch, and developed/disturbed. Developed/disturbed land cover includes the graded levee road and gravel slopes, dirt farm roads, and a graded area comprising weedy vegetation. The eastern levee slope is completely devoid of vegetation. Riparian woodland occurs along the western levee slope. The Stockton East Water District (SEWD) borrow site is in agricultural production surrounded by gravel access roads bordered by woody vegetation and orchards.

In addition to the components of the Modified Project discussed above, three biological mitigation sites were evaluated at the project level as described in Chapter 2, *Project Description*, Section 2.4.5. The three sites were surveyed on December 14 and December 21, 2022. The Fourteenmile Slough Pump Station Site consists of ruderal vegetation with patches of remnant riparian woodland and scrub habitat. It is surrounded by a levee, which is bordered by Fourteenmile Slough to the north, White Slough to the east, and agricultural lands to the south (rice) and west (orchard). The SJR West Site is also bordered by the SJR levee on the north, west, and southwest sides of the property and fallow agricultural farm fields to the east. The site consists mostly of recently disced fields with a small patch of fresh emergent and riparian scrub in the northwest corner of the property. Lastly, the SJR East Site is bordered by the SJR levee on the west/southwest and agricultural lands, consisting mostly of what appears to be fallow rice to the north and east. The site is planted in olives and surrounds the 40-acre Center for Natural Lands Management Pace Preserve, which includes riparian and aquatic habitat.

Site surveys were not conducted for the two mitigation sites that were evaluated at a program level, also described in Chapter 2, *Project Description*, Section 2.4.5. The Van Buskirk Park site was previously a golf course, and consists mostly of turf, but does contain areas of wetland and riparian habitat and occurs adjacent to French Camp Slough. The SJR South Site is currently in agricultural production but does have patches of riparian habitat. It is located along Walthall Slough on the southwest side and the Dredger Cut levee on the north. The rest of the surrounding areas consist mostly of agricultural land with some residential development.

## Special-Status Species

Special-status species are legally protected under the California Endangered Species Act (CESA) and Federal Endangered Species Act (FESA) or other regulations or are species that are considered sufficiently rare by the scientific community to qualify for such listing. These species fall into the following categories:

1. Species listed or proposed for listing as threatened or endangered under FESA (Code of Federal Regulations Title 50, Section 17.12 [50 CFR 17.12] [listed plants], 50 CFR 17.11 [listed animals], and various notices in the *Federal Register* [FR] [proposed species]).
2. Species that are candidates for possible future listing as threatened or endangered under FESA (61 FR 40, February 28, 1996).
3. Species listed or proposed for listing by the State of California as threatened or endangered under CESA (California Code of Regulations Title 14, Section 670.5).

4. Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.).
5. Animal species of special concern to CDFW.
6. Animals fully protected under the California Fish and Game Code (Sections 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).
7. Species that meet the definitions of rare and endangered under CEQA. CEQA Section 15380 provides that a plant or animal species may be treated as “rare or endangered” even if not on one of the official lists (CEQA Guidelines Section 15380).
8. Plants considered by the California Native Plant Society (CNPS) and CDFW to be “rare, threatened or endangered in California” (California Rare Plant Ranks 1A, 1B, and 2).

Several species known to occur on or in the vicinity of the Modified Project site are protected by federal and/or state endangered species laws or have been designated as species of special concern by CDFW. In addition, CEQA Guidelines Section 15380(b) provides a definition of rare, endangered, or threatened species that are not included in any listing. For example, vascular plants listed as rare or endangered or as List 1 or 2 by CNPS are considered to meet Section 15380(b) requirements. Species recognized under these terms are collectively referred to as “special-status species.”

The 2018 LSJR FR/EIS/EIR assessed the potential for special-status species to occur for Alternative 7a, including the TS\_30\_L reach. The special-status species considered for analysis in the 2018 LSJR FR/EIS/EIR were based on the California Natural Diversity Database (CNDDDB), CNPS, and USFWS lists generated in 2014. Each database query was based on a search of the U.S. Geological Survey (USGS) 7.5-minute quadrangle (quad) where each study area was located. The TS\_30\_L reach is located on the Stockton West quad; the SEWD borrow site is located on the Stockton East quad; the three project-level potential biological mitigation sites are located on the Holt (SJR West and East), Terminous, and Lodi South (Fourteenmile Slough) quads; and the two program-level biological mitigation sites are located on the Stockton West (Van Buskirk) and Lathrop (SJR South) quads. All lists were reviewed and habitat preferences for each species were compared with the Modified Project’s affected areas. Updated species lists were generated for preparation of this SEIR (see **Appendix F**) and compared with the list of previously evaluated species. Any species not previously occurring on the lists was evaluated for its potential to occur in the Modified Project site and is shown in **Table 3.6-1**. Additionally, while not occurring on the CNDDDB list, pallid bat (*Antrozous pallidus*) was added for evaluation because of the presence of suitable roosting habitat on the Modified Project site. The list includes the common and scientific names for each species, regulatory status (federal, state, local, CNPS), habitat descriptions, and a discussion of the potential for occurrence at the Modified Project site. The following criteria have been used to determine the potential of each species to occur at the Modified Project site:

- *Present*: Species has been observed at the Modified Project site.
- *High*: Species is known to occur on or near the Modified Project site (based on CNDDDB records within 5 miles) and suitable habitat is present on the site.
- *Moderate*: Species is not known to occur on or near the Modified Project site, but suitable habitat is present.

- *Low*: Species is known to occur in the vicinity of the Modified Project site and no or marginally suitable habitat is present.
- *None*: Species is not known to occur on or in the vicinity of the Modified Project site and no suitable habitat is present.

**TABLE 3.6-1  
 REGIONALLY OCCURRING SPECIAL-STATUS SPECIES NOT PREVIOUSLY EVALUATED**

<b>Scientific Name Common Name</b>	<b>Listing Status USFWS/ CDFW/CNPS</b>	<b>General Habitat</b>	<b>Potential to Occur in the Modified Project Area</b>
<b>Invertebrates</b>			
<i>Bombus crotchii</i> Crotch bumble bee	-/C/-	Variety of habitats including open grasslands, shrublands, chaparral, desert margins, and semi-urban areas.	<b>Low.</b> The Crotch bumble bee has been largely extirpated from the Central Valley. There are no CNDDDB records within the survey area.
<i>Bombus occidentalis occidentalis</i> Western bumble bee	-/C/-	Historically observed in a variety of habitats; currently observed in high-elevation meadows, forests, riparian areas, and coastal grasslands.	<b>Low.</b> Western bumble bee populations in California are now largely restricted to high-elevation sites in the Sierra Nevada and scattered observations along the California coast. There are no CNDDDB records within the survey area.
<i>Danaus plexippus</i> Monarch butterfly	C/-/-	Requires milkweed (primarily <i>Asclepias</i> spp.) as its host plant for egg-laying and as a larval food source.	<b>Low.</b> Several milkweed plants were observed during surveys, but a sufficient quantity to support monarch butterfly was not present.
<b>Amphibians</b>			
<i>Spea hammondi</i> Western spadefoot	-/SSC/-	Occurs primarily in grassland habitats but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	<b>None.</b> There are no vernal pools or other suitable breeding habitat on or adjacent to the Modified Project site.
<b>Birds</b>			
<i>Circus hudsonius</i> Northern harrier	-/SSC/-	Coastal salt and freshwater marsh. Nests and forages in grasslands.	<b>Present.</b> Observed during survey at the SJR West Site.
<i>Lanius ludovicianus</i> Loggerhead shrike	-/SSC/-	Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	<b>Moderate.</b> The survey area is within the known range and may provide suitable habitat. However, there are no CNDDDB records nearby.
<i>Laterallus jamaicensis coturniculus</i> California black rail	-/T/-	Freshwater, salt, and brackish marsh, swamp, and wetlands; needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	<b>High.</b> There is one CNDDDB record, from 2010, between the SJR East Site and the Fourteenmile Slough site. The survey area contains wetlands that may be suitable habitat.
<b>Mammals</b>			
<i>Antrozous pallidus</i> Pallid bat	-/SSC/-	Locally common in low elevations in California. Occupies a wide variety of habitats, including grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. Most common in open, dry habitats with rocky areas for roosting. Day roosts in caves, crevices, mines, and occasionally hollow trees and buildings. Night roosts may be in more open sites. Hibernation sites are not well known but likely in rock crevices.	<b>Moderate.</b> Riparian trees on-site may provide suitable day and night roosting habitat; agricultural land to the west provides suitable foraging habitat.

**TABLE 3.6-1  
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES NOT PREVIOUSLY EVALUATED**

<b>Scientific Name Common Name</b>	<b>Listing Status USFWS/ CDFW/CNPS</b>	<b>General Habitat</b>	<b>Potential to Occur in the Modified Project Area</b>
<i>Taxidea taxus</i> American badger	-/SSC/-	Requires sufficient food, friable soils to excavate dens and pursue prey, and relatively open, uncultivated ground.	<b>Low.</b> The species has possibly been extirpated from the survey area as a result of human development. There are no CNDDDB records within the Modified Project site or nearby.
<i>Vulpes macrotis mutica</i> San Joaquin kit fox	E/T/-	Grassland with scattered shrubby vegetation; needs loose-textured sandy soils for burrowing.	<b>Low.</b> The survey area does not provide suitable habitat. There are no CNDDDB records within the Modified Project site or nearby.
<b>Plants</b>			
<i>Amsinckia grandiflora</i> Large-flowered fiddleneck	E/E/1B.1	Annual herb found in cismontane woodland and valley and foothill grassland from 885 to 1,805 feet. Blooms April through May, though sometimes as early as March.	<b>None.</b> The Modified Project site is below the elevation range of this species.
<i>Carex comosa</i> Bristly sedge	-/-/2B.1	Perennial rhizomatous herb found in wet areas of coastal prairie, lake margins, and valley and foothill grassland below about 2,050 feet. Blooms May through September.	<b>Moderate.</b> The study area is in the range. Emergent wetland and the margins of aquatic habitats may provide potential habitat. There is a CNDDDB record near the study area from 1928, although it may now be extirpated from the area.
<i>Delphinium recurvatum</i> Recurved larkspur	-/-/1B.2	Perennial herb found in alkaline soils of chenopod scrub, cismontane woodland, and valley and foothill grassland from 10 to 2,590 feet elevation. Blooms March through June.	<b>None.</b> There are no alkaline soils on the Modified Project site that are suitable for this species.
<i>Scutellaria galericulata</i> Marsh skullcap	-/-/2B.2	Perennial rhizomatous herb found in mesic lower montane coniferous forest, meadows and seeps, and marshes and swamps below about 6,900 feet. Blooms June through September.	<b>Low.</b> The study area is not within the current accepted range. However, there are uncertain records elsewhere in the Delta. Emergent wetland and the margins of aquatic habitats may provide potential habitat.
<i>Scutellaria lateriflora</i> Side-flowering skullcap	-/-/2B.2	Perennial rhizomatous herb found in mesic meadows, seeps, marshes, and swamps below about 1,650 feet. Blooms July through September.	<b>Moderate.</b> The study area is in the range. Emergent wetland and the margins of aquatic habitats may provide potential habitat.

NOTES: CDFW = California Department of Fish and Wildlife; CNPS = California Native Plant Society; Delta = Sacramento–San Joaquin Delta; SJR = San Joaquin River; USFWS = U.S. Fish and Wildlife Service

**STATUS CODES:**

Federal (U.S. Fish and Wildlife Service):

E = Endangered  
T = Threatened  
P = Proposed  
D = Delisted  
CH = Critical habitat designated for this species

State (California Department of Fish and Wildlife):

E = Endangered  
T = Threatened  
C = Candidate  
SSC = Species of special concern  
FP = Fully protected

California Native Plant Society (CNPS):

Rank 1A = Plants presumed extirpated in California and either rare or extinct elsewhere  
Rank 1B = Plants rare, threatened, or endangered in California and elsewhere  
Rank 2A = Plants presumed extirpated in California but common elsewhere  
Rank 2A = Plants rare, threatened, or endangered in California but more common elsewhere  
Rank 3 = Plants about which more information is needed  
Rank 4 = Plants of limited distribution

CNPS Code Extensions

.1 = Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)  
.2 = Fairly threatened in California (20–80% occurrences threatened)  
.3 = Not very threatened in California (less than 20% of occurrences threatened or no current threats known)

SOURCE: Data compiled by Environmental Science Associates in 2021

This SEIR only discusses special-status species with potential to occur in the Modified Project site. Because of the broad extent of the area evaluated for the 2018 LSJR FR/EIS/EIR, additional species were considered to have potential to occur. The following species evaluated in the 2018 LSJR FR/EIS/EIR were determined to not have potential to occur in the TS\_30\_L levee reach: riparian brush rabbit (*Sylvilagus bachmani riparius*) and tricolored blackbird (*Agelaius tricolor*). Species with no or low potential for occurrence are excluded from the discussion below.

### **Critical Habitat**

“Critical habitat” is defined in Section 3(5)A of the FESA as a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. No designated critical habitat is present in the Modified Project area and the Modified Project would have no impact on critical habitat.

### **Special-Status Plants**

The 2018 LSJR FR/EIS/EIR identified six plants with potential to occur within or adjacent to the Modified Project area for Alternative 7a: alkali milkvetch (*Astragalus tener* var. *tener*), slough thistle (*Cirsium classical*), big tarplant (*Blepharizonia plumosa*), Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), Mason’s lilaeopsis (*Lilaeopsis masonii*), and rose mallow (*Hibiscus lasiocarpus*).

No special-status plants were observed during a botanical survey conducted of the TS\_30\_L levee improvement work area or the SEWD borrow site on August 18, 2021, the timing of which overlapped with the blooming window for each of the aforementioned plant species except alkali milkvetch. Given the lack of alkaline soils on the Modified Project site, it is unlikely that alkali milkvetch is present at the TS\_30\_L site. There are no CNDDDB records of special-status plants on the Modified Project site.

Site surveys for the three potential biological mitigation sites evaluated at a project level concluded that slough thistle, Delta tule pea, rose-mallow (woolly rose-mallow; *Hibiscus lasiocarpus* var. *occidentalis*), and Mason’s lilaeopsis also have the potential to occur on those sites, along with six additional species: watershield (*Brasenia schreberi*), bristly sedge (*Carex comosa*), Delta mudwort (*Limosella australis*), Sanford’s arrowhead (*Sagittaria sanfordii*), side-flowering skullcap (*Scutellaria lateriflora*), and Suisun Marsh aster (*Symphotrichum lentum*).

Based on reviews of aerial photos, potential habitat is present to support special-status plants along Walthall Slough and French Camp Slough adjacent to the program-level mitigation sites.

### **Special-Status Wildlife**

#### **Valley Elderberry Longhorn Beetle**

The valley elderberry longhorn beetle is endemic to the Central Valley and is found in riparian habitats and associated uplands where the elderberry (*Sambucus* spp.), the beetle’s food plant, grows. The beetle is a pith-boring species that depends on elderberry plants during its entire life cycle. Larvae feed on tree pith while adults eat the foliage and possibly the flowers of the plant. Larvae bore into the pith of elderberry roots, branches, and trunks to create an opening in the stem within which they pupate, remaining in this stage for 1–2 years before emerging as adults. After metamorphosing into an adult, the valley elderberry longhorn beetle chews a circular exit hole

through which it emerges, sometime during the period of late March to June. It has been suggested that this species is a poor disperser, based on the spatial distribution of occupied shrubs.

Subsequent to releasing the Draft FR/EIS/EIR, a protocol-level field survey was completed within the Alternative 7a project area. Within the TS\_30\_L levee improvement work area, there are elderberry shrubs within the riparian zone that provide potentially suitable habitat for valley elderberry longhorn beetle. Within the riparian zone of the TS\_30\_L levee improvement work area, there are 10 known elderberry shrubs, including a total of 38 individual stems at least 1 inch in diameter. No elderberry shrubs were observed during the arborist survey conducted at the SEWD borrow site on October 27, 2021. Eleven elderberry clumps and one individual elderberry shrub were observed on the SJR West and East mitigation sites. Although none of the shrubs were observed to have exit holes, all of these stems are considered to be suitable habitat for valley elderberry longhorn beetle. Surveys have not been completed on the two program-level mitigation sites, but there is riparian habitat that could support elderberry shrubs at both sites along Walthall and French Camp sloughs.

### **Giant Garter Snake**

Four giant garter snake occurrences are documented within 5 miles of the Modified Project site. One occurrence (351) is from 1880 and is approximately 1.7 miles southeast of the TS\_30\_L levee. This occurrence states that the record was mapped in a general location in Stockton; however, much of the area has been developed since then. Another occurrence (425) is from 2018 and is approximately 2.5 miles west of the TS\_30\_L levee. This occurrence states that two individuals were observed foraging within Himalayan blackberries on the waterside bank of the San Joaquin River. One giant garter snake occurrence (55) was observed in the Stockton Diverting Canal in 1976 approximately 1 mile northwest of the SEWD borrow site. The SEWD borrow site is approximately 200 feet from the aquatic habitat in the canal, so it would be just outside of the giant garter snake upland habitat. There is no aquatic habitat within the SEWD borrow site. An additional occurrence (425) from 2018 states that two individuals were observed within Himalayan blackberry on the waterside bank of the levee near walnut trees about 1 mile from the SJR East Site, across from the SJR (CDFW 2021, 2022; Appendix F). Wetlands and agricultural canals on all three project-level and both program-level mitigation sites as well as Fourteenmile Slough, French Camp Slough, and Walthall Slough bordering the sites may provide potential habitat for giant garter snake.

Giant garter snakes inhabit agricultural wetlands including irrigation and drainage canals, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands in the Central Valley. Giant garter snakes are often found within these aquatic features, especially when emergent vegetation including cattails and bulrushes are present. Because most of the species' natural habitat has been lost, giant garter snakes also live in rice fields (USFWS 2017a). Rice fields provide surface water during the summer when the snakes are active and marsh-like conditions provide the cover, habitat, and prey required for giant garter snake to survive (Halstead et al. 2010). The active season extends from April 1 to October 1. Giant garter snakes inhabit small-mammal burrows and other soil crevices above flood elevations during this inactive period (USFWS 2017a).

ESA Biologist Kelly Bayne conducted a habitat assessment for giant garter snake at the TS\_30\_L levee improvement work area on August 18, 2021. The irrigation ditch along the western edge of the TS\_30\_L levee site provides suitable aquatic habitat for giant garter snake because of the presence of ponded water and emergent vegetation. The rice fields to the west provide suitable refuge and foraging habitat. The small-mammal burrows present on the sides of the irrigation ditches within the TS\_30\_L levee site and on the graded farm road to the west of the TS\_30\_L levee provide suitable upland habitat.

Riparian woodlands typically do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (Hansen and Brode 1980). Giant garter snakes typically select burrows with sunny exposure along south- and west-facing slopes in areas where they can access basking locations on warmer sunny days (USFWS 1997a).

### **Western Pond Turtle**

Western pond turtles are found in slow-moving rivers, streams, lakes, ponds, wetlands, reservoirs, and brackish estuarine waters with deep pools and rocks, logs, and other exposed surfaces for basking. The irrigation ditch along the western edge of the TS\_30\_L levee and the Stockton Diverting Canal adjacent to the SEWD borrow site provide suitable habitat for western pond turtle. No western pond turtles were observed in the TS\_30\_L levee improvement work area during the 2021 biological field surveys. No western pond turtle occurrences are documented in the CNDDDB within 5 miles of the TS\_30 levee improvement work area. However, there are records within the SJR and associated sloughs and waterways. The survey area is within the western pond turtle's known range. The remains of an aquatic turtle were found at the Fourteenmile Slough Pump Station Site during ESA's first reconnaissance survey. Although it could not be positively identified as western pond turtle, the remains suggest the presence of either western pond turtles or red-eared sliders, which fill a similar niche. All three sites evaluated at a project level contain agricultural ditches or wetlands that may provide suitable habitat. Walthall Slough, French Camp Slough, and wetlands within the golf course provide potential habitat for western pond turtle within the program-level mitigation sites.

### **Swainson's Hawk**

No Swainson's hawk occurrences are documented in the CNDDDB within 0.5 mile of the TS\_30\_L levee improvement work area or SEWD borrow site. ESA Biologist Kelly Bayne conducted a survey for active Swainson's hawk nests at the TS\_30\_L levee improvement work area on July 27, 2021, and conducted a survey for potential Swainson's hawk nest trees along the access road for the SEWD borrow site on August 18, 2021. Both surveys included a windshield-level survey radius of 0.5 mile. No active Swainson's hawk nests or raptor nests suitable for Swainson's hawk were observed in these components of the Modified Project, or within 0.5 mile. Two Swainson's hawks were observed soaring overhead approximately 0.25 mile south of the TS\_30\_L levee improvement work area during the July survey, and a single Swainson's hawk was observed soaring overhead approximately 0.25 mile southeast of the SEWD borrow site access road during the August survey. The trees within these components of the Modified Project provide low-quality nesting habitat because they are small relative to those typically used by Swainson's hawk. Similarly, the ornamental landscape trees within the residential development to the east of the TS\_30\_L levee provide only marginally suitable nesting habitat, given their sparse lateral

structure and their proximity to residential dwellings. The trees along the SEWD borrow site access road also provide low-quality nesting habitat because of their small size.

There are two recent observations of Swainson's hawk adjacent to the SJR East and West mitigation sites. A record of nest building activity from 2000 occurred less than 1 mile from the SJR East site. A record from 2009 of a nesting Swainson's hawk occurred directly across from the SJR West site on the opposite side of the SJR (CDFW 2022). Large trees on the Fourteenmile Slough Pump Station and SJR West sites may provide suitable nesting habitat and grasslands on all three sites may provide suitable foraging habitat.

### **Burrowing Owl**

No CNDDDB occurrences of burrowing owl are documented within 500 feet of the Modified Project site. ESA Biologist Kelly Bayne conducted a survey for burrowing owl on July 27, 2021, at the TS\_30\_L levee improvement work area, which provides low-quality foraging habitat because of the lack of grassland habitat. No burrowing owls or signs of burrowing owls were observed at the TS\_30\_L levee improvement work area or surrounding 500-foot buffer during the survey. Surveys were not conducted for the SEWD borrow site, but burrowing owls could utilize the site. Burrowing owls typically use burrows made by fossorial mammals, most commonly ground squirrels (*Otospermophilus beecheyi*). Ground squirrels and their burrows were observed along the western levee slope between the levee road and the mixed riparian woodland. In addition, existing PVC culvert pipes occurring on the farm roads provide suitable burrowing owl habitat. No other burrows suitable for use by burrowing owls were observed.

All five biological mitigation sites and the surrounding levees may provide suitable habitat for western burrowing owl. The Fourteenmile Slough Pump Station site may provide the highest quality habitat of the three sites surveyed given the abundance of mammal burrows observed. There were also several CNDDDB occurrences that documented burrowing owls within 2 miles of the Van Buskirk site.

### **California Black Rail**

The California black rail is state listed as threatened. It is a scarce and rarely seen bird with little known about its life history. This species occurs year-round in the San Francisco Bay Area, the Sacramento–San Joaquin Delta (Delta), coastal Southern California, the Salton Sea, and the lower Colorado River area. It can be found in saline, brackish, and fresh emergent wetlands. The California black rail often occurs in association with pickleweed in tidal and brackish wetlands or with bulrushes, cattails, and saltgrass in freshwater wetlands (Zeiner et al. 1999). It builds its nests in dense vegetation at ground level or elevated several inches (Zeiner et al. 1999). Nests with eggs have been observed from mid-March to early June (Zeiner et al. 1999).

One CNDDDB record of California black rail occurs between the Fourteenmile Slough about halfway between the Fourteenmile Slough Pump Station and SJR East mitigation sites. The record details detections of individuals calling in 1974, 1977, 1982, and 2009. There is marginal habitat along Walthall Slough and French Camp Slough for the two program-level mitigation sites.

### **Other Birds Listed by the Migratory Bird Treaty Act and California Fish and Game Code**

The trees, shrubs, ground cover, and structures on the Modified Project site and in adjacent areas have potential to support nesting birds protected by the federal Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. Special-status bird species that could occur within the Modified Project site include white-tailed kite, song sparrow, northern harrier, loggerhead shrike, and least Bell's vireo. No nesting birds were observed during the July and August 2021 surveys within the TS\_30\_L levee improvement work area or the SEWD borrow site, or in December 2022, likely because of the time of year. However, three white-tailed kites were observed foraging at the Fourteenmile Slough Pump Station site and one white-tailed kite was observed foraging at the SJR West site during ESA's first and second reconnaissance surveys. A northern harrier was observed foraging on the SJR West site during ESA's first reconnaissance survey. Nesting birds could occur at both program-level mitigation sites. The generally accepted nesting season extends from February 1 to August 31.

### **Special-Status Bats**

Special-status bats including western red bat (*Lasiurus blossevillii*) and pallid bat (*Antrozous pallidus*) may roost in trees within the Modified Project site and forage in nearby areas. Western red bats are often observed in edge habitats near streams, fields, orchards, or urban areas; they roost non-colonially in dense canopies and within tree foliage. Pallid bats roost in rocky outcrops, cliffs, and crevices with access to open habitats for foraging. No special-status bats were observed within the Modified Project site during the 2021 or 2022 biological surveys. Special-status bats could also occur within the two program-level mitigation sites that were not surveyed.

### **Special-Status Fish**

Central Valley steelhead (*Oncorhynchus mykiss*), Central Valley fall-/late fall-run Chinook salmon (*O. tshawytscha*), green sturgeon (*Acipenser medirostris*), and delta smelt (*Hypomesus transpacificus*) may be present in the SJR in the vicinity of the barge off-haul location, the Stockton Diverting Canal adjacent to the SEWD borrow site, and the two program-level mitigation sites.

### **Sensitive Natural Communities including Waters of the United States and Waters of the State**

An aquatic resource delineation was conducted for the TS\_30\_L project area on March 9, 2021, by USACE and it was determined that wetlands occur within the Proposed Project. An irrigation ditch extends north to south to the west of the riparian woodland, west of the levee, within the TS\_30\_L levee improvement work area. The irrigation ditch contained standing water at the time of a July 27, 2021, survey. The northern half of the irrigation ditch still contained ponded water during an August 18, 2021, survey; the southern half contained only saturated soils, with no ponded water present. Dominant vegetation within or along the banks of the irrigation ditch include tule (*Schoenoplectus* sp.), barnyard grass (*Echinochloa crus-galli*), broadleaf cattail (*Typha latifolia*), and Johnson grass. Riparian woodland occurs along the western levee slope of the TS\_30\_L levee and includes densely growing vegetation with an overstory canopy comprising willow (*Salix* sp.), valley oak (*Quercus lobata*), interior live oak (*Quercus wislizeni*), English walnut (*Juglans regia*), northern black walnut (*Juglans hindsii*), cork oak (*Quercus suber*), pecan (*Carya illinoensis*), and ailanthus (*Ailanthus altissima*). Understory trees and shrubs include black elderberry (*Sambucus nigra* ssp. *caerulea*), sandbar willow (*Salix exigua*

var. *hindiana*), edible fig (*Ficus carica*), giant reed (*Arundo donax*), rose (*Rosa* sp.), Himalayan blackberry (*Rubus armeniacus*), tobacco (*Nicotiana acuminata*), and common buttonbush (*Cephalanthus occidentalis*). Understory herbaceous vegetation includes Johnson grass (*Sorghum halepense*), Bermuda grass (*Cynodon dactylon*), wild oat (*Avena fatua*), radish (*Raphanus sativus*), and soft chess (*Bromus hordeaceus*).

The northern staging area and the western edge of the TS\_30\_L levee improvement work area lie in irrigated rice fields; these areas were not included in the March 9, 2021 wetland delineation, however, USACE has determined that they are jurisdictional.

Riparian forested areas in the three biological mitigation sites evaluated at a project level are tree-dominated areas that are subject to hydrologic influence. These areas are generally associated with permanent agricultural ditches or other permanent water sources. Riparian woodlands within the Fourteenmile Slough site are dominated by Fremont cottonwood (*Populus fremontii*) and various willows. The herbaceous layer consists of various grasses, poison-hemlock, yellow star thistle, and coyote brush. SJR East had a small sliver of riparian woodland that overlapped from the adjacent conservation preserve and contained elderberry shrubs, blackberry, and oaks.

Riparian scrub habitat in the three biological mitigation sites evaluated at a project level consists of shrub-dominated areas. These areas are dominated by sandbar willow (*Salix exigua*), arroyo willow (*S. lasiolepis*), coyote brush (*Baccharis pilularis*), and Himalayan blackberry. On both the Fourteenmile Slough and the SJR West sites, these areas were associated with agricultural ditches or other hydrologic influences. The Fourteenmile Slough site had multiple patches throughout the site that were dominated by blackberry, willow, and coyote brush. SJR West had a patch of riparian scrub on the west end of the property that contained mostly willows and blackberry.

Fresh emergent wetland, observed on all three biological mitigation sites evaluated at a project level, is periodically flooded by nearby water bodies such as the irrigation ditches, or has topography and soils that support ponding. These areas are typically dominated by rooted aquatic emergent plants including bulrush (*Schoenoplectus* sp.) and cattail (*Typha* sp.); few trees are present.

Sensitive natural communities including waters of the United States and waters of the state could also occur within the two program-level mitigation sites that were not surveyed.

## 3.6.2 Regulatory Setting

The following federal, state, and local regulations would apply to the Modified Project.

### **Federal**

#### ***Federal Endangered Species Act***

FESA prohibits the unauthorized take of any fish or wildlife species listed as threatened or endangered, including the destruction of habitat that could hinder species recovery. The term *take* is defined by FESA as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.”

### ***Migratory Bird Treaty Act***

Federal law protects raptors, migratory birds, and their nests. The federal MBTA (U.S. Code Title 15, Sections 703–711 [15 USC 703–711] and 16 USC 7.3, Supp. I 1989, 50 CFR 21, and 50 CFR 10) prohibits killing, possessing, or trading in migratory birds. Executive Order 13186 (January 11, 2001) requires that any Modified Project with federal involvement address the impact of federal actions on migratory birds.

### ***Wetlands and Waters of the United States***

The federal government regulates waters of the United States, including many wetlands, under the Clean Water Act (CWA). The federal government defines *wetlands* in Section 404 of the CWA as “areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3[c] and 40 CFR 230.3). Under normal circumstances, the federal definition of wetlands requires the presence of three wetland identification parameters: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands include freshwater marsh, seasonal wetlands, and vernal pool complexes.

USACE is the responsible agency for regulating wetlands under Section 404 of the CWA, while the U.S. Environmental Protection Agency (EPA) has overall responsibility for the CWA. CDFW does not normally have direct jurisdiction over wetlands unless they are subject to regulation under streambed alteration agreements or they support state-listed species; however, CDFW has trust responsibility for wildlife and habitats pursuant to California law.

“Other waters of the United States” refers to those hydric features that are regulated by the CWA but are not wetlands (33 CFR 328.4). To be considered jurisdictional, these features must exhibit a defined bed and bank and an ordinary high-water mark. Examples of other waters of the United States include rivers, creeks, intermittent and ephemeral channels, ponds, and lakes.

## **State**

### ***California Endangered Species Act***

CESA prohibits the take of plant and animal species that the California Fish and Game Commission has designated as either threatened or endangered in California. In the context of CESA, to “take” means to hunt, pursue, kill, or capture a listed species, and to conduct any other action that may result in an adverse impact when a person is attempting to take individuals of a listed species. The take prohibitions also apply to candidates for listing under CESA.

### ***California Fish and Game Code***

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the code or any regulation under it. Section 3503.5 prohibits the take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Code Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) allow the designation of a species as fully protected. This is a greater level of protection than that

afforded by CESA. All take of fully protected species is prohibited except take related to scientific research.

### **Lake and Streambed Alteration Agreement (California Fish and Game Code Section 1602)**

Under Section 1602 of the California Fish and Game Code, any person, government agency, or public utility proposing any activity that would divert or obstruct the natural flow or change the bed, channel or bank of any river, stream, or lake, or proposing to use any material from a streambed, is required to first notify CDFW of such proposed activity. If CDFW determines that the activity that would affect a river, stream, or lake may substantially adversely affect an existing fish or wildlife resource, it may issue a lake or streambed alteration agreement that includes reasonable measures necessary to protect the fish or wildlife resource.

### **Waters of the State**

Most projects involving water bodies or drainages are regulated by the regional water quality control boards, the principal state agencies overseeing water quality of the state at the regional and local levels. Where waters of the state overlap with waters of the United States, pending verification from USACE, those waters would be regulated under CWA Section 401, as described in the *Wetlands and Waters of the United States* section of the federal regulatory setting discussion, above.

In the absence of waters of the United States, waters may be regulated under the Porter-Cologne Water Quality Control Act if project activities, discharges, or proposed activities or discharges could affect California's surface, coastal, or ground waters. The permit submitted by the applicant and issued by the regional water quality control board is either a water quality certification (if waters of the United States are present) or a waste discharge requirement (in the absence of waters of the United States). Whether a water quality certification and/or a waste discharge requirement is necessary, all application information must be submitted in accordance with the State Water Resources Control Board's *Procedures for the Discharge of Dredged or Fill Material to Waters of the State* (Procedures), which became effective on May 28, 2020. The Procedures define what is considered by the state to be a "wetland" and provides a framework for determining whether a feature that meets the state's definition of a wetland is a jurisdictional water of the state. The Procedures define a wetland as follows:

An area is wetland is, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

An artificial wetland (i.e., wetland that resulted from human activity) is considered a water of the state unless it does not satisfy any of the following criteria:

1. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration.
2. Specifically identified in a water quality control plan as a wetland or other water of the state.

3. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape.
4. Greater than or equal to 1 acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes:
  - i. Industrial or municipal wastewater treatment or disposal.
  - ii. Settling of sediment.
  - iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program.
  - iv. Treatment of surface waters.
  - v. Agricultural crop irrigation or stock watering.
  - vi. Fire suppression.
  - vii. Industrial processing or cooling.
  - viii. Active surface mining—even if the site is managed for interim wetlands functions and values.
  - ix. Log storage.
  - x. Treatment, storage, or distribution of recycled water.
  - xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits).
  - xii. Fields flooded for rice growing.

## **Local**

### ***San Joaquin County General Plan***

The San Joaquin County General Plan was adopted in 1992 and amended in 2016. The plan's Natural and Cultural Resources Element addresses protection of biological resources, including wetlands; riparian areas; rare, threatened, and endangered species and their habitats; potentially rare or commercially important species; vernal pools; significant oak groves; and heritage trees.

### ***San Joaquin County Multi-Species Habitat Conservation and Open Space Plan***

The San Joaquin County Multi-Species Habitat Conservation and Open Space Plan was permitted in 2000 and is administered by the San Joaquin Council of Governments. This 50-year plan addresses 97 special-status plant, fish, and wildlife species (47 of which are on the federal permit) throughout most of San Joaquin County (more than 900,000 acres), including a substantial portion of the eastern Delta. The plan participants include the County of San Joaquin and the Cities of Stockton, Lodi, Manteca, Tracy, Ripon, Escalon, and Lathrop. Activities covered under the plan include urban development, mining, expansion of existing urban boundaries, nonagricultural activities occurring outside of urban boundaries, levee maintenance undertaken by SJAFCA, transportation projects, school expansions, non-federal flood control projects, new parks and trails, maintenance

of existing facilities for non-federal irrigation district projects, utility installation, maintenance activities, managing preserves, and similar public agency projects.

### 3.6.3 Impact Analysis and Mitigation Measures

#### Significance Criteria

For the purpose of this analysis, the relevant standards of significance were based on the current CEQA Appendix G Environmental Checklist Form to determine whether implementing the Modified Project would result in a significant impact. A biological resource impact is considered significant if implementation of the Modified Project 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, 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 fish or 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.
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

#### Methodology and Assumptions

The following impact analysis considers the potential impacts of the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR is considered sufficient to evaluate the impacts of the Modified Project, no additional environmental review is provided. Mitigation measures from the 2018 LSJR FR/EIS/EIR have been refined and updated where appropriate.

The information in this section is based on data collected during special-status species field surveys conducted by ESA Biologist Kelly Bayne on July 27, August 18, and October 27, 2021; on reconnaissance-level biological surveys conducted by ESA Biologists Christy Dawson, Morgan Henry, and Natalie Lamas on December 14 and 21, 2022; and on review of the following other relevant documentation for the Modified Project and surrounding vicinity:

- The environmental commitments identified in the 2018 LSJR FR/EIS/EIR.

- A records search of CDFW's CNDDDB for the Stockton West, Stockton East, Holt, Terminus, and Lodi South quads (CDFW 2021, 2022; Appendix F).
- A species list from USFWS Information for Planning and Conservation database (Appendix F).
- A search of the CNPS Inventory of Rare and Endangered Plants Database for the Stockton West, Stockton East, Holt, Terminus, and Lodi South quads (CNPS 2021, 2022; Appendix F).
- A review of the NMFS Species List–Intersection of USGS Topographic Quadrangles (NMFS 2021).

## Impacts and Mitigation Measures

**Impact 3.6-1: The Modified Project 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.**

The 2018 LSJR FR/EIS/EIR discussed the effects of the Project on special-status species including plants, terrestrial wildlife, and fisheries. The analysis in the 2018 LSJR FR/EIS/EIR determined that the potential effects on special-status plant species would be reduced to a less-than-significant level after implementation of avoidance, minimization, and compensation measures. Additionally, the 2018 LSJR FR/EIS/EIR determined that the impacts on special-status terrestrial wildlife including valley elderberry longhorn beetle, western pond turtle, giant garter snake, nesting birds including burrowing owl and Swainson's hawk, and roosting bats would be less than significant after the implementation of avoidance, minimization, and compensation measures.

For the Modified Project, there is minimal change from the biological resources analysis presented in the 2018 LSJR FR/EIS/EIR for special-status plants and terrestrial wildlife. The Modified Project does not include the closure structure on Fourteenmile Slough, which was determined to have significant and unavoidable direct and indirect effects on native fish populations related to an increase of predatory species attracted to structures and shade for hiding, an increase in predation on native fish species, and the potential for entrainment during gate closure. There are no known fisheries resources within the irrigation ditch adjacent to the waterside slope of the TS\_30\_L levee site, within the SEWD borrow site, or within the three mitigation sites proposed for project-level analysis. However, several special-status fish species may be present in the vicinity of the barge off-haul site, and the increase in barge traffic and barge off-haul actions could increase the likelihood of accidental spills of materials, which could have a deleterious effect on aquatic habitat for special-status fish.

A project-level analysis has not been conducted for the Van Buskirk or SJR South mitigation sites. However, both sites include levee setbacks or levee notching to restore hydrology to the sites, which could have a deleterious effect on aquatic habitat for special-status fish.

### Special-Status Plants

The 2018 LSJR FR/EIS/EIR determined that there was suitable habitat for six special-status plants in the Modified Project site. Five of these special-status plants were not observed during

biological surveys conducted during the evident and identifiable period on August 18, 2021, and are not expected to occur in the Modified Project area. The survey was conducted outside the evident and identifiable period of one special-status plant determined to have potential to occur: alkali milkvetch. This species could potentially be present in the Modified Project site, though it is unlikely due to the lack of alkaline soils. Surveys conducted in December of 2022 determined that the potential exists for 10 special-status plants to occur within the three biological mitigation sites evaluated at a project level. Protocol-level botanical surveys have not been conducted for these sites. An analysis has not been conducted for the two program-level mitigation sites; however, based on their location and known habitats, the potential exists for special-status plants to occur.

Construction of the Modified Project could directly affect special-status plants if they are located on the Modified Project site. The barge off-haul site would be located so the conveyor belt used to transfer materials from the stationed barge onto shore would be positioned in a rocky area devoid of vegetation; the material off-loaded from the barge onto the conveyor system would be loaded directly onto trucks and not temporarily stockpiled on the ground. Therefore, the barge off-haul site specifically would not have the potential to affect special-status plants. The potential impact on special-status plants for the Modified Project would be **potentially significant**. However, the mitigation measures listed below specifically for the protection of special-status plants would be implemented for the Modified Project. These measures include conducting protocol-level surveys for alkali milkvetch in the TS\_30\_L levee improvement work area and the 10 species with potential to occur on the three biological mitigation sites evaluated at a project level, and conducting a project-level analysis and protocol-level surveys if needed for the two mitigation sites evaluated at a program level during the appropriate blooming season. Impacts would be **less than significant with mitigation**, consistent with the determination made in the 2018 LSJR FR/EIS/EIR.

### **Swainson's Hawk**

Based on the Swainson's hawk surveys conducted in 2021, the TS\_30\_L levee improvement work area and SEWD borrow site are considered to provide only moderate potential for Swainson's hawk nesting, based on the general lack of large riparian trees this species prefers to use for nesting, and the absence of any known records of Swainson's hawk nesting in the vicinity of the Project footprint. Two Swainson's hawks were observed soaring overhead approximately 0.25 mile south of the TS\_30\_L site during the July survey, and a single Swainson's hawk was observed soaring overhead approximately 0.25 mile southeast of the SEWD borrow site access road during the August survey. The Fourteenmile Slough mitigation site and both program-level mitigation sites have several large trees that would provide suitable nesting habitat, but this area was surveyed outside of the nesting season. Trees present on the SJR East and West sites are smaller and would not likely support nesting Swainson's hawks, but the adjacent Pace Preserve could support nesting Swainson's hawks. Suitable foraging habitat exists in nearby agricultural fields that were fallow during the period of the 2021 field surveys. The potential impact on Swainson's hawk for the Modified Project would be **potentially significant**. However, implementing the mitigation measures listed below specifically for the protection of Swainson's hawk, including establishing a buffer between construction activities and any discovered active nests, would

reduce the extent of these impacts to **less than significant with mitigation**, consistent with the determination made in the 2018 LSJR FR/EIS/EIR.

### **Burrowing Owl**

During the biological resources surveys conducted in 2021, no burrowing owls were observed within the TS\_30\_L levee improvement work area. The site provides low-quality foraging habitat given the lack of grassland habitat, but ground squirrel burrows were observed to be present, and such burrows are commonly used by burrowing owls for roosting and nesting. Surveys were not conducted for the SEWD borrow site, but burrowing owls could utilize the site. Multiple burrows were also observed within the Fourteenmile Slough mitigation site, which provides moderate foraging habitat, but there was no indication of burrowing owl presence. SJR East and West could also support burrowing owl foraging but did not have numerous burrows or signs of burrowing owl presence. Both program-level mitigation sites have potential to support burrowing owls.

If burrowing owls are present on the Modified Project site during construction, the potential impact would be **potentially significant**. However, implementing the mitigation measures listed below specifically for the protection of burrowing owls—including establishing a buffer between construction activities and nesting burrowing owls—would reduce the extent of these impacts to **less than significant with mitigation**, consistent with the determination made in the 2018 LSJR FR/EIS/EIR.

### **Other Birds Listed by the Migratory Bird Treaty Act and California Fish and Game Code**

Most birds are protected under the MBTA (16 USC 703–711) and all raptors, including common species not considered special-status, are protected under the California Fish and Game Code (Section 3503.5). Noise and disturbance from construction activities that occur during the breeding season (generally from February 15 to August 31) could disturb nesting activities if an active nest is located near these activities. Any disturbance that causes nest abandonment and subsequent loss of eggs or developing young at active nests would violate California Fish and Game Code Sections 2800, 3503, and 3503.5 and the MBTA. This impact would be **potentially significant**. However, implementing the mitigation measures listed below specifically for avoiding nesting birds and establishing appropriate buffers would reduce impacts to **less than significant with mitigation**, consistent with the determination made in the 2018 LSJR FR/EIS/EIR.

### **Western Pond Turtle and Giant Garter Snake**

The irrigation ditch along the waterside slope of the of the TS\_30\_L levee and the adjacent wetland and the rice fields provide suitable aquatic habitat for western pond turtle and giant garter snake, and the adjacent banks provide suitable upland habitat. Under the Modified Project, the new levee configuration would require realignment of the existing waterside irrigation ditch, which would be realigned at six locations to maintain 15 feet of distance from the waterside toe of the reconfigured levee slope. Use of the 9-acre northern staging/stockpile area would involve ceasing irrigation to a rice field to accommodate material and equipment storage and would not involve grading or permanent modifications. The staging/stockpile areas used for TS\_30\_L levee site improvements would be restored to pre-project conditions and irrigation and farming of the site could continue. The SEWD borrow site does not contain aquatic habitat and is approximately 200 feet from the aquatic habitat in the nearby canal, so it would be just outside of the giant garter

snake and western pond turtle upland habitat. The construction of any of the five potential biological mitigation sites also has the potential to affect aquatic and upland habitat for western pond turtle and giant garter snake that occurs within the irrigation ditches and fresh emergent wetlands. Although the restoration of the biological mitigation sites would be designed to avoid wetland features when feasible, modification of irrigation ditches may be required to create wetland and riparian habitat. However, the wetlands proposed for creation would provide additional habitat upon completion of construction.

The Modified Project, including the construction of the biological mitigation sites, would result in a temporal loss of suitable aquatic habitat for western pond turtle and giant garter snake during construction. Additionally, the replacement habitat would not initially have emergent vegetation preferred by giant garter snake. The filling or modification of the existing habitat to allow for the levee reshaping and restoration of riparian and wetland habitat could result in harm to western pond turtle and giant garter snake individuals, if they are present during the period of construction.

The potential impact on western pond turtle and giant garter snake for the Modified Project would be **potentially significant**. However, implementing the mitigation measures listed below, including pre-construction surveys, worker awareness trainings, installation of exclusion fencing, and compensatory mitigation specifically for the protection of western pond turtle and giant garter snake, would reduce the extent of these impacts to **less than significant with mitigation**, consistent with the determination made in the 2018 LSJR FR/EIS/EIR.

### **Valley Elderberry Longhorn Beetle**

Under the Modified Project, construction of the cutoff wall and reshaping of the TS\_30\_L levee would result in clearing of existing vegetation along the levee prism, including the removal of 25 native trees, a buttonbush thicket and a willow thicket, 15 nonnative trees, 13 walnut trees, and approximately 10 elderberry shrubs. The shrubs possess stems of adequate diameter to provide suitable habitat for valley elderberry longhorn beetle. The intensity of potential impact on valley elderberry longhorn beetle and associated riparian vegetation under the Modified Project would be increased relative to the 2018 LSJR FR/EIS/EIR, as the Modified Project would result in the entire existing waterside slope of the TS\_30\_L levee being stripped of all existing vegetation, whereas the 2018 LSJR FR/EIS/EIR assumed that 25 percent of trees and shrubs within the waterside levee easement would remain in place (as discussed in Chapter 2, *Project Description*, Section 2.3.5). However, in the design phase, it was determined that all vegetation would need to be removed for placement of riprap; therefore, a vegetation variance (or “design deviation”) was never acquired. The Modified Project would result in temporary loss of riparian forest along the existing TS\_30\_L levee; riparian forest is considered an important component for valley elderberry longhorn beetle habitat, because a healthy riparian community is conducive to future establishment of the elderberry shrubs upon which this species depends. The potential impact on valley elderberry longhorn beetles for the Modified Project would be **potentially significant**. Elderberry shrubs that occur within or adjacent to the biological mitigation sites would be avoided as described in Chapter 2, *Project Description*, Section 2.4.5. However, if appropriate buffers as required in the 2017 Framework cannot be maintained, indirect impacts associated with dust from construction or direct impacts from valley elderberry longhorn beetles being hit by vehicles or equipment would be potentially significant. However, implementing the mitigation

measures listed below specifically for the protection of valley elderberry longhorn beetles, including transplanting of elderberry shrubs to a nearby suitable site, maintenance of speed limits, and construction outside of the valley elderberry longhorn beetle flight season, would reduce the extent of these impacts to **less than significant with mitigation**, consistent with the determination made in the 2018 LSJR FR/EIS/EIR.

### **Special-Status Bats**

During the biological resources surveys conducted in 2021 and 2022, no special-status bats were observed within the Modified Project site. Potentially suitable roosting habitat for special-status bats is present within the riparian trees at all locations. Construction activities have the potential to result in direct impacts on roosting bats, including western red bat and pallid bat. Although construction activities would be restricted to a localized area, tree removal would occur at the Modified Project site, which could result in direct disturbance or mortality to special-status bat maternity roosts. Indirect impacts on special-status bat maternity roosts could also occur from noise and vibration caused by construction activity nearby. The potential impact on special-status bats for the Modified Project would be **potentially significant**. However, implementing the mitigation measures listed below, including pre-construction surveys, specifically for the protection of special-status bats would reduce the extent of these impacts to **less than significant with mitigation**, consistent with the determination made in the 2018 LSJR FR/EIS/EIR.

### **Special-Status Fish**

Under the Modified Project, use of the barge off-haul site off the mainstem San Joaquin River would occur within aquatic habitat used by Central Valley steelhead, Central Valley fall-/late-fall-run Chinook salmon, green sturgeon, and delta smelt. Operation of barges can have the potential to disturb shoreline habitat and benthic substrates from propeller wash. The SJR channel is a key shipping lane for movement of large shipping vessels, so the barge off-haul site is already subject to large wave action generated by these vessels. The bank shoreline at the off-haul site is already riprapped, which would minimize the effects of wave action generated by barge operations and reduce the likelihood of loss of suitable shallow-water rearing habitat for juvenile steelhead and Chinook salmon. The increase in barge traffic and barge off-haul actions could increase the likelihood of accidental spills of materials, which could have a deleterious effect on aquatic habitat for special-status fish (e.g., spills of petroleum-based fuels or accidental spillage of construction materials into the water during the off-haul process). The potential impacts on special-status fish for the Modified Project, specifically for the program-level biological mitigation sites, would be **potentially significant**. However, implementing the mitigation measures listed below specifically for the protection of special-status fish would reduce the extent of these impacts to **less than significant with mitigation**, consistent with the determination made in the 2018 LSJR FR/EIS/EIR.

### **Mitigation Measures**

#### Special-Status Plants

**Mitigation Measure 3.6-1 Special-Status Plant Surveys.** Before Modified Project construction, surveys for special-status plants with potential to occur shall be conducted by a qualified botanist at the appropriate time of year when the target species would be in flower or otherwise clearly identifiable. Surveys shall be conducted in accordance with specific guidelines described by *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (CDFW 2018).

**Mitigation Measure 3.6-2 Special-Status Plant Measures.** If special-status plants are found, the following measures shall be implemented:

- Qualified botanists shall survey the biological study area to document the presence of special-status plants before Modified Project implementation and shall conduct a floristic survey that follows the CDFW botanical survey guidelines (CDFW 2018). All plant species observed will be identified to the level necessary to determine whether they qualify as special-status plants or are plant species with unusual or significant range extensions. The guidelines also require that field surveys be conducted when special-status plants that could occur in the area are evident and identifiable, generally during the reported blooming period. To account for different special-status plant identification periods, one or more series of field surveys may be required in spring and summer. If any special-status plants are identified during the surveys, the botanist shall photograph and map locations of the plants, document the location and extent of the special-status plant population on a CNDDDB survey form, and submit the completed survey form to the CNDDDB. The amount of compensatory mitigation required will be based on the results of these surveys.
- If one or more special-status plants is identified in the biological study area during preconstruction surveys, the sponsor shall redesign or modify the Modified Project, including the restoration plans for the biological mitigation site components, to avoid indirect or direct effects on special-status plants wherever feasible. If special-status plants cannot be avoided by redesigning projects, compensatory mitigation shall be implemented to avoid significant effects on special-status plants.
- If complete avoidance of special-status plants is not feasible, the effects of the Modified Project on special-status plants shall be mitigated through off-site preservation at the chosen biological mitigation site at a minimum of a 1:1 ratio but shall be negotiated with the resource agencies. Suitable habitat for affected special-status plant species will occur in a conservation area, preserved and managed in perpetuity. Detailed information shall be provided to the agencies on the location and quality of the preservation area, the feasibility of protecting and managing the area in perpetuity, and the responsible parties. Other pertinent information also shall be provided, to be determined through future coordination with the resource agencies.

#### Swainson's Hawk

**Mitigation Measure 3.6-3 Worker Awareness Training.** Before ground disturbance, all construction personnel shall participate in a CDFW-approved worker environmental awareness program. A qualified biologist shall inform all construction personnel about the life history of Swainson's hawk and the importance of nest sites and foraging habitat.

**Mitigation Measure 3.6-4 Breeding-Season Survey.** If construction work is to occur during the Swainson's hawk breeding season, a breeding-season survey for nesting birds shall be conducted for all trees and shrubs that would be removed or disturbed that are located within 500 feet (0.5 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys shall be completed during at least two of the following survey periods: January 1 to March 20; March 20 to April 5; April 5 to April 20; and June 10 to July 30. No fewer than three surveys shall be completed in at least two survey periods and at least one of these surveys shall occur immediately prior to Modified Project initiation (SWHA TAC 2000). Other migratory bird nest surveys could be conducted concurrent with Swainson's hawk surveys, with at least one survey to be

conducted no more than 48 hours from the initiation of Modified Project activities to confirm the absence of nesting. If the biologist determines that the area surveyed does not contain any active nests, construction activities, including removal or pruning of trees and shrubs, could commence without any further mitigation.

**Mitigation Measure 3.6-5 Active Nest Buffer.** If active nests are found, USACE shall maintain a 0.25-mile buffer between construction activities and the active nest(s). In addition, a qualified biologist shall be present on-site during construction activities to ensure that the buffer distance is adequate and that the birds are not showing any signs of stress. If signs of stress that could cause nest abandonment are noted, construction activities shall cease until a qualified biologist determines that fledglings have left an active nest. With the written permission of the wildlife agencies and under the supervision of the qualified biologist, work within the temporary nest disturbance buffer may occur. The qualified biologist shall be on-site daily while construction-related activities are taking place within the buffer.

#### Burrowing Owl

**Mitigation Measure 3.6-6 Burrowing Owl Preconstruction Surveys.** Prior to initiation of any excavation activities at borrow sites, a preconstruction survey for burrowing owls shall be completed in accordance with CDFW guidelines described in the *Staff Report on Burrowing Owl Mitigation*. If no burrowing owls are located during these surveys, then effects on burrowing owls would be less than significant and no mitigation is required. If burrowing owls are located on or immediately adjacent to the site, then coordination shall occur with CDFW to determine the measures that need to be implemented to ensure that burrowing owls are not affected by the Modified Project. Potential mitigation measures that could be implemented include:

- A qualified biologist shall conduct appropriate surveys at and around material source sites, to determine the presence/absence of burrowing owls. At least one survey shall be conducted no more than 1 week prior to the onset of any construction activity.
- A 250-foot buffer, within which no new activity would be permissible, shall be maintained between Modified Project activities and nesting burrowing owls. This protected area shall remain in effect until August 31 or at CDFW's discretion, until the young owls are foraging independently.
- No burrowing owls shall be evicted from burrows during the nesting season (February 1 through August 31). Eviction outside the nesting season could be permitted pending evaluation of eviction plans and receipt of formal written approval from CDFW authorizing the eviction.
- Mandatory worker awareness training for construction personnel shall be conducted.

#### Other Birds Listed by the Migratory Bird Treaty Act and the California Fish and Game Code

**Mitigation Measure 3.6-7 Nesting Bird Surveys.** USACE shall conduct surveys in the spring of each construction year to locate nest sites of the mentioned species in suitable breeding habitats. Surveys shall be conducted by a qualified biologist using survey methods approved by USFWS. Survey results shall be submitted to USFWS before construction is initiated. If nests or young of these species are not located, construction may proceed. If nests or young are located, USACE shall coordinate with USFWS and

CDFW to determine what mitigation measures could be implemented to avoid or reduce potential disturbance-related impacts on these species. Measures could include a no-disturbance buffer zone established around the nest site. The width of the buffer zone shall be determined by a qualified biologist in coordination with USFWS. No construction activities shall occur within the buffer zone, which shall be maintained until the young have fledged (as determined by a qualified biologist).

### Giant Garter Snake

**Mitigation Measure 3.6-8 Minimization of Effects on Giant Garter Snake.** The following measures shall be implemented to minimize effects on giant garter snake habitat that occurs within 200 feet of any construction activity. These measures are based on USFWS guidelines for restoration and standard avoidance measures included as appendices in USFWS (1997).

- Unless approved otherwise by USFWS, construction shall be initiated only during the giant garter snake active period (May 1–October 1, when they are able to move away from disturbance).
- All construction personnel, including workers and contractors, shall participate in a worker environmental awareness training program conducted by a USFWS-approved biologist prior to commencement of construction activities.
- A giant garter snake survey shall be conducted 24 hours prior to construction in potential habitat. Should there be any interruption in work for greater than 2 weeks, a biologist shall survey the Modified Project area again no later than 24 hours prior to the restart of work.
- Giant garter snakes encountered during construction activities shall be allowed to move away from construction activities on their own.
- Movement of heavy equipment to and from the construction site shall be restricted to established roadways.
- Giant garter snake habitat within 200 feet of construction activities shall be designated as an environmentally sensitive area and delineated with signs and high-visibility fencing. Fencing shall be inspected and maintained as needed daily until completion of each work section of the Modified Project. This area shall be avoided by all construction personnel.
- If USACE elects to use exclusionary fencing in lieu of continuous monitoring, it shall be buried at least 6 inches below the ground to prevent snakes from burrowing and moving under the fence and shall be inspected daily.
- If a frac-out is identified, all work shall stop, including the recycling of the bentonite fluid. In the event of a frac-out into water, the location and extent of the frac-out shall be determined and the frac-out shall be monitored for 4 hours to determine whether the fluid congeals (bentonite will usually harden, effectively sealing the frac-out location).
- USFWS, NMFS, CDFW, and the Regional Water Quality Control Board shall be notified immediately of any spills and will be consulted regarding clean-up procedures. A Brady barrel will be on-site and shall be used if a frac-out occurs.

Containment materials, such as straw bales, also will be on-site prior to and during all operations and a vacuum truck will be on retainer and available to be operational on-site within 2 hours' notice. The site supervisor shall take any necessary follow-up response actions in coordination with agency representatives. The site supervisor shall coordinate the mobilization of equipment stored at staging areas (e.g., vacuum trucks) as needed.

- If the frac-out has reached the surface, any material contaminated with bentonite shall be removed by hand to a depth of 1 foot, contained, and properly disposed of, as required by law. The drilling contractor shall be responsible for ensuring that the bentonite is either properly disposed of at an approved Class II disposal facility or properly recycled in an approved manner.
- Project-related vehicles shall observe a 10 mph speed limit within construction areas, except on existing paved roads where they shall adhere to the posted speed limits.
- Aquatic habitat for the snake that would be affected by construction shall be inspected for the snake, then dewatered and maintained dry and absent of aquatic prey for 5 days before initiation of construction activities. This measure applies primarily to the ditches to be relocated west of the Delta front levee sections. If complete dewatering is not possible, USFWS shall be contacted to determine what additional measures, if any, may be necessary to minimize effects on the snake.

**Mitigation Measure 3.6-9 Giant Garter Snake Compensation.** If giant garter snake habitat would be temporarily affected during construction, the following measures shall be implemented to compensate for the habitat loss at the selected biological mitigation site:

- Habitat (including aquatic and upland) temporarily affected for one construction season (May 1–October 1) shall be restored after construction by applying appropriate erosion control techniques and replanting/seedling with appropriate native plants.
- Aquatic habitat permanently affected shall be replaced at a 3:1 ratio through the purchase of credits at a mitigation bank or the establishment of aquatic habitat at one of the mitigation sites.
- Upland habitat permanently affected shall be replaced at a minimum of 1:1 ratio.
- USACE shall work to develop appropriate mitigation prior to or concurrent with any disturbance of giant garter snake habitat. Habitat shall be protected in perpetuity and have an endowment attached for management and maintenance.

#### Western Pond Turtle

Implementation of Mitigation Measure 3.6-8, developed for giant garter snake, applies to western pond turtle and would reduce potential impacts on this species to a less-than-significant level.

#### Valley Elderberry Longhorn Beetle

**Mitigation Measure 3.6-10 Minimization of Any Potential Effects on VELB or Their Habitat.** During construction for the Modified Project, USACE shall implement the measures included in the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017b; see Appendix G) to reduce effects on valley elderberry

longhorn beetle. The framework includes avoidance and minimization measures for shrubs that would not be transplanted within 50 meters of the Project, methodologies for transplanting of shrubs, and methodologies for compensatory mitigation guidance for removed habitat.

**Mitigation Measure 3.6-11 VELB Compensation.** In accordance with the USFWS 2017 *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (*Desmocerus californicus dimorphus*), adverse effects on the VELB shall be compensated for by transplanting the affected elderberries with stems greater than 1 inch in diameter and by planting a mix of native suitable riparian vegetation at a 3:1 ratio. The amount of compensation for VELB shall be based on USFWS review. A suitable transplant site shall be selected and planted with transplanted shrubs and new seedlings and associated riparian habitat, in accordance with the USFWS guidelines.

#### Special-Status Bats

The following measures would be implemented to reduce short-term impacts on special-status bat species from construction of the Modified Project.

#### **Mitigation Measure 3.6-12 Bat and Roosting Habitat Survey.**

In advance of tree removal, a preconstruction survey for special-status bats shall be conducted by a qualified biologist to characterize potential bat habitat and identify active roost sites within the Modified Project site. Should potential roosting habitat or active bat roosts be found in trees and/or structures to be removed under the Modified Project, the following measures shall be implemented:

- Removal of trees and structures shall occur when bats are active, approximately March 1–April 15 and August 15–October 15, and outside of bat maternity roosting season (approximately April 15–August 31) and months of winter torpor (approximately October 15–February 28), to the extent feasible.
- If removal of trees during the periods when bats are active is not feasible and active bat roosts being used for maternity or hibernation purposes are found on or in the immediate vicinity of the Modified Project where tree removal is planned, a no-disturbance buffer of 100 feet shall be established around these roost sites until they are determined to be no longer active by the qualified biologist.
- The qualified biologist shall be present during tree removal if active bat roosts that are not being used for maternity or hibernation purposes are present. Trees with active roosts shall be removed only when no rain is occurring or is forecast to occur for 3 days and when daytime temperatures are at least 50 degrees Fahrenheit.
- Removal of trees with active or potentially active roost sites shall follow a two-step removal process:
  - On the first day of tree removal and under supervision of the qualified biologist, branches and limbs not containing cavities or fissures in which bats could roost, shall be cut only using chain saws.
  - On the following day and under the supervision of the qualified biologist, the remainder of the tree may be removed, using either chain saws or other equipment (e.g., excavator or backhoe).

- Removal of structures containing or suspected to contain active bat roosts, that are not being used for maternity or hibernation purposes, shall be dismantled under the supervision of the qualified biologist in the evening and after bats have emerged from the roost to forage. Structures shall be partially dismantled to significantly change the roost conditions, causing bats to abandon and not return to the roost. If deemed necessary by a qualified biologist, bat exclusion devices may be installed to prevent the re-entry of bats to a roost.

#### Special-Status Fish

**Mitigation Measure 3.6-13 Hazardous Materials Spill Notification.** Given the deleterious effects of numerous chemicals on native resident fish used in construction, if a hazardous materials spill does occur, a detailed analysis shall be performed immediately by a registered environmental assessor or professional engineer to identify the likely cause and extent of contamination. This analysis shall conform to American Society for Testing and Materials standards and shall include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, USACE and its contractors shall select and implement measures to control contamination, with a performance standard that surface water and groundwater quality must be returned to baseline conditions.

**Mitigation Measure 3.6-14 In-Water Work Windows.** In-water construction for the biological mitigation sites shall be restricted to the general estimated work window required for each waterway as described in the NMFS 2016 BO or superseding BO. During preconstruction engineering and design, the work window may be adjusted on a site-specific basis, considering periods of low fish abundance, and in-water construction outside the principal spawning and migration season. The typical construction season generally corresponds to the dry season, but construction may occur outside the limits of the dry season, only as allowed by applicable permit conditions.

**Mitigation Measure 3.6-15 Avoidance and Minimization of Effects on Listed Fish Species.** In 2016, NMFS issued a BO for the LSJR Feasibility Study consultation for levee improvements. The NMFS BO evaluated impacts on Central Valley spring-run Chinook salmon, California Central Valley steelhead, and green sturgeon, as well as their critical habitat. The BO evaluated potential impacts based on rough estimates and preliminary designs for the proposed Project. To avoid and minimize effects on listed fish species, the measures from the 2016 NMFS BO or superseding BO shall be implemented.

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#### **Impact 3.6-2: The Modified Project would have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.**

The 2018 LSJR FR/EIS/EIR discusses how construction effects would result in removal of riparian vegetation. This community is protected under California Fish and Game Code Section 1600 et seq. The impact of the potential loss of riparian habitat as a sensitive natural community as determined in the 2018 LSJR FR/EIS/EIR would be potentially significant.

The 2018 LSJR FR/EIS/EIR assumed that the levee would be eligible for a variance pursuant to USACE ETL 1110-2-583, which would allow approximately 25 percent of waterside vegetation

to remain in place on the lower one-third of the levee slope and within the waterside easement. However, during the design process, it was determined that all vegetation would be cleared within the TS\_30\_L levee site.

There is no change in the overall analysis approach presented in the 2018 LSJR FR/EIS/EIR; however, there are substantial changes in the Modified Project that would influence the potential effect of construction on riparian vegetation. The conveyor belt for the barge off-haul used to transfer materials from the stationed barge to the shore would be positioned in a rocky area where no riparian or other shoreline vegetation is present. With the Modified Project, the entire existing waterside slope of the TS\_30\_L levee would be stripped of all existing vegetation; therefore, the magnitude of the effect of levee construction work on riparian vegetation would be increased relative to the level of effects considered in the 2018 LSJR FR/EIS/EIR (which was based on an assumption that 25 percent of waterside vegetation would remain in place). The impact on riparian habitat for the TS\_30\_L levee site would be **potentially significant**. However, implementing the mitigation measures listed below would reduce impacts on riparian habitat to a level that would be **less than significant with mitigation**.

Development of the biological mitigation sites would be designed to improve ecological conditions for species within the proposed ecological restoration areas in a manner that would restore native natural communities, including riparian habitat, and would have beneficial long-term impacts on the habitat and special-status species that utilize the restored habitat type. The restoration sites would be cleared and grubbed to remove existing unwanted vegetation, and avoidance and minimization measures would be conducted to avoid and preserve designated high-value trees or habitat such as mature live oaks, elderberries, cottonwoods, willows, and wetland areas described in Chapter 2, *Project Description*, Section 2.4.5. Impacts on sensitive natural communities including riparian habitat and irrigation ditches (if they qualify) could occur during construction from soil disturbance, dust, and grubbing activities, but would likely be temporary, would be reduced with implementation of the mitigation measures identified below, and would result in a beneficial effect for both sensitive habitats and special-status species by increasing the overall habitat value and having a net gain of sensitive natural communities. Although direct effects are not anticipated, impacts on sensitive natural communities may occur during construction when connecting existing habitats to newly constructed habitats but would result in an overall net gain in habitat. Therefore, impacts would be **less than significant with mitigation**.

**Mitigation Measure 3.6-16 Temporary Fencing.** To clearly demarcate the Modified Project's boundaries and protect sensitive natural communities, temporary exclusion fencing shall be installed around the Modified Project boundaries (e.g., access roads, staging areas) 1 week prior to the start of construction activities. The temporary fencing shall be continuously maintained until all construction activities are completed so that construction equipment is confined to the designated work areas, including any off-site mitigation areas and access thereto. The exclusion fencing shall be removed only after construction for the year is entirely completed. Exclusionary construction fencing and explanatory signage shall be placed around the perimeter of sensitive vegetation communities that could be affected by construction activities throughout the period during which such effects occur. The signage will explain the nature of the sensitive resource and warn that no effect on the community is allowed. Where feasible, the fencing will include a buffer zone of at least 20 feet between the resource and

construction activities. All exclusionary fencing shall be maintained in good condition throughout the construction period.

**Mitigation Measure 3.6-17 Mandatory Contractor/Worker Awareness Training.**

Before the initiation of any work in the Modified Project area, including grading, a qualified biologist shall conduct mandatory contractor/worker awareness training for all construction personnel. This training shall be provided to brief workers on the need to avoid effects on sensitive biological resources (e.g., riparian habitat, special-status species, wetlands, and other sensitive biological communities) and the penalties for not complying with permit requirements. The biologist shall inform all construction personnel about the life history of special-status species with potential for occurrence on the site, the importance of maintaining habitat, and the terms and conditions of the BO or other authorizing document. Proof of this instruction shall be submitted to USFWS.

The training shall also cover the restrictions and guidelines that must be followed by all construction personnel to reduce or avoid effects on sensitive biological communities and special-status species during Modified Project construction. The crew leader shall be responsible for ensuring that crew members adhere to the guidelines and restrictions. Educational training shall be conducted for new personnel as they are brought on the job. General restrictions and guidelines for vegetation and wildlife that must be followed by construction personnel are listed below.

- Modified Project–related vehicles shall observe the posted speed limit on hard-surfaced roads and a speed limit of 10 miles per hour on unpaved roads during travel on the project site.
- Modified Project–related vehicles and construction equipment shall restrict their off-road travel to the designated construction area.
- To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel shall not service vehicles or construction equipment outside designated staging areas.

**Mitigation Measure 3.6-18 Construction Monitoring.** A qualified biologist shall monitor construction activities adjacent to sensitive biological resources (e.g., special-status species, riparian habitat, wetlands, elderberry shrubs), as needed. The biologist shall assist the construction crew, as needed, to comply with all Modified Project implementation restrictions and guidelines. In addition, the biologist shall be responsible for ensuring that construction barrier fencing is maintained adjacent to sensitive biological resources.

**Mitigation Measure 3.6-19 Riparian Compensation.** Vegetation impacts that cannot be mitigated through avoidance, minimization, or remediation shall be mitigated through restoration at the selected biological mitigation site. A revegetation plan for the biological mitigation site shall be prepared by a qualified biologist or landscape architect and reviewed by the appropriate agencies. The revegetation plan shall specify the planting stock appropriate for each riparian cover type and each mitigation site, ensuring the use of genetic stock from the Modified Project area, and shall employ the most successful techniques available at the time of planting. The plantings shall be maintained and monitored as necessary for 3–5 years, including weed removal, irrigation, and herbivory protection. For this establishment period, USACE shall submit annual monitoring reports of survival to the regulatory agencies including USFWS, NMFS, and CDFW. Replanting

will be necessary if success criteria are not met, with replacement plants subsequently monitored and maintained to meet the success criteria. The mitigation will be considered successful when the plants meet the success criteria and the vegetation no longer requires active management and is arranged in groups that, when mature, replicate the area, natural structure, and species composition of similar plant communities in the region.

If mitigation at the selected biological mitigation site is inadequate to fully compensate for the vegetation impacts, the remaining balance of compensation required for riparian, shaded riverine aquatic, wetland, and open water habitats shall be accomplished through the purchase of credits at a mitigation bank or the construction of additional mitigation sites. If an alternative biological mitigation site not evaluated in this SEIR is chosen for development, additional environmental review under CEQA will be required prior to construction.

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**Impact 3.6-3: The Modified Project would have a substantial adverse effect on state or federally protected wetlands (including but not limited to marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means.**

The 2018 LSJR FR/EIS/EIR discussed how construction at the Delta Front location (which includes the location of the TS\_30\_L levee) associated with levee reshaping was expected to result in permanent impacts on aquatic features that could be considered waters of the United States. Those aquatic features that could be considered waters of the United States would also represent waters of the state protected under the Porter-Cologne Water Quality Control Act. The 2018 LSJR FR/EIS/EIR concluded that even with implementation of mitigation measures, including avoidance, minimization, restoration, and compensatory mitigation, the impact would remain significant and unavoidable because construction and operation of the two in-water closure structures would result in permanent alteration of local water circulation.

For the Modified Project, there would be no associated alterations to local water circulations, because it does not include the elements of the operable gates at Fourteenmile Slough and the Smith Canal gate. Under the Modified Project, the new levee configuration would require realignment of the existing waterside irrigation ditch, which would be realigned at six locations to maintain 15 feet of distance from the waterside toe of the reconfigured levee slope, and the use of the 9-acre northern staging/stockpile area, which would involve ceasing irrigation to a rice field to accommodate material and equipment storage and would not involve grading or permanent modifications. Wetlands and waters within the mitigation sites would be avoided; however, levee notching and setbacks are proposed at the two program-level mitigation sites.

An aquatic resource delineation was conducted by USACE on March 9, 2021, for the irrigation ditch and the wetlands located between the ditch and the TS\_30\_L levee (**Table 3.6-2**). The delineation measured 2.3 acres of irrigation ditch and 0.6 acre of wetland associated with the ditch. USACE determined that these aquatic resources do not meet the definition of jurisdictional waters of the United States under the Clean Water Act under the June 2020 Navigable Waters Protection Rule in effect at the time of the delineation (Appendix E). The northern staging area and the western edge of the TS\_30\_L levee improvement work area lie in irrigated rice fields; these areas were not included in the wetland delineation for the Modified Project, however,

USACE has determined that they are jurisdictional. The irrigation ditch, wetlands, and rice fields all meet the definition of waters of the state.

**TABLE 3.6-2  
AQUATIC RESOURCES WITHIN THE TS\_30\_L PROJECT AREA**

<b>Aquatic Resource</b>	<b>Waters of the United States</b>	<b>Waters of the State</b>
Irrigation Ditch	0.0	2.3
Wetlands	0.0	0.6
Rice Fields	9.0	9.0

The TS\_30\_L levee reshaping would result in temporary or permanent impacts on all these features. The Project would permanently affect 0.6 acre of state wetlands and temporarily affect 2.3 acres of state waters of the United States, and 9.0 acres of state and federal jurisdictional wetlands associated with the rice fields.

The irrigation ditch would be reconstructed after TS\_30\_L levee improvements are completed; the staging/stockpile areas used for TS\_30\_L levee improvements would be restored to pre-project conditions, and irrigation and farming of the site could continue. The western edge of the TS\_30\_L levee improvement work area would be used for equipment access during construction and would also be returned to pre-project conditions after construction. Because these uses are temporary and would result in full restoration of the irrigation ditch and rice field after construction, temporary impacts on wetlands and other waters of the United States and the state would be **less than significant**. The impact on the 0.6 acre of permanently affected wetlands would be **potentially significant** but would be mitigated through development of the selected biological mitigation site at a minimum 1:1 ratio for impacts on giant garter snake and waters of the state (as required by Mitigation Measure 3.6-9). Permanent impacts on wetlands associated with levee improvements would therefore be **less than significant with mitigation**.

The Modified Project also considered three potential borrow sites: the SEWD property and two commercial borrow sources (Dutra Materials at Decker Island and Brown Sands Incorporated in Lathrop). The potential borrow site locations were analyzed more broadly in the 2018 LSJR FR/EIS/EIR. Prior to the start of construction, a delineation would be conducted to determine the location of wetlands and other waters within the borrow areas. Wetlands and waters that occur within borrow areas would be avoided when feasible. Although it is not anticipated given the nature of construction activities occurring in the borrow areas, if fill of waters of the United States and/or waters of the state is required to support construction of the Modified Project, then Mitigation Measure 3.6-20 would be implemented and impacts would be **less than significant with mitigation**.

A formal delineation of waters of the United States and state has not been conducted for the five potential biological mitigation sites. However, wetlands could occur within the proposed project area that would qualify as jurisdictional under the Clean Water Act or Porter-Cologne Water Quality Control Act. The mitigation sites would be cleared and grubbed to remove existing unwanted vegetation, and avoidance and minimization measures would be conducted to avoid

and preserve designated wetland areas as described in Chapter 2, *Project Description*, Section 2.4.5. Construction of any of the five potential mitigation sites would result in the enhancement of any aquatic resources present through the restoration of the surrounding land and preservation of the parcel in perpetuity. Temporary impacts may result during removal of invasive species, breaching of existing levees, regarding the floodplain, or other beneficial improvements. However, the impact of the multi-benefit components on aquatic features protected under state or federal protections would be minimal and would result in an overall net gain of wetlands, making this impact **less than significant**.

Overall, the impact of the Modified Project on aquatic features protected under state or federal protections would be **less than significant with mitigation**.

**Mitigation Measure 3.6-20 No Net Loss of Wetlands/Waters.** SJAFCA shall conduct an aquatic resources delineation to identify potential wetlands and other waters that fall under state and federal jurisdiction within mitigation sites and borrow sites.

Temporary and permanent impacts on riparian habitat and wetland/waters that cannot be mitigated through avoidance, minimization, or remediation shall be mitigated to ensure no net loss through compensation, by restoring riparian and wetlands/waters habitat at one of the proposed biological mitigation sites or an approved off-site location, mitigation bank, or in-lieu fee program. Riparian and wetlands/waters habitat shall not be restored where it would be removed by future maintenance activities. A revegetation plan shall be prepared by a qualified biologist or landscape architect and reviewed by the appropriate agencies. The revegetation plan will specify the use of beneficial native plants appropriate for each area that provide a diverse variety of grasses and forbs that support native wildlife species.

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**Impact 3.6-4: The Modified Project would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site.**

The 2018 LSJR FR/EIS/EIR discussed the effects of construction and maintenance on the movement and migratory corridors for wildlife. The vegetation removal that would occur as part of construction and ongoing maintenance to maintain a vegetation-free zone would result in losses of migratory and movement corridors. There would also be short-term effects on birds and other wildlife in areas adjacent to the construction footprint from increased noise, vibration, and dust. The 2018 LSJR FR/EIS/EIR also considered the adverse disruption to migration and movement of fish species associated with the closure structures on Fourteenmile Slough and Smith Canal, which was considered to be a significant effect.

The Modified Project would have no associated impacts on the movement and migration of fish species because it does not include the elements of the operable gates at Fourteenmile Slough and the Smith Canal gate, there are no fisheries resources in the irrigation ditch along the TS\_30\_L levee waterside toe, and the use of the barge off-haul site would not prevent fishes from moving upstream or downstream along the mainstem San Joaquin River. Restoring riparian habitat within the potential biological mitigation sites would create continuity along migration corridors and

potential nesting and nursery grounds for terrestrial wildlife species that utilize the San Joaquin River system as a migration corridor and breeding grounds. There would be short-term effects on birds and other wildlife in areas adjacent to the construction footprint from increased noise, vibration, and dust, and removal of invasive vegetation. Levee setback and notching proposed at the program-level mitigation sites could temporarily inhibit fish movements by increasing turbidity in the water and installing dewatering structures. However, overall impacts related to this component of the Modified Project would be **less than significant**. The loss of riparian vegetation at the TS\_30\_L levee would represent a disruption in migratory and movement conditions for terrestrial wildlife species, particularly riparian-dependent bird species. As a result, the impact of the Modified Project on movement and migratory conditions for fish or wildlife species would be **potentially significant**. Implementing the mitigation measures listed previously for Impact 3.6-2 would also avoid, minimize, rectify, and/or compensate for potential impacts on wildlife movement and migration conditions; however, because new plantings would take many years to establish, the temporal loss in the functionality for the riparian habitat to provide conditions for wildlife movement and migration would remain. As a result, impacts on wildlife movement and migration would be **significant and unavoidable**.

**Mitigation Measure 3.6-16.** See text under Impact 3.6-2.

**Mitigation Measure 3.6-17.** See text under Impact 3.6-2.

**Mitigation Measure 3.6-18.** See text under Impact 3.6-2.

**Mitigation Measure 3.6-19.** See text under Impact 3.6-2.

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**Impact 3.6-5: The Modified Project would conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.**

The San Joaquin County General Plan includes multiple goals and objectives for the protection of biological resources including Goal NCR-2, “to preserve and protect wildlife habitat areas for the maintenance and enhancement of biological diversity and ecological integrity”; Objective NCR-2-1, to protect significant biological and ecological resources; Objective NCR-2-4, which requires new development in the vicinity of significant oak groves to be designed and sited to maximize the long-term preservation of the trees and the integrity of their natural setting; and Objective NCR-2-5, which states that development that results in a net loss of riparian or wetland habitat is not to be allowed. The 2018 LSJR FR/EIS/EIR states that there were some conflicts between local policies in the General Plan regarding preservation of native vegetation and wildlife, which would be significant.

For the Modified Project, there is no change from the analysis presented in the 2018 LSJR FR/EIS/EIR regarding conflicts with local policies or ordinances protecting biological resources. Restoring riparian habitat within the biological mitigation sites is consistent with the goals and objectives in the San Joaquin County General Plan. There would be short-term effects on birds and other wildlife in areas adjacent to the construction footprint from increased noise, vibration, and dust and removal of invasive vegetation. However, overall impacts would be **less than**

**significant.** The Modified Project includes loss of riparian vegetation along the waterside slope of the TS\_30\_L levee, which would be in potential conflict with certain goals and objectives in the San Joaquin County General Plan. The impact would be **potentially significant.** Implementing the mitigation measures listed previously for Impact 3.6-2 would also avoid, minimize, rectify, and/or compensate for potential conflicts with local policies protecting biological resources. As a result, with implementation of these mitigation measures, the potential impacts for the Modified Project would be **less than significant with mitigation.**

**Mitigation Measure 3.6-16.** See text under Impact 3.6-2.

**Mitigation Measure 3.6-17.** See text under Impact 3.6-2.

**Mitigation Measure 3.6-18.** See text under Impact 3.6-2.

**Mitigation Measure 3.6-19.** See text under Impact 3.6-2.

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**Impact 3.6-6: The Modified Project 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.**

As described in 2018 LSJR FR/EIS/EIR, the project area is covered by San Joaquin County Multispecies Conservation and Open Space Plan approved in 2000. This plan covers an expansive list of species and habitats of interest at federal, state, and local levels. In the 2018 LSJR FR/EIS/EIR, it was determined there would be conflicts with the San Joaquin County Multispecies Conservation and Open Space Plan because of direct and indirect effects resulting in the permanent loss of shaded riverine aquatic habitat.

For the Modified Project, there is no change from the analysis presented in the 2018 LSJR FR/EIS/EIR. The San Joaquin County Multispecies Conservation and Open Space Plan specifically covers levee maintenance efforts undertaken by SJFACA. The Modified Project would not include any loss of shaded riverine aquatic habitat. Given the implementation of the mitigation measures listed above for biological resources, there would be no inconsistency between the Modified Project and the San Joaquin County Multispecies Conservation and Open Space Plan. Similarly, there would be no inconsistency between the biological mitigation site restoration and the San Joaquin County Multispecies Conservation and Open Space Plan.

The potential impacts for the Modified Project on an adopted conservation plan would be **less than significant.**

**Mitigation:** None required.

## Cumulative Impacts

### **Impact 3.6-7: The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to biological resources.**

The cumulative impacts for biological resources were analyzed in Section 5.23.5 of the 2018 LSJR FR/EIS/EIR. As discussed for Alternative 7a in the 2018 LSJR FR/EIS/EIR, the geographic scope for the cumulative impacts analysis for vegetation, wildlife, and special-status species included the San Joaquin River, Lower Calaveras River, Stockton Deepwater Ship Channel, Tenmile Slough, Fivemile Slough, Fourteenmile Slough, and Mosher Slough. Construction of the Modified Project would contribute to loss of vegetation and wildlife habitat when considered in combination with ongoing and planned development projects in San Joaquin County. In the 2018 LSJR FR/EIS/EIR, such development projects were determined to contribute to a significant cumulative effect, even with the anticipation that each project would separately implement a mitigation plan to reduce their impacts on vegetation and wildlife. Given the substantial loss of native riparian forests that have been removed over the past couple centuries, the 2018 LSJR FR/EIS/EIR determined that the additional contribution to loss of vegetation and associated wildlife habitat as a result of Alternative 7a would be considerable and would contribute to a significant cumulative impact. Similarly, the 2018 LSJR FR/EIS/EIR determined that the potential cumulative impacts on special-status species from the combination of ongoing and planned development projects and the Modified Project would result in considerable contributions to direct and indirect effects on special-status species, and that the cumulative impact would remain significant and unavoidable even after implementation of mitigation measures developed for these species.

The potential impacts of the Modified Project, when considered together with similar impacts from other probable future projects in the vicinity, could result in a significant cumulative impact on biological resources, including vegetation and special-status species. The Modified Project would have a smaller effect on loss of vegetation and habitat for wildlife species, including special-status species, than Alternative 7a analyzed in the 2018 LSJR FR/EIS/EIR. Given this consideration, and because the mitigation measures that would be implemented under the Modified Project would further minimize its potential adverse effects on biological resources, including vegetation, wildlife habitat, and special-status species, the Modified Project would not make a cumulatively considerable contribution to the significant cumulative impact, and thus would be considered **less than significant**.

The potential impacts of the biological mitigation site restoration efforts, when considered together with similar impacts from other probable future projects in the vicinity, would result in a positive beneficial cumulative impact on biological resources including vegetation and special-status species, by restoring previously removed riparian and wetland habitat that restores native vegetation and creates plant and wildlife habitat, which benefits special-status species. The restoration of the biological mitigation sites would have an overall beneficial cumulative impact.

## 3.7 Cultural and Paleontological Resources

This section discusses the potential for impacts of the Modified Project on cultural resources, including impacts on architectural resources, archaeological resources, paleontological resources, and human remains. Section 5.21 of the 2018 LSJR FR/EIS/EIR described the applicable environmental and regulatory setting and standards of significance, which are incorporated by reference and summarized below as appropriate.

No comments by individuals were received during circulation of the NOP for the 2018 LSJR FR/EIS/EIR relevant to cultural resources.

The analysis in this section was developed based on the construction and operational features of the Modified Project, current regulatory requirements, and cultural resources studies completed by the USACE.

### 3.7.1 Environmental Setting

This section briefly summarizes the environmental setting provided in the 2018 LSJR FR/EIS/EIR and provides an overview of the context and chronology of the human use of the general region and the Modified Project site. Portions of this section were excerpted from the overview provided in the 2018 LSJR FR/EIS/EIR (summaries of Rosenthal and Whittaker [2009], AECOM [2010], and Jones et al. [2006]), as well as the cultural resources studies from USACE (USACE 2020; Clinton-Selin and Ugan 2022) and InContext (2017). ESA also prepared a study on two of the mitigation sites, SJR East and SJR West (Sims and Cleveland 2023). No site-specific cultural resources studies have yet been conducted for the Van Buskirk and SJR South mitigation sites, which are analyzed at a program level in this SEIR.

### Paleontological Setting

The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found. Fossil discoveries not only provide a historical record of past plant and animal life but can assist geologists in dating rock formations. Fossil discoveries can expand understanding of the time periods and the geographic range of existing and extinct flora and fauna.

The Society of Vertebrate Paleontology (SVP) established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources (SVP 2010). Most practicing paleontologists in the United States adhere closely to the SVP's guidelines, which were approved through a consensus of professional paleontologists. Many federal, state, county, and city agencies have either formally or informally adopted the SVP's standard guidelines for the mitigation of adverse construction-related impacts on paleontological resources. The SVP has helped define the value of paleontological resources and, in particular, indicates that geologic units of high paleontological potential are those from which vertebrate or significant invertebrate or plant fossils have been recovered in the past (i.e., are represented in institutional collections). Geologic units of low paleontological potential are those that are not known to have produced a substantial body of significant paleontological material. Accordingly,

the sensitivity of an area with respect to paleontological resources hinges on its geologic setting and whether significant fossils have been discovered in the area or in similar geologic units.

The SVP further states the following:

- Vertebrate fossils and fossiliferous deposits are considered significant nonrenewable paleontological resources, and are afforded protection by federal, state, and local environmental laws and guidelines.
- A paleontological resource is considered to be older than recorded history or 5,000 years before present and should not be confused with archaeological resource sites.
- Certain plant or invertebrate fossils may be designated as significant by a Project paleontologist, special interest group, lead agency, or local government.

With these principles, the SVP has outlined criteria for screening the paleontological potential of rock units and established assessment and mitigation procedures tailored to such potential (SVP 2010). The criteria for high-potential, undetermined, and low-potential rock units are described below.

It is important to note that while paleontological potential as defined above can provide a rough idea of whether subsurface fossils may exist, the uniqueness or significance of a fossil locality is unknown until it is identified to a reasonably precise level (Scott and Springer 2003). Therefore, any fossil discovery should be treated as potentially unique or significant until determined otherwise by a professional paleontologist.

In its “Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontological Resources,” the SVP (2010:1–2) defines four categories of paleontological sensitivity (potential) for rock units:

- **High Potential.** Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rock units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcanoclastic formations (e.g., ashes or tephra), and some low-grade metamorphic rocks that contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones).
- **Low Potential.** Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception, not the rule (e.g., basalt flows or Recent colluvium). Rock units with low potential typically will not require impact mitigation measures to protect fossils.
- **Undetermined Potential.** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to

have undetermined potential. Further study is necessary to determine whether these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

- **No Potential.** Some rock units have no potential to contain significant paleontological resources—for instance, high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require neither protection nor impact mitigation measures relative to paleontological resources.

For geologic units with high potential, full-time monitoring is generally recommended during any project-related ground disturbance. For geologic units with low potential, protection or salvage efforts will not generally be required. For geologic units with undetermined potential, field surveys by a qualified vertebrate paleontologist should be conducted to specifically determine the paleontological potential of the rock units present within the study area.

Geologic mapping (Dawson 2009; Wagner et al. 1991) indicates that deposits from the Pleistocene-age Modesto Formation are present at the surface and subsurface within the Modified Project site (including all five potential biological mitigation sites).

The Modesto Formation dates to the Late Pleistocene (approximately 125,000–9,000 years before present); it overlies the Riverbank Formation and is stratigraphically below various Holocene-age to recent alluvial deposits (mapped as Dos Palos Alluvium by Wagner et al. [1991]). The Modesto Formation has been studied in the San Joaquin Valley, where it has been interpreted as river terrace deposits consisting of arkosic gravel, sand, and silt. Based on a search of the University of California Museum of Paleontology (UCMP) fossil locality online database and available scientific literature, the Modesto Formation is known to contain significant paleontological resources, which include mammoth, bison, camel, rodent, and horse fossil specimens (Hilton et al. 2018; Sub Terra Consulting 2017; UCMP 2021a). Further, Pleistocene-age deposits are generally considered to have a high potential to contain significant paleontological resources, given the abundance of previous fossil discoveries throughout California (Sub Terra Consulting 2017; UCMP 2021b). The Holocene-age alluvial deposits (Dos Palos Alluvium) are too young to have preserved significant fossils; however, the deeper, older layers of these deposits date to the late Pleistocene age and do have the potential to contain significant paleontological resources.

The available records from the UCMP fossil locality online database indicates that there have been vertebrate fossil discoveries within the Modesto Formation in San Joaquin County and in neighboring counties (UCMP 2021c). The UCMP database lists a few location names, but the exact locations are not provided because they are considered confidential. The locations of some of these discoveries can be inferred by locality name listed in the UCMP database and are near the Modified Project site. Three vertebrate fossil localities were discovered during construction for the South Stockton Six-Lane Project, which occurred approximately 8 miles southeast of the Project site. Two vertebrate fossil localities were discovered near Mormon Slough, approximately 4 miles southeast of the Project site. Additionally, two vertebrate fossil localities were discovered

in the Holocene-age sediments near CCRC Farms, approximately 9 miles west of the Modified Project site. There are no records in the online database that suggest the presence of fossil localities within the Modified Project site (UCMP 2021b).

Although there is no indication of previous fossil discoveries within the Project site, given the presence of the Modesto Formation deposits and other previous finds in the area, the deposits underlying the Modified Project site are considered to have a high potential to contain significant vertebrate fossils.

## **Cultural Setting**

### ***Pre-contact Setting***

The complexity of the archaeological record in the central Sacramento–San Joaquin Delta (Delta) region has resulted in the development and refinement of local sequences with specific cultural traits and chronologies. Fredrickson (1974) proposed a tripartite scheme—Archaic, Emergent, and Ethnographic—each with subdivisions, appropriate characteristics, and chronological ranges. The Lower Archaic (10,000–6,000 years before present [BP]) and the Initial Middle Archaic (6000–4500 BP) are not well known from San Joaquin County and are represented primarily from the research completed at Los Vaqueros Reservoir to the southwest. The other divisions of the Archaic, Emergent, and Ethnographic are reasonably well represented in the central Delta area. Additional details on the chronology and characteristics of these cultural divisions are summarized below.

The Terminal Archaic period is noted as having side-notched and stemmed projectile points, rectangular abalone ornaments, shaped and unshaped mortars and pestles, and rectangular Olivella shell beads. Subsistence focused on nuts and berries as well as bayshore resources (shellfish, marine fishes, and mammals), freshwater fish, shellfish, and terrestrial mammals.

Upper Archaic sites are characterized by a bone tool and ornament industry and unshaped and well-shaped mortars and pestles. Subsistence was still centered on nuts and seeds, and faunal assemblages indicate an inclusion of marine and/or mammal resources. The presence of ocean shellfish in the archaeological record indicates a growing reliance on marine resources in interior valley sites.

The Meganos Culture began to appear in the San Joaquin Valley and Delta during the Upper Archaic. It spread quickly into Contra Costa County and other parts of the Bay Area. The Meganos Culture has been characterized as a blend of Bay and Delta populations.

The time period between 1300 BP and 1100 BP was one of social change and upheaval in the Delta and Central Valley. The southern Wintuan groups (ancestral Patwin) pushed the Meganos peoples into the Sacramento Delta and the Bay Miwok groups from the West Delta to Suisun Bay. Costanoan groups began to move across the Carquinez Strait. Meganos cemeteries in the Alameda and Diablo districts were abandoned during this turbulent 200-year period. After 900 BP, the Meganos peoples integrated with the Valley Yokuts groups in the San Joaquin Valley.

During the Emergent Period, cremations became quite common, and the bow and arrow were introduced with the concomitant use of small projectile points. Bedrock mortar milling stations

appear early in the Emergent Period and were used in association with other portable milling equipment. Nuts, berries, and seeds were collected and processed. Large terrestrial mammals (e.g., deer, elk) appear to have been favored. Marine shellfish and marine fishes appear inland in much larger quantities than in previous periods. Emergent Period sites, typically identified as large mound villages, are found every few miles along the San Joaquin River and its major tributaries.

### ***Ethnographic Setting***

The Northern Valley Yokuts occupied the land on each side of the San Joaquin River from the Delta to south of Mendota when first encountered by the Spanish. The Yokuts' occupation of the northern parts of the Diablo Range may be relatively recent, as linguistic evidence points toward an earlier Miwok occupation. The late prehistoric Yokuts were probably the largest indigenous culture in pre-contact California.

There was no Yokuts tribal organization that encompassed the whole of the peoples speaking Yokutsan languages, or even a tribal organization that encompassed an entire primary division, such as Foothill Yokuts. These are linguistic and geographic designations only. Similar to most tribal groups in California, the largest political entity among the Yokuts was that of the tribelet, which consisted of a large village and a few smaller surrounding villages. Larger villages and tribelets had a chief or headman—an advisory position that was passed from father to son (Wallace 1978).

In general, the Yokuts were seasonally mobile hunter-gathers with semi-permanent villages. Seasonal movements to temporary camps would occur to exploit food resources in other environmental zones. The primary difference between the various Yokuts groups rests largely on the differences in available resources in their territory. The Northern Valley Yokuts relied heavily on acorns as a food staple, which was processed into a thick soup, along with salmon and other fish, grass seeds, and tule roots (which were processed into meal), and probably waterfowl, tule elk, and pronghorn (Wallace 1978).

Principal settlements were located on the tops of low mounds, on or near the banks of the larger watercourses. Settlements were composed of single-family dwellings, sweathouses, and ceremonial assembly chambers. Dwellings were small and lightly constructed, semi-subterranean and oval. The public structures were large and earth-covered. Seditism was fostered by the abundance of riverine resources in the area (Wallace 1978)

European contact with the Northern Valley Yokuts began with intermittent trips by Spanish explorers traveling through the Sacramento–San Joaquin Valley in the late 1700s and early 1800s. Missionaries lured or captured many Yokuts and kept them in various missions, although many escaped and returned home to the valley. Skirmishes between Yokuts raiding parties and the Spanish and other Euroamericans resulted from repeated cattle rustling, which ultimately led to the deaths of numerous Yokuts individuals. A malaria epidemic in 1833 greatly diminished the Native population by killing thousands of Yokuts and people of surrounding groups. The local population was further reduced by the rapid appearance of miners during the Gold Rush era. Despite the fact that there was no gold in the Yokuts' territory, miners making their way to the gold fields caused upheaval. The remaining native populations were later displaced by miners, who returned to farm the area (Wallace 1978).

### **Historic-Era Setting**

Spanish missionaries were among the first recorded European visitors to the area. In 1776, Juan Batista de Anza, along with Friar Pedro Font, traveled south along a portion of the San Joaquin River with a party of immigrants from Monterey. Other 18th-century explorers of the area included Pedro Fages (1772) and Francisco Eliza (1793). Nearly 30 years later, Gabriel Moraga completed more intensive explorations into the area, exploring some distance up and down the Mokelumne and Cosumnes rivers.

The establishment of the Spanish mission system ensured strong Hispanic influence throughout early California. Mexican influences remained even after the succession of Alta California to the United States in 1848 and the Gold Rush of 1849.

The city of Stockton was first settled when Charles M. Weber, a native of Germany, turned his strategy from gold mining, in late 1848, to supplying gold-seekers. To this end, he took over Guillermo Gulnac's portion of their joint Spanish land grant (Rancho del Campo de los Franceses) in 1849. Stockton was incorporated on July 23, 1850, by the San Joaquin County Court and the first city election was held on July 31, 1850. Early settlers of Stockton resembled those of other California settlements and included gold seekers from Asia, Africa, Australia, Europe, the Pacific Islands, Mexico, and Canada. The Port of Stockton was the first and is still the largest inland seaport in California.

### **Sacramento–San Joaquin River Delta System**

Before the mid-19th century, much of the Delta was marsh and swampland, with seasonal flooding and periodic inundation of normally dry areas. The San Joaquin River in particular had relatively high natural levees, interior areas with sandy soils, and tule marshes. Tidal and flood-stage waters penetrated the interior marshes through sloughs.

The legal framework for land reclamation in California can be traced to the Swamp Land Act of 1850, which authorized the transfer of federal swamplands to private ownership with the provision that they be drained and made productive. Flood management and land reclamation projects were undertaken to make the areas adjacent to river corridors habitable for increasing populations, expand arable land, improve navigable waterways, and offer flood protection.

In the 1860s and 1870s, land reclamation in the Delta was accomplished by building levees by hand. A large proportion of manual laborers for this effort were ethnically Chinese. Project carpenters were typically Caucasian. The peat levee systems of this era did not perform well in the long term. Eventually, the peat levees were improved using long-boom clamshell dredges to build the levees up with clay and alluvium from adjoining channels. Levees built in this manner at the beginning of the 20th century measured up to 125 feet wide at the base, 20 feet wide at the crown, and 5 feet above the high-water level. Coverings such as alfalfa, brush, and vegetation were used to counteract erosion. Between 1897 and 1918, more than 100,000 acres were enclosed with levees built by dredges and kept free of water by pumps. Many levees were “dressed” every 1–3 years by supplementing them with dredged material.

By the 1890s, the California State Commissioner of Public Works advocated for a comprehensive approach to flood management in the region. As a result, Captain Thomas Jackson of USACE undertook a flood control assessment of the Sacramento Valley in 1909–1910. Jackson produced a management plan for the California Debris Commission that would come to be known as the Jackson Report. The commission’s Jackson Report received congressional support and ultimately resulted in levee strengthening and constructing to reclaim land. Jackson’s written report included maps to depict the Sacramento and San Joaquin River systems, associated levees, and proposed improvements.

Congress enacted the Flood Control Act of 1917 to adopt the California Debris Commission’s management plan for the Central Valley based on the Jackson Report, and construction work soon began. Although the San Joaquin River and its tributaries had been mapped and assessed for the report, the San Joaquin River system has not been upgraded as significantly as the Sacramento River system was during this period, receiving mainly minor maintenance-focused efforts.

Large-scale improvements on the San Joaquin River flood control system were undertaken several decades later under the 1944 Flood Control Act. This law authorized modification of dams and levees across the United States, including the Lower San Joaquin River and Tributaries, Bear Creek Levee, New Hogan Dam, Duck Creek Diversion, and Reclamation District (RD) 17 levee improvements. A series of flood control acts have been passed since the Flood Control Act of 1917. The Lower San Joaquin River Feasibility Study was authorized by the Flood Control Act of 1944 and subsequent construction was initiated in 1956 with various modifications made through the mid-1980s.

### **Tenmile and Fourteenmile Slough Levee History**

The Jackson Report indicates that a private road ran along the southern half of the present-day Tenmile Slough Levee in 1909–1910, but it is unclear whether the road was located on a previously existing levee. Although the existence of a road implies the existence of a levee, a levee is not depicted. The Fourteenmile Slough Levee is not depicted or suggested. The 1913 U.S. Geological Survey quadrangle map for Stockton depicts both the Tenmile Slough Levee and the Fourteenmile Slough Levee definitively. Thus, it appears that the levees were extant by 1913, likely constructed by local interests.

The Sargent-Barnhart Tract was farmed from at least the early 20th century until the late 20th century. Operation and maintenance (O&M) manuals are the principal source of information about historical levee maintenance for USACE levees. The Tenmile Slough and Fourteenmile Slough levees are not documented in a levee-specific O&M Manual. As-built drawings of the levees were completed in the 1980s when the levees were improved. The as-built drawings indicate that the Tenmile Slough Levee was raised approximately 7 feet and its crown offset approximately 20 feet east along most of the levee’s length. The Fourteenmile Slough Levee crown was offset approximately 20 feet south. Development of the lands within RD 2074 began by 1993 and was substantially complete by 2005. RD 2074 now encompasses 1,798 acres of mixed-use commercial, residential, and recreational development known as Brookside Estates.

## Native American Consultation

For the 2018 LSJR FR/EIS/EIR, USACE obtained a list of potentially interested Native American Tribes (Tribes) and sent letters to the Ione Band of Miwok Indians, the Buena Vista Rancheria of Me-Wuk Indians, the Wilton Rancheria, the Nototomne/Northern Valley Yokuts, and the California Valley Miwok Tribe. The first letter, dated August 12, 2012, informed the Tribes of the new feasibility study and requested any information they may have on areas of traditional cultural interest to their tribal members. There were two responses. Ms. Sylvia Burley, Tribal Chairperson of the California Valley Miwok Indians, requested government-to-government consultation; the request was forwarded to Mr. Mark Gilfillan, the USACE Tribal Liaison. Ms. Katherine Perez, Tribal Chairwoman for the Nototomne/Northern Valley Yokuts, called to request more information.

On December 2, 2013, USACE sent letters that included a description, location maps of the final array of alternatives, and a copy of the draft *Programmatic Agreement between the U.S. Army Corps of Engineers and the California State Historic Preservation Officer regarding the Lower San Joaquin River Feasibility Study Project, San Joaquin County, California* (PA). A call from Mr. Randy Yonemura concerning the PA was received by USACE in December 2013; however, no specific comments were submitted by any Tribe. USACE sent a second round of letters on March 18, 2014, with a copy of the revised draft PA. No comments were received from the Tribes regarding the revised draft PA.

USACE distributed a final draft of the PA to the Tribes on August 13, 2014. In response, the California Valley Miwok Tribe sent a letter on August 15, 2014, stating that they had no further comments and were requesting concurring party status. Ms. Perez called USACE for additional information, stated that she was very concerned about the possibility of human burials within the project area, and requested concurring party status. She chose to sign the final draft form of the document and submitted it via facsimile on August 20, 2014. USACE received comments regarding the project and PA from the Buena Vista Rancheria on August 29, 2014. USACE provided the Buena Vista Rancheria responses to their comments in May 2016. The United Auburn Indian Community (UAIC) expressed interest in this project on November 23, 2015, and have also been included in consultations. The PA was fully executed by USACE and the California State Historic Preservation Officer (SHPO) on May 11, 2016.

As required by Stipulation XI of the PA, USACE sent letters to the Tribes on November 8, 2019, regarding geotechnical investigations at the Modified Project site. No responses were received. On March 24, 2020, USACE sent letters to the Tribes describing the Modified Project, the cultural resources inventory effort, and a request for the review of the Modified Project site delineation and historic property identification efforts. No responses were received. On July 28, 2021, USACE sent letters to the Tribes regarding the borrow site and a request for comments on the designation of the proposed borrow area. No responses were received.

On October 1, 2021, SJAFCAs sent letters to 11 representatives from the Tribes, pursuant to California Public Resources Code (PRC) Section 21080.3.1(b) (Assembly Bill [AB] 52) and CEQA; the letters provided information on the Modified Project and requested that the Tribes inform SJAFCAs if they had any concerns regarding potential impacts from the Modified Project on cultural resources and tribal cultural resources. One response was received within 30 days of

certified receipt of notices; Ms. Anna Cheng of UAIC's Tribal Historic Preservation Department wrote on October 21, 2021, that the majority of the Modified Project site falls outside the UAIC's geographic area of traditional and cultural affiliations.

Pursuant to PRC Section 21080.3.1(b) (AB 52) and CEQA, on February 27, 2023, SJAFCA sent letters to the Confederated Villages of Lisjan, North Valley Yokuts Tribe, and Wilton Rancheria via email and certified mail to notify the Tribes of the addition of the five potential biological mitigation sites to the Modified Project and requesting that the Tribes inform SJAFCA if they had any concerns regarding potential impacts from the Modified Project on cultural resources and tribal cultural resources. On March 8, 2023, the Confederated Villages of Lisjan responded and requested a copy of the California Historical Resources Information System results, the EIR, and archaeological reports. On March 8, 2023, the North Valley Yokuts Tribe responded with a request to be involved in the process and development of the project, stating that they are concerned about projects in and around the Old San Joaquin River. SJAFCA responded to the Confederated Villages of Lisjan and North Valley Yokuts via email on March 15, 2023. These emails included a link to download the cultural resources survey reports for the mitigation sites analyzed at a project level and provided additional context regarding the relationship between the 2018 LSJR FR/EIS/EIR and the Modified Project analyzed in this SEIR. SJAFCA did not receive any responses from this latest outreach.

## **Cultural Resources Inventory**

The following is a summary of the background research, records search, pedestrian survey, and resource evaluations conducted for the Modified Project site (including the Fourteenmile Slough Pump Station Site, SJR East Site, and SJR West Site, which are the three potential biological mitigation sites being evaluated at a project level). The corresponding cultural resources identification and evaluation efforts are detailed below (InContext 2017; USACE 2020; Clinton-Selin and Ugan 2022; Sims and Cleveland 2023). No site-specific cultural resources studies have yet been conducted for the Van Buskirk Park and SJR South mitigation sites, which are analyzed at the programmatic level for this SEIR.

### ***California Historical Resources Information System Records Searches***

Records searches of the Central California Information Center of the California Historical Resources Information System were conducted in 2017, 2019, 2021, and 2022, and covered the TS\_30\_L levee footprint, barge off-haul site, borrow site, and three of the five potential environmental mitigation sites (Fourteenmile Slough Pump Station, SJR East, and SJR West mitigation sites). As a result of these searches, four previously recorded cultural resources were identified in the project area: P-39-000002, P-39-004922, P-39-005174, and P-39-005475.

### ***Field Survey***

Cultural resources pedestrian surveys were conducted for the entire Modified Project site and the Fourteenmile Slough, SJR East, and SJR West mitigation sites between March 2017 and December 2022 (InContext 2017; USACE 2020; Clinton-Selin and Ugan 2022; Sims and Cleveland 2023). As a result of these surveys, 12 cultural resources were newly recorded: SEWD-1, Fourteenmile Slough Sanitary Complex, Wright-Elmwood Tract, Tenmile Slough Levee,

Fourteenmile Slough Levee, Eight Mile Road–Stagg 230 kV Transmission Line, Stagg-Tesla 230 kV Transmission Line, Hurley Tracy No. 1 Transmission Line, Hurley-Tracy No. 2 Transmission Line, and three archaeological isolates [SEWD-ISO-1, SEWD-ISO-7, and SEWD-ISO\_8]). Additionally, during the surveys, previously recorded cultural resource P-39-005174 was found to no longer be present in the SJR East mitigation site.

In 2017, InContext also conducted an archaeological subsurface survey of the borrow area consisting of 85 hand-excavated auger probes and monitoring of 20 geotechnical trenches. No buried archaeological materials or buried paleosols were observed during the investigation. Based on the results of the testing program, there is a low likelihood of any intact subsurface archaeological resources in the borrow area.

### ***Summary of Cultural Resources Identified***

As a result of the records searches and surveys, 15 cultural resources (three of which are archaeological isolates) were identified, collectively, at the Modified Project site and the Fourteenmile Slough, SJR East, and SJR West mitigation sites. These resources are discussed below.

P-39-00002 is the abandoned Oakdale Branch of the Southern Pacific Railroad. A portion of this resource intersects the Borrow Area portion of the project area and is now used as an unimproved road (Clinton-Selin and Ugan 2022).

P-39-004922 is within the Modified Project site and is the historic-era “Brookside Levee.” Research indicates that the accepted names for the segments of the “Brookside Levee” within the project area are the Tenmile Slough Levee and Fourteenmile Slough Levee. These segments are denoted in the National Levee Database as “RD 2074–Sargent-Barnhart Tract–Unit 2, Tenmile Slough” (segment ID 5204000352), and “RD 2074–Sargent-Barnhart Tract–Unit 3, Fourteenmile Slough” (segment ID 5204000353). The “Brookside Levee” does not appear to be the accurate current or historic name for the levees. Therefore, USACE provided updated California Department of Parks and Recreation 523 forms (site records) recording the segments as the Tenmile Slough Levee and Fourteenmile Slough Levee and treated these parts of P-39-004922 as two separate resources for the purposes of identification and evaluation for the Modified Project (USACE 2020).

P-39-005174 is the recorded location of a 1950s-era navigation tower. The resource was described in its 2009 recording as a “standing, exposed frame, and lighted steel tower” that appeared to be obsolete and disused (Martin and Frank 2009). P-39-005174 was within the SJR East mitigation site but is no longer extant.

P-39-005475 is the historic-era Wright-Elmwood Tract (also called RD 2119). The resource is bounded by three levees: San Joaquin County (SJC) Levee 31, SJC Levee 115, and the Tenmile Slough Levee. P-39-005475 consists of approximately 910 hectares of land, mostly devoted to agricultural use. Ditches within the tract were added to the resource’s description in 2023 (Sims and Cleveland 2023). Mitigation sites Fourteenmile Slough, SJR East, and SJR West are all within or intersect P-39-005475.

Archaeological site SEWD-01 is a historic-era artifact scatter identified adjacent to the main paved road within a pale brown soil matrix of the borrow area portion of the project area. The scatter consists of approximately 50 dispersed and highly fragmented pieces of amber, colorless, aqua, green, and cobalt glass fragments; threaded colorless jar fragments; fragments of light green ceramic tableware; brick fragments; terra cotta pipe fragments; and concrete fragments.

The Fourteenmile Slough Sanitary Complex, P-39-005473, is a historic-era architectural resource identified in the Fourteenmile Slough mitigation site and consists of “a modern pump station and multiple settling ponds that were used for sewage historically,” but that are not in current use (Clinton-Selin and Ugan 2022:51).

Four transmission lines were identified in the SJR East mitigation site. These consist of two Pacific Gas and Electric Company transmission lines, Eight Mile Road–Stagg 230 kV Transmission Line, and Stagg–Tesla 230 kV Transmission Line; and two Western Area Power Administration–owned lines, Hurley Tracy No. 1 Transmission Line and Hurley-Tracy No. 2 Transmission Line.

The three archaeological isolates identified in the project area are all in the borrow area and consist of an amethyst glass bottle base (ISO-7), a ceramic insulator (ISO-8), and a basalt flake (ISO-1).

All of the cultural resources identified on the Modified Project site, Fourteenmile Slough, SJR East, or SJR West mitigation sites were evaluated for significance and determined not eligible for the National Register of Historic Places (NRHP) by USACE. Similarly, none of these resources appear to be eligible for the California Register of Historical Resources (CRHR). Therefore, no historical resources or unique archaeological resources were identified on the Modified Project site, or on the Fourteenmile Slough, SJR East, or SJR West mitigation sites.

### 3.7.2 Regulatory Setting

The following federal, state, and local regulations would apply to the Modified Project.

#### **Federal**

##### ***National Historic Preservation Act of 1966***

The principal federal law that addresses historic properties is the National Historic Preservation Act (NHPA), as amended (United States Code Title 54, Section 300101 et seq.), and its implementing regulations (Code of Federal Regulations [CFR] Title 36, Part 800 [36 CFR 800]). Section 106 of the NHPA requires a federal agency with jurisdiction over a proposed federal action (referred to as an “undertaking”) to take into account the effects of the undertaking on historic properties, and to provide the Advisory Council on Historic Preservation an opportunity to comment on the undertaking.

The term *historic properties* refers to “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register [of Historic Places]” (36 CFR 800.16[1][1]). The implementing regulations (36 CFR 800) describe the process for

identifying and evaluating historic properties, for assessing the potential adverse effects of federal undertakings on historic properties, and seeking to develop measures to avoid, minimize, or mitigate adverse effects. The Section 106 process does not require the preservation of historic properties; instead, it is a procedural requirement mandating that federal agencies take into account effects on historic properties from an undertaking prior to approval.

The steps of the Section 106 process are accomplished through consultation with the SHPO, the Advisory Council on Historic Preservation, federally recognized Indian Tribes, local governments, and other interested parties. The goal of consultation is to identify potentially affected historic properties, assess effects on such properties, and seek ways to avoid, minimize, or mitigate any adverse effects on such properties. The agency also must provide an opportunity for public involvement (36 CFR 800.3[e]). Consultation with Indian Tribes regarding issues related to Section 106 and other authorities (such as the National Environmental Policy Act [NEPA] and Executive Order No. 13007) must recognize the government-to-government relationship between the federal government and Indian Tribes, as set forth in Executive Order 13175, *Federal Register* Title 65, Page 87249 (November 9, 2000), and the Presidential Memorandum of November 5, 2009.

### **National Register of Historic Places**

The NRHP was established by the NHPA as “an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the Nation’s historic resources and to indicate what properties should be considered for protection from destruction or impairment” (36 CFR 60.2). The NRHP recognizes a broad range of historic properties that are significant at the national, state, and local levels and can include districts, buildings, structures, objects, prehistoric archaeological sites, historic-period archaeological sites, traditional cultural properties, and cultural landscapes. As noted above, a resource that is listed in or eligible for listing in the NRHP is considered a *historic property* under Section 106.

To be eligible for listing in the NRHP, a property must be significant in American history, architecture, archaeology, engineering, or culture. Properties of potential significance must meet one or more of the following four established criteria:

- A. Are associated with events that have made a significant contribution to the broad patterns of our history.
- B. Are associated with the lives of persons significant in our past.
- C. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- D. Have yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one or more of the criteria of significance, a property must have integrity. *Integrity* is defined as the ability of a property to convey its significance. The NRHP recognizes seven qualities that, in various combinations, define integrity: location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity, a property must possess several—and usually most—of these seven aspects. Thus, the retention of the specific aspects of integrity is paramount for a property to convey its significance.

Ordinarily, religious properties, moved properties, birthplaces or graves, cemeteries, reconstructed properties, commemorative properties, and properties that have achieved significance within the past 50 years are not considered eligible for the NRHP unless they meet one of the Criteria Considerations (A–G), in addition to meeting at least one of the four significance criteria and possessing integrity.

### **Programmatic Agreement**

For the Lower San Joaquin River Feasibility Study Project, a Section 106 PA was developed between USACE and the SHPO regarding potential impacts from Project implementation on historic properties. The PA outlines the procedures to follow for the construction and management of levee improvements. Stipulations include review procedures, qualifications, and provisions for a Historic Properties Management Plan (HPMP) and Historic Properties Treatment Plans (as applicable). The PA also provides stipulations for the identification and evaluation of cultural resources before HPMP approval. Notices to proceed may be issued by USACE for individual construction segments after a historic properties inventory has been completed, provided that certain provisions are met (Stipulation VII), including:

- A. A plan is in place to respond to inadvertent archaeological discoveries.
- B. Modified Project actions do not encroach within 30 meters (100 feet) of the known boundaries of any potential historic properties.
- C. A monitor is present during any Modified Project activities in areas designated to be culturally sensitive by USACE.

### **State**

The State of California, through the SHPO, consults on implementation of the NHPA and oversees statewide comprehensive cultural resource surveys and preservation programs. The California Office of Historic Preservation (OHP), as an office of the California Department of Parks and Recreation, implements these policies and maintains the California Historical Resources Inventory. The SHPO is an appointed official who implements historic preservation programs within the State’s jurisdiction.

### **California Environmental Quality Act**

CEQA (PRC Section 21000 et seq.) is the principal statute governing environmental review of projects occurring in the state. CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including significant effects on historical resources, unique archaeological resources, and tribal cultural resources. Under CEQA, a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment (PRC Section 21084.1). The CEQA Guidelines (codified at California Code of Regulations [CCR] Title 14, Section 15064.5 [14 CCR Section 15064.5]) provide guidance for implementation of CEQA.

A significant effect under CEQA would occur if a project results in a substantial adverse change in the significance of a historical resource as defined in 14 CCR Section 15064.5(a). *Substantial adverse change* is defined as “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would

be materially impaired” (14 CCR Section 15064.5[b][1]). According to 14 CCR Section 15064.5(b)(2), the significance of a historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics that:

- A. Convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR; or
- B. Account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in a historical resources survey meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
- C. Convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

In general, a project that complies with the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Grimmer 2017) is considered to have mitigated its impacts on historical resources to a less-than-significant level (14 CCR Section 15064.5[b][3]).

### **Historical Resources**

The CEQA Guidelines (specifically 14 CCR Section 15064.5) recognize that historical resources include: (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency’s determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be an historical resource as defined in PRC Section 5020.1(j) or 5024.1.

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and 14 CCR Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource contained in the CEQA Guidelines, then the site may be treated in accordance with the provisions of PRC Section 21083, pertaining to unique archaeological resources.

### **Unique Archaeological Resources**

As defined in PRC Section 21083.2, a *unique archaeological resource* is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.

- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological site meets the criteria for a unique archaeological resource as defined in PRC Section 21083.2, then the site is to be treated in accordance with the provisions of PRC Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, the lead agency may require that reasonable efforts be made to permit any or all of these resources to be preserved in place (PRC Section 21083.1[a]). If preservation in place is not feasible, mitigation measures shall be required. The CEQA Guidelines note that if an archaeological resource is neither a unique archaeological resource nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (14 CCR Section 15064.5[c][4]).

### ***California Register of Historical Resources***

The CRHR is “an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change” (PRC Section 5024.1[a]). The criteria for eligibility for the CRHR are based upon NRHP criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties formally determined eligible for, or listed in, the NRHP.

To be eligible for the CRHR, a prehistoric or historic-era property must be significant at the local, state, and/or federal level under one or more of the following four criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage.
2. Is associated with the lives of persons important in our past.
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the CRHR must meet one of the criteria of significance described above and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the NRHP, but it may still be eligible for listing in the CRHR.

Additionally, the CRHR consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The CRHR automatically includes the following:

- California properties listed on the NRHP and those formally determined eligible for the NRHP.
- California Registered Historical Landmarks from No. 770 onward.
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the CRHR.

Other resources that may be nominated to the CRHR include:

- Historical resources with a significance rating of Category 3 through 5 (those properties identified as eligible for listing in the NRHP, the CRHR, and/or a local jurisdiction register).
- Individual historical resources.
- Historical resources contributing to historic districts.
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.
- Tribal cultural resources.

### ***California Government Code***

#### **Sections 6254(r) and 6254.10**

California Government Code (CGC) Sections 6254 and 6254.10 (part of the implementing regulations of the California Public Records Act of 2016) were enacted to protect archaeological sites from unauthorized excavation, looting, or vandalism. CGC Section 6254(r) explicitly authorizes public agencies to withhold information from the public relating to “Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission.” CGC Section 6254.10 specifically exempts from disclosure requests for “records that relate to archaeological site information and reports, maintained by, or in the possession of the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission (NAHC), another state agency, or a local agency, including the records that the agency obtains through a consultation process between a Native American Tribe and a state or local agency.”

#### **Sections 27460 and 27491**

CGC Section 27460 requires that human remains be “interred decently” in the event that no person takes charge of them when an inquest is held by a coroner. CGC Section 27491 requires that, in the case of unattended deaths, the person in charge of the human remains notify the coroner, and that the coroner inquire into the death.

#### ***California Health and Safety Code Section 7050.5***

California Health and Safety Code (HSC) Section 7050.5 states that in the event human remains are discovered, the County Coroner must be contacted to determine the nature of the remains.

If the remains are determined to be Native American in origin, the Coroner is required to contact the NAHC within 24 hours to relinquish jurisdiction. If no descendant is identified, if the descendant fails to make a recommendation for disposition, or if the landowner rejects the recommendation of the descendant, the landowner may, with appropriate dignity, re-inter the remains and burial items on the property in a location that will not be subject to further disturbance. PRC Section 5097.98 (reiterated in 14 CCR Section 15064.59[e]) identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery.

### ***California Public Resources Code***

#### **Sections 5024 and 5024.5**

The State Legislature enacted PRC Sections 5024 and 5024.5 as part of a larger effort to establish a state program to preserve historical resources. These code sections require state agencies to take several actions to ensure preservation of state-owned historical resources under their jurisdictions. These actions include evaluating resources for eligibility for listing in the NRHP and designation as California Historical Landmarks; maintaining an inventory of eligible and listed resources; and managing these historical resources so that they will retain their historic characteristics.

PRC Section 5024(f) states that a state agency shall submit to the SHPO for comment documentation for any project having the potential to affect historical resources listed in or potentially eligible for listing in the NRHP or registered as or eligible for registration as a California Historical Landmark. PRC Section 5024.5 requires state agencies to notify and consult with the SHPO regarding adverse effects to historical resources and measures to eliminate or mitigate the adverse effect.

#### **Section 5097.98**

PRC Section 5097.98 provides procedures to follow if human remains of Native American origin are discovered during project implementation on non-federal land. PRC Section 5097.98 requires that no further disturbances occur in the immediate vicinity of the discovery, that the discovery be adequately protected according to generally accepted cultural and archaeological standards, and that further activities take into account the possibility of multiple burials. PRC Section 5097.98 further requires the NAHC, upon notification by a County Coroner, designate and notify a Most Likely Descendant (MLD) regarding the discovery of Native American human remains. The MLD has 48 hours from the time of being granted access to the site by the landowner to inspect the discovery and provide recommendations to the landowner for the treatment of the human remains and any associated grave goods.

### ***California Executive Order B-10-11***

California Executive Order B-10-11 was issued by Governor Edmund G. Brown Jr. on September 19, 2011. The order affirms that all state agencies shall encourage communication and consultation with California Indian Tribes.

## Local

The San Joaquin County General Plan (December 2016) includes the following goal and applicable policies related to cultural resources:

**Goal NCR-6:** To protect San Joaquin County's valuable architectural, historical, archeological, and cultural resources.

***NCR-6.1 Protect Historical and Cultural Resources:*** The County shall protect historical and cultural resources and promote expanded cultural opportunities for residents to enhance the region's quality of life and economy.

***NCR-6.2 No Destruction of Resources:*** The County shall ensure that no significant architectural, historical, archeological, or cultural resources are knowingly destroyed through County action.

***NCR-6.5 Protect Archeological and Historical Resources:*** The County shall protect significant archeological and historical resources by requiring an archeological report be prepared by a qualified cultural resource specialist prior to the issuance of any discretionary permit or approval in areas determined to contain significant historic or prehistoric archeological artifacts that could be disturbed by project construction.

***NCR-6.6 Tribal Consultation:*** The County shall consult with Native American tribes regarding proposed development projects and land use policy changes consistent with the State's Local and Tribal Intergovernmental Consultation requirements.

### 3.7.3 Impact Analysis and Mitigation Measures

#### Significance Criteria

For the purpose of this analysis, the relevant standards of significance from the 2018 LSJR FR/EIS/EIR have been used to determine whether implementing the Modified Project would result in a significant impact. An impact is considered significant if implementation of the proposed Modified Project would:

- a) Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5.
- b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5.
- c) Disturb any human remains, including those interred outside of formal cemeteries.
- d) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

#### Methodology and Assumptions

The following impact analysis considers the potential impacts of the proposed changes included in the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR is considered sufficient to evaluate the impacts of the Modified Project, no additional environmental review is provided. The TS\_30\_L levee improvements, staging/stockpile and borrow sites, haul

routes, and three of the five potential biological mitigation sites (Fourteenmile Slough Pump Station Site, SJR East Site, and SJR West Site) are analyzed at a project level in this SEIR. The Van Buskirk and SJR South mitigation sites are analyzed at a program level in this SEIR.

## Issues Analyzed Further in This SEIR

The analysis in the 2018 LSJR FR/EIS/EIR focused on two potential impacts related to cultural resources relevant to this SEIR:

- Historic-era architectural resources.
- Archaeological resources.

Additional analysis of potential impacts of the Modified Project is presented below.

## Impacts and Mitigation Measures

### **Impact 3.7-1: The Modified Project may cause a substantial adverse change in the significance of a historical resource.**

The following discussion focuses on architectural and structural resources or the historic built environment. Archaeological resources, including archaeological resources that are potentially historical resources according to CEQA Guidelines Section 15064.5, are addressed under Impact 3.7-2.

Based on the results of the background research, survey, and evaluations described above, there are no historical resources, as defined in CEQA Guidelines Section 15064.5, in the components of the Modified Project site analyzed at a project level; therefore, there would be **no impact** on historical resources and no mitigation is required for these components of the project.

A project-level analysis has not been conducted for the Van Buskirk or SJR South mitigation sites. Proposed Modified Project activities at these mitigation sites have the potential to affect architectural resources, as they would involve ground disturbance, vibration, and introduction of new visual elements, all of which could result in potential impacts on architectural resources. Such activities could result in significant impacts on architectural resources that qualify as historical resources in several ways:

- Construction could introduce new elements to a historic setting associated with historical resources or could physically alter historical resources.
- Ground-disturbing construction activities could alter existing landscapes.
- Vibration generated during construction work could physically damage or alter nearby architectural resources that have the potential to qualify as historical resources.

If these activities were to result in either a direct impact (e.g., physical modification, damage, or destruction) or an indirect impact (e.g., alteration to setting, including visual) on any architectural resources that qualify as historical resources, as defined in CEQA Guidelines Section 15064.5, the impact would be potentially significant. Although impacts on historical resources from activities at the Van Buskirk or SJR South mitigation sites would be reduced with implementation of the PA,

as required by the 2018 LSJR FR/EIS/EIR, the level of impact would still be **significant and unavoidable** (as stated in the 2018 LSJR FR/EIS/EIR) because the specific location, design, construction, and operations at these mitigation sites is still largely unknown, as are the presence/absence and associated characteristics of any architectural resources that may be present in these mitigation sites.

**Mitigation:** None required.

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**Impact 3.7-2: The Modified Project could cause a substantial adverse change in the significance of an archaeological resource.**

This section discusses archaeological resources, including pre-contact and historic-era archaeological sites, that qualify as historical resources according to CEQA Guidelines Section 15064.5 as well as unique archaeological resources as defined in PRC Section 21083.2(g).

The Modified Project has the potential to affect archaeological resources because it includes construction activities involving ground disturbance, which is the type of activity that has the potential to affect archaeological resources. If any such construction activities were to affect archaeological resources as defined in CEQA Guidelines Section 15064.5, the impact would be potentially significant.

Based on the results of the background research and survey efforts, there are no archaeological resources in the components of the Modified Project site analyzed at a project level that qualify as historical resources or unique archaeological resources. However, because the Modified Project includes ground-disturbing activities, the potential exists for such activities to unearth, expose, or disturb subsurface archaeological resources that have not been previously recorded. If such resources were found to qualify as archaeological resources pursuant to CEQA Guidelines Section 15064, impacts from the Modified Project on archaeological resources would be potentially significant. Any such impacts on archaeological resources from the components of the Modified Project analyzed at a project level would be reduced through implementation of the mitigation measures listed below. These measures would require a cultural resources awareness training for all Project personnel involved with ground disturbance, as well as actions to follow if cultural materials are discovered during Project-related construction activities, including appropriate treatment and protection measures. These measures are consistent with Stipulation VII of the Lower San Joaquin River Feasibility Study Project PA. Impacts from components of the Modified Project evaluated at a project level would therefore be **less than significant with mitigation**.

**Mitigation Measure 3.7-1: Cultural Resources Awareness Training.** USACE in consultation with SJAFCA and other interested parties shall provide a cultural resources and tribal cultural resources sensitivity and awareness training program for all personnel involved in Modified Project construction, including field consultants and construction workers. The training shall be developed in coordination with an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology, as well as culturally and geographically affiliated Native American tribes. SJAFCA may invite Native American representatives from interested culturally and geographically affiliated Native American Tribes to participate. The training shall be conducted before

any Modified Project–related construction activities begin and shall include relevant information regarding sensitive cultural resources and tribal cultural resources, including applicable regulations, protocols for avoidance, and consequences of violating federal and state laws and regulations.

The training shall also describe appropriate avoidance and impact minimization measures for cultural resources and tribal cultural resources that could be located on the Modified Project site and shall outline what to do and whom to contact if any potential cultural resources or tribal cultural resources are encountered. The training shall emphasize the requirement for confidentiality and culturally appropriate treatment of any discovery of significance to Native American Tribes and shall discuss appropriate behaviors and responsive actions, consistent with Native American tribal values.

**Mitigation Measure 3.7-2: Inadvertent Discovery of Cultural Materials.** If an inadvertent discovery of cultural materials (e.g., unusual amounts of shell, animal bone, any human remains, bottle glass, ceramics, building remains), tribal cultural resources, sacred sites, or landscapes is made at any time during Project-related construction activities, USACE in consultation with SJAFCA and other interested parties, and in coordination with an archaeologist meeting the Secretary of the Interior’s Professional Qualifications Standards for Archeology and culturally and geographically affiliated Native American tribes, shall develop appropriate protection and avoidance measures where feasible. These procedures shall be developed in accordance with the Lower San Joaquin River Feasibility Study Project PA and associated HPMP, which specifies procedures for post-review discoveries. Additional measures, such as development of a Historic Properties Treatment Plan prepared in accordance with the PA and HPMP, may be necessary if avoidance or protection is not possible.

A project-level analysis has not been conducted for the Van Buskirk or SJR South mitigation sites. Proposed Modified Project activities at these mitigation sites have the potential to affect archaeological resources because they would likely include construction activities involving ground disturbance, which is the type of activity that has the potential to affect archaeological resources. If any such activities were to affect archaeological resources as defined in CEQA Guidelines Section 15064.5, the impact would be potentially significant.

Although impacts on archaeological resources from activities at the Van Buskirk or SJR South mitigation sites would be reduced with implementation of the PA, as required by the 2018 LSJR FR/EIS/EIR, the level of impact would remain **significant and unavoidable** (as determined in the 2018 LSJR FR/EIS/EIS) because the specific location, design, construction, and operations at these mitigation sites is still largely unknown, as are the presence/absence and associated characteristics of any archaeological resources that may be present at these mitigation sites.

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**Impact 3.7-3: The Modified Project could disturb human remains, including those interred outside of formal cemeteries.**

The Modified Project has the potential to affect human remains because it would include construction activities involving ground disturbance, which is the type of activity that has the potential to disturb human remains, including any associated with archaeological resources. If any

such construction activities were to disturb or damage any human remains, the impact would be potentially significant.

Based on the results of the background research and survey efforts, there is no indication that the components of the Modified Project site evaluated at a project level contain human remains, and none of these areas have had formal cemetery use or designations. Therefore, it does not appear that these components of the Modified Project would affect human remains. However, because the Modified Project includes ground-disturbing activities, the potential exists for such activities to unearth, expose, or disturb human remains that have not been previously identified. If any such construction activities were to disturb or damage any human remains, the impact would be potentially significant. Implementation of the PA (as required by the 2018 LSJR FR/EIS/EIR) and implementation of the following mitigation measure that complies with PRC Sections 21083.2(i), 5097.98, and 5097.99, CGC Sections 27460 et seq. and 27491, and HSC Section 7050.5, would reduce any such potential significant impacts on human remains from the Modified Project to a less-than-significant level by requiring appropriate protocol for treatment of any human remains that could be identified during Modified Project implementation. Therefore, any impacts from the components of the Modified Project site evaluated at a project level would be **less than significant with mitigation**.

**Mitigation Measure 3.7-3: Inadvertent Discovery of Human Remains.** In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, USACE shall immediately halt potentially damaging excavation in the area of the burial and notify the County coroner and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (HSC Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, they must contact the NAHC by phone within 24 hours of making that determination (HSC Section 7050[c]). After the coroner's findings have been made, the archaeologist and the NAHC-designated Most Likely Descendant (MLD), in consultation with USACE and SJAFCFA, shall determine the ultimate treatment and disposition of the remains.

Upon the discovery of Native American human remains, USACE in coordination with SJAFCFA, shall require that all construction work stop within 100 feet of the discovery until consultation with the MLD has taken place. The MLD shall have 48 hours to complete a site inspection and make recommendations to the USACE and SJAFCFA after being granted access to the site. A range of possible treatments for the remains, including nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. PRC Section 5097.98(b)(2) suggests that the concerned parties may mutually agree to extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. If agreed to by the MLD, SJAFCFA or SJAFCFA's authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance. Construction work in the vicinity of the burials shall not resume until the mitigation is completed.

A project-level analysis has not been conducted for the Van Buskirk or SJR South mitigation sites. Proposed Modified Project activities at these mitigation sites have the potential to affect human remains because it would include construction activities involving ground disturbance, which is the type of activity that has the potential to disturb human remains, including any associated with archaeological resources. If any such construction activities were to disturb or damage any human remains, the impact would be potentially significant. No effort to identify the potential for human remains has yet been conducted for the Van Buskirk and SJR South mitigation sites, although no formal cemetery use or designation has been identified for either of these mitigation sites. Implementation of the PA, as required by the 2018 LSJR FR/EIS/EIR, and implementation of the above mitigation measure that complies with PRC Sections 21083.2(i), 5097.98, and 5097.99, CGC Sections 27460 et seq. and 27491, and HSC Section 7050.5, would reduce any such potential significant impacts on human remains from Modified Project activities at the Van Buskirk and SJR South mitigation sites to a less-than-significant level by requiring the appropriate treatment of any human remains that could be identified during Modified Project implementation. Therefore, any impacts from the Modified Project site and the three mitigation sites on human remains would be **less than significant with mitigation**.

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**Impact 3.7-4: The Modified Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.**

Geologic mapping indicates that the surficial deposits at the Modified Project site consist of sediments of the Modesto Formation. Because of past fossil discoveries in San Joaquin County (and throughout California) within the Modesto Formation, these deposits are considered to have a high potential to contain significant paleontological resources. Given the proximity of past fossil discoveries in the area and the presence of sediments with a high potential to contain paleontological resources, the Modified Project site has the potential to yield unique paleontological resources during construction. The risks of uncovering or destroying paleontological resources increase with the amount of ground disturbance associated with a project; ground-disturbing activities that would not require mass excavation of soil (i.e., clearing and grubbing) would have a minimal impact on paleontological resources, as there would be little to no material to observe.

Modified Project construction would require varying degrees of ground disturbance, including excavation to a depth of approximately -42 feet below ground surface (bgs) for the cutoff wall construction. Ground disturbance at the five potential biological monitoring sites would range from 1.5 to 3 feet bgs. Modified Project components that would require excavations in the Modesto Formation have the potential to encounter paleontological resources. This impact would be **potentially significant**.

In the event that paleontological resources were encountered during ground-disturbing activities, the impact would be significant. The severity of the impact would be reduced to a **less-than-significant** level by implementation of Mitigation Measure 3.7-4, which requires that preconstruction training be conducted, that monitoring occur in areas of high paleontological

sensitivity, and that work halt in the vicinity of a find until a qualified paleontologist can make an assessment and provide further recommendations.

**Mitigation Measure 3.7-4: Preconstruction Training and Paleontological**

**Monitoring.** Prior to the start of construction activities, USACE shall retain a Qualified Paleontologist who meets the standards of the Society for Vertebrate Paleontology (SVP 2010) to carry out all mitigation measures related to paleontological resources. Prior to the start of any ground-disturbing activities, the Qualified Paleontologist shall conduct preconstruction worker paleontological resources sensitivity training. The training shall include information on what types of paleontological resources could be encountered during excavations, what to do in case an unanticipated discovery is made by a worker, and laws protecting paleontological resources. All construction personnel shall be informed of the possibility of encountering fossils and instructed to immediately inform the construction foreman or supervisor if any bones or other potential fossils are unexpectedly unearthed in an area where a paleontological monitor is not present. The Applicant shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance.

The Qualified Paleontologist shall supervise a paleontological monitor meeting the Society for Vertebrate Paleontology standards (SVP 2010) who shall be present during all excavations in the Modesto Formation. Monitoring shall consist of visually inspecting fresh exposures of rock for larger fossil remains and, where appropriate, collecting wet or dry screened standard sediment samples (up to 4.0 cubic yards) of promising horizons for smaller fossil remains (SVP 2010). Depending on the conditions encountered, full-time monitoring can be reduced to part-time inspections or ceased entirely if determined adequate by the Qualified Paleontologist. The Qualified Paleontologist may spot check the excavation on an intermittent basis and recommend whether the depth of required monitoring should be revised based on his/her observations. Monitoring activities shall be documented in a Paleontological Resources Monitoring Report to be prepared by the Qualified Paleontologist at the completion of construction.

If a paleontological resource is discovered during construction, the paleontological monitor shall be empowered to temporarily divert or redirect grading and excavation activities in the area of the exposed resource to facilitate evaluation of the discovery. An appropriate buffer area shall be established by the Qualified Paleontologist around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. All significant fossils shall be collected by the paleontological monitor and/or the Qualified Paleontologist. Collected fossils shall be prepared to the point of identification and catalogued before they are submitted to their final repository. Any fossils collected shall be curated at a public, non-profit institution with a research interest in the materials, such as the University of California Museum of Paleontology at Berkeley, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, maps, photographs, and a technical report shall also be filed at the repository and/or school.

## Cumulative Impacts

### **Impact 3.7-5: The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to cultural and paleontological resources.**

Cumulative impacts related to cultural resources were analyzed in Section 5.23 of the 2018 LSJR FR/EIS/EIR. The geographic scope for cultural resources was defined as areas of individual ground disturbance sites, with regional implication. When the impacts of the Modified Project are considered in combination with those of other past, present, and future projects to identify cumulative impacts, the other projects that are considered may also vary depending on the type of environmental impacts being assessed.

As discussed for Alternative 7a in the 2018 LSJR FR/EIS/EIR, cumulative impacts on cultural resources would be related primarily to other construction projects that could occur during the same time frame and within the same vicinity as the Modified Project. Construction activities, including those associated with the Modified Project, could contribute to the progressive loss of cultural resources and result in significant cumulative impacts, if any such resources were to exist. The same analysis and conclusions apply to paleontological resources. While there are no known cultural resources in the TS\_30\_L levee site, borrow area, barge off-haul site area, or the three project-level mitigation sites, an identification and evaluation effort has not yet been conducted for the Van Buskirk and SJR South proposed mitigation sites. The implementation of the PA, as required by the 2018 LSJR FR/EIS/EIR, would reduce the potential impact on any currently unidentified historical resources; however, this impact would still be significant and unavoidable. Therefore, the Modified Project's cumulatively considerable contribution to this cumulative impact would remain **significant and unavoidable**, as was determined for Alternative 7a.

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## 3.8 Energy

This section discusses the potential for effects of the Modified Project on energy resources. On December 28, 2018, Appendix G of the California Environmental Quality Act (CEQA) Guidelines was amended by the Governor's Office of Planning and Research so that it now includes an evaluation of impact to energy resources and renewable energy or energy efficiency plans. As such, the 2018 LSJR FR/EIS/EIR did not evaluate Alternative 7a's impacts related to energy use and no comments by individuals were received during circulation of the Notice of Preparation (NOP) for the 2018 LSJR FR/EIS/EIR relevant to energy. Therefore, this section discusses the potential effects of the Modified Project related to the updated Appendix G standards of significance for energy resources.

The analysis in this section was developed based on the construction and operational features of the Modified Project, current regulatory requirements, and the revised Appendix G CEQA checklist for energy.

### 3.8.1 Environmental Setting

Energy usage is typically quantified using the British thermal unit ("BTU"). As a point of reference, the approximate amount of energy contained in common energy sources are as follows: gasoline, 115,000 BTUs per gallon; diesel, 138,500 BTUs per gallon; natural gas, 21,000 BTUs per pound ("lb"); electricity, 3,414 BTUs per kilowatt-hour ("kWh") (USDOE 2014a).

Total energy usage in California was 7,640.8 trillion BTUs in 2012, which equates to an average of 201 million BTUs per capita. Of California's total energy usage, the breakdown by sector is 39 percent transportation, 23 percent industrial, 19 percent residential, and 19 percent commercial. Petroleum satisfies 55 percent of California's energy demand, natural gas 32 percent, and electricity 12 percent. Coal fuel accounts for less than one percent of California's total energy demand (USDOE 2014b). Electric power and natural gas in California are generally consumed by stationary users, whereas petroleum consumption is generally accounted for by transportation-related energy use (USDOE 2014b). The other sources are made up of renewable energy sources, which includes wind and solar power, among other uses.

Given the nature of the Modified Project, the main energy usage would be related to transportation energy use during the construction phase, related to use of construction tools and equipment, truck and barge trips to haul material, and vehicle trips generated from construction workers.

The transportation sector is a major end-user of energy in California, accounting for approximately 39 percent of total statewide energy consumption in 2019, as stated above. In addition, energy is consumed in connection with the construction and maintenance of transportation infrastructure, such as streets, highways, freeways, rail lines, and airport runways. California's 30 million vehicles consume more than 16 billion gallons of gasoline and more than 3 billion gallons of diesel each year, making California the second largest consumer of gasoline in the world (CEC 2014).

## 3.8.2 Regulatory Setting

The following federal, state, and local regulations would apply to the Modified Project.

### **Federal**

#### ***Federal Energy Regulatory Commission***

The Federal Energy Commission (FERC) regulates the transmission of oil, natural gas, and electricity for both Federal and non-Federal power projects. FERC licenses state, local and privately-owned hydroelectric projects and oversees hydroelectricity, electrical transmission, and large-scale electricity policy initiatives. FERC ensures the reliability of interstate electricity transmission systems.

#### ***North American Electric Reliability Corporation***

The North American Electric Reliability Corporation (NERC) is an international regulatory authority that develops and enforces power system reliability standards, and assesses seasonal and long-term energy reliability. NERC is subject to FERC oversight.

#### ***Western Electricity Coordinating Council***

With delegated authority from NERC and FERC, the Western Electricity Coordinating Council (WECC) is a regional entity that coordinates and promotes bulk electric system reliability in the western United States. WECC participates in development of the reliability standards, and enforces them.

#### ***The Energy Policy Act of 2005***

The Energy Policy Act (Public Law 109-58) addresses energy production in the United States, including: energy efficiency, renewable energy, oil and gas, coal, vehicles and motor fuels, including ethanol, electricity, hydropower and geothermal energy, climate change technology, etc. For example, a provision of the act increases the amount of biofuel that must be mixed with gasoline sold in the United States (USDOE 2023).

#### ***Federal Fuel Efficiency Standards***

The Energy Independence and Security Act of 2007 (Public Law 110-140, at 42 USC section 7545(o) (2)) increased the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard, which requires the blending of 36 billion gallons of renewable fuel in transportation fuels by 2022. It also tightened the Corporate Average Fuel Economy standards that regulate the average fuel economy in the vehicles produced by each major automaker, requiring that these standards be increased such that, by 2020, new cars and light trucks deliver a combined fleet average of 35 miles per gallon (USDOE 2023).

### **State**

In addition to the State regulations described below, laws pertaining to the emission of greenhouse gas (GHG) emissions associated with energy generation and consumption are described in Section 3.10, Greenhouse Gas Emissions.

### ***California Energy Commission***

The California Energy Commission (CEC) is the state’s primary energy policy and planning agency. Amongst its responsibilities, CEC forecasts future energy needs, licenses thermal power plants over 50 MW, including large solar thermal generation facilities, develops renewable energy resources, and plans for and directs state response to energy emergencies.

### ***California Public Utilities Commission***

The California Public Utilities Commission (CPUC) regulates privately owned electricity and natural gas companies. CPUC requires hydroelectric power companies to certify compliance with operations and maintenance standards for each generating unit. Regulated utilities must obtain a CPUC certificate of Public Convenience and Necessity to construct transmission lines 200 kilovolts (kV) and above or a Permit to Construct, for facilities between 50 kV and 200 kV. DWR facilities are not subject to CPUC oversight.

### ***California Independent System Operator Corporation***

CAISO is an independent operator of approximately 80 percent of the statewide wholesale power grid, and is responsible for system reliability and scheduling of available transmission capacity.

### ***California Renewable Energy Resources Act, adding and amending various sections of the Fish and Game Code, Public Resources Code, and Public Utilities Code***

As described in greater detail in Section 3.10, Greenhouse Gas Emissions, this Act codified California’s commitment to expanding the State’s Renewables Portfolio Standard (RPS) to include 33 percent renewable power by the end of 2020, and 60 percent by the end of 2030, in addition to requiring all the state’s electricity be derived from carbon-free resources by the end of 2045. In 2017, the Pacific Gas and Electric Company (PG&E) served 33 percent of its retail customers with renewable energy, while Southern California Edison served its customers with 32 percent, and San Diego Gas & Electric with 44 percent (CPUC 2022).

### ***Senate Bill 350***

Effective on January 1, 2016, Senate Bill (SB) 350 raised the RPS for both investor and publicly owned utilities for the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources from 33 percent to 50 percent by 2030.

### ***Senate Bill 100***

Effective September 10, 2019, SB 100 revised the above-described legislative findings and declarations to state that the goal of the program is to achieve 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by 2045. This bill sets interim renewable energy resources targets of 50 percent renewable energy resources by 2026 and 60 percent renewable energy resources by 2030.

## Local

### **San Joaquin County General Plan (2016)**

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since release of that document San Joaquin County has updated their general plan (San Joaquin County 2016). Chapter 3.1, *Community Development Element*, Chapter 3.2, *Public Facilities and Services Element*, and Chapter 3.4, *Natural and Cultural Resources Element*, of the updated general plan outline the following goals and applicable policies related to the analysis of energy impacts from the Modified Project:

**LU-2.3: Adaptive Reuse:** The County shall encourage the retention and the adaptive reuse of existing structures to limit the generation of waste.

**LU-2.4: Green Building Retrofit:** The County shall encourage the retrofitting of existing structures with green building technologies/practices and encourage structures being renovated to be built to a green building standard (e.g., Leadership in Energy and Environmental Design (LEED)).

**ED-2.4: Green Economy:** The County shall encourage the development and expansion of industries and businesses that rely on environmentally-sustainable products and services, such as renewable energy, green building, clean transportation, water conservation, waste management and recycling, and sustainable land management.

**TM-1.7: Energy Conservation:** The County shall develop the transportation system to reduce vehicle miles traveled, conserve energy resources, minimize air pollution, and reduce greenhouse gas emissions.

**IS-3.6: Clean Energy and Fuel Sources:** The County shall use available clean energy and fuel sources where feasible to operate its buildings, vehicles, and maintenance/construction equipment.

**IS-3.9: Contractor Preference:** The County shall encourage contractors to use reduced emission equipment for County construction projects and contracts for services, as well as businesses which practice sustainable operations.

**NCR-5.1: Nonrenewable Energy and Energy Efficiency:** The County shall support the efforts of residents, businesses, and energy providers to reduce the consumption of nonrenewable energy and shall promote energy providers' programs to increase energy efficiency and implement demand response programs.

**NCR-5.2: Alternative Energy:** The County shall encourage residents, businesses, and energy providers to develop and use alternative, renewable energy sources, including but not limited to, biomass, solar, wind, and geothermal.

**NCR-5.12: Energy Efficient Industry:** The County shall support energy efficiency of industrial processes.

### **City of Stockton General Plan (2018)**

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since release of that document the City of Stockton has updated their general plan to the Envision Stockton 2040 General Plan (City of

Stockton 2018). Chapter 4 of the updated general plan outlines the City’s goals and policies related to an integrated, safe, and efficient multimodal transportation system; active transportation systems; sustainable transportation infrastructure; and effective transportation assessments. The plan’s Transportation chapter contains the following policies that are relevant to the Modified Project:

***Policy LU-5.4:*** Require water and energy conservation and efficiency in both new construction and retrofits.

***Action LU-5.4B:*** Require all new development, including major rehabilitation, renovation, and redevelopment, to incorporate feasible and appropriate energy conservation and green building practices, such as building orientation and shading, landscaping, and the use of active and passive solar heating and water systems.

### 3.8.3 Impact Analysis and Mitigation Measures

#### Significance Criteria

For the purpose of this analysis, the relevant standards of significance from the current CEQA Guidelines Appendix G have been used to determine whether implementing the Modified Project would result in a significant impact. An energy impact is considered significant if the Modified Project would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

#### Methodology and Assumptions

No information or analysis related to energy resources was included in the 2018 LSJR FR/EIS/EIR. Therefore, the following impact analysis considers the potential impacts of the Modified Project components related to use of energy and qualitatively assesses anticipated energy use related to federal, state, and local plans and policies for renewable energy or energy efficiency.

#### Impacts and Mitigation Measures

**Impact 3.8-1: The Modified Project could result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.**

Construction of the Modified Project would result in fuel consumption from the use of construction tools and equipment, truck and barge trips to haul material, and vehicle trips generated from construction workers commuting to and from the site over the course of two construction seasons. The operational phase of the Modified Project would not require any new or expanded energy usage different from that undertaken in existing conditions for levee maintenance and operations or agricultural operations.

Construction equipment activities and corresponding fuel energy consumption would be temporary and localized, as the use of diesel fuel and heavy-duty equipment would not be a long-term condition of the Modified Project. In addition, there are no unusual Modified Project characteristics that would require the use of construction equipment or haul vehicles that are less energy efficient than are necessary for similar construction efforts in other parts of the state. Therefore, construction equipment-related fuel consumption by the Modified Project would not result in inefficient, wasteful, or unnecessary energy use as compared to what would be expected of other construction efforts in the region.

With respect to transportation energy, existing energy standards are promulgated through the regulation of fuel refineries and products, such as the Low Carbon Fuel Standard (LCFS), which mandates a 10 percent reduction in the non-biogenic carbon content of vehicle fuels by 2020. All on-road vehicles used for hauling and worker trips of the Modified Project would operate subject to these regulations. Additionally, there are other regulatory programs with emissions and fuel efficiency standards established by the U.S. Environmental Protection Agency (EPA) and California Air Resources Board (CARB), such as Pavley II/LEV III from California's Advanced Clean Cars Program and the Heavy-Duty (Tractor-Trailer) Greenhouse Gas (GHG) Regulation. CARB has set a goal of 4.2 million Zero Emissions Vehicles (ZEV) on the road by the year 2030 (CARB 2016). Further, construction sites, including the Modified Project, need to comply with state requirements designed to minimize idling and associated emissions, which also minimizes use of fuel. Specifically, idling of commercial vehicles and off-road equipment would be limited to 5 minutes in accordance with the Commercial Motor Vehicle Idling Regulation and the Off-Road Regulation (California Code of Regulations, 2005. Title 13, Chapter 10, 2485, updated through 2014).

The Modified Project would not require the use of construction equipment that would result in inefficient, wasteful, or unnecessary energy use. The Modified Project would comply with all federal and state-mandated energy regulations and would not conflict with the energy policies stated in the current San Joaquin County General Plan or the City of Stockton General Plan. In addition, Modified Project operations would not require any new or expanded energy usage as compared to existing conditions. As such, the Modified Project would have a **less than significant** impact on energy resources and on state and local plans for renewable energy and energy efficiency.

**Mitigation:** None required.

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## Cumulative Impacts

**Impact 3.8-2: The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative energy impacts.**

The geographic scope of potential cumulative effects with respect to energy resources encompasses the Modified Project site and its vicinity.

There is no significant cumulative condition to which the Modified Project would contribute related to the use of large amounts of fuel or energy in a wasteful or inefficient manner. Given that the Modified Project would have no measurable electrical demand during or after construction and the relatively small demand of the Modified Project's fuel and energy use compared to existing fuel and energy use in the region, the Modified Project's less-than-significant incremental impacts related to the use of fuel or energy in a wasteful or inefficient manner are not expected to combine with the incremental impacts of other projects to cause an adverse cumulative impact. There would be no operational electricity or natural gas requirements of the Modified Project and energy demand during Modified Project construction would be temporary. Accordingly, the Project's incremental contribution to cumulative energy use would not be cumulatively considerable and the impact would be **less than significant**.

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## 3.9 Land Use

This section discusses the potential for effects of the Modified Project on Land Use. Section 5.14, *Land Use*, of the 2018 LSJR FR/EIS/EIR described the applicable environmental and regulatory setting and standards of significance, which are incorporated by reference and summarized below as appropriate.

No comments by individuals were received during circulation of the Notice of Preparation for the 2018 LSJR FR/EIS/EIR relevant to land use.

The analysis in this section was developed based on the construction and operational features of the Modified Project, current regulatory requirements, and the revised Appendix G CEQA checklist for Land Use.

### 3.9.1 Environmental Setting

San Joaquin County is located in the Central Valley of California within the San Joaquin Valley and consists of approximately 1,426 acres. The County includes the incorporated cities of Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, and Tracy. Land uses within the County include residential (27%), public/semi-public (19%), mixed use (<1%), parks, recreation, and open space (4%), commercial (4%), agricultural (28%), industrial (7%), and Vacant (11%).

The City of Stockton has commercial, government, industrial, and residential areas. It is the fourth most populous city in California's Central Valley with residential uses being concentrated in the north, above the Lower Calaveras River and civic, business, and industrial uses concentrated in the south. Table 2-2 of Title 16 of the Stockton Municipal Code includes a list of the approximate 150 land use types and/or categories within the City (City of Stockton 2015).

The main components of the TS\_30\_L levee improvements lie on the border of the City of Stockton and unincorporated San Joaquin County but within the city's sphere of influence and general plan planning area. The TS\_30\_L levee, barge off-haul site, and three of the five potential biological mitigation sites (14-Mile Slough Pump Station Site, SJR West Site, and SJR East Site) are located on the far west side of Stockton; the SEWD borrow site is located on the far east side of Stockton; and the remaining two potential biological mitigation sites are located in Stockton (Van Buskirk) and Manteca (SJR South Site), approximately 4 and 15 miles southeast of the TS\_30\_L levee, respectively. According to the City of Stockton's General Plan Land Use Map, land directly east (landside) of the TS\_30\_L levee is designated Low Density Residential; land directly west (waterside) of the TS\_30\_L levee, as well as the barge off-haul site, is designated Open Space/Agriculture; land upon which the SEWD borrow site is located is designated Institutional; and Van Buskirk Park is designated Parks and Recreation (City of Stockton 2018). According to the City of Manteca's General Plan, the SJR South Site is designated Open Space (OS). According to the San Joaquin County General Plan Land Use Map, the TS\_30\_L levee site, 14-Mile Pump Station Site, SJR West Site, SJR East Site, and SEWD borrow site are designated General Agricultural (A/G); and the lands adjacent to the San Joaquin River where the barge off-

haul site would be located are designated Open Space/Resource Conservation (OS/RC). Van Buskirk Park and the SJR South Site are designated as Incorporated City.

## 3.9.2 Regulatory Setting

The 2018 LSJR FR/EIS/EIR identified federal, state, and local regulations that apply to land use. Below are additional or updated regulations that have been enacted since publication of the 2018 LSJR FR/EIS/EIR that apply to the Modified Project.

### Federal

Since the 2018 LSJR FR/EIS/EIR, there have been no changes to federal plans, policies, regulations, or laws relevant to the evaluation of land use impacts under CEQA.

### State

Since the 2018 LSJR FR/EIS/EIR, there have been no changes to state plans, policies, regulations, or laws relevant to the evaluation of land use impacts under CEQA.

### Local

#### ***San Joaquin County General Plan (2016)***

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since the release of that document San Joaquin County has updated their general plan to the San Joaquin 2035 General Plan (San Joaquin County 2016). The updated general plan is intended to be based on the County's historic role as an agricultural region and discusses the need to make the most of existing infrastructure and public facilities and minimize impacts to agricultural and natural resources.

The general plan designates nearly 920,000 acres (approximately 1,440 square miles) as agricultural productive lands and states that the County's jurisdiction covers approximately 90 percent of all land in the County, which is predominantly designated as General Agriculture (A/G).

Within the San Joaquin County general plan, goals and polices related to land use are described in the Land Use Element (*Chapter 3 Community Development Element, Section 3.1-3: Land Use*).

The following policies are relevant to analysis of the Modified Project's potential impacts to land use resources:

***LU-1.7: Farmland Preservation:*** The County shall consider information from the State Farmland Mapping and Monitoring Program when designating future growth areas in order to preserve prime farmland and limit the premature conversion of agricultural lands.

***LU-2.3: Adaptive Reuse:*** The County shall encourage the retention and the adaptive reuse of existing structures to limit the generation of waste.

***LU-7.5: Right to Farm:*** The County shall strive to protect agricultural land against nuisance complaints from nonagricultural land uses though the implementation of the San Joaquin County Right to Farm ordinance and, if necessary, other appropriate regulatory and land use planning mechanisms.

**LU-7.7: Agricultural Buffers:** The County shall ensure non-agricultural land uses at the edge of agricultural areas incorporate adequate buffers (e.g., fences and setbacks) to limit conflicts with adjoining agricultural operations.

### **City of Stockton General Plan (2018)**

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since the release of that document Stockton has updated their general plan to the Envision Stockton 2040 General Plan (City of Stockton 2018). The Stockton general plan, as discussed in the 2018 LSJR FR/EIS/EIR, is a land use and development plan that is required by state law. Regulations in the City of Stockton's general plan are designed to allow Stockton to manage growth while providing expanded employment opportunities, creating a mix of housing and supporting uses, and ensuring that impacts to natural and cultural resources are avoided or minimized. The City of Stockton's general plan proposed land use changes to existing zoning that would result in substantial conversion of farmland to non-agricultural uses.

Policies and actions within the Envision Stockton 2040 General Plan contain a number of policies and actions that would result in the long-term preservation and orderly conversion of farmland within Stockton's sphere of influence. The general plan also explains that the City of Stockton adopted a right-to-farm ordinance (Municipal Code Section 16.36.040) that states it is a policy of Stockton that commercial agricultural uses in the sphere of influence are areas not annexed by Stockton, are a priority use, and inconveniences or discomforts arising from such shall not be a nuisance. The ordinance requires discretionary development approvals to require a good faith effort to coordinate with adjacent agricultural operations to reduce potential conflicts.

Chapter 3 of the updated general plan outlines goals and applicable policies related to land use resources. The following policies are relevant to analysis of the Modified Project's potential impacts to land use resources:

**Policy LU-5.3:** Define discrete and clear city edges that preserve agriculture, open space, and scenic views.

*Action LU-5.3A:* At the interface between development and rural landscapes, use landscaping and other attractive edging instead of soundwalls and similar utilitarian edges of developments to maintain the visual integrity of open space.

*Action LU-5.3B:* Coordinate with San Joaquin County and property owners in unincorporated areas to preserve agricultural land and open space areas in the unincorporated county that contribute to maintaining clear boundaries between cities.

**Policy LU-5.4:** Require water and energy conservation and efficiency in both new construction and retrofits.

*Action LU-5.4A:* Require all new development, including major rehabilitation, renovation, and redevelopment, to adopt best management practices for water use efficiency and demonstrate specific water conservation measures.

**Policy LU-6.3:** Ensure that all neighborhoods have access to well-maintained public facilities and utilities that meet community service needs.

*Action LU-6.3A:* Require development to mitigate any impacts to existing sewer, water, stormwater, street, fire station, park, or library infrastructure that would reduce service levels.

### **City of Manteca General Plan (2013)**

The 2018 LSJR FR/EIS/EIR evaluated the 2013 plan, which remains the City's current guiding document for land use decisions. The City of Manteca is in the process of updating the general plan, but the revised general plan and revised general plan EIR are still in the public review phase.

## **3.9.3 Impact Analysis and Mitigation Measures**

### **Significance Criteria**

For the purpose of this analysis, the relevant standards of significance from the 2018 LSJR FR/EIS/EIR have been updated to the current CEQA Guidelines Appendix G thresholds to determine whether implementing the Modified Project would result in a significant impact. A land use impact is considered significant if implementation of the Modified Project would:

- Physically divide an established community; or
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

### **Methodology and Assumptions**

The following impact analysis considers the potential impacts of the proposed changes included in the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR is considered sufficient to evaluate the impacts of the Modified Project, no additional environmental review is provided.

### **Issues Not Analyzed Further in This SEIR**

The 2018 LSJR FR/EIS/EIR determined that the Modified Project would have either no impact or a less-than-significant impact with regard to each of the following criteria. The Modified Project would not change the conclusions described below, and therefore, they are not analyzed further.

- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

The analysis in the 2018 LSJR FR/EIS/EIR determined changes in land use from implementation of Alternative 7a would not conflict with land use plans, policies, or regulations, or conflict with master plans, policies, or regulations because, overall, affecting the 156 acres of land is small compared to the size and capacity of the city and county. Because the project would comply with any associated land acquisition and relocation regulations, effects for the majority of the 156 acres would be less than significant.

The Modified Project would not substantially change the footprint analyzed in the 2018 LSJR FR/EIS/EIR and there would be no substantial change from the analysis presented for Alternative

7a. While the City of Stockton and San Joaquin County have both updated their general plans, there are no significant changes to plans or policies therein related to land use designations in and around the Modified Project. The San Joaquin County general plan states that public, quasi-public, and special uses are compatible uses for land use designations within the Modified Project site. The City of Stockton Zoning Map (and therefore the definitions of allowable uses included in Chapter 16.20 of the city's Development Code) does not extend onto the Modified Project site.

As such, changes included as part of the Modified Project would not change the analysis included in the 2018 LSJR FR/EIS/EIR, and the Modified Project would not conflict with new or updated applicable land use plans, policies, or regulations. The Modified Project would not result in new or more severe potentially significant impacts than Alternative 7a and the 2018 LSJR FR/EIS/EIR adequately addresses potential conflicts with land use plans, policies, and regulations intended to avoid or mitigate and environmental effect.

### **Issues Analyzed Further in This SEIR**

The analysis in the 2018 LSJR FR/EIS/EIR did not discuss the following issue area that is included under the CEQA Guidelines Appendix G checklist for Land Use/Planning:

- Physically divide an established community.

Additional analysis of potential effects of the Modified Project is presented below.

### **Impacts and Mitigation Measures**

#### **Impact 3.9-1: The Modified Project would not physically divide an established community.**

The Modified Project would include approximately 1 mile of cutoff wall construction, levee reshaping, and runoff erosion protection of the TS\_30\_L levee, as well as development of a borrow site, barge off-haul site, two co-located staging and stockpile areas, haul routes, and a biological mitigation site (Figures 2-3 and 2-5). The TS\_30\_L levee site is a dry land levee located on the northwestern side of Stockton adjacent to the Brookside residential development. Construction activities associated with the TS\_30\_L levee site would occur on and in the immediate footprint of the levee itself, requiring the levee to be realigned slightly westward away from the Brookside community, and would not require development of features that would divide the Brookside community. Haul routes would use existing local and regional roadways outside the project site that would not interfere with or create new divisions within established communities. The SEWD borrow site is an established District-owned property and is not within the vicinity of an established residential community. The potential biological mitigation sites are currently in agricultural and open space uses and would be transitioned to wetland and riparian habitat and are also outside the boundaries of established communities.

Use of haul routes and development of the barge off-haul site and staging/stockpile areas would be temporary in nature and would be returned to pre-construction conditions once construction is completed, and the TS\_30\_L levee and biological mitigation sites would require maintenance and operations similar to existing levee and agricultural operations. Therefore, neither construction

nor operation of the Modified Project would physically divide an established community, and there would be **no impact**.

**Mitigation:** None required.

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## Cumulative Impacts

**Impact 3.9-2:** The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative land use impacts.

Cumulative impacts related to land use were analyzed in Section 5.23.5 of the 2018 LSJR FR/EIS/EIR.

As discussed for Alternative 7a in the 2018 LSJR FR/EIS/EIR, the cumulative geographic setting for land use regarding the Modified Project would include the City of Stockton and San Joaquin County. Construction of the setback levee along Fourteenmile Slough would result in the conversion of some land use types, including agricultural lands, into levees and supporting Flood Risk Management (FRM) features.

Construction and/or implementation of Alternative 7a, as discussed in the 2018 LSJR FR/EIS/EIR, was determined to have a significant cumulative effect to land use as a result of the irreversible conversion of farmland to urban development. Furthermore, it was determined that while Alternative 7a would implement mitigation measures to reduce the effects of the project to less than significant levels, implementation of Alternative 7a would still result in significant cumulative effects to agriculture in the region as a result of the conversion of farmland to urban development.

However, implementation of the Modified Project as it relates to land use would include improvements within an existing levee easement area and development of a borrow site within SEWD property, neither of which would necessitate a conversion of land uses or conflict with applicable land use plans and regulations. Further, other elements of the Modified Project (including development of a barge off-haul site and co-located staging/stockpile areas and use of haul routes) would be temporary in nature and would be returned to pre-construction conditions once construction is completed and would not result in permanent changes in land use within the Modified Project area. Additionally, construction and operation of the Modified Project would not require replacement of existing land uses or result in new land use that is incompatible with existing zoning and land use plans, and would not physically divide an established community because the Modified Project would result in improvements of an existing levee and focuses on the reduction of flood risk in the City of Stockton. Therefore, there would be **no cumulative impact** because no permanent changes in land uses would occur and the Modified Project's contribution to cumulative land use impacts would not be cumulatively considerable. For further analysis of the Modified Project's cumulative impacts related to agricultural resources and how these are associated with impacts covered in the 2018 LSJR FR/EIS/EIR, please see Section 3.5, *Agricultural and Forestry Resources*.

## 3.10 Noise and Vibration

This section discusses the potential for effects of the Modified Project on noise and vibration. Section 5.19, *Noise*, of the 2018 LSJR FR/EIS/EIR described the applicable environmental and regulatory setting and standards of significance, which are incorporated by reference and summarized below as appropriate.

No comments by individuals were received during circulation of the Notice of Preparation for the 2018 LSJR FR/EIS/EIR relevant to noise and vibration. The analysis in this section was developed based on the construction and operational features of the Modified Project, current regulatory requirements, and the revised Appendix G CEQA checklist for noise and vibration.

### 3.10.1 Environmental Setting

The Modified Project is located in and immediately adjacent to the Cities of Stockton and Manteca, in a primarily urban area, with a mix of residential, agricultural, open space, and recreational land uses. The ambient noise environment in the vicinity of the Modified Project site is primarily from traffic on local roadways, distant traffic on Interstate 5 (I-5), recreational activities, and farming activities, in addition to natural noise sources such as wind and birds.

Noise varies over time, as background noise gradually increases and decreases throughout the day and as short-term noise events such as sirens or passing aircraft are added to the ambient noise levels. Thresholds for noise exposure are normally expressed with statistical noise descriptors such as an average daily exposure level over an extended period of time or average day-night sound level ( $L_{dn}$ ). To account for greater noise sensitivity during evening hours, nighttime noise exposure is more heavily weighted than daytime exposure in the calculation of  $L_{dn}$ . Short term noise levels measured over a brief period are expressed as  $L_{eq}$ . Sound intensity is measured in decibels (dB). The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hertz (Hz) and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies, instead focusing on the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). All sound pressure levels and sound power levels reported below are A-weighted. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion; rather, they combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. However, where ambient noise levels are high in comparison to a new noise source, there will be a small change in noise levels. For example, when 70 dBA ambient noise levels are combined with a 60 dBA noise sources, the resulting noise level equals 70.4 dBA.

### 3.10.2 Regulatory Setting

Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles,

while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of General Plan policies and noise ordinance standards. Local General Plans tend to identify general principles intended to guide and influence development plans and local ordinances that establish standards and procedures for addressing specific noise sources and activities.

The following federal, state, and local regulations would apply to the Modified Project.

## Federal

### *Truck Operations*

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters (approximately 50 feet) from the vehicle pathway centerline. These regulatory controls are implemented on truck manufacturers.

### *Vibration*

The FTA has adopted vibration standards that are used to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 3.10-1**.

**TABLE 3.10-1  
CONSTRUCTION VIBRATION DAMAGE CRITERIA**

<b>Building Category</b>	<b>PPV (in/sec)</b>
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

SOURCE: FTA 2018

In addition, the FTA has adopted standards associated with human annoyance for ground-borne vibration impacts for the following three land-use categories: Vibration Category 1 – High Sensitivity; Vibration Category 2 – Residential; and Vibration Category 3 – Institutional. The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but still have the potential for activity interference. The vibration thresholds associated with disturbance for these three land-use categories are shown in **Table 3.10-2**. No thresholds have been adopted or recommended for commercial and office uses.

**TABLE 3.10-2  
 GROUND-BORNE VIBRATION IMPACT CRITERIA FOR GENERAL ASSESSMENT**

Land Use Category	Frequent Events <sup>a</sup>	Occasional Events <sup>b</sup>	Infrequent Events <sup>c</sup>
<b>Category 1:</b> Buildings where vibration would interfere with interior operations	65 VdB <sup>d</sup>	65 VdB <sup>d</sup>	65 VdB <sup>d</sup>
<b>Category 2:</b> Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
<b>Category 3:</b> Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

NOTES:

- <sup>a</sup> "Frequent Events" is defined as more than 70 vibration events of the same source per day.
- <sup>b</sup> "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
- <sup>c</sup> "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
- <sup>d</sup> This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

SOURCE: FTA 2018.

## State

### **State of California General Plan Guidelines**

The Governor’s Office of Planning and Research (OPR) published the State of California General Plan Guidelines (OPR 2017), which provides guidance for the acceptability of projects within specific  $L_{dn}$  contours. Generally, residential uses (e.g., mobile homes) are considered to be acceptable in areas where exterior noise levels do not exceed 60 dBA  $L_{dn}$ . Residential uses are normally unacceptable in areas exceeding 70 dBA  $L_{dn}$  and conditionally acceptable within 55–70 dBA  $L_{dn}$ . Schools are normally acceptable in areas up to 70 dBA  $L_{dn}$  and normally unacceptable in areas exceeding 70 dBA  $L_{dn}$ . Commercial uses are normally acceptable in areas with an ambient noise environment of up to 70 dBA  $L_{dn}$ . Commercial uses are conditionally acceptable where the  $L_{dn}$  is between 67.5 and 77.5 dBA, depending on the noise insulation features of the building and the noise reduction requirements in the facility design. The OPR guidelines also provide adjustment factors for determining noise acceptability standards that reflect the noise control goals of the community, the particular community’s sensitivity to noise, and the community’s assessment of the relative importance of noise pollution.

### **Vehicle Operations**

The State of California establishes noise limits for vehicles licensed to operate on public roads. The pass-by standard for heavy trucks is consistent with the federal limit of 80 dBA. The pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanctions on vehicle operators by state and local law enforcement officials.

## Vibration

The California Department of Transportation (Caltrans) has developed guidance on addressing vibration issues associated with construction, operation, and maintenance of transportation projects (Caltrans 2013). **Table 3.10-3** shows the Caltrans criteria for human response to transient vibration.

**TABLE 3.10-3  
 HUMAN RESPONSE TO TRANSIENT VIBRATION**

Human Response	PPV (in/sec)
Severe	2.0
Strongly Perceptible	0.9
Distinctly Perceptible	0.24
Barely Perceptible	0.035

SOURCE: Caltrans 2013.

## Local

To identify, appraise, and remedy noise problems in local communities, noise standards are typically established through General Plans and noise ordinances of local jurisdictions. The City of Manteca General Plan sets daytime noise standards for outdoor activity areas at 50 dBA (City of Manteca 2013). The City of Stockton (City) General Plan does not specify quantitative noise standards for construction activities. The General Plan places restrictions only on construction hours by stating that “the City shall limit construction activities to the hours of 7:00 a.m. to 7:00 p.m., Monday through Saturday. No construction shall occur on Sundays or national holidays without a written permit from the City” and that “the City shall seek to limit the potential noise impacts of construction activities on surrounding land uses” (City of Stockton 2018). The City’s standard encroachment permit, which will be required for work on the Modified Project, further limits truck haul hours to 8:00 a.m. to 4:00 p.m. unless special approval is granted.

In addition, section 16.60.040 of the City of Stockton Municipal Code provides daytime and nighttime noise standards for outdoor activity areas, which are shown in **Table 3.10-4** below.

**TABLE 3.10-4  
 CITY OF STOCKTON MAXIMUM ALLOWABLE EXTERIOR NOISE STANDARDS**

Noise Level Descriptor	Daytime Noise Levels in Outdoor Activity Areas (7:00 a.m. to 10:00 p.m.)	Nighttime Noise Levels in Outdoor Activity Areas (10:00 p.m. to 7:00 a.m.)
Hourly equivalent sound level ( $L_{eq}$ ), dBA	55	45
Maximum sound level ( $L_{max}$ ), dBA	75	65

SOURCE: Section 16.60.040 of the City of Stockton Municipal Code

### 3.10.3 Impact Analysis and Mitigation Measures

#### Significance Criteria

For the purpose of this analysis, the relevant standards of significance from the 2018 LSJR FR/EIS/EIR have been updated to the current CEQA Guidelines Appendix G thresholds to determine whether implementing the Modified Project would result in a significant impact. A noise and vibration impact is considered significant if implementation of the proposed Modified Project would lead to:

- Generation of substantial temporary or permanent increase in ambient noise levels in the vicinity of the Modified Project in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the Modified Project area to excessive noise levels.

Consistent with the 2018 LSJR FR/EIS/EIR, the following analysis uses maximum exterior noise standards in Section 16.60.040 of the City of Stockton Municipal Code (shown in Table 3.10-4) to assess construction noise impacts.

Consistent with the 2018 LSJR FR/EIS/EIR, construction vibration impacts associated with the Modified Project would be considered significant if attenuated vibration levels at nearby receptors would exceed the 80 VdB threshold for infrequent events for Category 2 land uses specified by the FTA (shown in Table 3.10-2).

#### Methodology and Assumptions

The following impact analysis considers the potential impacts of the proposed changes included in the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR is considered sufficient to evaluate the impacts of the Modified Project, no additional environmental review is provided.

#### Issues Not Analyzed Further in This SEIR

The 2018 LSJR FR/EIS/EIR determined that the Alternative 7a would have no impact with regard to the following criteria. The Modified Project would not change the conclusions described below; therefore, they are not analyzed further.

- Generation of substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive permanent groundborne vibration or groundborne noise levels.

- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

The analysis in the 2018 LSJR FR/EIS/EIR determined that the Alternative 7a would not modify the existing or planned land use and would not be located in the vicinity of any public or private airports; therefore, Alternative 7a would not result in the encroachment of incompatible land uses near known noise-producing sources, including airports. The Modified Project would not be located in the vicinity of any private or public airports and would therefore not expose people working in the Modified Project area to excessive aircraft noise levels.

The analysis in the 2018 LSJR FR/EIS/EIR also determined that there would be no impacts of Alternative 7a operation related to any of the Appendix G Noise and Vibration criteria. Alternative 7a evaluated in the 2018 LSJR FR/EIS/EIR did not include any long-term operational activities inconsistent with ongoing operational activities already taking place. Operation and maintenance of the levees were expected to include regular control of vegetation on and adjacent to the levees and would continue with Alternative 7a using equipment similar to equipment already being used. Therefore, Alternative 7a was not found to result in a substantial permanent increase in ambient noise levels. The operation and maintenance activities associated with the Modified Project would be similar to those analyzed in the 2018 LSJR FR/EIS/EIR; therefore, the analysis presented for Alternative 7a in the 2018 LSJR FR/EIS/EIR would also apply to the operation of the Modified Project.

The Modified Project would not result in new or more severe potentially significant impacts than Alternative 7a with respect to the criteria listed above. The 2018 LSJR FR/EIS/EIR adequately addresses potential noise and vibration impacts of the operation of the Modified Project and impacts related to exposure to aircraft noise.

### **Issues Analyzed Further in This SEIR**

The analysis in the 2018 LSJR FR/EIS/EIR focused on two potential impacts related to the following issue areas:

- Generation of substantial, construction-related, temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive permanent groundborne vibration or groundborne noise levels during construction.

Additional analysis of potential effects of the Modified Project on construction noise and vibration is presented below.

## Impacts and Mitigation Measures

**Impact 3.10-1: Construction activities associated with the Modified Project could lead to a temporary increase in ambient noise levels in the vicinity of the Modified Project in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.**

The 2018 LSJR FR/EIS/EIR determined that construction activities associated with Alternative 7a would result in a temporary increase in ambient noise levels at nearby sensitive receptors that would exceed the maximum allowable exterior noise standards for outdoor activity areas in the City of Stockton and in the City of Manteca, resulting in significant and unavoidable impacts even with the implementation of mitigation measures detailed in Section 5.19.10 of the 2018 LSJR FR/EIS/EIR.

The Modified Project includes cutoff wall construction, levee reshaping, and erosion protection installation along the 1.1-mile stretch of the TS\_30\_L reach, as well development of staging/stockpile areas, a barge off-haul site, borrow sites, biological mitigation sites, and access routes; however, these elements of the Modified Project would be similar to what was analyzed in the 2018 LSJR FR/EIS/EIR. Construction activities associated with the Modified Project would be similar to those analyzed in the 2018 LSJR FR/EIS/EIR and would use similar equipment. However, as the Modified Project would not include closure structures, the use of a pile driver would not be required. Construction activities would generate short-term and intermittent noise at or near individual noise-sensitive locations along a 1.1-mile stretch of the TS\_30\_L reach (adjacent to the Brookside residential development). Maximum noise levels associated with construction equipment range from 80 to 90 dBA at 50 feet (FHWA 2017). Using the FTA noise methodology for the prediction of the cumulative noise level generated by the three loudest pieces of equipment operating simultaneously (FTA 2018), noise from construction activities associated with the Modified Project would be 77.8 dBA at 100 feet. Residences within 740 feet of construction activities would experience noise levels in excess of the daytime maximum outdoor noise standard. Therefore, the potential impact of construction noise from the Modified Project would be **significant**. Even with the implementation of mitigation, due to the proximity of noise-sensitive land uses to construction activities, the residual impact of construction noise would be **significant and unavoidable**, consistent with the determination in the 2018 LSJR FR/EIS/EIR.

The mitigation measures for Alternative 7a outlined in Section 5.19.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project.

### **Mitigation Measure 3.10-1: Construction Noise Reduction.**

The following measures shall be implemented to reduce the effects of construction under the Modified Project:

- The contractor shall prepare a construction noise and vibration plan prior to construction.
- The contractor shall employ vibration-reducing construction practices.
- The contractor shall employ noise-reducing construction practices.

- All construction equipment shall be equipped with noise-reduction devices such as mufflers to minimize construction noise and all internal combustion engines shall be equipped with exhaust and intake silencers in accordance with manufacturers' specifications.
- Equipment that is quieter than standard shall be used, including electrically powered equipment instead of internal combustion equipment, where use of such equipment is a readily available substitute that accomplishes project tasks in the same manner as internal combustion equipment.
- The use of bells, whistles, alarms, and horns shall be restricted to safety warning purposes only.
- Noise-reducing enclosures shall be used around stationary noise-generating equipment (e.g., compressors and generators at slurry pond locations).
- Mobile and fixed construction equipment (e.g., compressors and generators), construction staging and stockpiling areas and construction vehicle routes shall be located at the most distant point feasible from noise-sensitive receptors.
- When noise-sensitive uses subject to prolonged construction noise are located within 740 feet of construction in Stockton or unincorporated areas of San Joaquin County, noise-attenuating buffers such as structures, truck trailers, or soil piles shall be located between noise-generation sources and sensitive receptors.
- Before construction activity begins within 740 feet of one or more residences or businesses, the project proponent shall provide written notification to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. The USACE resident engineer and contractor's project manager shall be designated and contact information shall be provided in the notices and posted near the project area in a conspicuous location that it is clearly visible to nearby receptors most likely to be disturbed. The USACE resident engineer shall manage complaints and concerns resulting from noise-generating activities. The severity of the noise concern shall be assessed by the noise disturbance coordinator and, if necessary, evaluated by a qualified noise control engineer.
- The project proponent shall ensure that all heavy trucks are properly maintained and equipped with noise control devices (e.g., muffler) in accordance with manufacturers' specifications at each work site during project construction to minimize construction traffic noise effects on sensitive receptors.
- Before haul truck trips are initiated during construction season on roads within 90 feet of residences located along haul routes, written notification shall be provided to potentially affected residents identifying the hours and frequency of haul truck trips. Notifications provide contact information for the USACE resident engineer identified above and also identify a mechanism for residents to register complaints with the appropriate jurisdiction if haul truck noise levels are overly intrusive or occur outside the exempt daytime hours for the applicable jurisdiction.

**Impact 3.10-2: Construction activities associated with the Modified Project could generate excessive groundborne vibration or groundborne noise levels in the vicinity of the Modified Project.**

The 2018 LSJR FR/EIS/EIR determined that construction activities associated with Alternative 7a would result in a temporary increase in groundborne noise and vibration levels at nearby sensitive receptors that would exceed the FTA's standard for vibration levels at Category 2 land uses such as residences where people sleep, resulting in significant and unavoidable impacts even with the implementation of mitigation measures detailed in Section 5.19.10 of the 2018 LSJR FR/EIS/EIR.

Construction activities associated with elements of the Modified Project would be similar to those already analyzed in the 2018 LSJR FR/EIS/EIR. Construction activities would use similar equipment with the exception of pile drivers. As the Modified Project would not include closure structures, the use of a pile driver would not be required. The highest-vibration-generating construction equipment used for the Modified Project include large bulldozers and loaded trucks, which generate vibration levels of 86 to 87 VdB at 25 feet. Therefore, residences within 90 feet of such equipment would experience vibration levels in excess of the 80 VdB FTA standard. Residences are located approximately 70 feet to the east of Brookside Road adjacent to the TS\_30\_L levee improvements, which will serve as a haul route for the transport of construction equipment and materials. Therefore, potential construction vibration impacts associated with the Modified Project would be **significant**. Even with the implementation of mitigation, due to the proximity of noise-sensitive land uses to haul routes and construction activities, the residual impact of construction noise would be **significant and unavoidable**, consistent with the determination in the 2018 LSJR FR/EIS/EIR.

The mitigation measures for Alternative 7a outlined in Section 5.19.10 of the 2018 LSJR FR/EIS/EIR (referenced above) shall be applied to the Modified Project, as applicable.

**Mitigation Measure 3.10-1.** See text under Impact 3.10-1.

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## **Cumulative Impacts**

**Impact 3.10-3: The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative noise impacts.**

Potential cumulative noise and vibration impacts were analyzed in Section 5.23.5 of the 2018 LSJR FR/EIS/EIR. The 2018 LSJR FR/EIS/EIR considered the cumulative setting for impacts to noise and vibration based on other local projects that would result in temporarily increased levels of ambient noise in the study area. In residential areas along the rivers and creeks, the cumulative impact of multiple projects would be a significant effect on those residents, although the effects would be limited to people in the immediate proximity to the construction sites. However, the 2018 LSJR FR/EIS/EIR determined Alternative 7a's contribution to cumulative noise and vibration impacts to be less than significant as there were no local projects in the area in close

enough proximity of the construction sites to create a cumulative effect from concurrent construction. The EIR determined that cumulative impacts would be maintained at a less than significant level by scheduling projects such that they do not coincide with any local projects.

The Modified Project would be constructed over up to two construction seasons and, as discussed for Alternative 7a in the 2018 LSJR FR/EIS/EIR, the Modified Project's contribution to cumulative noise and vibration impacts would not be cumulatively considerable. The impact would be **less than significant**.

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## 3.11 Transportation

This section discusses the potential for effects of the Modified Project on transportation. Section 5.15, *Transportation*, of the 2018 LSJR FR/EIS/EIR described the applicable environmental and regulatory setting and standards of significance, which are incorporated by reference and summarized below as appropriate.

Comments relevant to transportation were received from individuals or agencies during circulation of the Notice of Preparation for the 2018 LSJR FR/EIS/EIR and included concerns about impacts to roads atop levees.

The analysis in this section was developed based on the construction and operational features of the Modified Project and current regulatory requirements.

### 3.11.1 Environmental Setting

Setting information relevant to transportation for the Modified Project remains the same as discussed in the certified 2018 LSJR FR/EIS/EIR, but since that time, additional details have been developed related to haul routes to and from borrow and staging/stockpile areas to be used for the Modified Project. This section briefly summarizes and/or excerpts the environmental setting provided in the 2018 LSJR FR/EIS/EIR as it relates to the Modified Project and updates this information with changes that have occurred since that document was released.

#### Roadways

The San Joaquin Council of Governments (SJCOG) is the Congestion Management Agency for San Joaquin County. It adopted its first Congestion Management Program (CMP) in November 1991. SJCOG implements the Congestion Management Program and the Federal Congestion Management Process. The most recent update to the current Regional CMP (RCMP) was adopted by the SJCOG Board of Directors in August 2021 (SJCOG 2021).

#### **State-Maintained Highways**

Interstate 5 (I-5) is the only interstate highway near the Modified Project site. State Routes (SRs) 99, 4, 26, 88, and 120 also cross San Joaquin County near the Modified Project site. All of these roads are regionally significant and are included in the CMP for San Joaquin County.

I-5 is an important corridor for both commuter and freight traffic. I-5 runs north-south for the length of the state (and beyond). As it enters California's Central Valley from the south, SR 99 splits from it and travels through the Central Valley East of the San Joaquin River, servicing population centers such as Bakersfield, Fresno, Merced, and Modesto. I-5 skirts the more remote western side of the valley, crossing the San Joaquin River near Lathrop and crossing the Calaveras River and Old Mormon Slough in Stockton. I-5 and SR 99 parallel each other on the west and east sides of Stockton, respectively, with SR 99 crossing the Stockton Diverting Canal and Mormon Channel on the east side of Stockton. In the vicinity of the Modified Project site, I-5 and SR 99 carry average annual daily traffic (AADT) volumes of approximately 150,000 and approximately 100,000 vehicles, respectively (Caltrans 2020).

SR 4 runs east-west and connects I-5 to SR 99 north of the Old Mormon Slough and carries an AADT volume ranging from approximately 10,000 to 130,000 in the vicinity of the Modified Project. SR 88 originates where Waterloo Road (a four-lane minor arterial road) crosses the Stockton Diverting Canal and runs generally northeast and carries an AADT volume of approximately 25,000 in the vicinity of the Modified Project. Similar to SR 88, SR 26 originates just before Fremont Street crosses the Stockton Diverting Canal as it exits Stockton. SR 26 roughly parallels SR 88 as it extends onward through agricultural areas and communities to the northeast and carries an AADT volume of approximately 20,000 in the vicinity of the Modified Project. SR 120 runs east-west and connects I-5 to SR 99 on the southern side of Manteca and carries an AADT volume of approximately 90,000 in the vicinity of the Modified Project.

### **City and County Roadways**

The functional classification of roadways in the Modified Project area include principal arterials, collectors, and local roads. Principal arterials provide access to shopping, employment and recreation and comprise the main network for traffic within and between communities. Collectors are the main interior streets carrying traffic from neighborhoods and business areas to higher level roads. Local roads are two-lane streets providing local access and service in agricultural and rural areas of the county.

Roads that cross the San Joaquin River and tributaries and may be used for the Modified Project (i.e., for hauling construction materials such as levee fill materials and crushed rock to the Modified Project site from a borrow site and/or commercial crushed rock source) are listed below:

- The vehicle bridges across the Stockton Diverting Canal for SRs 26, 88, and 99, as well as East Main Street, which are two-lane minor arterial roadways
- The I-5 vehicle bridge across the Calaveras River
- The I-5 vehicle bridge across the San Joaquin River
- The I-5 vehicle bridge across Mormon Slough
- The I-5 vehicle bridge across French Camp Slough

### **Project Site Access and Haul Routes**

The 2018 LSJR FR/EIS/EIR stated that haul routes had not yet been designated but would be analyzed in subsequent CEQA environmental documentation. That document went on to state that Alternative 7a would be accessed from I-5, Highway 99, and major arterial roadways, which would connect to minor arterial, local, and connector roadways, and that access to levees would be provided from residential streets and rural agricultural roads that connect to maintenance ramps.

Potential construction material sources for the Modified Project have been identified, along with haul routes and Project site accessways. The staging and stockpile areas are to be co-located at the areas depicted in Chapter 2, *Project Description*, Figures 2-3 and 2-5. Haul routes to and from the staging/stockpile areas for the levee degrade and cutoff wall construction would use March Lane west of I-5 as an access point to the TS\_30\_L levee road (Brookside Road) and the parallel agricultural road on the west side of the waterside levee toe.

As described in Chapter 2, *Project Description*, there are three potential borrow sites under consideration for the Modified Project, based on proximity and availability of appropriate materials:

- 1) The Stockton East Water District (SEWD) property is located approximately 9 miles east of the Modified Project site. This borrow site location would require a haul route that follows a private road on the west side of the SEWD property to either SR 26 or East Main Street in order to cross the Stockton Diverting Canal, and then follows one of these roads to SR 99 until its interchange with SR 4. SR 4 leads to I-5, which would be followed north and west to West March Lane, which leads directly onto the south end of the Modified Project site.
- 2) Dutra Materials is a commercial borrow site on Decker Island, located approximately 20 miles northwest of the Modified Project site. For this option, materials would be delivered to the Wright Elmwood Tract adjacent to the west side of the Modified Project site via barge, offloaded, and then trucked approximately 0.7 miles to the Modified Project site via Brookside Road.
- 3) Brown Sands Incorporated is another commercial borrow site option, located approximately 20 miles south of the Modified Project site in Lathrop. Materials from this borrow site would be hauled by truck briefly (for approximately 0.75 mile) on Mossdale Road to reach I-5, which would then join with the haul route proposed from the SEWD borrow site option.

The haul routes for other construction materials (i.e., crushed rock for runoff erosion protection) are based on the location of the material source. All crushed rock source options are commercial sites within 50 miles of the Modified Project site and all haul routes would use local roads and the major state and interstate highways discussed in this section to access SR 99 or I-5, depending on location, and would then follow the haul route proposed for the SEWD borrow site. The location of all potential commercial sources for borrow material and crushed rock are shown in Chapter 2, *Project Description*, Figure 2-6, along with estimated haul routes, which all flow through I-5, Highway 99, and major arterial roadways, connecting to minor arterial, local, and connector roadways, as described for Alternative 7a in the 2018 LSJR FR/EIS/EIR.

## Public Transit

San Joaquin Regional Transit District provides fixed route service throughout the Stockton Metropolitan Area and provides subscription commuter services connecting Stockton with Livermore, Dublin, Mountain View, Palo Alto, Pleasanton, Santa Clara, Sunnyvale, San Jose, and Sacramento.

## Railroad

Stockton is served by two national rail lines (the Union Pacific Railroad [UPRR] and the Burlington Northern Santa Fe Railroad [BNSF]) and two short-line railroads (Central California Traction Company [CCT] and Stockton Terminal and Eastern Railroad [STE]). UPRR owns 2,773 track miles in California. BNSF owns 1,155 track miles and operates more than 2,000 track miles in California. STE operates freight service in Stockton along 25 miles of leased UPRR rail lines (UPRR 2023), including a crossing at Cardinal Avenue along the haul route to be used by trucks entering and exiting the SEWD borrow site location. CCT operates freight service along 16 miles of track between Stockton and Lodi (UPRR 2023). Commodities carried include

agriculture, asphalt, cement, food processing, lumber, steel, and chemical transportation. The Altamont Commuter Express provides passenger service between Stockton and San Jose. Service currently consists of four westbound morning trains and four eastbound evening trains. Amtrak also makes stops in Stockton and provides passenger service to the rest of the nation.

### 3.11.2 Regulatory Setting

The 2018 LSJR FR/EIS/EIR identified federal, state, and local regulations that apply to transportation. Below are additional or updated regulations that have been enacted since publication of the 2018 LSJR FR/EIS/EIR that apply to the Modified Project.

#### **Federal**

Since the 2018 LSJR FR/EIS/EIR, there have been no changes to federal plans, policies, regulations, or laws relevant to the evaluation of transportation impacts under CEQA.

#### **State**

##### ***California Department of Transportation (Caltrans)***

The adoption of CEQA Guidelines section 15064.3 in December 2018 replaced LOS with the vehicle miles traveled (VMT) performance measure as the preferred measure for evaluating transportation impacts under CEQA (see Senate Bill [SB] 743, below). Therefore, regulatory information regarding level of service (LOS) standards included in the 2018 LSJR FR/EIS/EIR do not need to be included in the SEIR for the Modified Project.

##### ***Senate Bill 743***

With the adoption of the SB 375 in 2008, the State Legislature signaled its commitment to encourage land use and transportation planning decisions and investments to reduce VMT and thereby contribute to the reduction of greenhouse gas (GHG) emissions, as required by the California Global Warming Solutions Act of 2006 (Assembly Bill 32). VMT is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

Signed into law on September 27, 2013, SB 743 started a process to change transportation impact analysis as part of CEQA compliance. These changes include the elimination of auto delay, LOS, and other similar measures of vehicular capacity or traffic congestion as a basis for determining transportation impact significance in many parts of California (if not statewide). SB 743 required the Governor's Office of Planning and Research (OPR) to propose revisions to the CEQA Guidelines establishing new criteria to "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses" (Public Resources Code Section 21099(b)(1)).

The current CEQA Guidelines Section 15064.3, Subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. The CEQA Guidelines criterion for determining the significance of transportation impacts are primarily focused on projects within transit priority areas, and shifts the focus from driver delay to an evaluation of a project's long-term operational

changes of VMT through reduction of GHG emissions, creation of multimodal networks, and promotion of a mix of land uses (which in turn reduces vehicle trips).

If a local jurisdiction has not adopted VMT thresholds, then pursuant to CEQA Guidelines Section 15064.3, the statewide guidance provided by the State of California Office of Planning and Research (OPR) shall apply. The City of Stockton, where the Modified Project is located, has not adopted VMT thresholds.

As defined in CEQA Guidelines Section 15064.3, Subdivision (a), VMT refers to the amount and distance of automobile travel attributable to a project. OPR's *Technical Advisory on Evaluating Transportation Impacts in CEQA* (Technical Guidelines), published in December 2018, further explains that the term, "automobile" in Section 15064.3 "refers to on-road passenger vehicles, specifically cars and light trucks."

## Local

### **Regional Congestion Management Program (2021)**

Since the 2018 LSJR FR/EIS/EIR, the SJCOG has updated their Regional Congestion Management Program (RCMP). The purpose of the RCMP is to monitor congestion in order to identify congestion problems and establish programs to reduce this congestion. The 2021 RCMP designates a core network of key transportation facilities as part of the regional transportation system in order to focus implementation of the RCMP in a way that facilitates regional travel within San Joaquin County. One of the main focuses of the RCMP is to reduce single occupant vehicle (SOV) travel and minimize the need for increasing SOV roadway capacity. The RCMP consists of a network of 504 roadway miles (396 of which are National Highway System (NHS)-designated roadways and 108 of which are non-NHS roadways. The RCMP also incorporates SJCOG's Bicycle, Pedestrian, and Safe Routes to School Plan (SJCOG 2012) to designate a regional bikeway network and guide future bicycle performance measure developments and infrastructure improvement projects.

The RCMP sets forth a system of objectives for operational efficiency; goods movement; the transit system, regional bikeway network, and complete streets; travel demand management, safety, and system management. Each category of objectives is then associated with a measure of effectiveness and specific monitoring-based performance measure. The RCMP also sets forth a prioritization of congestion reduction strategies, including demand management strategies (e.g., promotion of public transit or ridesharing, improvements to pedestrian and bicycle facilities, employer-based commuter benefits or telecommuting programs, transit-oriented land use development and zoning); traffic operations strategies (e.g., metering traffic onto freeways, transit signal priority, automated toll collection, traffic signal optimization); public transportation strategies (e.g., realigned transit service schedules and stop locations, providing real-time data on transit schedules, more frequent transit or expanded hours of service, provision for bicycles on transit vehicles); and road capacity strategies (e.g., intersection improvements, center turn lanes, constructing new high occupancy vehicle lanes). As a last resort, the RCMP also provides for the possibility of SOV capacity increasing projects.

### **City of Stockton General Plan (2018)**

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since release of that document the City of Stockton has updated their general plan to the Envision Stockton 2040 General Plan (City of Stockton 2018). The general plan incorporates and implements the City’s Bicycle Master Plan, adopted in 2017. Chapter 4 of the updated general plan outlines the City’s goals and policies related to an integrated, safe, and efficient multimodal transportation system; active transportation systems; sustainable transportation infrastructure; and effective transportation assessments. The plan’s Transportation chapter contains the following policies that are relevant to the Modified Project:

**Policy TR-1.1:** Ensure that roadways safely and efficiently accommodate all modes and users, including private, commercial, and transit vehicles, as well as bicycles and pedestrians and vehicles for disabled travelers.

*Action TR-1.1A:* Direct truck traffic to designated truck routes that facilitate efficient goods movement and minimize risk to areas with concentrations of sensitive receptors, such as schools, for example by disallowing any new truck routes to pass directly on streets where schools are located, and vulnerable road users, like pedestrians and bicyclists.

**Policy TR-2.1:** Develop safe and interconnected bicycle and pedestrian facilities, including along “complete” streets that target multiple travel modes.

**Policy TR-2.3:** Utilize natural features and routes with lower traffic volumes and speeds to encourage residents to walk and wheel more frequently.

*Action TR-2.3A:* Develop and maintain bikeways on separate rights-of way (e.g., Calaveras River, East Bay Municipal Utility District easement, French Camp Slough, and Shima Tract Levee).

### **San Joaquin County General Plan (2016)**

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since release of that document San Joaquin County has updated their general plan (San Joaquin County 2016). Chapter 3.2 contains the County’s goals and policies related to a comprehensive, safe, and efficient multimodal transportation system; active transportation systems; a safe and efficient roadway system; expanding a safe, continuous, and convenient bicycle and pedestrian travel network; maintaining and expanding public transit access and services; and congestion management strategies. The plan’s Transportation and Mobility chapter contains the following policies that are relevant to the Modified Project:

**TM-1.2: Emergency Service:** The County shall coordinate the development and maintenance of all transportation facilities with emergency service providers to ensure continued emergency service operation and service levels.

**TM-3.1: Roadway Provision:** The County shall maintain Level of Service (LOS) standards consistent with the San Joaquin Council of Governments (SJCOG) Congestion Management Program (CMP) for State highways and designated County roadways and intersections of regional significance. Per the CMP, all designated CMP roadways and intersections shall operate at an LOS D or better except for roadways with “grandfathered” LOS. LOS for State highways shall be maintained in cooperation with Caltrans. The County LOS standards for intersections is LOS “D” or better on Minor Arterials and roadways of higher classification and LOS “C” or better on all other non-CMP

designated County roadways and intersections. The County shall also maintain the following:

- on State highways, LOS D or Caltrans standards whichever is stricter.
- within a city's sphere of influence, LOS D, or the city planned standards for that level of service.
- on Mountain House Gateways, as defined in the Master Plan, LOS D, on all other Mountain House roads, LOS C.

For State highways that are designated as part of SJCOG's CMP, both the Caltrans and CMP LOS standards shall apply. Where roadways are designated as part of SJCOG's CMP, both the County and CMP LOS standards shall apply.

### ***Regional Transportation Plan and Sustainable Communities Strategy***

An updated Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) has been adopted since release of the 2018 LSJR FR/EIS/EIR, adopted in June 2018 (SJCOG 2018). The RTP/SCS was developed by SJCOG as the metropolitan planning organization and regional transportation planning agency for San Joaquin County. The plan's purpose is to reflect a region-specific, balanced multimodal plan that can be implemented through existing and planned programs or policies. The plan can be considered SJCOG's regional statement of priorities for the future transportation system from 2017 through 2042. The policy element of the plan focuses on existing and future land use patterns to support housing and GHG emissions goals and objectives, consideration of resource areas and farmland, and identifying transportation needs and the planned transportation network. Transportation-specific policies focus on development of efficient land use patterns and transportation networks; supporting energy and water efficiency and improving air quality; optimizing public transit systems and transit-oriented development; improving non-motorized travel facilities; increase safety and security; maintaining the existing transportation system; and improving connectivity and access to active transportation.

## **3.11.3 Impact Analysis and Mitigation Measures**

### **Significance Criteria**

For the purpose of this analysis, the relevant standards of significance from the 2018 LSJR FR/EIS/EIR have been updated to the current CEQA Guidelines Appendix G thresholds to determine whether implementing the Modified Project would result in a significant impact. A transportation impact is considered significant if implementation of the Modified Project would:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
- Conflict or be inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b).
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.

## Methodology and Assumptions

The following impact analysis considers the potential impacts of the proposed changes included in the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR is considered sufficient to evaluate the impacts of the Modified Project, no additional environmental review is provided.

## Issues Not Analyzed Further in This SEIR

The 2018 LSJR FR/EIS/EIR determined that the Alternative 7a would have either no impact or a less-than-significant impact with regard to each of the following criteria. The Modified Project would not change the conclusions described below, and therefore, they are not analyzed further.

- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Project operations related to any of the Appendix G Transportation criteria.

The analysis in the 2018 LSJR FR/EIS/EIR determined that impacts of Project construction related to hazards due to a geometric design feature would be less than significant. Alternative 7a evaluated in the 2018 LSJR FR/EIS/EIR would not involve land use changes or redesign of existing intersections as a result of the proposed flood management improvements. For the Modified Project, there is no change from the analysis presented for Alternative 7a in the 2018 LSJR FR/EIS/EIR related to geometric design hazards or incompatible uses.

The analysis in the 2018 LSJR FR/EIS/EIR also determined that impacts of Alternative 7a operations related to any of the Appendix G Transportation standards would be less than significant. Alternative 7a, evaluated in the 2018 LSJR FR/EIS/EIR, would not include any long-term operational activities inconsistent with current operational activities. The operation and maintenance activities associated with the Modified Project would be similar to those analyzed in the 2018 LSJR FR/EIS/EIR; therefore, the analysis presented for Alternative 7a in the 2018 LSJR FR/EIS/EIR would also apply to the operation of the Modified Project.

The Modified Project would not result in new or more severe potentially significant impacts than Alternative 7a related to the above-mentioned significance standards. The 2018 LSJR FR/EIS/EIR adequately addresses potential impacts of the Modified Project on hazards related to geometric design features and incompatible uses, as well as Transportation-related operational impacts of the Modified Project.

## Issues Analyzed Further in This SEIR

The analysis in the 2018 LSJR FR/EIS/EIR focused on potential impacts related to the following issue areas:

- Emergency access related to delays in emergency response time and interference with evacuation routes during construction.

- Conflicts with programs or policies addressing the circulation system due to hauling of materials through residential neighborhoods and school zones.

Additional analysis of potential effects of the Modified Project on emergency access and the circulation system is presented below, along with a qualitative analysis of the Modified Project related to VMT, as required by CEQA Guidelines Section 15064.3, Subdivision (b).

## Impacts and Mitigation Measures

### **Impact 3.11-1: Construction of the Modified Project could conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.**

The 2018 LSJR FR/EIS/EIR discussed the applicable CMP at the time, which, similarly to the current RCMP, emphasized travel demand measures to reduce the number of miles driven per capita; infrastructure improvements to reduce SOV trips; land use regulations to encourage the use of alternative modes of transportation instead of cars; and monitoring and enforcement of travel demand measure implementation by development projects. The 2018 LSJR FR/EIS/EIR stated that, because homes, businesses, and other traffic-generating development would not be constructed under Alternative 7a, and because construction-related traffic is not targeted in the CMP, no conflict would occur with implementation of the CMP due to the Alternative 7a. For the Modified Project, there is no change from the analysis presented in the 2018 LSJR FR/EIS/EIR related to the applicable CMP. The RCMP has been updated since the analysis contained in the 2018 LSJR FR/EIS/EIR; however, the general focus of the document remains consistent and does not target construction-related traffic.

The 2018 LSJR FR/EIS/EIR also discussed that Alternative 7a would increase traffic on local roadways associated with construction haul trips, which could interfere with the use of main roadways for emergency evacuation routes. In addition, Alternative 7a could have haul routes that occur in the vicinity of schools or through residential areas that are not designated truck routes. These activities would conflict with local plans and policies and therefore were found to cause significant and unavoidable impacts. The Modified Project includes March Lane west of I-5 as a haul route, which runs through a residential and commercial area. Other items discussed in the 2018 LSJR FR/EIS/EIR regarding lane closures for levee road work, railroad service disruption due to work under railroad crossings, and road closures due to levee work requiring drilling through roadways would not apply to the Modified Project.

In addition, the portion of March Lane west of I-5 to be used as a haul route for the Modified Project is a designated Class I multi-use path according to SJCOG's Bicycle, Pedestrian, and Safe Routes to School Plan, and it crosses Feather River Drive, which is a Class II bike lane according to the City of Stockton general plan and a Class I multi-use path according to the Bicycle, Pedestrian, and Safe Routes to School Plan. Depending on the source of construction material chosen, the haul routes for the Modified Project may cross or briefly follow additional Class I or II bike routes as designated by the City or County plans. However, the haul trips generated for the Modified Project would be temporary and would not preclude use of the bike routes or future development of proposed bike or pedestrian routes and, similar to the analysis for Alternative 7a

in the 2018 LSJR FR/EIS/EIR, impacts related to bicycle and pedestrian facilities would be less than significant for the Modified Project.

The analysis in the 2018 LSJR FR/EIS/EIR found that Alternative 7a would have potentially significant impacts related to construction traffic near schools and residences interfering with the circulation system and use of main roadways for emergency evacuation routes and could therefore conflict with local plans and policies. Modified Project site access and haul routes fit within the description presented for Alternative 7a access and haul routes in the 2018 LSJR FR/EIS/EIR. Therefore, consistent with the determination made for Alternative 7a in the 2018 LSJR FR/EIS/EIR, during construction the Modified Project would conflict with local plans and policies and the impact would be **significant**. Even with implementation of mitigation, the conflict with local plans and policies would remain **significant and unavoidable**, consistent with the determination in the 2018 LSJR FR/EIS/EIR.

The mitigation measures for Alternative 7a outlined in Section 5.15.10 of the 2018 LSJR FR/EIS/EIR have been updated and shall be applied to the Modified Project, as applicable.

**Mitigation Measure 3.11-1: Traffic Safety Plan.** Before the start of each construction season, the primary contractors for construction shall hire a licensed traffic engineer to develop a coordinated construction traffic safety and control plan in accordance with the latest Manual on Uniform Traffic Control Devices (MUTCD) standards and requirements to minimize the simultaneous use of roadways by different construction contractors for material hauling and equipment delivery to the extent feasible and to avoid and minimize potential traffic hazards on local roadways during construction. Items (a) through (i) of this mitigation measure shall be integrated as terms of the construction contracts.

- (a) The plan shall outline phasing of activities and the use of multiple routes to and from off-site locations to minimize the daily amount of traffic on individual roadways.
- (b) The plan shall provide bicycle and pedestrian detours to allow for continued use by bicycle and pedestrian commuters and maintain safe pedestrian and bicyclist access around the construction areas at all times. Construction areas shall be secured as required by the applicable jurisdiction to prevent pedestrians and bicyclists from entering the work site, and all stationary equipment shall be located as far away as possible from areas where bicyclists and pedestrians are present.
- (c) The construction contractors shall develop traffic control plans (TCP) for the local roadways that would be affected by construction traffic. The TCP must be designed and stamped by a licensed traffic engineer in accordance with the latest MUTCD requirements. The TCP must be submitted by the contractor with the City's road encroachment permit application for review and approval. Before the initiation of construction-related activity involving high volumes of traffic, the plan shall be submitted for review by the agency of local jurisdiction (San Joaquin County, City of Stockton, or Caltrans [if applicable]) that has responsibility for roadway safety at and between the Modified Project sites. The contractor shall train construction personnel in appropriate safety measures as described in the plan and shall implement the plan. The plan shall include the prescribed locations for staging equipment and parking trucks and vehicles. Provisions shall be made for overnight parking of haul trucks to

avoid causing traffic or circulation congestion. The plan shall call for the following elements:

- Posting warnings about the potential presence of slow-moving vehicles.
  - Using traffic control personnel when appropriate.
  - Placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones and in accordance with city/county requirements.
  - The TCP shall include signs placed on March Lane west of I-5 advising the public of traffic delays due to construction and the tentative timeline of the project. Language to be placed on the signs must be approved by the City's traffic engineer.
- (d) All operations shall limit and expeditiously remove, as necessary, the accumulation of Modified Project-generated mud or dirt from adjacent public streets at least once every 24 hours if substantial volumes of soil are carried onto adjacent paved public roadways during construction.
- (e) If needed to comply with Caltrans requirements, a transportation management plan shall be prepared and submitted to Caltrans to cover any points of access from the State highway system for haul trucks and other construction equipment.
- (f) Before the start of the first construction season, the construction contractor shall obtain a road encroachment permit with San Joaquin County and the City of Stockton to address permit conditions set for the maintenance and repair of affected roadways resulting from increased truck traffic. The road encroachment permit conditions and requirements shall ensure that the affected roadways are repaired to a level that is equivalent to their pre-project condition. Such an agreement may require the contractor to take pre-project photos of existing conditions. Upon project completion, the City or County shall develop a punch list of requirements to ensure that pre-project conditions are restored.
- (g) Before the Modified Project construction begins, the contractor shall provide notification of Modified Project construction to all appropriate emergency service providers in San Joaquin County, Stockton, Lathrop, and Manteca and shall coordinate with providers throughout the construction period to ensure that emergency access through construction areas is maintained.
- (h) The contractor shall avoid neighborhoods and school zones to the maximum extent feasible when determining haul routes. When possible, hauling in school zones shall be limited to the period of summer breaks to avoid noise and traffic impacts on the schools. Any damage to residential roadways during construction shall be mitigated per the requirements outlined in the traffic safety and control plan.
- (i) During preliminary engineering and design, the Modified Project proponent shall provide notification of Modified Project construction to all appropriate railroads in the Modified Project area and shall coordinate with all railroads to minimize freight and passenger service disruptions. Prior to the start of construction, the Modified Project Proponent's contractor shall contact the general manager of affected railroads to coordinate truck haul route traffic and schedule an on-site meeting.

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**Impact 3.11-2: Construction of the Modified Project could conflict or be inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b).**

In accordance with SB 743, the new CEQA Guidelines Section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the CEQA Guidelines criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas and shifts the focus from driver delay to a reduction of GHG emissions, creation of multimodal networks, and promotion of a mix of land uses. The CEQA Guidelines define VMT as the amount and distance of automobile travel attributable to a project; therefore, VMT is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

Neither the City of Stockton nor SJAFCA has yet adopted VMT screening criteria and thresholds; therefore, the statewide guidance as documented in the Technical Advisory on Evaluating Transportation Impacts in CEQA (Technical Guidelines) would apply to the Modified Project. According to the Technical Guidelines, absent substantial evidence indicating that a project would generate a potentially significant level of VMT or inconsistency with a Sustainable Communities Strategy or general plan, projects that generate fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact.

Taking the information discussed above into account, the Modified Project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b) during construction. Construction-generated trips would be temporary and would result in fewer than 110 trips per day during the peak construction traffic period, when there would be as many as 70 daily commuter trips generated by construction crew travel to and from the site. In accordance with guidance provided by the Governor's Office of Planning and Research, automobiles (in the context of VMT analysis and screening) refer to on-road passenger vehicles, specifically cars and light trucks, and therefore truck trips needed for construction materials hauling to and from the site are not evaluated (OPR 2018). Furthermore, no changes to existing operation and maintenance activities are anticipated. For these reasons, VMT generated by the Modified Project would be **less than significant**, and no mitigation is required.

**Mitigation:** None required.

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**Impact 3.11-3: Construction of the Modified Project could result in inadequate emergency access.**

The 2018 LSJR FR/EIS/EIR discussed that Alternative 7a would result in minimal, short-term impacts on traffic but would not substantially restrict emergency access. However, it goes on to state, as mentioned in Impact 3.11-1, that Alternative 7a would increase traffic on local roadways associated with construction haul trips, which could interfere with the use of main roadways for emergency evacuation routes and therefore concludes that Alternative 7a would have a significant

and unavoidable impact. For the Modified Project, there is no change from the analysis presented in the 2018 LSJR FR/EIS/EIR related to emergency access. The Modified Project would temporarily increase traffic on local roadways near residential communities, which could slow emergency response times and/or interfere with the use of roadways for emergency evacuation routes. As discussed in the 2018 LSJR FR/EIS/EIR for Alternative 7a, during the operational phase, the Modified Project could reduce the risk of inundation to freeway on-ramps and off-ramps, which would improve access for emergency responders, but the construction impacts of the Modified Project remain consistent with those evaluated for Alternative 7a and are **significant**. Even with implementation of mitigation, the Modified Project could result in inadequate emergency access; therefore, the impact would remain **significant and unavoidable**, consistent with the determination in the 2018 LSJR FR/EIS/EIR.

The mitigation measures for Alternative 7a outlined in Section 5.15.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project, as applicable.

**Mitigation Measure 3.11-1.** See text under Impact 3.11-1.

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## Cumulative Impacts

**Impact 3.11-4: The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative transportation impacts.**

The following potential cumulative impacts to Transportation were analyzed in Section 5.23 of the 2018 LSJR FR/EIS/EIR

- Short-term increases in construction-related vehicle trips and disruptions of traffic patterns.

The 2018 LSJR FR/EIS/EIR states that the cumulative setting for impacts to transportation is the transportation network in the study area. For the Modified Project, that would include the roadway network in the City of Stockton. The 2018 LSJR FR/EIS/EIR acknowledged that construction projects occurring at the same time as Alternative 7a could contribute to short-term increases in construction-related vehicle trips and disruptions of traffic patterns, which could result in cumulative effects on freeways and other regional roadways. However, the roadways are designed to handle temporary increased traffic loads and Alternative 7a was found not to contribute to significant cumulative impacts on traffic or transportation. The Modified Project is planned to be constructed over two construction seasons and, as discussed for Alternative 7a in the 2018 LSJR FR/EIS/EIR, the transportation impacts from the Modified Project would be temporary; therefore, the Modified Project's contribution to cumulative transportation impacts would not be cumulatively considerable and the impact would be **less than significant**.

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## 3.12 Tribal Cultural Resources

This section discusses the potential for effects of the Modified Project on tribal cultural resources. Section 5.21 of the 2018 LSJR FR/EIS/EIR described the applicable environmental and regulatory setting and standards of significance, which are incorporated by reference and summarized below as appropriate.

No comments by individuals were received during circulation of the Notice of Preparation (NOP) for the 2018 LSJR FR/EIS/EIR relevant to tribal cultural resources.

The analysis in this section was developed based on the construction and operational features of the Modified Project, current regulatory requirements, and the tribal consultation efforts and cultural resources studies completed by the U.S. Army Corps of Engineers (USACE).

### 3.12.1 Environmental Setting

#### Cultural Setting

##### *Pre-contact Setting*

The complexity of the archaeological record in the central Sacramento–San Joaquin River Delta (Delta) region has resulted in the development and refinement of local sequences with specific cultural traits and chronologies. Fredrickson (1974) proposed a tripartite scheme—Archaic, Emergent, and Ethnographic—each with subdivisions, appropriate characteristics, and chronological ranges. The Lower Archaic [10,000–6,000 years before present (BP)] and the Initial Middle Archaic (6000–4500 BP) are not well known from San Joaquin County and are primarily represented from the research completed at Los Vaqueros Reservoir to the southwest. The other divisions of the Archaic, Emergent, and Ethnographic are reasonably well represented in the central Delta area. Additional details on the chronology and characteristics of these cultural divisions are summarized below.

The Terminal Archaic period is noted as having side-notched and stemmed projectile points, rectangular abalone ornaments, shaped and unshaped mortars and pestles, and rectangular Olivella shell beads. Subsistence focused on nuts and berries as well as bay-shore resources (shellfish, marine fishes, and mammals), freshwater fish, shellfish, and terrestrial mammals.

Upper Archaic sites are characterized by a bone tool and ornament industry and unshaped and well-shaped mortars and pestles. Subsistence was still centered on nuts and seeds, and faunal assemblages indicate an inclusion of marine and/or mammal resources. The presence of ocean shellfish in the archaeological record indicates a growing reliance on marine resources in interior valley sites.

The Meganos Culture began to appear in the San Joaquin Valley and Delta during the Upper Archaic. It spread quickly into Contra Costa County and other parts of the Bay Area. The Meganos Culture has been characterized as a blend of Bay and Delta populations.

The time period between 1300 BP and 1100 BP was one of social change and upheaval in the Delta and Central Valley. The southern Wintuan groups (ancestral Patwin) pushed the Meganos peoples into the Sacramento Delta and the Bay Miwok groups from the West Delta to Suisun Bay. Costanoan groups began to move across the Carquinez Strait. Meganos cemeteries in the Alameda and Diablo districts were abandoned during this turbulent 200-year period. After 900 BP, the Meganos peoples integrated with the Valley Yokuts groups in the San Joaquin Valley.

During the Emergent Period, cremations became quite common, and the bow and arrow were introduced with the concomitant use of small projectile points. Bedrock mortar milling stations appear early in the Emergent Period and were used in association with other portable milling equipment. Nuts, berries, and seeds were collected and processed. Large terrestrial mammals (e.g., deer, elk) appear to have been favored. Marine shellfish and marine fishes appear inland in much larger quantities than in previous periods. Emergent Period sites, typically identified as large mound villages, are found every few miles along the San Joaquin River and its major tributaries.

### ***Ethnographic Setting***

The Northern Valley Yokuts occupied the land on each side of the San Joaquin River from the Delta to south of Mendota when first encountered by the Spanish. The Yokuts' occupation of the northern parts of the Diablo range may be relatively recent, as linguistic evidence points toward an earlier Miwok occupation. The late prehistoric Yokuts were probably the largest indigenous culture in pre-contact California.

There was no Yokuts tribal organization that encompassed the whole of the peoples speaking Yokutsan languages, or even a tribal organization that encompassed an entire primary division, such as Foothill Yokuts. These are linguistic and geographic designations only. Similar to most tribal groups in California, the largest political entity among the Yokuts was that of the tribelet, which consisted of a large village and a few smaller surrounding villages. Larger villages and tribelets had a chief or headman—an advisory position that was passed from father to son (Wallace 1978).

In general, the Yokuts were seasonally mobile hunter-gathers with semi-permanent villages. Seasonal movements to temporary camps would occur to exploit food resources in other environmental zones. The primary difference between the various Yokuts groups rests largely on the differences in available resources in their territory. The Northern Valley Yokuts relied heavily on acorns as a food staple, which was processed into a thick soup, along with salmon and other fish, grass seeds, and tule roots (which were processed into meal), and probably waterfowl, tule elk, and pronghorn (Wallace 1978).

Principal settlements were located on the tops of low mounds, on or near the banks of the larger watercourses. Settlements were composed of single-family dwellings, sweathouses, and ceremonial assembly chambers. Dwellings were small and lightly constructed, semi-subterranean and oval. The public structures were large and earth covered. Sedentism was fostered by the abundance of riverine resources in the area (Wallace 1978).

European contact with the Northern Valley Yokuts began with intermittent trips by Spanish explorers traveling through the Sacramento-San Joaquin Valley in the late 1700s and early 1800s. Missionaries lured or captured many Yokuts and kept them in various missions, although many escaped and returned home to the valley. Skirmishes between Yokuts raiding parties and the Spanish and other Euroamericans resulted from repeated cattle rustling, which ultimately led to the deaths of numerous Yokuts individuals. A malaria epidemic in 1833 greatly diminished the Native population by killing thousands of Yokuts and people of surrounding groups. The local population was further reduced by the rapid appearance of miners during the Gold Rush era. Despite the fact that there was no gold in the Yokuts' territory, miners making their way to the gold fields caused upheaval. The remaining native populations were later displaced by miners, who returned to farm the area (Wallace 1978).

## Native American Consultation

For the 2018 LSJR FR/EIS/EIR, the USACE obtained a list of potentially interested Native Americans Tribes (Tribes) and sent letters to the Ione Band of Miwok Indians, the Buena Vista Rancheria of Me-Wuk Indians, the Wilton Rancheria, the Nototomne/Northern Valley Yokuts, and the California Valley Miwok Tribe. The first letter, dated August 12, 2012, informed the Tribes of the new feasibility study and requested any information they may have on areas of traditional cultural interest to their tribal members. There were two responses. Ms. Sylvia Burley, Tribal Chairperson of the California Valley Miwok Indians, requested government-to-government consultation; the request was forwarded to Mr. Mark Gilfillan, the USACE Tribal Liaison. Ms. Katherine Perez, Tribal Chairwoman for the Nototomne/Northern Valley Yokuts, called to request more information.

On December 2, 2013, the USACE sent letters that included a description, location maps of the final array of alternatives, and a copy of the draft *Programmatic Agreement between the U.S. Army Corps of Engineers and the California State Historic Preservation Officer regarding the Lower San Joaquin River Feasibility Study Project, San Joaquin County, California (PA)*. A call from Mr. Randy Yonemura concerning the PA was received by the USACE in December 2013; however, no specific comments were submitted by any Tribe. USACE sent a second round of letters on March 18, 2014, with a copy of the revised draft PA. No comments were received from the Tribes regarding the revised draft PA.

USACE distributed a final draft of the PA to Tribes on August 13, 2014. In response, the California Valley Miwok Tribe sent a letter on August 15, 2014, stating they had no further comments and were requesting concurring party status. Ms. Perez called USACE for additional information, stated that she was very concerned about the possibility of human burials within the project area, and requested concurring party status. She chose to sign the final draft form of the document and submitted it via facsimile on August 20, 2014. USACE received comments concerning the project and PA from the Buena Vista Rancheria on August 29, 2014. USACE provided the Buena Vista Rancheria responses to their comments in May 2016. The United Auburn Indian Community (UAIC) expressed interest in this project on November 23, 2015, and have also been included in consultations. The PA was fully executed by USACE and the California State Historic Preservation Officer (SHPO) on May 11, 2016.

As required by Stipulation XI of the PA, USACE sent letters to Tribes on November 8, 2019, regarding geotechnical investigations at the Modified Project site. No responses were received. On March 24, 2020, USACE sent letters to Tribes describing the Modified Project, the cultural resources inventory effort, and a request for the review of the Modified Project site delineation and historic property identification efforts. No responses were received. On July 28, 2021, USACE sent letters to Tribes regarding the borrow site and a request for comments on the designation of the proposed borrow area. No responses were received. February 6, 2023, USACE consulted with Native American Tribes on a Revised APE for the addition of environmental mitigation sites. March 16, 2023, USACE consulted with Native American Tribes on the environmental mitigation sites finding of No Historic Properties Affected for the Project.

On October 1, 2021, SJAFCA sent letters to 11 representatives from Tribes, pursuant to California Public Resources Code (PRC) Section 21080.3.1(b) (Assembly Bill [AB] 52) and CEQA; the letters provided information on the Modified Project and requested that the Tribes inform SJAFCA if they had any concerns regarding potential impacts from the Modified Project on cultural resources and tribal cultural resources. One response was received within 30 days of certified receipt of notices; Ms. Anna Cheng of UAIC's Tribal Historic Preservation Department wrote on October 21, 2021, that the majority of the Modified Project site falls outside the UAIC's geographic area of traditional and cultural affiliations.

Pursuant to PRC Section 21080.3.1(b) (AB 52) and CEQA, on February 27, 2023, SJAFCA sent letters to the Confederated Villages of Lisjan, North Valley Yokuts Tribe, and Wilton Rancheria via email and certified mail to notify the Tribes of the addition of the environmental mitigation sites to the Modified Project and requesting that the Tribes inform SJAFCA if they had any concerns regarding potential impacts from the Modified Project on cultural resources and tribal cultural resources. On March 8, 2023, the Confederated Villages of Lisjan responded and requested a copy of the CHRIS results, the EIR, and archaeological reports. On March 8, 2023, the North Valley Yokuts Tribe responded requesting to be involved in the process and development of the project and stated that they are concerned about projects in and around Old San Joaquin River. SJAFCA responded to the Confederated Villages of Lisjan and North Valley Yokuts via email on March 15, 2023. These emails included a link to download the cultural resources survey reports for the mitigation sites analyzed at a project-level and provided additional context regarding the relationship between the 2018 LSJR FR/EIS/EIR and the Modified Project analyzed in this SEIR. SJAFCA did not receive any responses from this latest outreach.

To date, no Tribes have identified any tribal cultural resources that may be impacted by the Modified Project.

## **Cultural Resources Inventory**

The following is a summary of the background research, records search, pedestrian survey, and resource evaluations conducted for the Modified Project site (including the Fourteen-Mile Slough Pump Station Site, SJR East Site, and SJR West Site, which are the three potential biological mitigation sites being evaluated at a project-level). The corresponding cultural resources identification and evaluation efforts are detailed below (InContext 2017; USACE 2020; Clinton-Selin and Ugan 2022; Sims and Cleveland 2023). No site-specific cultural resources studies have

yet been conducted for the Van Buskirk Park and SJR South mitigation sites, which are analyzed at the programmatic level for this SEIR.

### ***CHRIS Records Searches***

Records searches of the Central California Information Center (CCIC) of the California Historical resources Information System (CHRIS) were conducted in 2017, 2019, 2021, and 2022, and covered the TS\_30\_L levee footprint, barge off-haul site, borrow site, and three of the five potential environmental mitigation sites (Fourteen-Mile Slough Pump Station, SJR East, and SJR West mitigation sites). As a result of these searches, four previously recorded cultural resources were identified in the project area, none of which are indigenous.

### ***Field Survey***

Cultural resources pedestrian surveys were conducted for the entire Modified Project site and the Fourteenmile Slough, SJR East, and SJR West mitigation sites between March 2017 and December 2022 (InContext 2017; USACE 2020; Clinton-Selin and Ugan 2022; Sims and Cleveland 2023). As a result of these surveys, nine cultural resources were newly recorded; only one of these, archaeological isolate SEWD-ISO-1, is an indigenous resource.

In 2017, InContext also conducted an archaeological subsurface survey of the borrow area consisting of 85 hand-excavated auger probes and monitoring of 20 geotechnical trenches. No buried archaeological materials or buried paleosols were observed during the investigation. Based on the results of the testing program, there is a low likelihood of any intact subsurface archaeological resources in the borrow area.

### ***Summary of Cultural Resources Identified***

As a result of the records searches and surveys, 12 cultural resources were identified, collectively, in the Modified Project site and the Fourteenmile Slough, SJR East, and SJR West mitigation sites; only one of these, archaeological isolate SEWD-ISO-01, is an indigenous resource and is discussed below.

Archaeological isolate SEWD-ISO-1 was identified in the borrow area and consists of one basalt flake. SEWD-ISO-01 was evaluated for significance and determined not eligible for the NRHP by the USACE. Similarly, it does not appear to be eligible for the California Register of Historical Resources (CRHR). Therefore, no indigenous archaeological resources or unique archaeological resources were identified in the Modified Project site, Fourteenmile Slough, SJR East, or SJR West mitigation sites.

## **3.12.2 Regulatory Setting**

The following federal, state, and local regulations would apply to the Modified Project.

### **Federal**

There are no federal regulations specifically related to tribal cultural resources. Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, includes protection of

traditional cultural properties as a type of historic property. Section 3.7.2 provides an overview of the NHPA and its implementing regulations.

## State

### **California Environmental Quality Act**

CEQA (PRC Section 21000 *et seq.*) is the principal statute governing environmental review of projects occurring in California. CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including a significant effect on tribal cultural resources. Under CEQA (PRC Section 21084.1), a project that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment.

### **Tribal Cultural Resources**

Impacts on tribal cultural resources are considered under CEQA (PRC Section 21084.2) (see AB 52 discussion, below). PRC Section 21074(a) defines a *tribal cultural resource* as any of the following:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that are either of the following:
  - Included or determined to be eligible for inclusion in the California Register of Historical Resources (CRHR).
  - Included in a local register of historical resources, as defined in PRC Section 5020.1(k).
- Resources determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of [PRC] Section 5024.1. In applying these criteria, the lead agency would consider the significance of the resource to a California Native American Tribe.

### **Assembly Bill 52**

AB 52 applies to projects for which an NOP of an EIR or a Notice of Intent to Adopt a Negative Declaration or Mitigated Negative Declaration (MND) will be filed. The primary intent of AB 52 is to include Tribes early in the environmental review process and to establish a new category of resources related to Native Americans that require consideration under CEQA, known as *tribal cultural resources*. As stated above, PRC Section 21074(a) defines tribal cultural resources as “sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe” that are either included or determined to be eligible for inclusion in the CRHR or included in a local register of historical resources, or a resource that is determined to be a tribal cultural resource by a lead agency, in its discretion and supported by substantial evidence.

Within 14 days of a lead agency determining that an application for a project is complete, or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact, or a tribal representative, of Tribes that are traditionally and culturally affiliated with the geographic area of the project (as defined in PRC Section 21073) and who have requested in writing to be informed by the lead agency (PRC Section 21080.3.1[b]).

Tribes interested in consultation must respond in writing within 30 days of receipt of the notification and the lead agency must begin consultation within 30 days of receiving the Tribe's request for consultation (PRC Sections 21080.3.1[d] and 21080.3.1[e]).

Potential consultation discussion topics include: the type of environmental review necessary; the significance of tribal cultural resources; the significance of the project's impacts on the tribal cultural resources; project alternatives or appropriate measures for preservation; and mitigation measures (PRC Section 21080.3.2[a]). Consultation is considered concluded when either: (1) the parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or (2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached (PRC Section 21080.3.2[b]).

If a Tribe has requested consultation, but fails to provide comments to the lead agency, or otherwise fails to engage in the consultation process, or if the lead agency has complied with PRC Section 21080.3.1(d) and the Tribe did not request consultation within 30 days, the lead agency may certify an EIR or adopt an MND (PRC Section 21082.3[d]).

Information, including, but not limited to, the location, description, and use of the tribal cultural resources, that is submitted by a Tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed without the prior consent of the Tribe that provided the information. Any information included in an environmental document shall be published in a confidential appendix to the environmental document unless the Tribe consented to the disclosure of some or all of the information to the public (PRC Section 21082.3[c][1]).

### ***California Register of Historical Resources***

The CRHR is "an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility for the CRHR are based upon National Register of Historic Places (NRHP) criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties formally determined eligible for, or listed in, the NRHP. To be eligible for the CRHR, a cultural resource must be significant at the local, State, and/or federal level under one or more of the following four criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. Is associated with the lives of persons important in our past.
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the CRHR must meet one of the criteria of significance described above and retain integrity to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a cultural resource may not retain sufficient integrity to meet the criteria for listing in the NRHP but may still be eligible for listing in the CRHR.

Additionally, the CRHR consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The CRHR automatically includes the following:

- California properties listed in the NRHP and those formally determined eligible for the National Register.
- California Registered Historical Landmarks from No. 770 onward.
- California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion in the CRHR.

Other resources that may be nominated to the CRHR include:

- Cultural resources with a significance rating of Categories 3 through 5 (those properties identified as eligible for listing in the NRHP, the CRHR, and/or a local jurisdiction register).
- Individual cultural resources.
- Cultural resources contributing to historic districts.
- Cultural resources designated or listed as local landmarks, or designated under any local ordinance, such as a historic preservation overlay zone.
- Tribal cultural resources.

### **California Government Code**

#### **Sections 6254(r) and 6254.10**

California Government Code (CGC) Section 6254 and 6254.10 (part of the implementing regulations of the California Public Records Act of 2016 [PRA]), were enacted to protect archaeological sites from unauthorized excavation, looting, or vandalism. CGC Section 6254® explicitly authorizes public agencies to withhold information from the public relating to “Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission.” CGC Section 6254.10 specifically exempts from disclosure requests for “records that relate to archaeological site information and reports, maintained by, or in the possession of the DPR, the State Historical Resources Commission, the CSLC, the NAHC, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a Native American Tribe and a state or local agency.”

#### **Sections 27460 and 27491**

CGC Section 27460 requires that human remains be “interred decently” in the event that no person takes charge of them when an inquest is held by a coroner. CGC Section 27491 requires that, in the case of unattended deaths, the person in charge of the human remains notify the coroner, and that the coroner inquire into the death.

## **California Public Resources Code**

### **Section 5097**

PRC Section 5097.99, as amended, states that no person shall obtain or possess any Native American artifacts or human remains that are taken from a Native American grave or cairn. Any person who knowingly or willfully obtains or possesses any Native American artifacts or human remains is guilty of a felony, which is punishable by imprisonment. Any person who removes, without authority of law, any such items with an intent to sell or dissect, or with malice or wantonness, is also guilty of a felony punishable by imprisonment. PRC Section 5097.98 provides procedures in the event human remains of Native American origin are discovered during project implementation on non-federal land. PRC Section 5097.98 requires that no further disturbances occur in the immediate vicinity of the discovery, that the discovery is adequately protected according to generally accepted cultural and archaeological standards, and that further activities take into account the possibility of multiple burials. PRC Section 5097.98 further requires the NAHC, upon notification by a County Coroner, designate and notify a Most Likely Descendant regarding the discovery of Native American human remains. The Most Likely Descendant has 48 hours from the time of being granted access to the site by the landowner to inspect the discovery and provide recommendations to the landowner for the treatment of the human remains and any associated grave goods. The provisions of PRC Section 5097.99 are summarized since tribal cultural resource may include human remains and associated artifacts.

### **Sections 5024 and 5024.5**

The State Legislature enacted PRC Sections 5024 and 5024.5 as part of a larger effort to establish a state program to preserve cultural resources. These code sections require state agencies to take several actions to ensure preservation of state-owned cultural resources under their jurisdictions. These actions include: evaluating resources for eligibility for listing in the National Register and designation as California Historical Landmarks; maintaining an inventory of eligible and listed resources; and managing these cultural resources so that they will retain their historic characteristics. PRC Section 5024(f) states that a state agency shall submit to the State Historic Preservation Officer (SHPO) for comment documentation for any project having the potential to affect historical resources listed in or potentially eligible for listing in the National Register or registered as or eligible for registration as a California Historical Landmark. PRC Section 5024.5 requires state agencies to notify and consult with the SHPO regarding adverse effects to historical resources and measures to eliminate or mitigate the adverse effect. Note, some tribal cultural resources may also qualify as historical resources and, therefore, the provisions of PRC Sections 5024 and 5024.5 would apply.

## **California Native American Historic Resources Protection Act**

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to \$50,000 per violation, for persons who unlawfully and maliciously excavate upon, remove, destroy, injure, or deface a Native American historic, cultural, or sacred site that is listed or may be listed in the CRHR.

### **California Health and Safety Code Section 7050.5**

Section 7050.5 of the California Health and Safety Code protects human remains by prohibiting the disinterment, disturbance, or removal of human remains from any location other than a dedicated cemetery. PRC Section 5097.98 (reiterated in CCR Section 15064.59[e] and discussed above) also identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery.

### **California Executive Order B-10-11**

California Executive Order B-10-11 was issued by Governor Edmund G. Brown, Jr. on September 19, 2011. The order affirms that all state agencies shall encourage communication and consultation with Tribes.

## **Local**

### **City of Stockton General Plan**

The City of Stockton General Plan (December 2018) includes the following policy and action item related to tribal cultural resources.

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

*Action LU-5.2F:* If development could affect a tribal cultural resources, require the developer to contact an appropriate tribal representative to train construction workers on appropriate avoidance and minimization measures, requirements for confidentiality and culturally appropriate treatment, other applicable regulations, and consequences of violating State laws and regulations.

## **3.12.3 Impact Analysis and Mitigation Measures**

### **Significance Criteria**

For the purpose of this analysis, the relevant standards of significance from the 2018 LSJR FR/EIS/EIR have been used to determine whether implementing the Modified Project would result in a significant impact. An impact is considered significant if implementation of the proposed Modified Project would:

- a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:
  - i. Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k).
  - ii. Determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

## Methodology and Assumptions

The following impact analysis considers the potential impacts of the proposed changes included in the Modified Project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the 2018 LSJR FR/EIS/EIR is considered sufficient to evaluate the impacts of the Modified Project, no additional environmental review is provided.

## Issues Analyzed Further in This SEIR

The analysis in the 2018 LSJR FR/EIS/EIR focused on potential impacts related to the following issue area relevant to this SEIR:

- Tribal cultural resources (by proxy through traditional cultural properties)

Additional analysis of potential effects of the Modified Project is presented below.

## Impacts and Mitigation Measures

### **Impact 3.12-1: The Modified Project could cause a substantial adverse change in the significance of a tribal cultural resource as defined in PRC Section 21074.**

The USACE and SJAFCA have been consulting with a number of Tribes, including in accordance with the PA and PRC Section 21080.3.1(b), on the Modified Project since 2021; this consultation has included all five mitigation sites. Based on the background research and consultation with Tribes, no tribal cultural resources, as defined in PRC Section 21074, have been identified that could be impacted by the Modified Project. Therefore, it does not appear that the Modified Project would impact tribal cultural resources.

However, if archaeological resources or human remains are uncovered during construction activities for the levee improvements and three project-level environmental mitigation sites (14-Mile Sough Pump Station Site, SJR West Site, and SJR East Site) and are considered to be tribal cultural resources, impacts to tribal cultural resources could be **potentially significant**. Implementing Mitigation Measure 3.12-1 and Mitigation Measure 3.12-2 would reduce the potential for a significant impact resulting from inadvertent damage to or destruction of previously undocumented cultural materials to a less-than-significant level. These measures would require cultural resources awareness training for all Modified Project personnel involved with ground disturbance as well as actions to follow if cultural or tribal cultural materials are discovered during Modified Project-related construction activities, including appropriate treatment and protection measures. In addition, Mitigation Measure 3.12-3 would ensure that any human remains identified during Modified Project activities are treated according to the provisions of the PRC and the California Health and Safety Code. Therefore, the substantial adverse change in the significance of a tribal cultural resource impact would be **potentially significant** for the levee improvements and three project-level biological mitigation sites.

**Mitigation Measure 3.12-1 Cultural Resources Awareness Training.** See text under Section 3.7, Cultural and Paleontological Resources, Impact 3.7-2, Mitigation Measure 3.7-1.

**Mitigation Measure 3.12-2 Inadvertent Discovery of Cultural Materials:** See text under Section 3.7, Cultural and Paleontological Resources, Impact 3.7-2, Mitigation Measure 3.7-2.

**Mitigation Measure 3.12-3 Inadvertent Discovery of Human Remains:** See text under Section 3.7, Cultural and Paleontological Resources, Impact 3.7-3. Mitigation Measure 3.7-3.

The program-level environmental mitigation sites (Van Buskirk Park and SJR South Site) are not fully developed and construction details are not known, there is the potential that construction activities could unearth, expose, or disturb subsurface archaeological resources that have not been previously recorded. If such archaeological resources were encountered and found to qualify as tribal cultural resources, pursuant to PRC Section 21074, any impacts of the program-level biological mitigation sites on the resources would be potentially significant. Such potentially significant impacts would be reduced with implementation of the PA, as required by the 2018 LSJR FR/EIS/EIR. However, the level of impact would still be **potentially significant** for program-level biological mitigation sites because the characteristics of any previously unidentified tribal cultural resources that may be present remains unknown.

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## Cumulative Impacts

**Impact 3.12-2: The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts on tribal cultural resources.**

Cumulative impacts related to cultural resources, including traditional cultural properties (which may qualify as tribal cultural resources), were analyzed in Section 5.23 of the 2018 LSJR FR/EIS/EIR. The geographic scope for cultural resources was defined as areas of individual ground-disturbance sites, with regional implication. When the effects of the Modified Project are considered in combination with those of other past, present, and future projects to identify cumulative effects, the other projects that are considered may also vary depending on the type of environmental effects being assessed.

As discussed for Alternative 7a in the 2018 LSJR FR/EIS/EIR, cumulative impacts to tribal cultural resources would be primarily related to other construction projects that could occur during the same timeframe and within the same vicinity as the Modified Project. Construction activities, including those associated with the Modified Project, could contribute to the progressive loss of tribal cultural resources and result in significant cumulative impacts, if any such resources were to exist. While there are no known cultural resources in the TS\_30\_L levee site, borrow area, barge off-haul site area, or the three project-level mitigation sites, an identification and evaluation effort has not yet been conducted for the Van Buskirk and SJR South proposed mitigation sites. The implementation of the PA, as required by the 2018 LSJR FR/EIS/EIR, would reduce the project's contribution to a potential impact on currently unidentified tribal cultural resources, but not to a less than considerable level. Therefore, this cumulative impact would remain **significant and unavoidable**, as was determined for Alternative 7a.

## 3.13 Wildfire

This section discusses the potential for effects of the Modified Project to be located in or near state responsibility areas or lands classified as Very High Fire Hazard Severity Zones, and to result in wildfire impacts.

On December 28, 2018, Appendix G of the California Environmental Quality Act (CEQA) Guidelines was amended by the Governor's Office of Planning and Research so that it now includes an evaluation of wildfire risks. As such, the 2018 LSJR FR/EIS/EIR did not evaluate Alternative 7a's impacts related to wildfire and no comments by individuals were received during circulation of the Notice of Preparation (NOP) for the 2018 LSJR FR/EIS/EIR relevant to wildfire. Therefore, this section discusses the potential effects of the Modified Project related to the updated Appendix G standards of significance for wildfire.

Section 5.15, Transportation, of the 2018 LSJR FR/EIS/EIR described potential impacts related to the following topic relevant to wildfire that will be discussed in this section for the Modified Project:

- Potential to interfere with emergency access or with an adopted emergency response or evacuation plan.

The analysis in this section was developed based on the construction and operational features of the Modified Project and current regulatory requirements, and the revised Appendix G CEQA checklist for wildfire.

### 3.13.1 Environmental Setting

#### Regional Overview

The Modified Project is located in the lower (northern) portion of the San Joaquin River system in the Central Valley of California. The TS\_30\_L levee is located on the northwestern side of Stockton, bordering North and Central Stockton, and extends over one mile in length, separating the Brookside residential development on the east and the Wright Elmwood Tract on the west and bounded on the south by West March Lane and on the north by White Slough/Fourteenmile Slough. Other Modified Project components include: the SEWD borrow site, which is located approximately nine miles east of the TS\_30\_L levee (on the east side of Stockton); haul routes through the City of Stockton; the barge off-haul site, which is located along the San Joaquin River approximately 0.7 miles west of the southern end of the TS\_30\_L levee; and the biological mitigation sites, which are located in the Wright-Elmwood Tract directly west and within 2 miles of the TS\_30\_L levee (14-Mile Slough Pump Station Site, SJR West Site, and SJR East Site), in Stockton approximately 4.3 miles southeast of the TS\_30\_L levee, and in Manteca approximately 15 miles southeast of the TS\_30\_L levee. These sites are at the interface of urban and agricultural areas.

## Fire Hazard Severity Zones

The California Department of Forestry and Fire Protection (CAL FIRE) is responsible for managing and protecting California's natural resources and has been charged with the identification of Fire Hazard Severity Zones (FHSZs). These zones include FHSZs in State Responsibility Areas (SRAs) and all Very High FHSZs within Local Responsibility Areas (LRAs). Factors that account for wildfire behavior include several variables, primarily climate, weather, vegetation, topography, and human influences, which intermix to produce local and regional fire regimes that affect how, when, and where fires burn. FHSZs are categorized as Moderate, High, and Very High, which are defined as (CAL FIRE 2021):

- **Moderate:** Wildland areas supporting areas of typically low fire frequency and relatively modest fire behavior or developed/urbanized areas with a very high density of nonburnable surfaces including roadways, irrigated lawn/parks, and low total vegetation cover (less than 30 percent) that is highly fragmented and low in flammability (e.g., irrigated, manicured, managed vegetation).
- **High:** Wildland areas that support medium- to high-hazard fire behavior and roughly average burn probabilities or developed/urban areas, typically with moderate vegetation cover and more limited nonburnable cover. Vegetation cover typically ranges from 30 to 50 percent and is only partially fragmented.
- **Very High:** Wildland areas that support high to extreme fire behavior or developed/urban areas with high vegetation density (greater than 70 percent cover) and associated high fuel continuity. Actions taken within Very High FHSZs are subject to additional restrictions and requirements by the State and local governments.

### **Local Responsibility Areas**

The Modified Project, in its entirety, is located within an undesignated LRA (SJMAP, 2021). The San Joaquin County General Plan identifies four communities as Communities at Risk for wildland fire due to their location near areas susceptible to potential wildfires (Bellota, Clements, Linden, and Lockeford), none of which are within or near the Modified Project.

### **State Responsibility Areas**

The Modified Project is not located within or near a SRA.

### **Federal Responsibility Areas**

The Modified Project is not located within or near a FRA.

## 3.13.2 Regulatory Setting

The following federal, state, and local regulations would apply to the Modified Project.

### **Federal**

No federal regulations pertain to wildfire that are applicable to the Modified Project.

## State

### ***Executive Order B-52-18***

On May 10, 2018, in response to changing environmental conditions and the increased risk to California's citizens, Governor Edmund G. Brown Jr. issued Executive Order B-52-18 to support the state's resilience to wildfire and other climate impacts, address extensive tree mortality, increase forests' capacity for carbon capture, and improve forest and forest fire management. The executive order required the California Natural Resources Agency, in coordination with the State Water Resources Control Board, CAL FIRE, and other agencies, to increase the pace and scale of fire fuel treatments on State and private lands. Executive Order B-52-18 committed \$96 million in additional State funds to for these efforts and called for a doubling of the land actively managed through vegetation thinning, prescribed burning, and restoration from 250,000 acres per year to 500,000 acres per year statewide.

### ***Government Code Sections 51179 and 51182***

Under California Government Code sections 51179 and 51182, local agencies are required to designate Very High FHSZs and to require landowners to reduce fire hazards adjacent to occupied buildings within these zones.

### ***California Fire Code***

The California Fire Code (Fire Code) (California Code of Regulations [Cal. Code Regs.] title 24, part 9) includes provisions and standards for emergency planning and preparedness, fire service features, fire protection systems, hazardous materials, fire flow requirements, fire hydrant locations and distribution, and the clearance of debris and vegetation within a prescribed distance from occupied structures in wildfire hazard areas. Fire Code Chapter 49, Requirements for Wildland-Urban Interface Fire Areas, prescribes construction materials and methods in fire hazard severity zones; requirements generally parallel California Building Code Chapter 7A. The Fire Code is updated on a 3-year cycle; the current 2016 Fire Code took effect in January 2017; the 2019 Fire Code took effect in 2020.

## Local

### ***Regional Congestion Management Program (2021)***

Since the 2018 LSJR FR/EIS/EIR, the SJCOG has updated their Regional Congestion Management Program (RCMP). The purpose of the RCMP is to monitor congestion in order to identify congestion problems and establish programs to reduce this congestion. The 2021 RCMP designates a core network of key transportation facilities as part of the regional transportation system in order to focus implementation of the RCMP in a way that facilitates regional travel within San Joaquin County. One of the main focuses of the RCMP is to reduce single occupant vehicle (SOV) travel and minimize the need for increasing SOV roadway capacity. The RCMP consists of a network of 504 roadway miles (396 of which are National Highway System [NHS]-designated roadways and 108 of which are non-NHS roadways). The RCMP also incorporates City of Stockton Bicycle Master Plan, Pedestrian, and Safe Routes to School Plan (SJCOG 2012) to designate a regional bikeway network and guide future bicycle performance measure developments and infrastructure improvement projects.

The RCMP sets forth a system of objectives for operational efficiency; goods movement; the transit system, regional bikeway network, and complete streets; travel demand management, safety, and system management. Each category of objectives is then associated with a measure of effectiveness and specific monitoring-based performance measure. The RCMP also sets forth a prioritization of congestion reduction strategies, including demand management strategies (e.g., promotion of public transit or ridesharing, improvements to pedestrian and bicycle facilities, employer-based commuter benefits or telecommuting programs, transit-oriented land use development and zoning, etc.); traffic operations strategies (e.g., metering traffic onto freeways, transit signal priority, automated toll collection, traffic signal optimization, etc.); public transportation strategies (e.g., realigned transit service schedules and stop locations, providing real-time data on transit schedules, more frequent transit or expanded hours of service, provision for bicycles on transit vehicles, etc.); and road capacity strategies (e.g., intersection improvements, center turn lanes, constructing new high occupancy vehicle lanes, etc.). As a last resort, the RCMP also provides for the possibility of SOV capacity increasing projects.

### **San Joaquin County General Plan (2016)**

The 2018 LSJR FR/EIS/EIR evaluated the 2007 plan, but since release of that document San Joaquin County has updated their general plan (San Joaquin County 2016). Chapter 3.3 of the updated general plan outlines the following goals and applicable policies related to wildfire:

**Policy PHS-1.13 Public Awareness of Climate Change:** The County shall support public awareness of water conservation measures, agricultural changes, storm and flood preparedness, wildfire fire protection, air quality effects, extreme weather events, heat and human health, and disease prevention to help prepare for the potential impacts of climate change.

**Policy PHS-4.1 Community Wildfire Protection Plan:** The County shall maintain and implement the Community Wildfire Protection Plan as a mechanism for community input and identification of areas with high fire hazard risk.

**Policy PHS-4.2 Residential Densities in High Hazard Areas:** The County shall restrict development to rural residential densities or lower and require on-site fire suppression measures in areas with high or extreme wildfire hazards.

**Policy PHS-4.3 Fire Prevention Measures:** The County shall implement State recommendations for fire prevention in Fire Hazard Severity Zones and require new and/or existing development to provide clearance around structures, use fire-resistant ground cover, build with fire-resistant roofing materials, participate in fuel load reduction, and take other appropriate measures.

**Policy PHS-4.4 Clear Zones:** The County shall require clear zones and regular weed abatement around residential structures in high fire hazard areas and assist property owners in identifying how clear zones should be maintained.

**Policy PHS-4.5 Vegetation and Fuel Management:** The County shall require new development in high fire-hazard areas to have fire-resistant vegetation, cleared fire breaks separating communities or clusters of structures from native vegetation, or a long-term comprehensive vegetation and fuel management program consistent with State codes 4290 and 4291 for wildland fire interface and vegetation management.

**Policy PHS-4.6 Fire Protection Coordination:** The County shall encourage well-organized and efficient coordination among fire agencies, CalFire, and the County.

### 3.13.3 Impact Analysis and Mitigation Measures

#### Significance Criteria

For the purpose of this analysis, the relevant standards of significance from the current CEQA Guidelines Appendix G have been used to determine whether implementing the Modified Project would result in a significant impact. A wildfire impact is considered significant if the Modified Project is located in or near SRAs or lands classified as very high hazard severity zones, and implementation of the Modified Project would:

- Substantially impair an adopted emergency response plan or emergency evacuation plan;
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire;
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

#### Methodology and Assumptions

The following impact analysis considers the potential impacts of the proposed changes included in the Modified Project, including changed circumstances and new information requiring additional environmental review. As little information or analysis related to wildfire risk was included in the 2018 LSJR FR/EIS/EIR (outside evaluation of potential conflicts with emergency response plans), new analysis has been added to sufficiently consider the Modified Project relative to the current wildfire criteria in the CEQA Appendix G Guidelines.

#### Impacts and Mitigation Measures

**Impact 3.13-1: The Modified Project could substantially impair an adopted emergency response plan or emergency evacuation plan.**

The 2018 LSJR FR/EIS/EIR discussed impacts related to emergency response in Section 5.15, *Transportation*.

The 2018 LSJR FR/EIS/EIR determined that Alternative 7a would result in minimal, short-term impacts on traffic but would not conflict with the SJCOG CMP because homes, businesses, and other traffic generating development would not be constructed and because traffic is not targeted in the CMP. For the Modified Project, there is no change from the analysis presented in the 2018 LSJR FR/EIS/EIR related to the CMP. Additionally, Section 3.5, *Transportation*, of this SEIR further discusses impacts related to emergency access and emergency response times as a result of Modified Project construction traffic.

The 2018 LSJR FR/EIS/EIR determined that Alternative 7a would result in an increase in traffic on local roadways as a result of construction haul trips and implementation of Alternative 7a could require haul routes that occur in the vicinity of schools or move through residential areas that are not designated truck routes. Therefore, construction activities associated with Alternative 7a could result in construction traffic near residences and schools, which could cause additional traffic on local roads that could slow emergency response times. This impact was determined to be significant and unavoidable. Other items discussed in the 2018 LSJR FR/EIS/EIR regarding lane closures for levee road work, railroad service disruption due to work under railroad crossings, and road closures due to levee work requiring drilling through roadways would not apply to the Modified Project.

Similar to Alternative 7a, the Modified Project would result in minimal, short-term impacts on traffic. However, the Modified Project would not substantially impair an adopted emergency response plan or emergency evacuation plan because the Modified Project does not conflict with the SJCOG CMP or any other adopted emergency response or evacuation plan. Therefore, the Modified Project would not substantially impair an adopted emergency response plan or emergency evacuation plan, related to wildfire or otherwise, and this impact would be **less than significant**.

**Mitigation:** None required.

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**Impact 3.13-2: The Modified Project could, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.**

The Modified Project is not located within or near state responsibility areas or lands classified as very high fire hazard severity zones. However, components of the Modified Project are located adjacent to the Brookside residential community, which is immediately to the east of the TS\_30\_L levee, and construction activities would require the use of heavy equipment, vehicles, and temporary staging/stockpile areas that could lead to an increased risk of ignition of the vegetation or material within and around the Modified Project site, leading to a **potentially significant** impact. These materials are commonly used in construction of levees and associated infrastructure, however, and the worker health and safety plan required in Section 5.20.10 of the 2018 LSJR FR/EIS/EIR would call for fuel, equipment, and hazards Best Management Practices that would reduce the risk of igniting a wildfire to a less than significant impact.

Implementation of the Modified Project in the long term would result in less vegetation/wildfire fuel at the TS\_30\_L levee site because the Modified Project would remove vegetation from the levee slopes, resulting in beneficial impacts to wildfire from fuel reduction. As TS\_30\_L levee slopes are to be covered in crushed rock and riprap (and not revegetated), the reduction in wild growth would further reduce wildfire risks. In addition, operation and maintenance activities at the TS\_30\_L levee site would not require mowing and would therefore not introduce a fire risk from equipment use within dry, fire-prone grasses. Other components of the Modified Project (i.e., development of biological mitigation sites) would require transitioning land from agricultural use to wetland and riparian habitat. These sites would be graded to support wetland

hydrology and vegetation, thereby requiring ground saturation for much of the year, which would not exacerbate wildfire risk in the area. Similarly, development of the barge off-haul site and SEWD borrow site would disturb, grade, and/or excavate areas currently in agricultural use, which would not introduce greater risk of wildfire.

Implementation of the health and safety plan required for Alternative 7a and stated in the 2018 LSJR FR/EIS/EIR, the potential impact on the exacerbation of wildfire risks for the Modified Project would be **less than significant** with mitigation.

The mitigation measures for Alternative 7a outlined in Section 5.20.10 of the 2018 LSJR FR/EIS/EIR shall be applied to the Modified Project, as applicable:

**Mitigation Measure 3.13-1: Worker Health and Safety Plan.** A worker health and safety plan shall be prepared before the start of construction that identifies, at a minimum, all contaminants that could be encountered during construction; all appropriate worker, public health, and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan shall describe actions to be taken if hazardous materials are encountered on-site, including protocols for handling hazardous materials, preventing their spread and emergency procedures to be taken in the event of a spill.

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**Impact 3.13-3: The Modified Project could require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.**

The Modified Project would include the construction of a 5,850 linear foot cutoff wall, levee reshaping, placement of rock riprap and crushed rock along the existing levee slopes, creation of two co-located stockpile and staging areas, development of a barge off-haul site and an approximately 96.4-acre borrow site, use of haul routes to and from the staging/stockpile areas and borrow sites, and development of a biological mitigation site. Implementation of the Modified Project would not include the construction or maintenance of infrastructure (i.e., roads, fuel breaks, emergency water sources, power lines, or other utilities) that could exacerbate fire risk. Additionally, the Modified Project is not located within or near SRAs or lands classified as very high hazard severity zones. Modified Project operations do not vary significantly from ongoing activities that already occur to maintain the levee. Therefore, the potential impact on exacerbated fire risk from Modified Project construction or operation would be **less than significant**.

**Mitigation:** None required.

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**Impact 3.13-4: The Modified Project could expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.**

As discussed under Impact 3.13-2 and Impact 3.13-3, the Modified Project site is not located within an SRA or lands classified as very high hazard severity zones. The Modified Project would result in cutoff wall construction, levee reshaping, erosion protection installation, and development of staging/stockpile areas, borrow sites, a barge off-haul site, access routes, and a biological mitigation site. Under existing conditions, the existing levee does not meet a 200-year level of protection for urban and urbanization areas and the study area has experienced floods (i.e., years 1955, 1958, and 1997) that resulted in varying degrees of damage. Implementation of the Modified Project would increase the level of flood protection along the TS\_30\_L levee and would result in beneficial impacts on flooding. Levee maintenance and operation would be provided by a local maintaining agency (LMA), as discussed in Chapter 2, *Project Description*, Section 2.4.6, to ensure serviceability of the Modified Project facilities in times of flood. Inspections would occur prior to the flood season and immediately after a major high-water period. However, these activities would not expose people or structures to significant risks, including flooding or landslide as a result of runoff, post-fire slope instability, or drainage changes. Additionally, because the Modified Project is consistent with existing uses and located within an LRA, the Modified Project would not exacerbate fire risk or create exacerbated post-fire conditions involving slope instability, landslides, downslope or downstream flooding, or changes in drainage. Modified Project operations do not vary significantly from ongoing activities that already occur to maintain the levee. Therefore, the Modified Project would not expose people or structures to significant post-fire changes, and this impact would be **less than significant**.

**Mitigation:** None required.

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## **Cumulative Impacts**

**Impact 3.13-5: The Modified Project, in combination with reasonably foreseeable future projects, could result in significant cumulative impacts related to wildfire.**

The geographic scope of potential cumulative wildfire impacts encompasses the Modified Project site and its vicinity. However, none of the cumulative projects evaluated in the 2018 LSJR FR/EIS/EIR would be associated with a high potential for wildfire ignition and the Modified Project would create less-than-significant impacts related to wildfire risk, uncontrolled spread of wildfire, or emergency response plans. Therefore, the cumulative impact would not be cumulatively considerable and would be **less than significant**.

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# CHAPTER 4

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# CHAPTER 5

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Appendix A  
**2018 LSJRP FR/EIS/EIR  
Mitigation Monitoring and  
Reporting Program**

# Mitigation Monitoring and Reporting Program

This chapter is prepared in accordance with CEQA Guidelines Section 15097, which requires adoption of a program for monitoring or reporting on the project revisions and measures imposed to mitigate or avoid significant environmental effects.

This chapter summarizes in tabular format the mitigation measures that would be integrated into the Lower San Joaquin River Final Feasibility Report Final EIR/EIS to reduce the severity of potentially significant impacts. The chapter also describes the party responsible for mitigation measure implementation, timing of implementation, and the party responsible for ensuring compliance. The table that follows consists of four column headings which are defined as follows:

- **Mitigation Measure:** This column contains the mitigation measures to be implemented.
- **Implementation Responsibility:** This column contains an assignment of responsibility for implementing the mitigation measures.
- **Implementation Timing:** This column provides a general schedule for conducting each monitoring and reporting task, identifying where appropriate both the timing and the frequency of the action.
- **Monitoring/Oversight Responsibility:** This column contains an assignment of responsibility for the monitoring and reporting tasks

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.5 Water Quality</b>			
<p><b>Avoidance and Minimization Measures (BMPs)</b></p> <ul style="list-style-type: none"> <li>• The contractor would prepare a spill control plan and a SWPPP prior to initiation of construction in accordance with guidance from the RWQCB, Central Valley Region. These plans would be reviewed and approved by USACE before construction begins.</li> <li>• Implement appropriate measures to prevent debris, soil, rock or other material from entering the water. Use a water truck or other appropriate measures to control dust on haul roads, construction areas and stockpiles.</li> <li>• Implement appropriate measures for handling and disposing of concrete and concrete washout water.</li> <li>• Properly dispose of oil or other liquids.</li> <li>• Fuel and maintain vehicles in a specified area that is designed to capture spills. This area cannot be near any ditch, stream or other body of water or feature that may convey water.</li> <li>• Fuels and hazardous materials would not be stored on site.</li> <li>• Inspect and maintain vehicles and equipment to prevent dripping oil and other fluids.</li> <li>• Schedule construction to avoid the rainy season as much as possible. If rains are forecasted during construction, erosion control measures would be implemented as described in the RWQCB Erosion and Sediment Control Field Manual.</li> <li>• Maintain sediment and erosion control measures during construction. Inspect the control measures before, during and after a rain event.</li> <li>• Train construction workers in SWPPP and how to respond to, control, contain and clean up spills.</li> <li>• Revegetate disturbed areas in a timely manner to control erosion.</li> <li>• Materials will be covered and protected from wind, rain and runoff to avoid unwarranted dispersal.</li> <li>• Construct culverts at Moreing Road to slightly reduce residence time at the upstream end of Atherton Cove (by approximately 0.2 days).</li> <li>• Refine operational criteria to ensure that desired FRM benefits are achieved while avoiding degradation of water quality behind the closure structures.</li> </ul>	<p>The project sponsor or its contractor</p>	<p>Prior to, during, and following construction; and During PED</p>	<p>Project sponsor or its contractor, and USACE</p>
<b>5.6 Groundwater</b>			
<p>Potential impacts to groundwater that could result from construction of the cutoff wall would be mitigated through development and implementation of a BSSCP, also known as a frac-out plan. A BSSCP is typically developed for activities that involve the use of bentonite materials. It is intended to minimize the potential for a frac-out associated with excavation and tunneling activities, provide for timely detection of frac-outs and ensure a "minimum-effect" response in the event of a frac-out and release of excavation fluid.</p>	<p>The project sponsor or its contractor</p>	<p>Prior to and during construction</p>	<p>Project sponsor or its contractor</p>

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.7 Wetlands and Other Waters of the United States</b>			
<p>Before construction, a qualified biologist would survey the project area and all wetlands and other waters of the U.S. would be subject to a formal jurisdictional determination and delineation to determine the extent and value of the wetlands affected. All delineated areas would be clearly marked and, to the extent feasible, avoided. Impacts would be minimized by establishing a buffer around wetlands and waterways. Construction worker awareness training would be conducted to ensure that personnel working the site know the location of and protocols for, working around sensitive habitat. Toe drains and local irrigation and drainage ditches would be relocated and restored with similar wetland habitat functions. Compensation for permanent impacts to wetland and open water habitats would include the purchase of credits from an approved mitigation bank. The USACE is proposing to purchase 2 acres of bank credits for permanent impacts to open water habitat and 21.5 acres of bank credits for permanent impacts to wetland habitats. In addition, relocated landside levee toe drains and drainage ditches would be restored following construction to their pre-project condition.</p>	<p>The project sponsor's qualified biologist, or its qualified biologist contractor</p>	<p>Prior to and during construction</p>	<p>Project sponsor or its contractor</p>
<b>5.8 Air Quality</b>			
<p>The Lead Agencies shall either:</p> <ul style="list-style-type: none"> <li>Require the use of off-road equipment that meets or exceeds USEPA or California Air Resources Board (CARB) Tier 3 off-road emission standards for all off-road vehicles greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities.</li> <li>Prior to issuance of a construction permit, the prime contractor(s) shall prepare and submit a Construction Emissions Minimization Plan (Plan) to the Lead Agencies for review and approval. The Plan shall include estimates of the construction timeline by phase with a description of each piece of equipment required for every construction phase. Equipment descriptions and information shall include: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number and expected fuel usage and hours of operation.</li> <li>The Plan shall be kept by the Lead Agencies and made available for review by any persons requesting it. Quarterly reports shall be submitted by the prime contractor(s) to the Lead Agencies indicating the construction phase and equipment information used during each phase for the previous quarter;</li> </ul> <p><u>or</u></p> <ul style="list-style-type: none"> <li>Enter into a Verified Emissions Reduction Agreement (VERA) with SJVAPCD. The VERA would require payment of a fee to SJVAPCD that would be used to purchase NOx emission reductions to offset all NOx emissions during years when the Project's unmitigated NOx emissions exceed 10 tons. The VERA will be entered into prior to initiating the project and posted on the Lead Agencies website. The NOx offsets developed by the fee will be provided to the Lead Agencies and posted on the Lead Agencies website. The information shall be posted in a location that is easy to access by the public and must remain on the website for 1 full year after all construction in completed.</li> </ul>	<p>The project sponsor or its contractor responsible for plan development and implementation; the lead agencies responsible for plan review and approval</p> <p>Project sponsor and SJVAPDC enter into agreement. Lead agencies post agreement on their respective websites.</p>	<p>Prior to and during construction</p> <p>Prior to project initiation</p>	<p>The project sponsor or its contractor</p> <p><u>or</u></p> <p>San Joaquin Area Flood Control Agency</p> <p>Project sponsor and SJVAPDC</p>

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.9 Vegetation</b>			
<p><u>Retain a Biological Monitor</u></p> <p>A qualified biologist would monitor construction activities adjacent to sensitive biological resources (e.g., special-status species, riparian habitat, wetlands, elderberry shrubs), as needed. The biologist would assist the construction crew, as needed, to comply with all project implementation restrictions and guidelines. In addition, the biologist would be responsible for ensuring that construction barriers fencing is maintained adjacent to sensitive biological resources.</p>	Project sponsor	Prior to construction	Project sponsor, USFWS, CDFW, and NMFS
<p><u>Install Exclusion Fencing along the Construction Work Area Perimeter and Implement General Measures to Avoid Effects on Sensitive Natural Communities and Special-Status Species</u></p> <p>To clearly demarcate the project boundary and protect sensitive natural communities, temporary exclusion fencing would be installed around the project boundaries (including access roads, staging areas, etc.) 1 week prior to the start of construction activities. The temporary fencing would be continuously maintenance until all construction activities were completed so that construction equipment would be confined to the designated work areas, including any off site mitigation areas and access thereto. The exclusion fencing would be removed only after construction for the year is entirely completed.</p> <p>Exclusionary construction fencing and explanatory signage would be placed around the perimeter of sensitive vegetation communities that could be affected by construction activities throughout the period during which such effects occur. Signage would explain the nature of the sensitive resource and warn that no effect on the community is allowed. Where feasible, the fencing would include a buffer zone of at least 20 feet between the resource and construction activities. All exclusionary fencing would be maintained in good condition throughout the construction period.</p>	The project sponsor's qualified biologist, or its qualified biologist contractor	1 week prior to construction	Project sponsor
<p><u>Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel</u></p> <p>Before initiating any work in the project area, including grading, a qualified biologist would conduct mandatory contractor/worker awareness training for all construction personnel. It would be provided to brief them on the need to avoid effects on sensitive biological resources (e.g., riparian habitat, special-status species, wetlands and other sensitive biological communities) and the penalties for not complying with permit requirements. The biologist would inform all construction personnel about the life history of special status species with potential for occurrence on the site, the importance of maintaining habitat and the terms and conditions of the BO or other authorizing document. Proof of this instruction would be submitted to USFWS and CDFW.</p> <p>The training would also cover the restrictions and guidelines that must be followed by all construction personnel to reduce or avoid effects on sensitive biological communities and special-status species during project construction. The crew leader would be responsible for ensuring that crew members adhere to the guidelines and restrictions. Educational training would be conducted for new personnel as they are brought on the job. General</p>	The project sponsor's qualified biologist, or its qualified biologist contractor	Prior to construction	USFWS and CDFW

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.9 Vegetation (continued)</b>			
<p>restrictions and guidelines for vegetation and wildlife that must be followed by construction personnel are listed.</p> <ul style="list-style-type: none"> <li>• Project-related vehicles would observe the posted speed limit on hard-surfaced roads and a 10-mile-per-hour speed limit on unpaved roads during travel in the project site.</li> <li>• Project-related vehicles and construction equipment would restrict off-road travel to the designated construction area.</li> <li>• To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel would not service vehicles or construction equipment outside designated staging areas</li> </ul> <p><b>Remediation</b> After construction, structural FRM features and easement areas would be reseeded with native grasses and herbs and/or planted with appropriate herbaceous riparian and wetland species.</p> <p><b>Compensation</b> Vegetation impacts that cannot be mitigated through avoidance, minimization or remediation will be mitigated through compensation. A 14-acre mitigation site has been identified at the setback area in the Delta Front portion of the study area. This site would be planted with primarily VELB compensation (as discussed in Section 5.12) and associated riparian habitat. Additional compensation required for riparian, SRA, wetland and open water habitats would be accomplished through the purchase of credits at a mitigation bank. More information regarding proposed compensation can be found in the Habitat Mitigation, Monitoring and Adaptive Management Plan (Environmental Addendum). Where possible, on site mitigation areas would be the preferred action. USACE would seek opportunities to increase on site mitigation options during the design phase of the project, in accordance with the terms and conditions of the NMFS BO. Mitigation site selection would avoid areas where future disturbance or maintenance is likely. A revegetation plan would be prepared by a qualified biologist or landscape architect and reviewed by the appropriate agencies. The revegetation plan would specify the planting stock appropriate for each riparian cover type and each mitigation site, ensuring the use of genetic stock from the project area and would employ the most successful techniques available at the time of planting. The plantings would be maintained and monitored, as necessary, for 3 to 5 years, including weed removal, irrigation and herbivory protection. USACE would submit annual monitoring reports of survival to the regulatory agencies including USFWS, NMFS and CDFW. Replanting would be necessary if success criteria are not met and replacement plants would subsequently be monitored and maintained to meet the success criteria. The mitigation would be considered successful when the plants meet the success criteria, the vegetation no longer requires active management and is arranged in groups that, when mature, replicate the area, natural structure and species composition of similar plant communities in the region.</p>	<p>The project sponsor's qualified biologist, or its qualified biologist contractor responsible for revegetation plan</p>	<p>3 to 5 years following construction</p>	<p>USACE would submit annual reports to USFWS, NMFS, and CDFW</p>

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.10 Wildlife</b>			
<p>The same mitigation measures apply to all of the action alternatives, although the amount of compensatory mitigation would vary based upon the amount and quality of habitat temporarily and permanently affected by the project. Measures to avoid potential impacts to special status species are described in Section 5.12 and would also benefit more common wildlife. Mitigation described in Section 5.9, VEGETATION, would also avoid, minimize, rectify and/or compensate for potential impacts to wildlife. If a vegetation variance was approved and some compensatory mitigation was accomplished on site, then short- and long-term impacts to wildlife habitat would be greatly reduced. However, because new plantings would take many years to establish, a temporal loss would remain. In addition, even with a vegetation variance, some areas that currently support trees and shrubs would be maintained permanently in herbaceous vegetation after construction.</p>	<p>The project sponsor's qualified biologist, or its qualified biologist contractor</p>	<p>Prior to, during, and following construction</p>	<p>USACE, USFWS, CDFW, and NMFS</p>
<b>5.11 Fisheries</b>			
<p>Additional mitigation associated with impacts to fisheries is identified:</p> <ul style="list-style-type: none"> <li>In-water construction not associated with the closure structures would be restricted to the August 1 through November 30 work window, during periods of low fish abundance and outside the principal spawning and migration season. The typical construction season would generally correspond to the dry season, but construction may occur outside the limits of the dry season, only as allowed by applicable permit conditions.</li> <li>Due to the deleterious effects of numerous chemicals on native resident fish used in construction, if a hazardous materials spill does occur, a detailed analysis will be performed immediately by a registered environmental assessor or professional engineer to identify the likely cause and extent of contamination. This analysis will conform to American Society for Testing and Materials standards and will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, USACE and its contractors would select and implement measures to control contamination, with a performance standard that surface water quality and groundwater quality must be returned to baseline conditions.</li> <li>During design feasibility studies for the operation and maintenance of the Mormon Channel bypass, the parameters would be to avoid or minimize stranding in the channel after flow events and flushing of upstream migrating adult fish down the channel from the Stockton Diverting Canal. Designs would include but not be limited to either an adult fish passage barrier at the confluence of the Stockton DWSC or for fish passage facilities at the Stockton Diverting Canal.</li> </ul> <p>The following measures would be implemented during construction of the proposed Fourteen-mile Slough and Smith Canal closure structures to reduce potential adverse effects on ESA listed species, other native fish species and their habitats.</p> <ul style="list-style-type: none"> <li>All in water construction activities would be limited to the period of June 1 through October 31 to avoid the primary migration periods of listed salmonids.</li> </ul>	<p>The project sponsor or its contractor</p>	<p>Prior to, during and following construction</p>	<p>The project sponsor or its contractor</p>

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.11 Fisheries (cont.)</b>			
<ul style="list-style-type: none"> <li>In-water pile driving would be restricted to the period of July 1 through September 30 to avoid or minimize exposure of adults and juvenile salmonids to underwater pile-driving sounds.</li> <li>All pile driving would be conducted by a vibratory pile driver to minimize underwater sound levels during pile driving operations.</li> <li>Pile driving would be conducted by barge to minimize disturbance of riparian habitat.</li> </ul>			
<b>5.13 Socioeconomic and Environmental Justice</b>			
<p>Project planning for all of the action alternatives has included attention to avoiding and minimizing potential impacts to adjacent properties to the extent feasible in consideration of the FRM goals of the study. Potential significant adverse impacts to adjacent properties would be mitigated through appropriate compensation. If relocation of people or their homes are required, they would be compensated under the Federal Relocation Act.</p>	The project sponsor and its contractors	Prior to and during construction.	SJAFCA
<b>5.15 Transportation</b>			
<p>Before the start of each construction season, the primary contractors for engineering and construction shall develop a coordinated construction traffic safety and control plan to minimize the simultaneous use of roadways by different construction contractors for material hauling and equipment delivery to the extent feasible and to avoid and minimize potential traffic hazards on local roadways during construction. Items (a) through (f) of this mitigation measure shall be integrated as terms of the construction contracts.</p> <p>a) The plan shall outline phasing of activities and the use of multiple routes to and from offsite locations to minimize the daily amount of traffic on individual roadways.</p> <p>b) The construction contractors shall develop traffic safety and control plans for the local roadways that would be affected by construction traffic. Before the initiation of construction-related activity involving high volumes of traffic, the plan shall be submitted for review by the agency of local jurisdiction (San Joaquin County, City of Stockton or Caltrans [if applicable]) that has responsibility for roadway safety at and between project sites. The contractor would train construction personnel in appropriate safety measures as described in the plan and shall implement the plan. The plan would include the prescribed locations for staging equipment and parking trucks and vehicles. Provisions would be made for overnight parking of haul trucks to avoid causing traffic or circulation congestion. The plan shall call for the following elements:</p> <ul style="list-style-type: none"> <li>posting warnings about the potential presence of slow-moving vehicles;</li> <li>using traffic control personnel when appropriate; and</li> <li>placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's Manual of Traffic Controls for Construction and Maintenance Work Zones and in accordance with city/county requirements.</li> </ul>	The project sponsor and its contractors for engineering and construction	Prior to, and during construction.	The project sponsor and the agency of local jurisdiction (i.e., San Joaquin County, City of Stockton, or Caltrans [if applicable])

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.15 Transportation (cont.)</b>			
<p>c) All operations would limit and expeditiously remove, as necessary, the accumulation of project generated mud or dirt from adjacent public streets at least once every 24 hours if substantial volumes of soil are carried onto adjacent paved public roadways during construction.</p> <p>d) If needed to comply with Caltrans requirements, a transportation management plan would be prepared and submitted to Caltrans to cover any points of access from the State highway system for haul trucks and other construction equipment.</p> <p>e) Before the start of the first construction season, the project proponent would enter into maintenance agreements with San Joaquin County and the City of Stockton to address maintenance and repair of affected roadways resulting from increased truck traffic. The agreements would ensure that the affected roadways are repaired to a level that is equivalent to their pre-project condition.</p> <p>f) Before project construction begins, the contractor would provide notification of project construction to all appropriate emergency service providers in San Joaquin County, Stockton, Lathrop and Manteca and shall coordinate with providers throughout the construction period to ensure that emergency access through construction areas is maintained.</p> <p>The contractor would be required to avoid neighborhoods and school zones to the maximum extent feasible when determining haul routes. When possible, hauling in school zones would be limited to the period of summer breaks to avoid noise and traffic impacts to the schools. Any damage to residential roadways during construction would be mitigated per the requirements outlined in the traffic safety and control plan.</p> <p>Alternatives 8a and 8b mitigation measures shall be implemented as described for Alternatives 7a and 7b, except that they would be expanded to include additional lands and the jurisdictions along the Stockton Diverting Canal. During preliminary engineering and design, the project proponent shall provide notification of project construction to all appropriate railroads in the project area, and shall coordinate with all railroads to minimize freight and passenger service disruptions.</p> <p>Alternatives 9a and 9b mitigation measures shall be implemented as described for Alternative 7a and Alternative 7b, except that they would be expanded to include additional lands and the jurisdictions along the Old Mormon Slough. Prior to construction, USACE would coordinate with Caltrans and the City of Stockton to determine detour routes for all proposed bridge replacements. Public notification would occur prior to all bridge closures during construction.</p>			

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.16 Utilities and Public Services</b>			
<p>Before beginning construction, coordination with utility providers to implement orderly relocation of utilities that need to be removed or relocated would occur. Coordination would include the following:</p> <ul style="list-style-type: none"> <li>• Notification of any potential interruptions in service shall be provided to the appropriate agencies and affected landowners.</li> <li>• Before the start of construction, utility locations shall be verified through field surveys and the use of Underground Service Alert services. Any buried utility lines shall be clearly marked where construction activities would take place and on the construction specifications before any earthmoving activities begin.</li> <li>• Before the start of construction, the contractor would be required to coordinate with the local municipality and acquire any applicable permits prior to use of municipal water for construction.</li> <li>• Before the start of construction, a response plan shall be prepared to address potential accidental damage to a utility line. The plan shall identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the public and worker safety. Worker education training in response to such situations shall be conducted by the contractor. The response plan shall be implemented by the contractor during construction activities.</li> <li>• Utility relocations shall be staged to minimize interruptions in service.</li> </ul>	The project sponsor or its contractor	Prior to and during construction	The project sponsor
<b>5.17 Recreation</b>			
Impacts resulting from the loss of vegetation would be mitigated on site, where feasible, through additional plantings in existing parks. Approaches to mitigate for loss of vegetation are in Section 5.9, above.	The project sponsor's qualified biologist, or its qualified biologist contractor	During and following construction	USACE, USFWS, CDFW, and NMFS
<b>5.19 Noise</b>			
<ul style="list-style-type: none"> <li>• The contractor shall prepare a construction noise and vibration plan prior to construction.</li> <li>• The contractor shall employ vibration-reducing construction practices.</li> <li>• The contractor shall employ noise-reducing construction practices.</li> <li>• All construction equipment shall be equipped with noise-reduction devices such as mufflers to minimize construction noise and all internal combustion engines shall be equipped with exhaust and intake silencers in accordance with manufacturers' specifications.</li> <li>• Equipment that is quieter than standard shall be used, including electrically powered equipment instead of internal combustion equipment, where use of such equipment is a readily available substitute that accomplishes project tasks in the same manner as internal combustion equipment.</li> <li>• The use of bells, whistles, alarms and horns shall be restricted to safety warning purposes only.</li> </ul>	The project sponsor or its contractor	Prior to and during construction	The project sponsor or its contractor

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.19 Noise (cont.)</b>			
<ul style="list-style-type: none"> <li>Noise-reducing enclosures shall be used around stationary noise-generating equipment (e.g., compressors and generators at slurry pond locations).</li> <li>Mobile and fixed construction equipment (e.g., compressors and generators), construction staging and stockpiling areas and construction vehicle routes shall be located at the most distant point feasible from noise-sensitive receptors.</li> <li>When noise-sensitive uses subject to prolonged construction noise and are located within 740 feet of construction in Stockton, Lathrop or unincorporated areas of San Joaquin county or within 1140 feet of construction in Manteca, noise attenuating buffers such as structures, truck trailers or soil piles shall be located between noise generation sources and sensitive receptors.</li> <li>Before construction activity begins within 740 feet of one or more residences or businesses (or within 1140 feet of residences or businesses in Manteca), the local sponsors (SJAFCA) shall provide written notification to the potentially affected residents or business owners, identifying the type, duration and frequency of construction activities. A noise disturbance coordinator shall be designated and contact information shall be provided in the notices and posted near the project area in a conspicuous location that it is clearly visible to nearby receptors most likely to be disturbed. The coordinator shall manage complaints and concerns resulting from noise-generating activities. The severity of the noise concern would be assessed by the coordinator and if necessary, evaluated by a qualified noise control engineer.</li> <li>The project proponent (USACE, CVFPB and/or SJAFCA) shall ensure that all heavy trucks are properly maintained and equipped with noise control (e.g., muffler) devices in accordance with manufacturers' specifications at each work site during project construction to minimize construction traffic noise effects on sensitive receptors.</li> <li>Before haul truck trips are initiated during construction season on roads within 90 feet of residences located along haul routes, written notification shall be provided to potentially affected residents identifying the hours and frequency of haul truck trips. Notifications provide contact information for a noise disturbance coordinator identified above and also identify a mechanism for residents to register complaints with the appropriate jurisdiction if haul truck noise levels are overly intrusive or occur outside the exempt daytime hours for the applicable jurisdiction.</li> </ul>			
<b>5.20 Public Health and Environmental Hazards</b>			
<p>If significant time has elapsed between approval of this document and construction, additional investigations should be done to reduce risk. If construction activities would occur in close proximity to sites identified in the existing conditions section or in the Phase I Site Assessment, a Phase II Environmental Site Assessment should also be conducted. This would further reduce the risk of exposure to workers and the public during construction and assist in the remediation planning. If necessary, the assessment would include an analysis of soil or groundwater samples for the potential contamination sites that have not yet been covered by previous investigations before construction activities begin. Recommendations in Phase I and Phase II Environmental Site Assessments to address any contamination that is found would be implemented before initiating ground-disturbing activities.</p>	<p>The project sponsor or its contractor</p>	<p>Prior to and during construction</p>	<p>Project sponsor</p>

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.20 Public Health and Environmental Hazards (cont.)</b>			
<p>In addition, the following measures would be implemented before ground-disturbing or demolition activities begin, in order to reduce health hazards associated with potential exposure to hazardous substances:</p> <ul style="list-style-type: none"> <li>• Complete a Phase I Site Assessment prior to completing preconstruction designs and initiating construction.</li> <li>• Prepare a site plan that identifies any necessary remediation activities appropriate for proposed land uses, including excavation and removal of contaminated soils and redistribution of clean fill material on the project site. The plan would include measures that ensure the safe transport, use and disposal of contaminated soil and building debris removed from the site, as well as any other hazardous materials. In the event that contaminated groundwater is encountered during site excavation activities, the contractor would report the contamination to the appropriate regulatory agencies, dewater the excavated area and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The contractor would be required to comply with the plan and applicable Federal, State and local laws.</li> <li>• Notify appropriate Federal, State and local agencies if evidence of previously undiscovered soil or groundwater contamination is encountered during construction. Any contaminated areas would be cleaned up in accordance with the recommendations of the Central Valley RWQCB, California DTSC or other appropriate Federal, State or local regulatory agencies.</li> <li>• A worker health and safety plan would be prepared before the start of construction that identifies, at a minimum, all contaminants that could be encountered during construction; all appropriate worker, public health and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan would describe actions to be taken if hazardous materials are encountered on-site, including protocols for handling hazardous materials, preventing their spread and emergency procedures to be taken in the event of a spill.</li> <li>• Retain licensed contractors to remove all underground storage tanks.</li> </ul>			
<b>5.21 Cultural Resources</b>			
<p>USACE began consultation concerning a PA with SHPO and Native American Tribes (Environmental Addendum). A fully executed PA will be in place prior to project implementation. Specific mitigation measures would be developed in accordance with the PA to address any adverse effects on historic properties through the development of an HPTP. The HPTP would guide the level of data recovery, mitigation or actions taken to resolve adverse effects to the historic property. The main requirements of the contents of a research design and HPTP are located in the PA.</p> <p>Depending on the nature of the adverse effect, actions to protect or mitigate for adverse effects to historic properties may include the following:</p>	<p>The project sponsor or its contractor</p>	<p>Prior to and during construction</p>	<p>Project sponsor</p>

Mitigation Measure	Implementation Responsibility	Implementation Timing	Monitoring/Oversight Responsibility
<b>5.21 Cultural Resources (cont.)</b>			
<ul style="list-style-type: none"> <li>• Redesigning the project to avoid historic properties or sensitive areas.</li> <li>• Conducting data recovery excavations of archaeological sites that cannot be avoided or are discovered during construction, based on an approved HPTP.</li> <li>• Monitoring all ground disturbing construction activities in areas where buried resources are anticipated.</li> <li>• Surveying and protecting exposed inundated cultural deposits.</li> <li>• Protecting exposed archaeological sites from vandalism and erosion with fencing and revegetation or capping sites in an approved manner with appropriate material.</li> <li>• Preparing and implementing an inadvertent discovery plan.</li> <li>• If previously undiscovered resources are identified during an undertaking, suspend work while the resource is evaluated and mitigated to avoid any further impact.</li> </ul>			

# Appendix B

## **Design Documentation Report**

**95% Design Documentation Report (DDR)**

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**Lower San Joaquin River  
Reach TS\_30\_L Levee Improvement**

**San Joaquin County, California**

**Contract No.: W91238-19-D-0005**

**Project Number: 475448  
Specification Number: 2402**

**DFN: 7-04-1877**

**August 24, 2021**



**US Army Corps of Engineers  
Sacramento District**

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95% Design Documentation Report (DDR)

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Lower San Joaquin River  
Reach TS\_30\_L Levee Improvement

San Joaquin County, California

Prepared by:

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Contract No.: W91238-19-D-0005

Project Number: 475448  
Specification Number: 2402

August 24, 2021

## SYLLABUS

1. Segment 1: Sta 1+00 to 4+50
  - Total Length: 350 ft
  - Cutoff Wall Length: 200 ft (Sta 2+50 to 4+50)
  - Waterside Slope: unchanged
  - Landside Slope: unchanged
  - Minimum Top of Levee: 14.9 ft (NAVD88)
  - Design Levee Height: 18.6 ft (NAVD88), existing levee height
  - Degrade Elevation: 10.5 ft (NAVD88)
  - Cutoff Wall Tip Elevation: -21ft (NAVD88)
  - Waterside Erosion Control: 3 inches of 3/4" aggregate surfacing to match existing
  
2. Segment 2: Sta 4+50 to 51+50
  - Total Length: 4,700 ft
  - Cutoff Wall Length: 4,700 ft
  - Waterside Slope: 2.5:1 (reshaped from current 3:1)
  - Landside Slope: 3:1 (reshaped from current 2:1)
  - Minimum Top of Levee: 14.9 ft (NAVD88)
  - Design Levee Height: 18.6 ft (NAVD88), existing levee height
  - Degrade Elevation: 10.5 ft (NAVD88)
  - Cutoff Wall Tip Elevation: -42ft (NAVD88)
  - Waterside Erosion Control: 3 inches of 3/4" aggregate surfacing to match existing
  
3. Segment 3: Sta 51+50 to 61+00
  - Total Length: 950 ft
  - Cutoff Wall Length: 950 ft
  - Waterside Slope: 2.5:1 (reshaped from current 3:1)
  - Landside Slope: 3:1 (reshaped from current 2:1)
  - Minimum Top of Levee: 14.9 ft (NAVD88)
  - Design Levee Height: 18.6 ft (NAVD88), existing levee height
  - Degrade Elevation: 10.5 ft (NAVD88)
  - Cutoff Wall Tip Elevation: -25ft (NAVD88)
  - Waterside Erosion Control: 3 inches of 3/4" aggregate surfacing to match existing

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**ACRONYMS AND ABBREVIATIONS**

ADJ	Adjacent
ATR	Agency Technical Review
BEP	Backward Erosion Piping
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
CVFED	Central Valley Flood Evaluation and Delineation Program
DDR	Design Documentation Report
DWR	California Department of Water Resources
DWSE	Design Water Surface Elevation
EA	Environmental Assessment
EDR	Engineering Documentation Report
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EM	Engineer Manual
ER	Engineer Regulation
ETL	Engineer Technical Letter
FY	Fiscal Year
FAA	Final Alternatives Analysis
FT	Feet
GBODR	Geotechnical Basis of Design Report
GDR	Geotechnical Data Report
GGG	Giant Garter Snake
GRD	Ground
HBODR	Hydraulic Basis of Design Report
HTRW	Hazardous, Toxic, and Radioactive Waste
IIFR	Integrated Interim Feasibility Report
LF	Linear Feet
LRP	Legally Responsible Person
MCACES	Micro-Computer Aided Cost Estimating System
MFR	Memorandum for Record
MIN	Minimum
NA	Not Applicable
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NO.	Number
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
PFM	Potential Failure Mode
PDT	Project Development Team
PRD	Permit
QSD	Qualified SWPPP Developer
RD	Reclamation District

ROD	Record of Decision
RM	River Mile
SB	Soil Bentonite
SHPO	California State Historic Preservation Office
SJAFCA	San Joaquin Area Flood Control Agency
SPK	Sacramento District, USACE
SQRA	Semi-Quantitative Risk Assessment
SSFM	Sanitary Sewer Force Main
STA	Station
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TLP	Theoretical Levee Prism
ULDC	Urban Levee Design Criteria
ULE	Urban Levee Evaluation
USACE	United States Army Corps of Engineers
VELB	Valley Elderberry Longhorn Beetle

## 1.0 GENERAL

This Design Documentation Report (DDR) provides the technical basis for the plans and specifications for the Lower San Joaquin River (LSJR), Reach TS\_30\_L Levee Improvement Project (Project). It summarizes the design criteria for the various project components of the design. This DDR presents the project design requirements, criteria, guidance, assumptions, and coordination related to the design. It also documents the issues that were encountered during the design process and what decisions were made.

## 2.0 PROJECT OVERVIEW

### 2.1 General Description and History

The City of Stockton is located in San Joaquin County, CA. The City relies upon the LSJR levee system to prevent flooding during high water events. The LSJR TS\_30\_L levee was constructed by Reclamation District No. 2074. The record drawings are dated September 30, 1988 for the 10 MILE & 14 MILE SLOUGH LEVEE PROJECT prepared by R.W. Siegfried & Associates.

### 2.2 Project Background

#### 2.2.1 Integrated Interim Feasibility Report

USACE published the LSJR Integrated Interim Feasibility Report/Environmental Impact Statement/Environmental Impact Report (Feasibility Study) in January 2018. The Feasibility Study identified a recommended plan to mitigate flooding in the commingled floodplains for the North and Central Stockton areas from three sources of flooding: the Delta Front, Calaveras River and San Joaquin River (See Figure 2-1). Implementation of the recommended Plan will greatly reduce flood risk to people and property in the City of Stockton, revitalizing local levees that were built to reduce the chance of hazardous flooding in the area, affecting 122,000 residents. Construction of the recommended plan is estimated to take 14 years under optimum funding. The estimated first cost of the recommended project is \$1,070,309,000.

The Feasibility Study's recommended plan has been divided into five major levee reaches for construction sequencing: Calaveras River (Right Bank), Calaveras River (Left Bank) and San Joaquin River (Right Bank, North Port), Delta Front & Fourteenmile Slough Control Structure, North Stockton and Smith Canal Control Structure. Since the Feasibility Study found that the Delta Front represents the greatest risk, construction of the Project will begin with the Delta Front levees. Reach TS\_30\_L is one of six (6) reaches in the Delta Front and was selected for final design and construction. Reach TS\_30\_L levee improvements include modifying approximately 5,900 feet existing levee geometry to meet current levee design and operation standards, to provide seepage mitigation measures (cutoff wall installation), and to add rock slope protection.

#### 2.2.2 Semi-Quantitative Risk Assessment

The USACE completed a Draft Semi-Quantitative Risk Assessment (SQRA) in September of 2020 to provide risk informed design guidance for levee modifications during the design phase. The SQRA evaluated risk for both existing conditions, with-project condition, and for both scenarios with consideration of sea level rise. The SQRA identified that breach of TS30L would result in deep flood water depths in an area that is densely populated with single family residential dwellings which would result in potential large consequences both in human casualties and property damage. The highest risk Potential Failure Mode (PFM) identified by the SQRA is Backward Erosion Piping (BEP) through foundation sands by an existing

defect in clay blanket. Waterside levee erosion due to wave runup was determined to not be a risk driver for the project since coincident probabilities between flood conditions and a significant wind event are very low. Additionally, the small fetch distance would result in minor wave runup onto the waterside levee slope. The Draft SQRA presented the following recommendations:

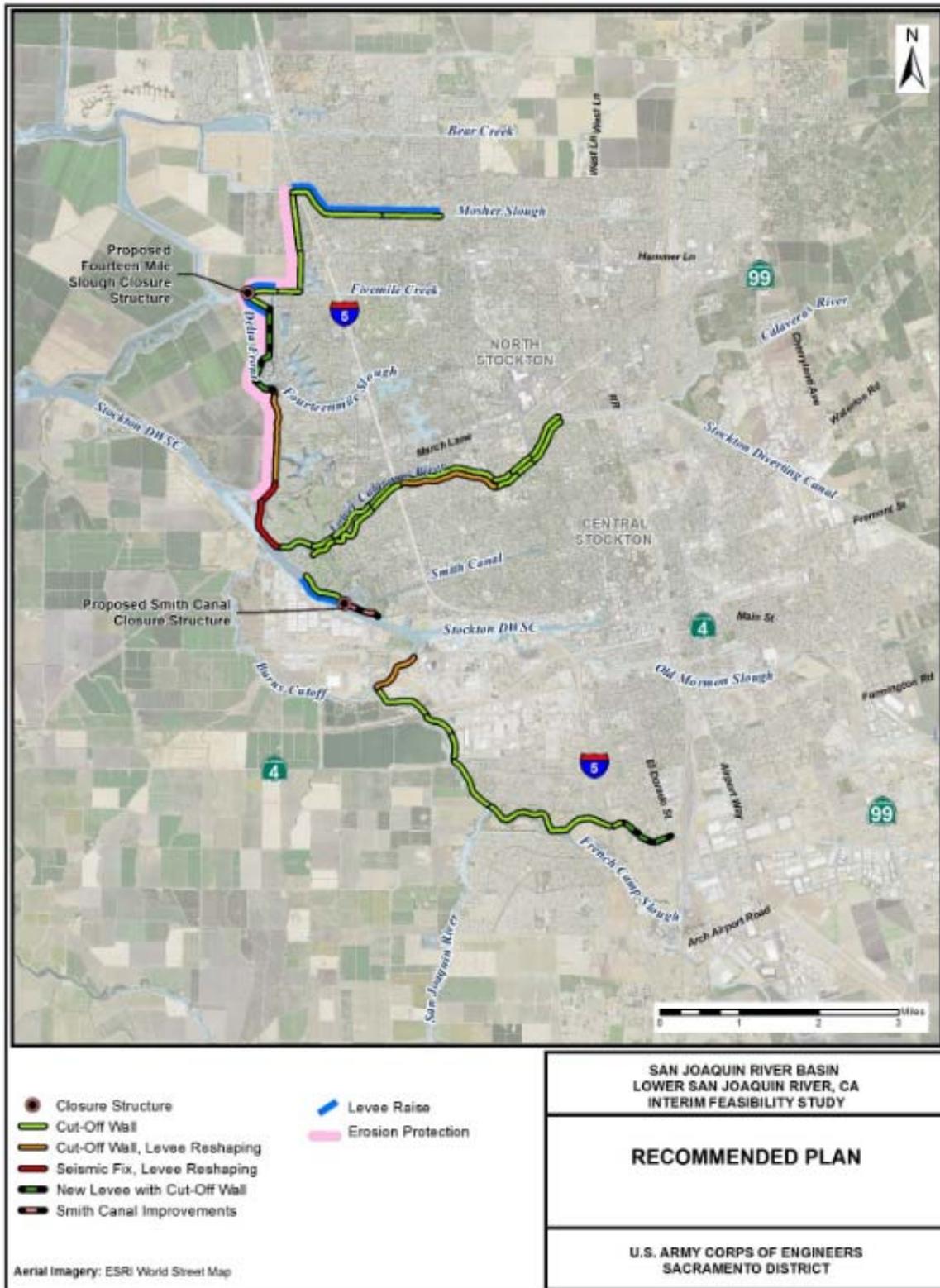
- The cutoff wall should be constructed in accordance with the approved plan and should be continuous across the length of this reach. The centerline was recommended for cutoff wall placement.
- There is no additional risk reduction to be achieved by going deeper with the cutoff wall than the shallowest clay layer.
- Soil bentonite cutoff wall mix was recommended in this seismically active area.
- Risk reduction evaluation was based on successful completion of the cutoff wall, free from discontinuities in the cutoff wall backfill.
- The slope should be regraded and mostly cleared of vegetation to support cutoff wall work platform.
- There may be a need to place gravel or rock on the slopes to reduce runoff erosion, vegetation control or animal control.
- Construction of Fourteenmile Slough closure structure appears to provide the greatest magnitude of risk reduction (non-breach) to the community of Stockton.

During the design phase it was determined that there are no design concerns with the cutoff wall alignment shifting towards the water side. The position of the cutoff wall was adjusted from the landside to centerline during stability and seepage modeling with no appreciable benefit to a specific alignment. All stability and seepage analyses show satisfactory performance under the cutoff wall's current location. Additionally, while the recommendations included consideration of prioritizing Fourteenmile Slough closure structure in the implementation plan, schedule and right of way acquisition drove the decision to move forward with TS\_30\_L first.

### 2.3 Project Authorization

The Project was authorized in America's Water Infrastructure Act of 2018 (P.L. 115-270). The Design Agreement was executed between the Department of the Army, the California Central Valley Flood Protection Board, and the San Joaquin Area Flood Control Agency on 3-May-2019.

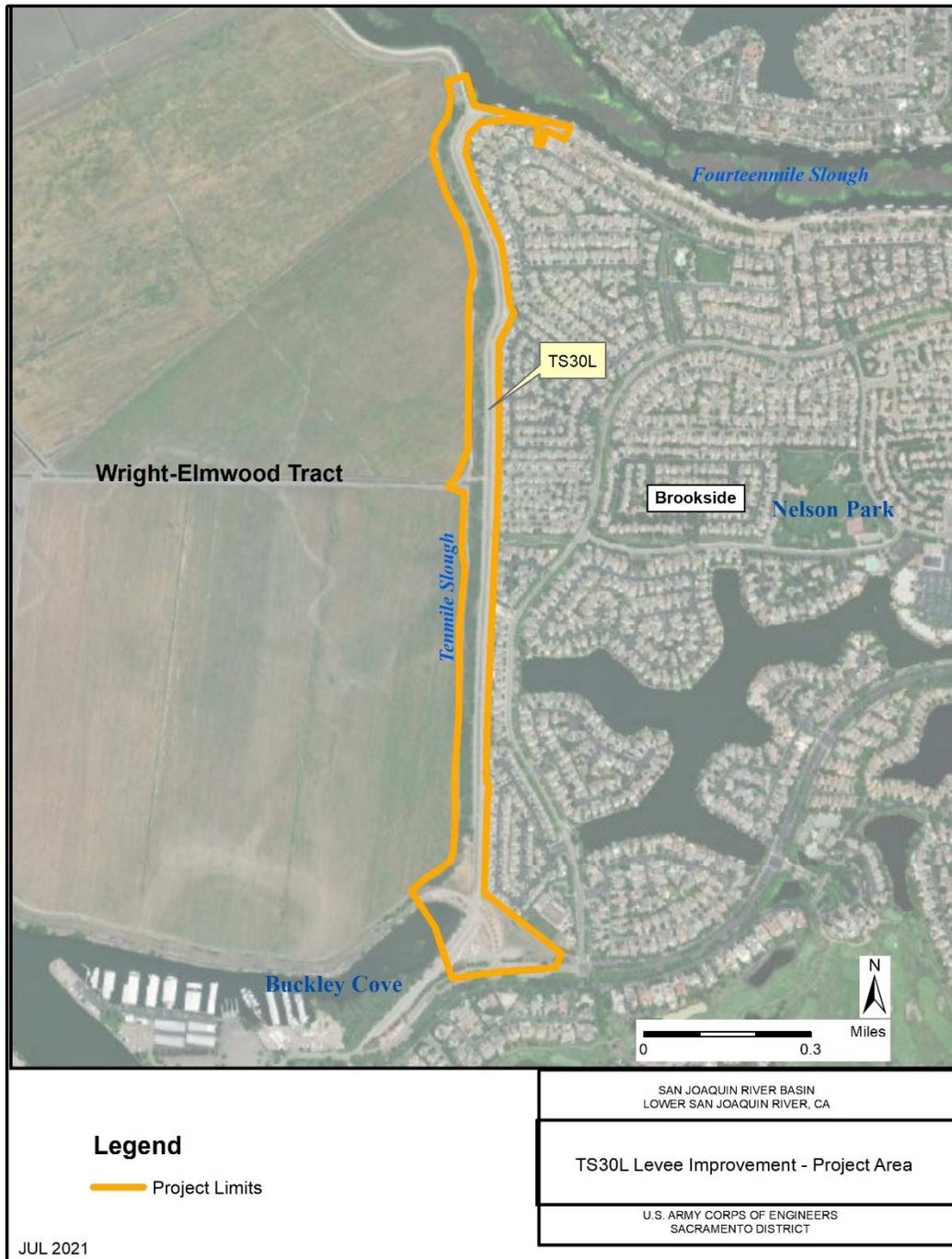
Figure 2-1. Recommended Plan for the LSJR



## 2.4 Project Location

The Reach TS\_30\_L levee is a dry-land levee located on the northwestern side of Stockton, California (See Figure 2-2). Reach TS\_30\_L is about 1.1 miles long separates the Brookside residential development (land side) on the east and the Wright Elmwood Tract (water side) on the west. Reach TS\_30\_L is bounded on the south by West March Lane and on the north by Fourteenmile Slough.

**Figure 2-2. Reach TS\_30\_L Project Area**



### 3.0 Project Design Criteria and Guidance

The design of the Project follows all the applicable Federal and State policy and guidance as well as the Sacramento District Standard Operating Procedures (SOP). Some of the current design criteria and guidance are list below.

- EM 1110-1-1804, dated 01 January 2001, Geotechnical Investigations
- EM 1110-2-1901, dated 30 April 1993, Seepage Analysis and Control for Dams
- EM 1110-2-1902, dated 31 October 2003, Slope Stability
- EM 1110-1-1913, dated 30 April 2000, Design and Construction of Levees.
- EM 1110-2-2902, dated 31 October 1997 (Original), 31 March 1998 (Change 1), Conduits, Culverts, and Pipes.
- ETL 1110-2-569, 01 May 2005, Design Guidance for Levee Underseepage
- ETL 1110-2-583, dated 30 April 2014, Guidelines for Landscape Planting and Vegetation Management at levees, Floodwalls, Embankment Dams, and Appurtenant Structures.
- CESPK-ED-G SOP 3, dated 18 April 2008, Sacramento District Geotechnical Levee Practice.
- ER 1110-2-1302, dated 15 September 2008, Civil Works Cost Engineering.
- ER 11-1-321, Change 1, dated 01 January 2011, Army Programs Value Engineering

### 4.0 PERTINENT DATA

Information from a variety of sources was utilized during the development of the design, which includes the construction plans, specifications, and the working construction cost estimate. A summary of the data used and their sources is contained in Table 4-1.

**Table 4-1. Summary of Data Types and Sources**

Data	Source
Survey	USACE, July 2020
Levee Alignment	National Levee Database modified beyond STA 57+00 to match existing topography
Hydraulic Analysis	100% Hydraulic Basis of Design Report (HBODR), Lower San Joaquin River Project – Tenmile Slough, Reach TS_30_L, USACE, July 2021
Geotechnical Engineering	95% Geotechnical Basis of Design Report (GBODR), 2020, Lower San Joaquin Levee Improvement Project Reach TS_30_L, August 2021

### 5.0 PROJECT DESCRIPTION

The objective of this Project is to construct seepage/stability improvements along the TS\_30\_L Levee to improve levee safety. The main components of this Project include:

- Construction of soil bentonite (SB) slurry cutoff wall to mitigate underseepage
- Levee reshaping to mitigate instability

The Feasibility Study Recommended Plan for TS\_30\_L consisted of fix in-place with 50 ft cutoff wall, geometry improvements and erosion control. The 95% Project Design is consistent with the authorized Recommended Plan and does not require a post-authorization change per ER 1105-2-100. No project features have been modified or added that would substantially change the scope or scale of the authorized plan.

## 6.0 SURVEY AND GEOMATICS

The design topography was provided by a ground survey completed by USACE in July 2020.

To develop a more complete overview of the levee and surrounding project area, lidar-based survey data from the DWR Central Valley Floodplain Evaluation and Delineation (CVFED) Program was added in the Brookside Development area. All survey data is referenced to the North American Vertical Datum of 1988 (NAVD88) for vertical control and the North American Datum of 1983 (NAD83) for horizontal control.

## 7.0 ENGINEERING, INVESTIGATION AND DESIGN

The project design is based on the guidance documents listed in paragraph 3.0 “Project Design Criteria and Guidance” of this DDR. Geotechnical, Hydraulic and Environmental engineering is ongoing as of this 95% submittal and will influence the final decision about design elements.

### 7.1 Hydraulic Design

The recommendations of the 100% HBODR (Appendix A) are listed below. The existing levee height will be maintained throughout the Project length.

- Design Water Surface Elevation = 13.6 ft (NAVD88)
- Minimum Top of Levee Elevation = 14.9 ft (NAVD88)
- Design Levee Height = Highest elevation of the following:
  - Existing Levee Height = 18.6 ft (NAVD88)
  - MTOL = 14.9 ft (NAVD88)
  - DWSE + 3 ft = 16.6 ft (NAVD88)
- Waterside Erosion Control = 3” thick  $\frac{3}{4}$ ” rock to match existing condition from the levee toe to the existing top of levee

### 7.2 Geotechnical Design

The project reach was divided into three subreaches representing varying through seepage, under seepage, and slope stability conditions based on subsurface soil information, existing levee geometry and existing utilities. These three subreaches are broken down as follows:

- Subreach A: 1+00 to 4+50
- Subreach B: 4+40 to 51+50
- Subreach C: 51+50 to 61+00

Cutoff wall location and depth was based on the evaluation of representative cross-sections for each of the subreaches. A cross-section at 4+00 was selected to represent Subreach A, a cross-section at 47+00 was selected to represent Subreach B, with additional cross sections at 8+00 and 17+00, and a cross-section at 57+00 was selected to represent Subreach C.

The recommendations of the 95% GBODR (Appendix B) are listed below:

- Construct seepage cutoff walls along Reach TS\_30\_L from STA 2+50 to STA 61+00.
  - Working Platform - degrade the levee to a minimum 1/3 of the levee height (elevation 10.5 ft NAVD88) to create the working platform for the SB cutoff wall installation
  - Material – soil-bentonite (SB) backfill

- Construction Method – slurry trench method
- Cutoff wall located at the centerline of the existing levee up to STA 4+50
- Cutoff wall located 10' towards the water side from the levee centerline from STA 4+50 to STA 61+00
- Staging Area – located to maintain pumping distances for the slurry to less than 5,000 linear feet.
- Cutoff wall dimensions – width of cutoff wall is 30 inches; tip elevations of -21 ft (NAVD88) from STA 2+00 to 4+50, -42 ft (NAVD88) from STA 4+50 to 51+50 and -25 ft (NAVD88) from STA 51+50 to 61+00
- Lead-in Trenches – 1H:1V minimum slope. If in-situ material is not able to maintain a 1H:1V slope, lead-in trench slopes shall be flattened to 2H:1V. The lead-in trench must extend beyond the specified cutoff wall beginning and ending limits.
- Initial Cutoff Wall Trench – 3 ft deep, 12 ft wide trench with 1:1 side slopes backfilled with impervious levee fill material
- Levee reconstruction and reshaping from STA 4+50 to STA 61+00
  - Reshape levee following installation of the cutoff wall and placement of temporary cap
  - Waterside slope – 2.5H:1V
  - Landside Slope – 3H:1V
- Staged Construction and Piezometer Installation
  - Fill placement may cause rise in pore pressure reducing shear strength in the near surface soft foundation soils, potentially resulting in waterside slope failures during construction.
  - Piezometers to be installed near the new waterside toe to monitor in-situ pore pressure changes during construction
  - Piezometers will be installed to a depth of approximately -16 ft (NAVD88) spaced every 500 ft.

### 7.3 Civil Engineering

At 95% design, civil design has been based on the 100% HBODR and the 95% GBODR. The recommendations of these documents are incorporated into this 95% DDR and will continue to be refined throughout the design process. All project features, including improvements to existing features (erosion protection, cut-off wall, levee reshaping), are designed to meet all current USACE design requirements (seepage, slope stability, geometry, et al.) as described in EM 1110-2-1913.

#### 7.3.1 Levee Improvements

Levee improvements include seepage cutoff wall and levee reshaping.

##### 7.3.1.1 Seepage Cutoff Wall

The GBODR recommended construction of a soil bentonite (SB) cutoff wall and clay cap to mitigate underseepage. The constructed seepage cutoff walls throughout Reach TS\_30\_L shall be located such that they will have a minimum of 4 ft cover once the levee reshaping is complete. This location is along the levee centerline from Station 2+50 to 4+50, and approximately 10 ft towards the waterside from the centerline of the existing levee after Station 4+50 to 61+00. The levee embankment shall be degraded to create a working platform for the slurry trench construction method. Table 7-1 presents the proposed cutoff wall dimensions for the Project.

**Table 7-1. Cutoff Wall Dimensions**

Construction Reach	Length of Cutoff Wall (Feet)	Cutoff Wall Tip Elevation (Feet NAVD88)	Cutoff Wall Material	Expected Construction Method
2+50 to 4+50	200	-21	SB	Slurry Trench
4+50 to 51+50	4,700	-42	SB	Slurry Trench
51+50 to 61+00	950	-25	SB	Slurry Trench

The cutoff wall alignment was selected to avoid potential constructability issues related to shallow groundwater and excavation of the older levee embankment. Additionally, construction stability of the slurry trench is very sensitive to surcharge loads. It is SPK District policy that SB slurry trench method walls are not allowed to be placed at the toe of an existing levee unless all surcharge loads such as the remaining undegraded portion of the embankment are removed to eliminate the surcharge load, thus requiring further earthwork than a centerline alignment.

South of 2+50 the levee merges into March Lane and is not being hydraulically loaded along this stretch anymore from the Wright-Elmwood Tract. Therefore, no improvements are proposed south of 2+50. The proposed cutoff wall may begin to transition back to existing conditions south of 2+50.

#### 7.3.1.2 Levee Geometry

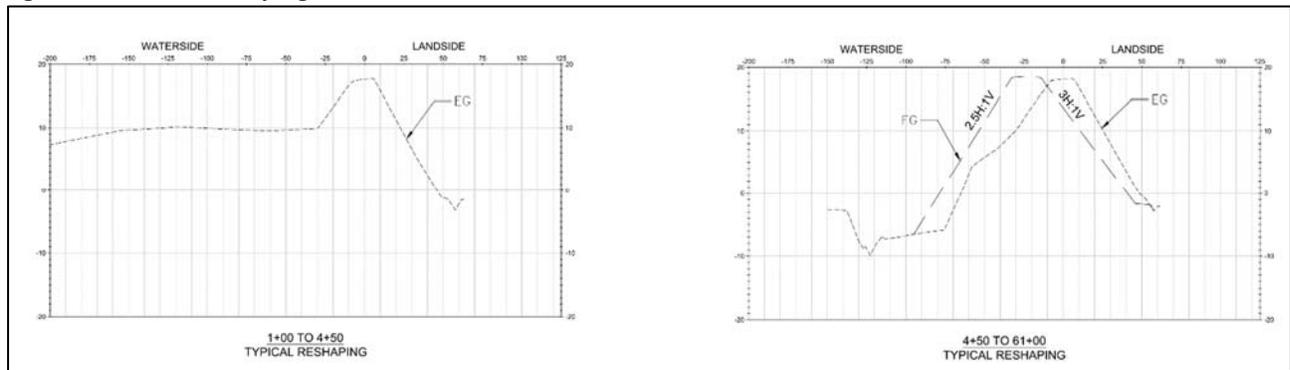
The 100% HBODR states that the design levee height for the entire TS\_30\_L levee should match the existing levee height of 18.6 ft (NAVD88).

The 95% GBODR states that starting at STA 4+50, the landside levee slope should be modified from the current 2H:1V to 3H:1V, while the waterside levee slope should be modified from the current 3H:1V to 2.5H:1V (see figure 7-1). This shifts the levee centerline approximately 20 ft towards the waterside.

South of 4+50, levee reshaping was not required due to the inclusion of the seepage cutoff wall.

Additionally, shifting the levee centerline toward the west to flatten the landside slope would encroach on the existing SSFM running parallel to the waterside toe of the levee, which was not acceptable by the City of Stockton; therefore, the City of Stockton would need to relocate the SSFM line, which would result in substantial time delays and increase costs of the project. The reshaped levee will provide a levee crown width of 20 ft per SPK SOP-03 with roadway surfacing on top.

The reshaped levee also moves the landside levee toe up to 10 ft towards the waterside to provide 15 ft separation between the landside levee toe and the existing property line.

**Figure 7-1. Levee Reshaping**

### 7.3.1.3 Levee Degrade, Levee Rebuild and Levee Road

The levee will be degraded to allow for a working platform. Because this Project is expected to be completed in one season (4/15 to 10/31), the contractor will be allowed to degrade the entire length of the cutoff wall prior to the installation of the cutoff wall.

The 95% GBODR recommends degrading the levee to create the working surface at elevation 10.5 ft (NAVD88). Levee degrade materials will be stored at the temporary stockpile area identified at the north end of TS\_30\_L. The levee degrade will provide a minimum working surface width of 55 ft. In addition, there are two truck turnouts along the levee near STA 27+00 and STA 45+50. Each turnout is approximately 50 ft long and 35 ft wide at the degrade elevation. The truck turnout areas can be used for staging areas to prepare, store and pump the SB slurry for cutoff wall construction.

The levee will be rebuilt to reshape the levee slopes and move the levee centerline as described in Section 7.3.1.2 Levee Geometry. In addition, chip sealed aggregate surfacing on the levee crown will be removed and replaced in-kind with 6-inch thick Class II aggregate base covered with triple-pass chip seal to form the levee road. The existing landside and waterside slopes are surfaced with gravel, and the new slopes will be surfaced with 3-inch thick 3/4" aggregate surfacing to match existing conditions.

### 7.3.1.4 Rock Revetment

Existing riprap on the landside of the levee from approximate station 1+50 to 2+50 will be removed during cutoff wall construction and replaced in-kind following reconstruction of the levee. The existing riprap consists of 18-inch minus rock placed 12" to 24" thick. The existing rock was placed to deter public from walking around the existing access gate and will be replaced in-kind to serve this purpose. Additionally, geotechnical evaluations determined that placement of this rock improves slope stability performance. .

## 7.3.2 Levee Encroachments

There are four underground utilities that cross the levee at the south end of TS\_30\_L. One of these is a 30" sanitary sewer force main (SSFM). To prevent the schedule constraints associated with relocation of the 30" SSFM, the cutoff wall was extended to this location so that the levee slopes could be maintained at existing condition. The SSFM should be monitored during construction to ensure it is protected in place and there is no damage. The other three utilities include PG&E gas piping, PG&E electrical conduit

and AT&T conduit and buried cable. None of these utilities impact the construction of this Project. A guy wire on the water side levee slope at STA 2+10 will need to be temporarily removed and replaced after construction. Two overhead high voltage lines are located at approximate STA 28+40 and 28+70. The working platform is at elevation 10.5 and the low point of the bottom lines are at 51' and 50', providing a minimum of 40' clearance. The Contractor will need to prepare a critical lift plan to account for this restriction.

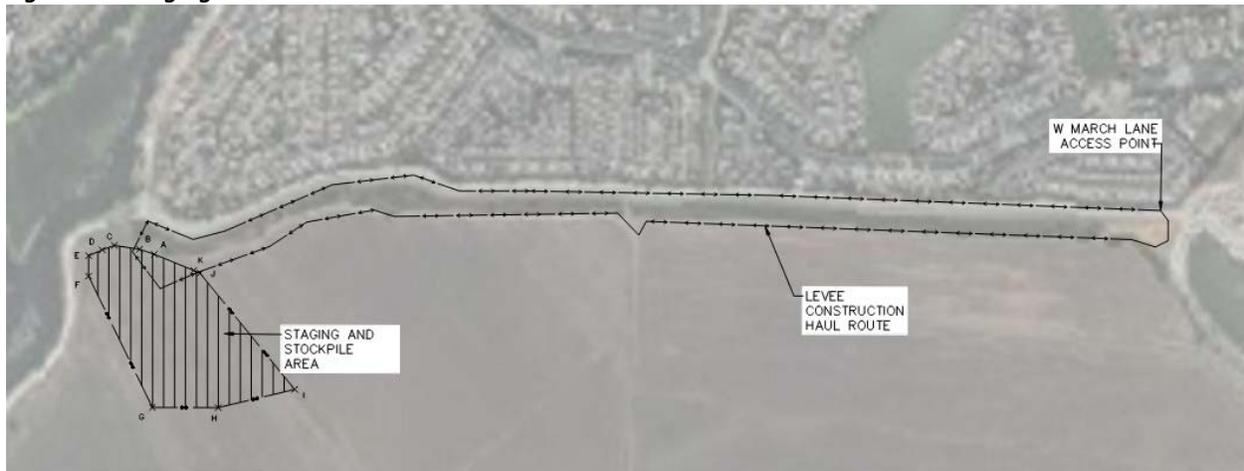
In addition, there are gate, fence and guardrail encroachments along the levee crown that will be removed and replaced once levee reconstruction is complete.

### 7.3.3 Staging Areas

SJAFCA has identified one staging area for this project at the North end of the Project site. Figure 7-2 presents the location of the staging area along with preliminary haul routes to and from the Project site and a temporary stockpile area. Temporary construction easements will be required for these staging areas prior to their use.

Provide staging areas for slurry mixing ponds along the project alignment such that the pumping distance of the bentonite slurry is no greater than 5,000 linear feet. Maximum slurry transport distance is based on previous project experience within the District; therefore, longer slurry transport may be acceptable on a case by case basis, provided slurry quality is maintained over the proposed distance. Waterside areas located away from the existing levee may provide sufficient space for bentonite mixing ponds provided these areas are not subject to environmental restrictions and are not located within the footprint of the levee after it has been reshaped. If neither of these options are viable, slurry mixing may be performed in batch plant tanks located on the on the waterside of the levee crest.

**Figure 7-2. Staging Areas**

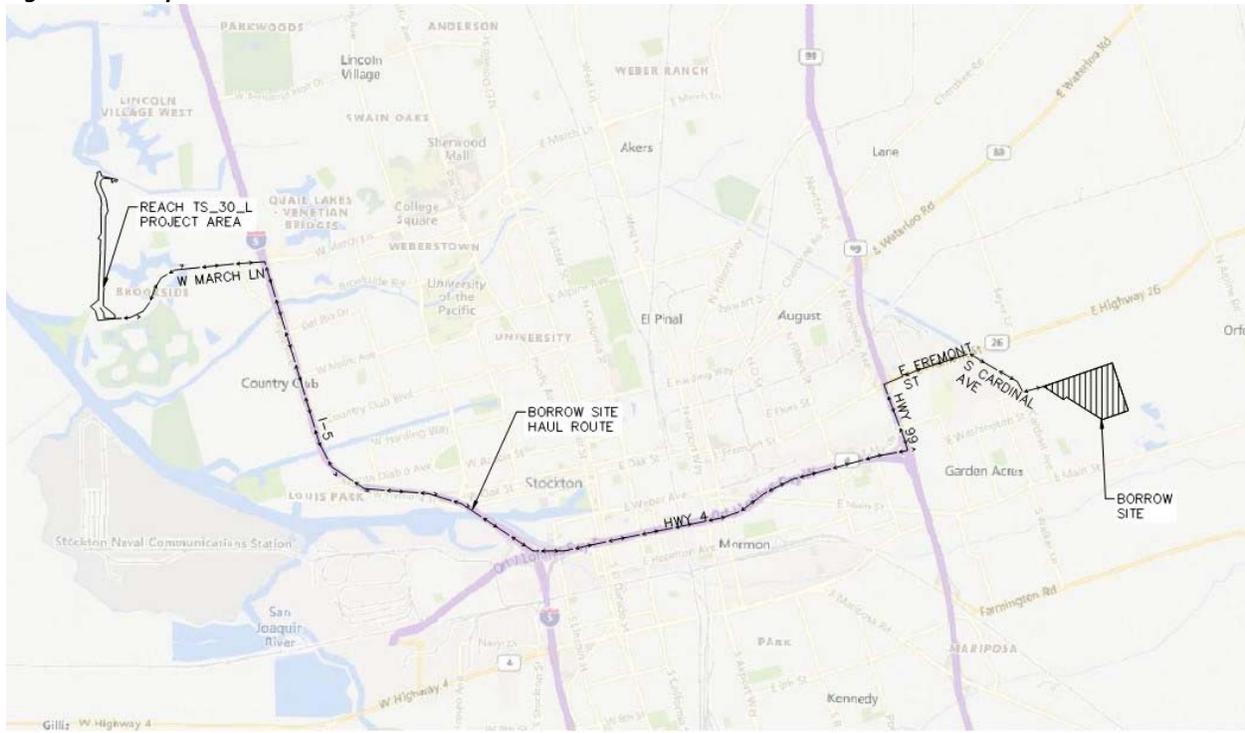


### 7.3.4 Borrow Site

SJAFCA has identified a potential borrow site for the Project located approximately 9 miles east of the Project site. Figure 7-3 presents the location of this proposed borrow site along with preliminary haul routes to and from the Project site. A borrow site investigation and report is currently being conducted. Based on existing investigations around the borrow site, soil at the borrow site is expected to meet

levee fill project specifications. If this material does not meet project specifications, commercial suppliers will be considered.

**Figure 7-3. Proposed Borrow Site**



### 7.3.5 Haul Routes

Potential haul routes for the staging areas and the proposed borrow site are shown in Figure 7-2 and Figure 7-3, respectively. The haul routes for materials are based on the location of the material source.

### 7.3.6 Erosion Control

During construction, the contractor will provide all temporary erosion control measures, as identified in the Storm Water Pollution Prevention Plan (SWPPP), to meet State water quality requirements. As part of the contract, the contractor will also provide permanent grass seeding and erosion control measures that will permanently stabilize the site of all exposed soil that has been disturbed.

## 7.4 Environmental Engineering

Construction activities for the Project will involve the use of hazardous materials such as fuels and lubricants to operate construction equipment and vehicles such as excavators, compactors, haul trucks, and loaders. Bentonite (a non-hazardous material) will be transported to sites where slurry cutoff wall construction will occur. Construction contractors will be required to use, store, and transport hazardous materials in compliance with Federal, state, and local regulations during project construction and operation.

### 7.4.1 HTRW

During levee construction there is the potential that previously undocumented hazardous materials could be encountered at the project site during earth disturbing construction activities. The Contractor will be required to prepare a worker health and safety plan before the start of construction activities that identifies, at a minimum, all contaminants that could be encountered during construction activity; all appropriate worker, public health, and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan will describe the actions to be taken should hazardous materials be encountered on site, including protocols for handling hazardous materials and preventing their spread, and emergency procedures to be taken in the event of a spill.

The Contractor will be required to stop the relevant portion of work if HTRW materials are found during construction and notify the USACE contracting officer. The USACE will provide direction on how to proceed. Typically, the Contractor (or USACE as specified) will notify the appropriate Federal, state, and local agencies if evidence of previously undiscovered soil or groundwater contamination is encountered during construction activities. Any contamination will be cleaned up in accordance with the recommendations appropriate regulatory agencies.

### 7.4.2 Waste Slurry

Excess slurry will be disposed of, as approved by the USACE, on-site by drying, mixing with dry materials or spreading in thin layers on adjacent areas. No slurry should be left in ponds, and all ponds should be pumped dry and backfilled in a controlled manner. Under no circumstances should slurry be allowed to escape to nearby drainage courses or wetlands. Excess slurry may alternatively be disposed of off-site at a facility approved by the USACE.

## 7.5 Cost Engineering

A detailed cost estimate completed with the Micro-Computer Aided Cost Estimating System (MCACES II) is included with the 95% Design Submittal. To meet the construction schedule and complete the project in one construction season (4/15/22 – 10/31/22), the cost estimate utilized a 10 hour/day, 6 day/week work schedule. Appendix C presents a summary of the current working estimate.

## 7.6 Construction Schedule

This Project is planned for construction in 2022. The duration of the Project is expected to last one construction season. The construction schedule was evaluated two ways, both with 10 hour work days: 5-day work week and 6-day work week. All Federal holidays were taken into account in the construction schedule. Starting levee work on 4/15/22, the 5-day work week finished levee work on 12/22/22 while the 6-day work week finished levee work on 10/31/22. Appendix D presents the detailed construction schedules for both the 5-day and 6-day work week scenarios. Since this is a setback levee and typically dry on both sides, the construction window may be extended with approval from the USACE.

## 8.0 Environmental and Cultural Resources

### 8.1 Environmental Protection

A joint National Environmental Policy Act/California Environmental Quality Act (NEPA/CEQA) document was prepared by the USACE for the overall Project. This document was titled San Joaquin River Basin

Lower San Joaquin River, CA Final Integrated Interim Feasibility Report/Environmental Impact Statement/Environmental Impact Report (the 2018 IIFR/EIS/EIR), and its associated Record of Decision (ROD) was signed on February 8, 2019. A copy of the 2018 IIFR/EIS/EIR can be provided upon request. Key decisions are outlined in Chapter 8 – Recommended Plan included in Appendix E.

The 2018 IIFR/EIS/EIR set forth several commitments and mitigation measures that directly affect development of design plans for constructing TS\_30\_L and subsequent reaches. The 2018 IIFR/EIS/EIR made the assumption that vegetation variances would be applied as needed to retain a portion of existing vegetation on the subject levees. However, these variances are no longer authorized and a design deviation will be applied where feasible. Table 8-2 in the 2018 IIFR/EIS/EIR provides a summary listing of various environmental commitments timing established for the Project. These commitments should be reviewed to better understand the environmental commitments.

A Memorandum for the Record (MFR) will be prepared by the USACE to address specific Project design elements that have been developed since preparation of the 2018 IIFR/EIS/EIR. The MFR will be based on 65% and later design plans and it must be signed before a construction contract may be awarded for the construction of TS\_30\_L. The MFR will document that a design deviation will not be sought at TS\_30\_L since all vegetation must be removed to accommodate the levee reshaping. The MFR will also address several environmental factors including (but not limited to) air quality impacts, traffic impacts, and mitigation plans for elderberries (VELB), wetlands, riparian, vegetation, giant garter snake habitat (GGS), and cultural resources.

## 8.2 Mitigation

The USACE will coordinate with USFWS and implement measures that mitigate for possible impacts to listed species on site (the valley elderberry longhorn beetle or VELB and giant garter snake or GGS). The current plan is to transplant ten elderberry shrubs in the project footprint to a USFWS-approved conservation bank. Transplanting the elderberry shrubs must take place in their dormancy period between November 1st and February 14th to increase chances of transplant success. Tree and other vegetation removal would be conducted September 16th to January 31st to the extent feasible, in order to minimize impacts to migratory birds and bat maternity roosts. Impacts to GGS can be minimized by restricting construction activities to their active period (between May 1st and October 1st). Impacts to wetlands and riparian habitat will be mitigated by purchasing credits from a USFWS approved conservation bank in the service area.

## 8.3 Staging and Borrow Areas

As used herein, the term “staging areas” refers to areas temporarily used during Project construction for things such as storing equipment and supplies, construction offices, materials processing, stockpiles, temporary work areas, and potentially borrow areas. During 95 percent design, the limits of one potential staging area were developed for the subject property (Figure 7-2). Environmental and cultural surveys of the staging areas will be conducted once temporary entry permits are available.

As part of any grading or excavation within a given staging area, the construction contractor must first remove the upper foot of soil in the area slated for grading/excavation and stockpile this topsoil. Once use of the affected staging area is finished, the contractor must place the stockpiled topsoil back on the surface of the areas this soil came from as part of the staging area restoration process. This requirement must be covered in both the plans and specifications.

Project plans and specifications will need to address the requirement that all staging areas, as well as any new haul roads, must be restored upon completion of the Project. Unless otherwise approved by the USACE and SJAFCA, topography must be restored to mimic pre-Project topography and in a manner that ensures appropriate drainage patterns. During the topographic restoration, all areas subject to soil disturbance should include a topsoil layer using topsoil acquired from an off-site licensed commercial facility. The topsoil layer would greatly aid revegetation efforts. Following completion of topographic restoration, all disturbed areas must be planted with native grasses and forbs.

During 95% design, one site was identified as a potential borrow site (Figure 7-3). An environmental survey was conducted on the borrow site and the report can be found in Appendix F. Soil hazards testing will be required for all borrow materials. The borrow area is an exception to the restoration guidelines as the current plan is to leave the excavation in place to facilitate plans the Stockton East Water District has for the property. Additionally, a soil disposal plan must be created as it is currently unlikely that the borrow site will be available for soil disposal as well.

#### 8.4 Haul Routes

Haul routes have been identified to and from the staging areas and the proposed borrow site in Figure 7-2 and Figure 7-3, respectively. These haul routes will be evaluated for traffic impacts in the Environmental Assessment being prepared.

Temporary signs will need to be installed prior to and during Project construction. These signs will need to advise road closures, road detours, general warnings and restrictions, etc. The location of such signs will be determined by the Contractor. The specifications address requirements for installation and removal of these temporary signs.

#### 8.5 Stormwater Pollution Control

Prior to construction of TS\_30\_L, the Contractor will need to obtain a Construction General Permit (similar to a National Pollutant Discharge Elimination System permit) from the Central Valley Regional Water Quality Control Board. The General Permit includes preparing a Stormwater Pollution Prevention Plan (SWPPP) and a Spill Prevention and Control Plan that will be approved by the USACE and the Central Valley Regional Water Quality Control Board prior to initiating construction activities.

Appropriate erosion control measures would be incorporated into the SWPPP by the construction Contractor in order to prevent sediment from entering wetlands, waterways, and to minimize temporary turbidity impacts. Examples include but are not limited to straw bales/wattles, erosion blankets, silt fencing, silt curtains, mulching, revegetation, and temporary covers. Sediment and erosion control measures would be maintained by the Contractor during construction at all times. Control measures would be inspected periodically by the construction Contractor, particularly during and after significant rain events. Information regarding environmental requirements and design is pending. Elderberry bushes to be removed or protected are shown on the 95% Plans.

#### 8.6 Cultural Resources

A cultural resource records search and inventory has already been completed for the area within 300 meters of the TS-30-L levee segment. The only resources identified were the Ten mile and Fourteenmile Slough Levees, both of which were determined ineligible for listing on the National Register of Historic Places, with concurrence by the California State Historic Preservation Officer (SHPO). Evaluation and

consultation for borrow, staging, and mitigation areas may need to be completed as part of the environmental review process and in compliance with Section 106 of the National Historic Preservation Act and the Programmatic Agreement between Army Corps of Engineers and SHPO.

## **9.0 Real Estate**

RD No. 2074 owns the parcel that covers most of the TS\_30\_L levee. The parcel is about 100 ft wide with its east boundary along the fence line of the Brookside Estates properties. RD 2074 also may have an easement on the water side of the levee that extends approximately 60 ft west of the property line. The available levee right-of-way on the landside will be 15 ft minimum and the levee is reshaped and pushed towards the waterside. On the waterside, the levee toe is about 60 ft beyond the property line. Therefore, additional land will need to be acquired on the waterside. In addition, a new easement will be required to provide the minimum 15 ft right-of-way beyond the levee toe.

# Appendix D

## **Air Quality Modeling**

EQ Model/Type	EQ Hours	Construction Phase	Model Phase	Total EQ Hours	Total NOx Using 1980s Equipment (12.5 g/BHP)	Total NOx Using Tier 3 Equipment (2.6 g/BHP)	If Model Phase = # Days/Phase	Total Days/Category in Model	Override Hours	Override Hours / 2 Years	Category in Model	Description	Power Notes From Specs
DS 70	53.3	NEW SECURITY MEASURES	Grading/Excavation	58.9	1568	1082	30	139	0.42	0.21	Plate Compactor	COMPACTOR, RAMMER, 13" X 13" SHOE, 3,550 LBS IMPACT	2.8 kW
P47/40KM	6.7	FINE GRAINED BEDDING (C33 SAND IMPORTED) - 6 INCH	Grading/Excavation	90.4	12742	8794	30	273	0.33	0.17	Rollers	COMPACTOR, TRENCH ROLLER, VIBRATORY, 47"W X 22"DIA, QUAD PADFOOT DRUMS, RIDE ON, 21,600 LBS IMPACT	14.8 kW
COMMANDER III (CURB)	11.1	CONCRETE FLOODWALL	Paving	45.6	41943	13530	22	191	0.24	0.12	Pavers	CONCRETE PAVING MACHINES, CURB/GUTTER SUPFORM PAVER, CRAWLER, 3-TRACK, 36" WIDE MOLD/FORM	99 HP
BT4792	1.3	DEMOBILIZATION	Drainage/Utilities/Subgrade	21.1	56464	16495	109	611	0.03	0.02	Cranes	CRANES, HYDRAULIC, TRUCK MTD, BOOM TRUCK, 23.5T (21.3MT), 102' (31.1M) BOOM, 6X2	300 HP
20KW	13.3	EQUIPMENT DEMOB CLEANUP	Drainage/Utilities/Subgrade	66.7	12695	5364	109	218	0.31	0.15	Generator Set	GENERATOR SET, SKID MTD, 20 KW	20 kW
12-M3	1.1	FOUNDATION PREPARATION	Grubbing/Clearing	5.6	9248	2586	22	131	0.04	0.02	Graders	GRADER, MOTOR, ARTICULATED, 6X4, 12' BLADE W/11 TEETH SCARIFIERS	179 HP
RDG 60	26.7	RIPRAP SLOPE PROTECTION	Drainage/Utilities/Subgrade	176.0	281547	78712	109	665	0.26	0.13	Excavators	Hydraulic Rotating Grapple (38,000 - 70,000 Lb Excavator) - Labounty RDG-60	172 HP
930M	14.1	DEMOBILIZATION	Drainage/Utilities/Subgrade	113.3	247778	51538	109	619	0.18	0.09	Tractors/Loaders/Bac khoes	LOADER, FRONT END, WHEEL, ARTICULATED, 3.50 CY (2.7 M3) BUCKET, 4X4	137 HP
PH980E	1.1	CHAIN LINK SWING GATES (GALVANIZED, 9 GA 7-FT X 24-FT WIDTH T) - SECURITY	Drainage/Utilities/Subgrade	9.3	231	159	109	349	0.03	0.01	Bore/Drill Rigs	POST HOLE DRILL, UP TO 8" DIA, 30" DEEP, ONE MAN OPERATION	3.5 HP
S3A1	53.3	EQUIPMENT DEMOB CLEANUP	Drainage/Utilities/Subgrade	53.3	0	0	109	43	1.24	0.62	Pumps	PUMP, WATER, SUBMERSIBLE, ELECTRIC, 3" DIA, 278 GPM @ 20' HEAD (ADD HOSES), 230V 1-PHASE	Elec
TH255C	3.3	REMOVE GUARDRAIL	Grubbing/Clearing	145.5	106607	32305	22	1358	0.11	0.05	Rough Terrain Forklifts	TELEHANDLER, 5500 LB RATED LOAD CAPACITY, 18.4' MAX LIFT HEIGHT WITH 3000 LB CAPACITY, 10.8' MAX FORWARD REACH WITH 1700 LB CAPACITY, 4X4	74 HP
D6TXW	1.5	MOBILIZATION	Grubbing/Clearing	2.6	6116	1710	22	52	0.05	0.03	Crawler Tractors	TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	250 HP
2620	2.7	MOBILIZATION	Grubbing/Clearing	2.7	9137	2669	22	15	0.18	0.09	Trenchers	TRENCHER, WHEEL TYPE CUTTER, 87" (2.2 M) DEEP X 18"-32" (46CM - 81CM) WIDE, ROUND BUCKET, WHEELED	380 HP
6X6 70KGVW DSL	88.9	MOBILIZATION	Grubbing/Clearing	844.6	3796254	1109018	22	3177	0.27	0.13	Off-Highway Trucks	TRUCK, HIGHWAY, 70 KGVW (31.8 MT), 3 AXLE, 6X6 (CHASSIS ONLY-ADD OPTIONS)	505 HP
H3.5*3000	4.4	EQUIPMENT DEMOB CLEANUP	Drainage/Utilities/Subgrade	5.6	0	0	109	218	0.03	0.01	Pressure Washers	WATER BLASTER, LOW PRESSURE, HOT WATER, 3,000 PSI, 3.5 GPM, TRAILER MTD	Elec
					<b>SBT Grams NOx</b>	4582329	1323962						
					<b>Pounds NOx</b>	10093	2916						
<b>On-Site Equipment Only</b>					<b>Tons Nox *</b>	5.05	1.46						
CONCRETE Pump	370.0	Cutoff wall construction	Paving	370.0	860250	240500							250 HP
Highway TRUCK	370.0	Cutoff wall construction	Paving	370.0	1564175	456950							475 HP
Water Truck	370.0	Cutoff wall construction	Paving	370.0	1564175	456950							475 HP
Concrete batch plant	370.0	Cutoff wall construction	Paving	370.0	860250	240500							250 HP
Generator	370.0	Cutoff wall construction	Paving	370.0	809375	168350							175 HP
Rough Terrain Fork Lift	20.0	Cutoff wall construction	Paving	20.0	14652	4440							74 HP
					<b>TTL Grams NOx</b>	10255206	2891652						
					<b>Pounds NOx</b>	22589	6369						
<b>On-Site and Paving Equipment</b>					<b>Tons NOx *</b>	11.29	3.18						

\* SJVAPCD NOx Conformity limits are 10.0 tons/year. EIS notes project total NOx for 1980s equipment (Tier 0) to exceed 10 tons/year for five years between 2019-2023 whereas mitigated emissions using Tier 3 equipment does not exceed 10 tons/year for any year.

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> TS30L Levee Project														
Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	2.03	35.03	4.19	50.22	0.22	50.00	10.59	0.19	10.40	0.07	6,497.46	2.05	0.07	6,570.29
Grading/Excavation	6.13	108.98	14.37	50.70	0.70	50.00	11.00	0.60	10.40	0.21	20,367.25	6.19	0.34	20,624.30
Drainage/Utilities/Sub-Grade	2.04	36.26	4.77	50.24	0.24	50.00	10.60	0.20	10.40	0.07	6,766.35	2.05	0.11	6,851.77
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum (pounds/day)	6.13	108.98	14.37	50.70	0.70	50.00	11.00	0.60	10.40	0.21	20,367.25	6.19	0.34	20,624.30
Total (tons/construction project)	0.73	13.07	1.72	7.28	0.08	7.20	1.57	0.07	1.50	0.03	2,441.64	0.74	0.04	2,472.40

Notes:  
 Project Start Year -> 2024  
 Project Length (months) -> 12  
 Total Project Area (acres) -> 55  
 Maximum Area Disturbed/Day (acres) -> 5  
 Water Truck Used? -> Yes

Phase	Total Material Imported/Exported Volume (yd <sup>3</sup> /day)		Daily VMT (miles/day)			
	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	2	0	22	0	120	0
Grading/Excavation	111	0	132	0	300	150
Drainage/Utilities/Sub-Grade	22	0	44	0	120	50
Paving	0	0	0	0	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> TS30L Levee Project														
Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.01	0.21	0.03	0.30	0.00	0.30	0.06	0.00	0.06	0.00	38.98	0.01	0.00	35.76
Grading/Excavation	0.66	11.77	1.55	5.48	0.08	5.40	1.19	0.06	1.12	0.02	2,199.66	0.67	0.04	2,020.71
Drainage/Utilities/Sub-Grade	0.06	1.09	0.14	1.51	0.01	1.50	0.32	0.01	0.31	0.00	202.99	0.06	0.00	186.48
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum (tons/phase)	0.66	11.77	1.55	5.48	0.08	5.40	1.19	0.06	1.12	0.02	2199.66	0.67	0.04	2,020.71
Total (tons/construction project)	0.73	13.07	1.72	7.28	0.08	7.20	1.57	0.07	1.50	0.03	2441.64	0.74	0.04	2,242.95

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Data Entry Worksheet		Version 9.0.0																															
<p><b>Note:</b> Required data input sections have a yellow background.                      Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.                      The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.                      Please use "Clear Data Input &amp; User Overrides" button first before changing the Project Type or begin a new project.</p>		<p>To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.</p>																															
																																	
<p><b>Input Type</b></p>																																	
Project Name	TS204 Levee Project																																
Construction Start Year	2024	Enter a Year between 2014 and 2040 (inclusive)																															
Project Type	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction																															
Project Construction Time	12.00	months																															
Working Days per Month	24.00	days (assume 22 if unknown)																															
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)																															
Project Length	1.20	miles																															
Total Project Area	55.00	acres																															
Maximum Area Disturbed/Day	5.00	acres																															
Water Trucks Used?	1	1. Yes 2. No																															
<p><b>Material Hauling Quantity Input</b></p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>Material Type</th> <th>Phase</th> <th>Haul Truck Capacity (yd<sup>3</sup>) (assume 20 if unknown)</th> <th>Import Volume (yd<sup>3</sup>/day)</th> <th>Export Volume (yd<sup>3</sup>/day)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Soil</td> <td>Grubbing/Land Clearing</td> <td style="background-color: #ffffcc;">20.00</td> <td></td> <td style="background-color: #ffffcc;">2.00</td> </tr> <tr> <td>Grading/Excavation</td> <td style="background-color: #ffffcc;">20.00</td> <td style="background-color: #ffffcc;">111.00</td> <td></td> </tr> <tr> <td>Drainage/Utilities/Sub-Grade Paving</td> <td style="background-color: #ffffcc;">20.00</td> <td style="background-color: #ffffcc;">22.00</td> <td></td> </tr> <tr> <td rowspan="3">Asphalt</td> <td>Grubbing/Land Clearing</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Grading/Excavation</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Drainage/Utilities/Sub-Grade Paving</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Material Type	Phase	Haul Truck Capacity (yd <sup>3</sup> ) (assume 20 if unknown)	Import Volume (yd <sup>3</sup> /day)	Export Volume (yd <sup>3</sup> /day)	Soil	Grubbing/Land Clearing	20.00		2.00	Grading/Excavation	20.00	111.00		Drainage/Utilities/Sub-Grade Paving	20.00	22.00		Asphalt	Grubbing/Land Clearing				Grading/Excavation				Drainage/Utilities/Sub-Grade Paving			
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<p><b>Mitigation Options</b></p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tbody> <tr> <td style="width: 20%;">On-road Fleet Emissions Mitigation</td> <td style="width: 20%; background-color: #ffffcc;">2010 and Newer On-road Vehicles Fleet</td> <td rowspan="3" style="font-size: x-small;">                     Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer                      Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (<a href="http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation">http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation</a>).                      Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard                 </td> </tr> <tr> <td>Off-road Equipment Emissions Mitigation</td> <td style="background-color: #ffffcc;">Tier 4 Equipment</td> </tr> <tr> <td>Will all off-road equipment be tier 4?</td> <td style="background-color: #ffffcc;">All Tier 4 Equipment</td> </tr> </tbody> </table>			On-road Fleet Emissions Mitigation	2010 and Newer On-road Vehicles Fleet	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure ( <a href="http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation">http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation</a> ). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard	Off-road Equipment Emissions Mitigation	Tier 4 Equipment	Will all off-road equipment be tier 4?	All Tier 4 Equipment																								
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Off-road Equipment Emissions Mitigation	Tier 4 Equipment																																
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<p>The remaining sections of this sheet contain areas that require modification when 'Other Project Type' is selected.</p>																																	

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

[http://www.construction.ca.gov/cga/information/geologic\\_mapping/Pages/googlmaps.aspx#regionalseries](http://www.construction.ca.gov/cga/information/geologic_mapping/Pages/googlmaps.aspx#regionalseries)

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
	Grubbing/Land Clearing	0.50	1.20	
Grading/Excavation	0.00	5.40		1/17/2024
Drainage/Utilities/Sub-Grade	2.50	3.60		10/1/2024
Paving	0.00	1.80		1/2/2025
<b>Totals (Months)</b>		12		

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
	Miles/round trip: Grubbing/Land Clearing	22.00			1
Miles/round trip: Grading/Excavation	22.00			0	152.00
Miles/round trip: Drainage/Utilities/Sub-Grade	22.00			2	44.00
Miles/round trip: Paving				0	0.00

2010+ Model Year Mitigation Option Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Grading/Excavation (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Drainage/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.27	0.00	0.27	1,772.62
Paving (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Hauling Emissions</b>	<b>ROG</b>	<b>CO</b>	<b>NOx</b>	<b>PM10</b>	<b>PM2.5</b>	<b>SOx</b>	<b>CO2</b>	<b>CH4</b>	<b>N2O</b>	<b>CO2e</b>
Pounds per day - Grubbing/Land Clearing	0.00	0.02	0.16	0.01	0.00	0.00	82.14	0.00	0.01	85.95
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.52
Pounds per day - Grading/Excavation	0.01	0.12	0.94	0.03	0.01	0.00	492.84	0.00	0.08	515.94
Tons per const. Period - Grading/Excavation	0.00	0.01	0.10	0.00	0.00	0.00	53.25	0.00	0.01	55.72
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.04	0.31	0.01	0.00	0.00	164.25	0.00	0.03	171.95
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.01	0.00	0.00	0.00	4.93	0.00	0.00	5.16
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total tons per construction project</b>	<b>0.00</b>	<b>0.01</b>	<b>0.11</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>58.65</b>	<b>0.00</b>	<b>0.01</b>	<b>61.40</b>

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
	Miles/round trip: Grubbing/Land Clearing				0
Miles/round trip: Grading/Excavation				0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade				0	0.00
Miles/round trip: Paving				0	0.00

2010+ Model Year Mitigation Option Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Grading/Excavation (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Drainage/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.27	0.00	0.27	1,772.62
Paving (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Emissions</b>	<b>ROG</b>	<b>CO</b>	<b>NOx</b>	<b>PM10</b>	<b>PM2.5</b>	<b>SOx</b>	<b>CO2</b>	<b>CH4</b>	<b>N2O</b>	<b>CO2e</b>
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total tons per construction project</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Note: Worker commute default values can be overridden in cells D121 through D126.

User Input	User Override of Worker Commute Default Values	Default Values		
		Calculated Daily Trips	Calculated Daily VMT	
Miles/one-way trip	10			
One-way trips/day	2			
No. of employees: Grubbing/Land Clearing	6	12	120.00	
No. of employees: Grading/Excavation	15	30	300.00	
No. of employees: Drainage/Utilities/Sub-Grade	6	12	120.00	
No. of employees: Paving		0	0.00	

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.01	0.84	0.06	0.05	0.02	0.00	306.70	0.00	0.01	308.54
Grading/Excavation (grams/mile)	0.01	0.84	0.06	0.05	0.02	0.00	306.70	0.00	0.01	308.54
Drainage/Utilities/Sub-Grade (grams/mile)	0.01	0.84	0.06	0.05	0.02	0.00	306.55	0.00	0.01	308.39
Paving (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grubbing/Land Clearing (grams/trip)	0.98	2.66	0.27	0.00	0.00	0.00	65.99	0.07	0.03	76.61
Grading/Excavation (grams/trip)	0.98	2.66	0.27	0.00	0.00	0.00	65.99	0.07	0.03	76.61
Drainage/Utilities/Sub-Grade (grams/trip)	0.98	2.66	0.27	0.00	0.00	0.00	65.96	0.07	0.03	76.57
Paving (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Emissions</b>	<b>ROG</b>	<b>CO</b>	<b>NOx</b>	<b>PM10</b>	<b>PM2.5</b>	<b>SOx</b>	<b>CO2</b>	<b>CH4</b>	<b>N2O</b>	<b>CO2e</b>
Pounds per day - Grubbing/Land Clearing	0.03	0.02	0.29	0.01	0.01	0.00	82.88	0.00	0.00	83.65
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.50
Pounds per day - Grading/Excavation	0.07	0.06	0.73	0.06	0.03	0.01	207.21	0.01	0.01	209.13
Tons per const. Period - Grading/Excavation	0.01	0.08	0.01	0.00	0.00	0.00	22.38	0.00	0.00	22.59
Pounds per day - Drainage/Utilities/Sub-Grade	0.03	0.29	0.02	0.01	0.01	0.00	82.84	0.00	0.00	83.61
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.01	0.00	0.00	0.00	0.00	2.49	0.00	0.00	2.51
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total tons per construction project</b>	<b>0.01</b>	<b>0.09</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>25.36</b>	<b>0.00</b>	<b>0.00</b>	<b>25.63</b>

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values	Calculated	User Override of	Default Values	Calculated						
User Input	Default # Water Trucks	Number of Water Trucks	Round Trips/Vehicle/Day	Round Trips/Vehicle/Day	Trips/day	Miles/Round Trip	Miles/Round Trip	Daily VMT						
Grubbing/Land Clearing - Exhaust														
Grading/Excavation - Exhaust	3		10.00			5.00		150.00						
Drainage/Utilities/Subgrade	1		10.00			5.00		50.00						
Paving								0.00						
<b>2010+ Model Year Mitigation Option Emission Rates</b>	<b>ROG</b>	<b>CO</b>	<b>NOx</b>	<b>PM10</b>	<b>PM2.5</b>	<b>SOx</b>	<b>CO2</b>	<b>CH4</b>	<b>N2O</b>	<b>CO2e</b>				
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92				
Grading/Excavation (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92				
Drainage/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.27	0.00	0.27	1,772.62				
Paving (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Grading/Excavation (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Drainage/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Paving (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
<b>Emissions</b>	<b>ROG</b>	<b>CO</b>	<b>NOx</b>	<b>PM10</b>	<b>PM2.5</b>	<b>SOx</b>	<b>CO2</b>	<b>CH4</b>	<b>N2O</b>	<b>CO2e</b>				
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Pounds per day - Grading/Excavation	0.01	0.13	1.29	0.04	0.02	0.01	560.05	0.00	0.09	598.29				
Tons per const. Period - Grading/Excavation	0.00	0.01	0.14	0.00	0.00	0.00	60.49	0.00	0.01	63.32				
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.04	0.43	0.01	0.01	0.00	186.65	0.00	0.03	195.40				
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.01	0.00	0.00	0.00	5.60	0.00	0.00	5.66				
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
<b>Total tons per construction project</b>	<b>0.00</b>	<b>0.02</b>	<b>0.15</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>66.08</b>	<b>0.00</b>	<b>0.01</b>	<b>69.15</b>				

Note: Fugitive dust default values can be overridden in cells D183 through D185.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing			50.00	0.30	10.40	0.06
Fugitive Dust - Grading/Excavation			50.00	5.40	10.40	1.12
Fugitive Dust - Drainage/Utilities/Subgrade			50.00	1.50	10.40	0.31

Values in cells D195 through D226, D246 through D279, D297 through D330, and D348 through D381 are required when 'Other Project Type' is selected.

Off-Road Equipment Emissions														
Grubbing/Land Clearing		Default Number of Vehicles	Mitigation Option	Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day									
			Tier 4	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00			Tier 4	Other Construction Equipment	1.81	28.02	3.22	0.16	0.15	0.05	5,121.41	1.66	0.05	5,176.54
			Tier 4	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Tier 4	Rubber Tired Loaders	0.39	6.70	0.77	0.04	0.04	0.01	1,211.03	0.39	0.01	1,224.10
			Tier 4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>User-Defined Off-road Equipment</b>					ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Number of Vehicles		Equipment Tier	Type		pounds/day									
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing		pounds per day		2.00	34.72	4.01	0.20	0.18	0.07	6,332.44	2.05	0.06	6,400.64
	Grubbing/Land Clearing		tons per phase		0.01	0.21	0.02	0.00	0.00	0.00	37.99	0.01	0.00	38.40
<b>Grading/Excavation</b>														
Grading/Excavation		Default Number of Vehicles	Mitigation Option	Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day									
			Tier 4	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Cranes	0.18	3.07	0.35	0.02	0.02	0.01	558.81	0.18	0.01	564.83
			Tier 4	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Excavators	0.16	3.92	0.32	0.02	0.01	0.01	500.27	0.16	0.00	505.66
			Tier 4	Forklifts	0.05	1.16	0.09	0.00	0.00	0.00	148.03	0.05	0.00	149.63
			Tier 4	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00			Tier 4	Other Construction Equipment	4.04	70.05	8.06	0.40	0.37	0.13	12,803.52	4.14	0.12	12,941.36
			Tier 4	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00			Tier 4	Rollers	0.24	5.95	0.48	0.02	0.02	0.01	762.44	0.25	0.01	770.65
			Tier 4	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Tier 4	Rubber Tired Dozers	0.52	9.06	1.05	0.05	0.05	0.02	1,653.96	0.53	0.01	1,671.78
2.00			Tier 4	Rubber Tired Loaders	0.39	6.70	0.77	0.04	0.04	0.01	1,211.03	0.39	0.01	1,224.10
1.00			Tier 4	Scrapers	0.47	8.06	0.93	0.02	0.04	0.01	1,468.10	0.48	0.01	1,484.93
			Tier 4	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>User-Defined Off-road Equipment</b>					ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Number of Vehicles		Equipment Tier	Type		pounds/day									
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation		pounds per day		6.03	107.99	12.08	0.60	0.56	0.20	19,107.15	6.18	0.17	19,312.94
	Grading/Excavation		tons per phase		0.65	11.66	1.30	0.07	0.06	0.02	2,063.57	0.67	0.02	2,085.80
	Default													
	Mitigation Option													

Drainage/Utilities/Subgrade		Number of Vehicles	Override of	Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Tier 4	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Cranes	0.18	3.07	0.35	0.02	0.02	0.01	558.81	0.18	0.01	564.83
			Tier 4	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Excavators	0.16	3.92	0.02	0.01	0.01	0.01	500.27	0.16	0.00	505.68
			Tier 4	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00			Tier 4	Off-Highway Trucks	1.21	21.01	2.42	0.12	0.11	0.04	3,841.03	1.24	0.03	3,882.38
			Tier 4	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Rubber Tired Dozers	0.00	4.53	0.52	0.03	0.02	0.01	826.98	0.27	0.01	835.89
1.00			Tier 4	Rubber Tired Loaders	0.19	3.35	0.39	0.02	0.02	0.01	605.52	0.20	0.01	612.05
			Tier 4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>User-Defined Off-road Equipment</b>					<i>If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab</i>									
Number of Vehicles	Program-estimate	Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Drainage/Utilities/Sub-Grade				pounds per day	2.00	35.89	4.01	0.20	0.18	0.07	6,332.60	2.05	0.06	6,400.81
Drainage/Utilities/Sub-Grade				tons per phase	0.06	1.08	0.12	0.01	0.01	0.00	189.98	0.06	0.00	192.02

Paving		Number of Vehicles	Override of	Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Tier 4	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>User-Defined Off-road Equipment</b>					<i>If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab</i>									
Number of Vehicles	Program-estimate	Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Paving				pounds per day	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving				tons per phase	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Emissions all Phases (tons per construction period) =&gt;</b>					0.72	12.95	1.45	0.07	0.07	0.02	2,291.54	0.74	0.02	2,316.23

Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		221		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		231		8
Crawler Tractors		212		8
Crushing/Proc. Equipment		85		8
Excavators		158		8
Forklifts		89		8
Generator Sets		84		8
Graders		187		8
Off-Highway Tractors		124		8
Off-Highway Trucks		402		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		168		8
Pavers		130		8
Paving Equipment		132		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		80		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		247		8
Rubber Tired Loaders		203		8
Scrapers		367		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		263		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		97		8
Trenchers		78		8
Welders		46		8

END OF DATA ENTRY SHEET

The maximum pounds per day in row 11 is summed over overlapping phases, but the maximum tons per phase in row 34 is not summed over overlapping phases.

**Road Construction Emissions Model, Version 9.0.0**

Daily Emission Estimates for -> LSJR Mitigation Project														
Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.74	12.96	2.29	50.17	0.17	50.00	10.50	0.10	10.40	0.03	2,953.60	0.68	0.09	2,996.70
Grading/Excavation	1.37	25.74	3.96	50.24	0.24	50.00	10.57	0.17	10.40	0.05	5,078.86	1.33	0.13	5,149.39
Drainage/Utilities/Sub-Grade	1.24	23.99	3.53	50.19	0.19	50.00	10.54	0.14	10.40	0.05	4,488.21	1.22	0.11	4,552.93
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum (pounds/day)	3.34	62.69	9.78	150.60	0.60	150.00	31.61	0.41	31.20	0.13	12,520.67	3.23	0.33	12,699.01
Total (tons/construction project)	0.06	1.05	0.16	2.21	0.01	2.20	0.46	0.01	0.46	0.00	208.53	0.05	0.01	211.45

Notes:  
 Project Start Year -> 2025  
 Project Length (months) -> 4  
 Total Project Area (acres) -> 154  
 Maximum Area Disturbed/Day (acres) -> 5  
 Water Truck Used? -> Yes

Phase	Total Material Imported/Exported Volume (yd <sup>3</sup> /day)		Daily VMT (miles/day)			
	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	780	100
Grading/Excavation	194	0	34	0	780	100
Drainage/Utilities/Sub-Grade	2	0	30	0	360	100
Paving	0	0	0	0	0	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> LSJR Mitigation Project														
Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.00	0.07	0.01	0.28	0.00	0.28	0.06	0.00	0.06	0.00	16.24	0.00	0.00	14.95
Grading/Excavation	0.05	0.85	0.13	1.66	0.01	1.65	0.35	0.01	0.34	0.00	167.60	0.04	0.00	154.16
Drainage/Utilities/Sub-Grade	0.01	0.13	0.02	0.28	0.00	0.28	0.06	0.00	0.06	0.00	24.69	0.01	0.00	22.72
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum (tons/phase)	0.05	0.85	0.13	1.66	0.01	1.65	0.35	0.01	0.34	0.00	167.60	0.04	0.00	154.16
Total (tons/construction project)	0.06	1.05	0.16	2.21	0.01	2.20	0.46	0.01	0.46	0.00	208.53	0.05	0.01	191.83

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Data Entry Worksheet		Version 9.0.0		
<p><b>Note:</b> Required data input sections have a yellow background. Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background. The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types. Please use "Clear Data Input &amp; User Overrides" button first before changing the Project Type or begin a new project.</p>		<p>To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.</p>		
<b>Input Type</b>				
Project Name	USJR Mitigation Project			
Construction Start Year	2025	Enter a Year between 2014 and 2040 (inclusive)		
Project Type	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction		
Project Construction Time	4.00	months		
Working Days per Month	22.00	days (assume 22 if unknown)		
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	1	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)		
Project Length	0.50	miles		
Total Project Area	154.00	acres		
Maximum Area Disturbed/Day	5.00	acres		
Water Trucks Used?	1	1. Yes 2. No		
<b>Material Hauling Quantity Input</b>				
Material Type	Phase	Haul Truck Capacity (yd <sup>3</sup> ) (assume 20 if unknown)	Import Volume (yd <sup>3</sup> /day)	Export Volume (yd <sup>3</sup> /day)
Soil	Grubbing/Land Clearing	12.00		
	Grading/Excavation	12.00	96.00	96.00
	Drainage/Utilities/Sub-Grade	12.00	2.00	
	Paving			
Asphalt	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			
<b>Mitigation Options</b>				
On-road Fleet Emissions Mitigation	2010 and Newer On-road Vehicles Fleet	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer		
Off-road Equipment Emissions Mitigation	Tier 4 Equipment	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure ( <a href="http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation">http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation</a> ).		
Will all off-road equipment be tier 4?	All Tier 4 Equipment	Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier-4 Standard		
The remaining sections of this sheet contain areas that require modification when 'Other Project Type' is selected.				

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

[http://www.construction.ca.gov/cga/information/geologic\\_mapping/Pages/geologicmaps.aspx#regionalseries](http://www.construction.ca.gov/cga/information/geologic_mapping/Pages/geologicmaps.aspx#regionalseries)

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
	Grubbing/Land Clearing	0.50	0.40	4/1/2025
Grading/Excavation	3.00	1.60	4/16/2025	1/17/2025
Drainage/Utilities/Sub-Grade	0.50	1.40	7/16/2025	4/19/2025
Paving	0.00	0.60	8/6/2025	5/5/2025
<b>Totals (Months)</b>		4		

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions		User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT										
<b>User Input</b>																
Miles/round trip: Grubbing/Land Clearing		2.00			0	0.00										
Miles/round trip: Grading/Excavation		2.00			17	34.00										
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00			1	30.00										
Miles/round trip: Paving					0	0.00										
<b>2010+ Model Year Mitigation Option Emission Rates</b>																
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e						
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28						
Grading/Excavation (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28						
Drainage/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28						
Paving (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Grading/Excavation (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Drainage/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Paving (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
<b>Hauling Emissions</b>							ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.03	0.40	0.01	0.00	0.00	125.39	0.00	0.02	131.27						
Tons per const. Period - Grading/Excavation	0.00	0.00	0.01	0.00	0.00	0.00	4.14	0.00	0.00	4.33						
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.03	0.21	0.01	0.00	0.00	110.64	0.00	0.02	115.83						
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.64						
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Total tons per construction project	0.00	0.00	0.01	0.00	0.00	0.00	4.75	0.00	0.00	4.97						

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

Asphalt Hauling Emissions		User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT										
<b>User Input</b>																
Miles/round trip: Grubbing/Land Clearing					0	0.00										
Miles/round trip: Grading/Excavation					0	0.00										
Miles/round trip: Drainage/Utilities/Sub-Grade					0	0.00										
Miles/round trip: Paving					0	0.00										
<b>2010+ Model Year Mitigation Option Emission Rates</b>																
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e						
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28						
Grading/Excavation (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28						
Drainage/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28						
Paving (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Grading/Excavation (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Drainage/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Paving (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
<b>Emissions</b>							ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Worker commute default values can be overridden in cells D121 through D126.

Worker Commute Emissions		User Override of Worker Commute Default Values	Default Values	Calculated Daily Trips	Calculated Daily VMT										
<b>User Input</b>															
Miles/one-way trip		30													
One-way trips/day		2													
No. of employees: Grubbing/Land Clearing		13		26	780.00										
No. of employees: Grading/Excavation		13		26	780.00										
No. of employees: Drainage/Utilities/Sub-Grade		6		12	360.00										
No. of employees: Paving				0	0.00										
<b>Emission Rates</b>															
	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e					
Grubbing/Land Clearing (grams/mile)	0.01	0.78	0.06	0.05	0.02	0.00	295.84	0.00	0.01	297.52					
Grading/Excavation (grams/mile)	0.01	0.78	0.06	0.05	0.02	0.00	295.84	0.00	0.01	297.52					
Drainage/Utilities/Sub-Grade (grams/mile)	0.01	0.78	0.06	0.05	0.02	0.00	295.84	0.00	0.01	297.52					
Paving (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
Grubbing/Land Clearing (grams/trip)	0.93	2.56	0.25	0.00	0.00	0.00	63.73	0.06	0.03	73.77					
Grading/Excavation (grams/trip)	0.93	2.56	0.25	0.00	0.00	0.00	63.73	0.06	0.03	73.77					
Drainage/Utilities/Sub-Grade (grams/trip)	0.93	2.56	0.25	0.00	0.00	0.00	63.73	0.06	0.03	73.77					
Paving (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
<b>Emissions</b>						ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearing	0.07	1.48	0.11	0.08	0.03	0.01	512.38	0.01	0.01	515.85					
Tons per const. Period - Grubbing/Land Clearing	0.00	0.01	0.00	0.00	0.00	0.00	2.82	0.00	0.00	2.84					
Pounds per day - Grading/Excavation	0.07	1.48	0.11	0.08	0.03	0.01	512.38	0.01	0.01	515.85					
Tons per const. Period - Grading/Excavation	0.00	0.05	0.00	0.00	0.00	0.00	16.91	0.00	0.00	17.02					
Pounds per day - Drainage/Utilities/Sub-Grade	0.03	0.68	0.05	0.04	0.02	0.00	236.48	0.00	0.01	238.08					
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.00	0.00	1.31					
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
Total tons per construction project	0.00	0.06	0.00	0.00	0.00	0.00	21.03	0.00	0.00	21.17					

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values	Calculated	User Override of	Default Values	Calculated				
User Input	Default # Water Trucks	Number of Water Trucks	Round Trips/Vehicle/Day	Round Trips/Vehicle/Day	Trips/day	Miles/Round Trip	Miles/Round Trip	Daily VMT				
Grubbing/Land Clearing - Exhaust	1		20.00			5.00		100.00				
Grading/Excavation - Exhaust	1		20.00			5.00		100.00				
Drainage/Utilities/Subgrade	1		20.00			5.00		100.00				
Paving								0.00				
<b>2010+ Model Year Mitigation Option Emission Rates</b>	<b>ROG</b>	<b>CO</b>	<b>NOx</b>	<b>PM10</b>	<b>PM2.5</b>	<b>SOx</b>	<b>CO2</b>	<b>CH4</b>	<b>N2O</b>	<b>CO2e</b>		
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28		
Grading/Excavation (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28		
Drainage/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.06	0.11	0.05	0.02	1,672.88	0.00	0.26	1,751.28		
Paving (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grading/Excavation (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Drainage/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Paving (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
<b>Emissions</b>	<b>ROG</b>	<b>CO</b>	<b>NOx</b>	<b>PM10</b>	<b>PM2.5</b>	<b>SOx</b>	<b>CO2</b>	<b>CH4</b>	<b>N2O</b>	<b>CO2e</b>		
Pounds per day - Grubbing/Land Clearing	0.01	0.09	0.87	0.02	0.01	0.00	368.81	0.00	0.06	386.09		
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	2.03	0.00	0.00	2.12		
Pounds per day - Grading/Excavation	0.01	0.09	0.87	0.02	0.01	0.00	368.81	0.00	0.06	386.09		
Tons per const. Period - Grading/Excavation	0.00	0.00	0.03	0.00	0.00	0.00	12.17	0.00	0.00	12.74		
Pounds per day - Drainage/Utilities/Sub-Grade	0.01	0.09	0.87	0.02	0.01	0.00	368.81	0.00	0.06	386.09		
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	2.03	0.00	0.00	2.12		
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
<b>Total tons per construction project</b>	<b>0.00</b>	<b>0.00</b>	<b>0.04</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>16.23</b>	<b>0.00</b>	<b>0.00</b>	<b>16.99</b>		

Note: Fugitive dust default values can be overridden in cells D183 through D185.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing			50.00	0.28	10.40	0.06
Fugitive Dust - Grading/Excavation			50.00	1.65	10.40	0.34
Fugitive Dust - Drainage/Utilities/Subgrade			50.00	0.28	10.40	0.06

Values in cells D195 through D226, D246 through D279, D297 through D330, and D348 through D381 are required when 'Other Project Type' is selected.

Off-Road Equipment Emissions														
Grubbing/Land Clearing		Default Number of Vehicles	Mitigation Option	Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles		Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day								
			Tier 4	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.50			Tier 4	Other Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Rubber Tired Dozers	0.26	4.53	0.52	0.03	0.02	0.01	826.96	0.27	0.01	835.87
			Tier 4	Rubber Tired Loaders	0.19	3.35	0.39	0.02	0.02	0.01	605.62	0.20	0.01	612.16
			Tier 4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>User-Defined Off-road Equipment</b>					If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment tab'									
	Number of Vehicles		Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing			pounds per day	0.66	11.38	1.31	0.07	0.06	0.02	2,072.42	0.67	0.02	2,094.76
	Grubbing/Land Clearing			tons per phase	0.00	0.06	0.01	0.00	0.00	0.00	11.40	0.00	0.00	11.52
Grading/Excavation														
Grading/Excavation		Default Number of Vehicles	Mitigation Option	Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles		Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day								
			Tier 4	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Excavators	0.16	3.92	0.32	0.02	0.01	0.01	500.34	0.16	0.00	505.73
			Tier 4	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Other Highway Trucks	0.40	7.00	0.81	0.04	0.04	0.01	1,276.68	0.41	0.01	1,293.45
			Tier 4	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rollers	0.08	1.98	0.16	0.01	0.01	0.00	254.06	0.08	0.00	256.80
1.00			Tier 4	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Rubber Tired Dozers	0.26	4.53	0.52	0.03	0.02	0.01	826.96	0.27	0.01	835.87
2.00			Tier 4	Rubber Tired Loaders	0.39	6.70	0.77	0.04	0.04	0.01	1,211.24	0.39	0.01	1,224.32
			Tier 4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>User-Defined Off-road Equipment</b>					If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment tab'									
	Number of Vehicles		Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation			pounds per day	1.29	24.14	2.58	0.13	0.12	0.04	4,072.28	1.32	0.04	4,116.18
	Grading/Excavation			tons per phase	0.04	0.90	0.09	0.00	0.00	0.00	134.39	0.04	0.00	135.83
			Default											
			Mitigation Option											

Drainage/Utilities/Subgrade		Number of Vehicles	Override of	Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Tier 4	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Excavators	0.16	3.92	0.02	0.01	0.01	0.01	500.34	0.16		567.73
			Tier 4	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Off-Highway Trucks	0.40	7.00	0.81	0.04	0.04	0.01	1,279.88	0.41	0.01	1,293.45
			Tier 4	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Other Material Handling Equipm	0.18	4.39	0.36	0.02	0.02	0.01	559.68	0.18	0.01	565.71
			Tier 4	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Tier 4	Rubber Tired Dozers	0.26	4.53	0.52	0.03	0.02	0.01	826.96	0.27	0.01	835.87
1.00			Tier 4	Rubber Tired Loaders	0.19	3.35	0.39	0.02	0.02	0.01	605.62	0.20	0.01	612.16
			Tier 4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>User-Defined Off-road Equipment</b>					<i>If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab</i>									
Number of Vehicles	Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Drainage/Utilities/Sub-Grade			1.19	23.19	2.39	0.12	0.11	0.04	3,772.28	1.22	0.03	3,812.93		
Drainage/Utilities/Sub-Grade			0.01	0.13	0.00	0.00	0.00	0.00	20.75	0.01	0.00	20.97		

Paving		Number of Vehicles	Override of	Default	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	Program-estimate	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Tier 4	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other General Industrial Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Tier 4	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>User-Defined Off-road Equipment</b>					<i>If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" tab</i>									
Number of Vehicles	Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Paving			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Paving			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
<b>Total Emissions all Phases (tons per construction period) =&gt;</b>					0.05	0.99	0.11	0.01	0.00	0.00	166.53	0.05	0.00	168.33

Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		221		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		231		8
Crawler Tractors		212		8
Crushing/Proc. Equipment		85		8
Excavators		158		8
Forklifts		89		8
Generator Sets		84		8
Graders		187		8
Off-Highway Tractors		124		8
Off-Highway Trucks		402		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		168		8
Pavers		130		8
Paving Equipment		132		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		80		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		247		8
Rubber Tired Loaders		203		8
Scrapers		367		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		263		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		97		8
Trenchers		78		8
Welders		46		8

END OF DATA ENTRY SHEET

Appendix C  
**Geotechnical Basis of  
Design Report**

**95% GEOTECHNICAL BASIS OF DESIGN REPORT**  
**LOWER SAN JOAQUIN LEVEE IMPROVEMENT PROJECT**  
**REACH TS\_30\_L**



**Prepared By:**  
**U.S. Army Corps of Engineers**  
**Sacramento District**  
**Geotechnical Branch**  
**Levee Safety Section**  
**23 August 2021**

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## **LIST OF ACRONYMS**

**ASTM-** American Society for Testing and Materials

**CPT-** Cone penetration test

**CME-** Central Mine Equipment

**CESPK-** Corps of Engineers, Sacramento District

**DC-** During construction

**DDR-** Design documentation report

**DMM-** deep mixing methods

**DWSE-** Design water surface elevation

**DWR-** Department of Water Resources

**EOC-** End of construction

**GDR-** Geotechnical data report

**GBODR-** Geotechnical basis of design report

**HTOL-** Hydraulic top of levee

**LEP** – Levee evaluation program

**LS** - Landside

**LSJ-** Lower San Joaquin

**MSM-** mass soil mixing

**NAD-** North American Datum

**NAVD-** North American Vertical Datum

**NGVD-** National Geodetic Vertical Datum

**NSHM-** National Seismic Hazard Model

**PED-**preconstruction, engineering, and design

**PFM-** Potential failure mode

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**RD-** Reclamation District

**RDD-** Rapid drawdown

**SJAFCA-** San Joaquin Flood Control Agency

**SPT-** Standard penetration test

**SSC-** “Soft” soil condition

**SSS-** Steady-state seepage

**STA-** Station

**SQRA-** Semi-quantitative risk assessment

**TOL-** Top of levee

**UHT-** Unified Hazard Tool

**ULE-** Urban Levee Evaluation

**USCS-** Unified Soil Classification System

**USACE-** United States Army Corps of Engineers

**WS-** Waterside

---

## 1.0 INTRODUCTION

### 1.1 General and Site Location

The Lower San Joaquin (LSJ) levee improvement project is located in Stockton, California, and is comprised of Project and Non-Project levees within two levee systems: Mormon Slough-Calaveras left bank – Reclamation District (RD) 0404 - Duck Creek system, and Mormon Slough - Calaveras R right bank - RD 2074 system. This report focuses on a specific levee reach, Reach TS\_30\_L (referred herein as TS30L throughout the remainder of the report), located within the LSJ project area. The reach name, TS30L, denotes the specific reach location (Tenmile Slough abbreviated as TS), with the levee location (30) and appropriate bank delineation between right bank (R) or left bank (L). Reach TS30L is generally located on the western side of Stockton, California, as shown in Figure 1 and is part of the larger delta front levee system and represents a dividing line where low-lying agriculture lands are present to the west and densely developed residential and commercial land exists to the east. TS30L has never been hydraulically loaded due to a system of farm levees that prevents water from reaching the TS30L alignment. TS30L effectively is a second line of defense (i.e., setback levee) that would only experience hydraulic loading due to a breach or overtopping of the Wright-Elmwood Tract farm levees (Wright-Elmwood Tract is the agricultural land just west (waterside) of TS30L).

Reach TS30L is about a 1.1-mile section of the existing Tenmile Slough (TS) levee, which is a dry levee that provides flood protection to the southwest side of North Stockton and is bounded by Wright-Elmwood Tract on the to the west (waterside) and to the east (landside) by Sargent Barnhart Tract. The Sargent Barnhart Tract consists of several residential housing developments and is colloquially known as the Brookside development area. An existing manmade lake, Brookside Lake, within the residential development to the east of the levee, is located about 300 feet, at its closest, landside from the levee centerline. Additionally, an overhead Pacific Gas and Electric Company (PG&E) electrical transmission tower encroaches on a portion of the landside toe of the Ten Mile Slough levee near the middle of the reach. The tower lies within a PG&E easement that crosses perpendicular to the levee.

The U.S. Army Corps of Engineers (USACE), California Department of Water Resources (DWR) and San Joaquin Flood Control Agency (SJAFCA) completed a feasibility study for the Lower San Joaquin River Project in January 2018. The feasibility study selected Alternative 7A as the recommended design plan (Figure 2). Based on this plan, recommended levee improvements for the LSJ project area include cut-off wall, seismic fix, new levee, levee reshaping, levee raise, erosion protection, and closure structures. Feasibility improvement recommendations for the subject project reach, TS30L, consisted of levee reshaping, cutoff wall, and waterside erosion protection.

The Geotechnical Basis of Design Report (GBODR) summarizes the geotechnical engineering evaluation, conclusions, and recommendations for the LSJ Reach TS30L project. Based on analysis of subsurface investigation data, the 95% PED recommends a cut-off wall and levee reshaping be conducted along Reach TS30L to decrease under-seepage concerns and increase

levee embankment slope stability. The GBODR is an evolving document that continues to be updated throughout the various design stages and will be updated in the future as the project moves toward final design.

## **1.2 Report Organization**

The GBODR is organized into the following sections: Introduction, Site Assessment, Risk Assessment, Site Investigation, Laboratory Testing, Site Characterization, Geotechnical Evaluation Criteria and Methodology, Seismic Analysis Summary, Existing Condition Analysis, Potential Improvement Measures, With Project Condition Analysis, Conclusions, Recommendations, References, Limitations, Figures and Appendices. The Appendices contain a summary of the soil laboratory testing results, groundwater data, seismic analyses, soil parameter evaluation, and seepage and stability analyses.

## **1.3 Purpose and Scope**

The purpose of the Reach TS30L and overall LSJ levee improvement project is to improve select levees to a 200-year flood protection level. The scope of this report includes evaluating the existing and with-project conditions for under-seepage, through-seepage, levee embankment slope stability, and seismic slope stability. The modes of failure are evaluated for several flood loading conditions to assess embankment performance and compliance with design criteria. The flood loading conditions include the 200-year flood elevation, 200-year flood elevation plus freeboard, and the 500-year flood elevation. The design water surface elevation (DWSE) was taken as the 200-year flood elevation and the top of levee water surface elevation, also known as the hydraulic top of levee (HTOL) was determined as the greater of the 200-year flood elevation plus freeboard or the 500-year flood elevation. The water surface elevations were provided by the CESPCK – Hydraulic & Hydrology (H&H) Section. Analyses design recommendations based on the engineering evaluation were developed to mitigate design deficiencies by project phase.

The proposed project will meet the requirements of EM 1110-2-1913, SOP 3 with generally 2.5H:1V waterside slopes and 3H:1V landside slopes throughout Reach TS30L. A soil bentonite (SB) cutoff wall will be constructed from project station 2+50 to 61+00 with the bottom of the cutoff wall ranging from elevation -21 feet between Stations 2+50 to 4+50, elevation -42 feet between 4+50 to 51+50 and -25 feet between Stations 51+50 to 61+00. Furthermore, the embankment will be degraded to a minimum elevation 10.5 feet (NAVD88) for cutoff wall construction and rebuilt to about elevation 18 feet.

## **1.4 Survey Control**

The elevations in this report are in feet and are referenced to the North American Vertical Datum of 1988 (NAVD88). The grid coordinate system used for this project was the California State Plane Coordinate System Zone 2, North American Datum of 1983 (NAD83). A USACE survey

team has performed a site-specific survey of Reach TS30L using hand-held GPS units to support the TS30L PED phase.

### 1.5 Key Project Team Participants

Key project team participants within the USACE geotechnical branch involved with the 2020/2021 USACE geotechnical evaluation and analyses for Reach TS30L, and the GBODR throughout 35%, 65% and 95% development are shown in Table 1. The team members were assigned various responsibilities that include developing and reviewing various geotechnical evaluations and analyses such as literature review and evaluation, plan and profile development, cross section development, soil parameter evaluation and selection, seismic analyses, seepage analyses, and slope stability analyses, and developing and reviewing the GBODR.

Table 1: LSJ Reach TS30L Key Participants – GBODR

Title	Participant
USACE Technical Lead	Spencer Waganaar, PE
USACE Report Team	Spencer Waganaar, PE
	Bradley Rousseau
	Fidan Mamedova
USACE Analysis and Evaluation (SPK District Engineers)	Spencer Waganaar, PE
	Bradley Rousseau
	Fidan Mamedova
	Malak Alhaidari
	Christopher Rica
USACE Review Team	Erik James, PG, PE, GE
	Joseph Sciandrone, PE
	Glen Johnson

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## 2.0 SITE ASSESSMENT

### 2.1 Literature Review

Several geotechnical reports, which include subsurface explorations, were available near TS30L for review. Previous reports were conducted for the existing TS30L levee by DWR, USACE, and two private consulting firms, Kleinfelder and Moore & Taber. Reports generally consisted of subsurface explorations, engineering analysis and design recommendations. Additionally, previous explorations associated with the design and development of the adjacent residential property located to the east of TS30L, conducted by Kleinfelder were also available for review. Finally, construction records, plans and quality control reports were available for review. A summary of the relevant subsurface conditions and conclusion obtained from these previous studies is provided in the subsequent sections. Additionally, we have included historical boring, CPTs, and test pit locations on the plan and profile plots (Figure 3) and incorporated existing subsurface information into our engineering analysis and design.

#### 2.1.1 Construction Records

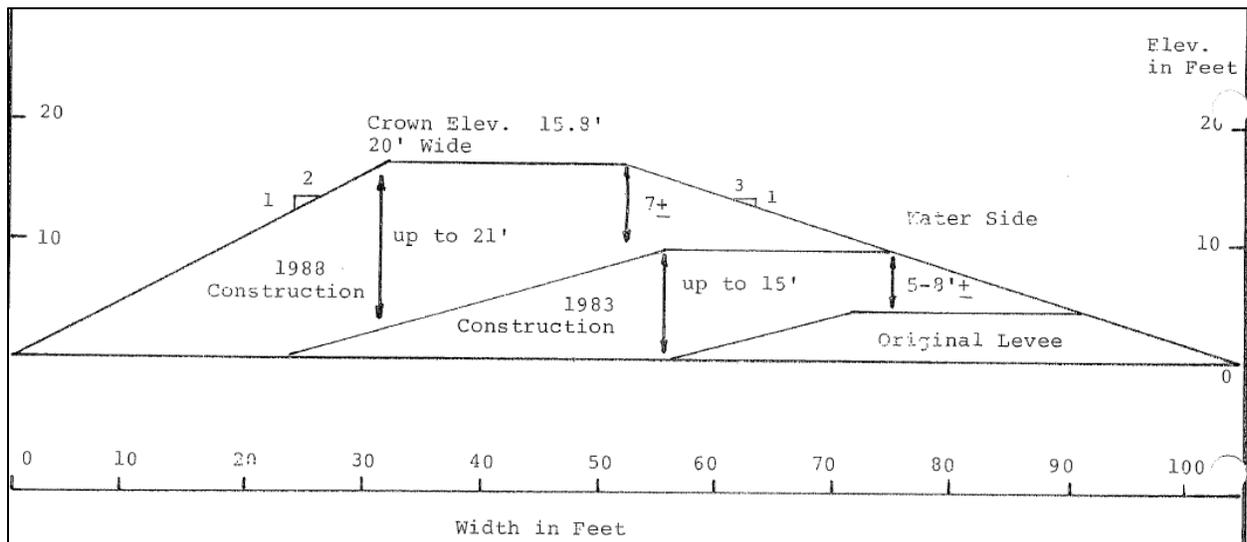
Available construction records include as-built drawings, progress reports, and density test results of compacted levee fill. Previous geotechnical recommendation reports, along with construction records indicate TS30L was constructed in stages. In the early to mid-1900s a small levee was constructed to approximately an elevation of +3 feet (msl) to provide protection in the event of minor flooding. No as-built drawings or construction records of the original levee construction or dimensions were available for review, and the precise construction date of the original levee is unknown. The original levee was most likely built using shallow borrow sources located near or directly adjacent to the site, potentially from dredging Tenmile Slough. Additionally, these embankment soils were likely not prepared, placed, and compacted in accordance with the current standard of practice.

In 1983 the levee was raised to an elevation of about +9.0 feet (NGVD29) to improve protection from the estimated 100-year flood event water surface elevation. The levee construction was monitored by Moore & Taber Consultants (now Taber Consultants). TS30L was raised a third and final time to an elevation of about +15.8 feet (NGVD29) in 1988 to provide additional freeboard and protection in the event of flooding. The levee construction was monitored by Kleinfelder. The new levee configuration was designed by R. W. Siegfried & Associates and incorporated in general slopes of 2:1 and 3:1 for the east (landside) and west (waterside) facing slopes, respectively. The additional levee fill was generally placed directly above the crown and on the landside slope of the existing levee.

The available as-built construction drawings and progress reports (located in Appendix J of the GDR) provide limited specifications; however, based on existing geotechnical recommendations the fill placed in both 1983 and 1988 construction events were likely prepared, placed and compacted in accordance with standards of practice acceptable at the time of construction, which include some level of compaction, material specification and quality assurance measures (Kleinfelder, 1988). No construction records were available to review for the levee construction conducted in 1983; however, representatives from Kleinfelder were present onsite to perform field

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density testing and other conformance testing during levee construction in 1988. Based on QC information in the progress reports issued by Kleinfelder, the engineered fill in the levee embankment generally consisted of a mixture of silt and clay with lesser amounts of sand and organic soil; however, sporadic organic clay and peaty material was used to some capacity which was likely available for engineered fill due to the nearby excavation of the landside lakes (Kleinfelder, 1989). Approximately 300 field density tests were completed during the 1988 levee construction. Additionally, settlement and pore water pressure measurements were monitored during construction at project stations 139+00 and 122+00, which correspond to the current project station of approximately 24+00 and 56+00. Compaction requirements for levee material placed during the levee raise in 1988 were required to be above 85% relative compaction. All compaction tests met specified requirements and were generally above 95% relative compaction (Kleinfelder, 1989). A schematic illustrating the three phases of levee construction along TS30L, provided by Kleinfelder, is presented in Exhibit 2-1. As-built compaction test results and construction progress reports are provided in Appendix J of the GDR.



**Exhibit 2-1 : Hand drawn schematic illustrating the construction phasing to construct the existing TS30L levee. Elevations are in NGVD29 (Kleinfelder, 1990)**

## 2.1.2 Previous Geotechnical Reports

### 2.1.2.1 Moore & Taber Geotechnical Reports

Moore and Taber conducted several levee investigations within Sargent Barnhart Tract in the early 1980s. In a preliminary subsurface study dated February 20, 1981, Moore and Taber performed a limited investigation to provide preliminary soils criteria for design and construction of levee improvements for about 15,100 linear feet of levee along Buckley Cove and Ten Mile and Fourteen Mile sloughs and an evaluation of borrow materials within the Sargent Barnhart Tract. Representative soil samples were collected during these explorations for laboratory testing and material characterization.

Moore and Taber also installed numerous levee monitors (settlement platforms and inclinometers) along Ten Mile Slough during the 1983 levee construction work; however, as-built reports which summarize construction observations and instrumentation measurements were not available. Laboratory results, conclusions and recommendations provided by Moore & Taber can be found in Appendix I of the GDR. Additionally, Plan and Profile sheets provided in Figure 3 show approximate location of the historical borings conducted by Moore & Taber.

#### 2.1.2.2 Kleinfelder, Inc. Geotechnical Reports

Kleinfelder conducted several levee explorations and developed numerous geotechnical reports prior to and following the final levee raise in 1988. Prior to the levee raise in 1988, Kleinfelder drilled additional test borings to evaluate the competency of the recently placed levee fill (1983), analyze seepage and stability issues, susceptibility to post-construction settlement, bank erosion, liquefaction, and provide recommendations for the proposed levee raise along TS30L. Following levee construction in 1988, additional borings were drilled by Kleinfelder to evaluate recently placed fill at the direction of the Federal Emergency Management Authority (FEMA). Finally, a third round of borings were drilled by Kleinfelder on the levee crown and toe at the direction of FEMA to evaluate consistency of the recently placed levee fill, organic clay thickness, presence of a shallow aquifer, along with any potential changes to levee seepage and slope stability following the additional levee improvements.

Based on these previous explorations, Kleinfelder concluded that recently placed levee fill material in 1983 and 1988 generally consisted of stiff silty clay, coarse-grained material generally exists below elevation -10 feet and tends to dip from north to south along TS30L, and organic material thickness varies throughout the site, but generally becomes thicker moving south along TS30L. Nonetheless, shallow coarse-grained materials, above elevation -10 feet, are possible in isolated locations in the southern portion of TS30L as encountered in B-6, B-25, B-25A, and B-25B, and organic soil can be up to 6-to-10 feet thick as encountered in B-4, B-6, B-25, B-25A, and B-25B.

According to Kleinfelder's levee evaluation report dated January 25, 1990 (Kleinfelder, 1990), no clean sand deposits were encountered during sub excavation at or directly below the toe TS30L during the extensive grading operations completed during levee construction in 1988. Previous geotechnical recommendation reports are provided in Appendix I of the GDR. Additionally, Plan and Profile sheets provided in Figure 3 show the approximate location of the historical borings conducted by Kleinfelder.

#### 2.1.3 California Department of Water Resources DWR Geotechnical Data Report Study

DWR and their contractors provided engineering oversight for two exploratory soil borings along TS30L, two exploratory soil borings located just south of TS30L project site, three (3) CPTs, and a soil resistivity survey throughout the area. The results of this field investigation are contained within the larger Brookside Geotechnical Data Report (DWR, 2011). The borings were advanced with a CME 55 and 75 truck-mounted drilling rig using rotary/auger methods to a depth of about 50 to 70 feet bgs. DWR's contractor provided an engineer or geologist who logged each exploratory boring using the USCS as a guideline. Representative disturbed soil samples were

collected at intervals from below ground surface for laboratory testing and material characterization. These explorations were done as part of multiple studies completed by DWR. These studies and the boring logs can be viewed and downloaded at <http://ferix.water.ca.gov/lep/>.

DWR explorations completed within and directly adjacent to the Reach TS30L project area between 2010 and 2011 are summarized in Table 3 within the Reach TS30L GDR. Additionally, the Plan and Profile sheets provided in Figure 3, show the approximate location of the borings and CPTs. The DWR explorations were completed along the levee crest and the Station Offset is expected to be about 0 to 8 feet. Previous DWR exploration boring logs and CPTs are provided in Appendix F and G of the GDR

#### **2.1.4 California Department of Water Resources Urban Levee Evaluation Reports**

Based on the available data compiled for the GDR developed by DWR and its subcontractors, levee analyses were performed for two representative cross sections with the levee reach. Previous analyses included: seepage, stability, erosion, settlement, freeboard, and seismic evaluation with results and conclusions summarized in the Geotechnical Evaluation Report (GER). The GER for the Brookside Study Area was completed in March 2015 and is a collection of two reports, an existing conditions report and potential mitigation report.

The ULE Reports reviewed include the Brookside Study Area Geotechnical Evaluation Report (GER) Volume 1 (existing conditions) and Volume 2 (remedial alternatives), and the Brookside Study Area Geotechnical Data Report (GDR). The Brookside Study Area was defined by the DWR Levee Evaluation Program (LEP) and includes Reach TS30L. The ULE Reports contained borings, cross-sections, analysis, and preliminary recommendations for the Brookside Area. Both the USACE and DWR developed the evaluation reaches independently through the USACE feasibility study and the DWR LEP, respectively. In general, reach boundaries are not consistent between the USACE and DWR studies.

Based on DWR's evaluation, the existing TS30L levee meets DWR requirements for seepage, stability, erosion, settlement, freeboard, and seismic evaluation and no levee improvement is required along this reach of Tenmile Slough. DWR evaluations considered a lower design water surface elevation than that used in the current levee evaluation conducted by USACE.

#### **2.1.5 USACE Feasibility Study Geotechnical Addendum**

The USACE Lower San Joaquin River Feasibility Study (LSJRFS) – Geotechnical Addendum presents the results of geotechnical analyses and feasibility level geotechnical recommendations as performed in accordance with Engineer Regulation (ER) 1110-2-1150 to address levee height, geometry, erosion, access, vegetation, seepage, and slope stability deficiencies within the LSJRFS area. The Geotechnical Addendum to the LSJRFS was completed in 2016, with the latest revision being issued in 2018. The feasibility report was prepared using existing information provided by the Department of Water Resources (DWR), San Joaquin Area Flood Control Agency (SJAFC), URS Corporation, and Kleinfelder. Given the limited information available at the time of the feasibility study, the recommended levee improvement measures are not sufficient to support a

planning engineering and design (PED) level geotechnical evaluation and analysis but were used for planning purposes.

The geotechnical analyses performed have identified several technical deficiencies associated with the flood risk management system protecting the study area. The feasibility study selected Alternative 7A as the recommended design plan, which consists of seepage cutoff walls, levee reshaping, levee raises, seismic remediation. Recommended levee improvements for the Reach TS30L project area includes a cut-off wall, levee reshaping, and erosion protection as shown in Figure 2.

### 2.1.6 Past Performance Records

Based on the information available and provided to USACE, it is our understanding that the Reach TS30L levee has not been hydraulically loaded. Therefore, no reports of performance issues related to a hydraulic event have been reported in this reach. A 2012 USACE periodic inspection report stated this reach has experienced erosion issues, most likely from rainfall and surficial runoff.

The local sponsor and their representatives from Siegfried Engineering have reported that this reach has experienced areas of localized cracking in the past, and that historically cracks were typically 2 to 4 inches wide and generally occur near the waterside hinge. Prior to the USACE drilling program in March 2020, USACE personnel observed a longitudinal crack about 1 to 2 inches wide near the waterside crest hinge and near project station 7+00. In January 2021, local representatives observed cracks as wide as 12 inches near the waterside crest hinge and at about project station 7+50 to 9+00 and about 24+75 to 27+60. These cracks are typically oriented parallel to the levee alignment with the edge of the cracks curving landward. No vertical offset was noted at either of these locations; however, given the historic construction sequence used to construct TS30L, cracking along the waterside hinge appears to be a manifestation of the different levee fills, specifically the 1983 and 1988 levee fills, settling differentially. The most recent levee material was placed in 1983 landside of the existing centerline; therefore, larger settlement is expected landside of the levee centerline compared to areas waterside of the levee centerline where less levee fill was placed (near the waterside hinge of the existing levee centerline). As a result, cracking near the waterside hinge, as observed in the field, is expected.

## 2.2 Regional and Site Geology

This section provides the background information on the regional and site geology, along with hydrogeology of the LSJ project site and Reach TS30L based on the assessment developed by USACE and the State of California Department of Water Resources (DWR) Urban Levee Evaluation (ULE) program.

### 2.2.1 Surficial Soils Maps

The United States Department of Agriculture soil maps were reviewed and indicate that the project site surface soils east of the TS30L levee generally consist of Egbert mucky clay loam, and surface

soils west of the TS30L levee generally consist of Peltier mucky clay loam, Valdez silt loam, and Ryde-Peltier complex. These surface soils generally consist of mucky clay loam, silty clay, and silt loam within the upper 5 feet of soil.

### 2.2.2 Geologic Maps

The surficial geologic map for the project area and the geomorphology report prepared for the ULE program were reviewed for this report and used in the planning of the subsurface exploration program. The regional geologic map, along with surficial geomorphic maps, developed for the general project area as part of the DWR ULE program, are included in Appendix H of the GDR. Surficial geomorphology maps along the reach also provided in plan and profile plots located in Figure 3.

### 2.2.3 Regional Geology

The project is located in the North-Central part of the Great Valley geomorphic province of California. The Great Valley geomorphic province is between the Coast Range province in the West and the Sierra Nevada province to the East. The Great Valley province is dominated by alluvial deposits and the Sierra Nevada province is dominated by plutonic and metamorphic rocks. Stream terrace deposits in the Great Valley consists of eroded material from the Sierra Nevada mountain range. The stream terrace deposits range in age from roughly three million years to the present. Generally, the younger alluvium in the valley is situated closer to the current stream channels and is nested within older soil deposits. The older units sit topographically higher than the younger units at their surface exposed contact. Typical alluvium deposits include Pleistocene Merced, Turlock Lake, Riverbank, and Modesto formations. These formations thin to the west of the basin and interfinger with sediments derived from the coast range to the west. These are in turn incised by Holocene alluvial channels and covered by Holocene fan deposits.

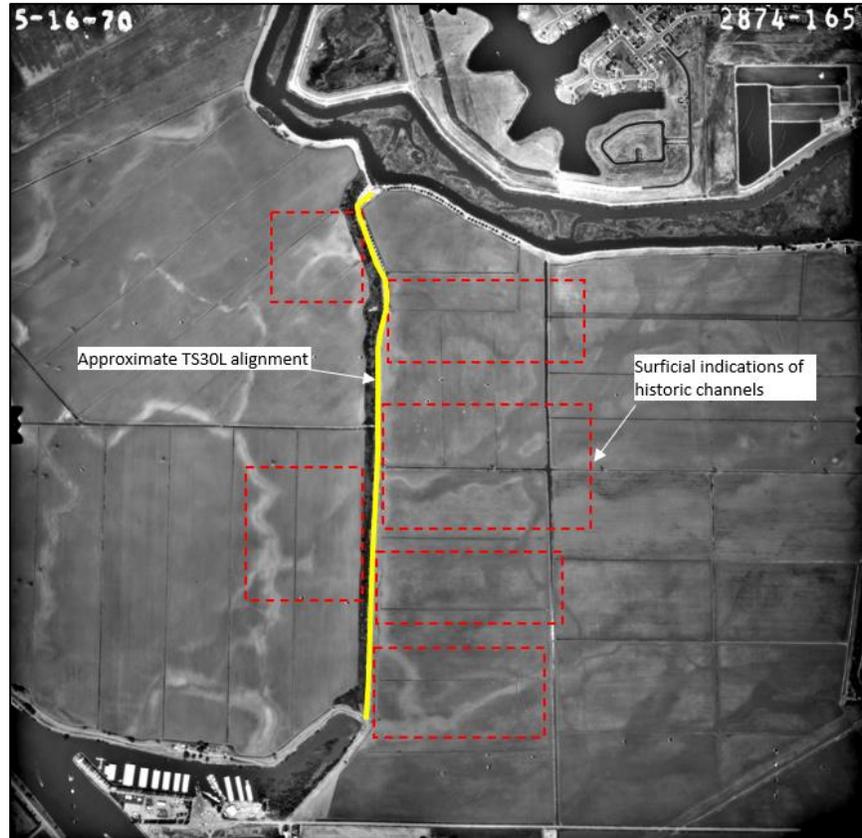
### 2.2.4 Site Geology and Geomorphology

Reach TS30L sits on the eastern edge of the Delta area. In general, the project site is underlain by the Delta geomorphic domain, which in turn is underlain by older alluvial fans deposited from the Sierra Nevada Range. The Delta geomorphic domain consists of saucer-shaped islands separated by fluvial channels and tidal sloughs that were connected prior to dredging and levee construction. This project area is part of the tidally influenced Delta that prior to reclamation was part of the inundated Delta characterized by organic-rich peat and peaty mud sediments.

Based on surficial mapping throughout the general levee footprint, the site is dominated by flood basin deposits primarily consisting of peat and mud deposits, with historic channel and overbank deposits, consisting of silt and sand and gravel, carving throughout the greater area. Historic channels are typically infilled with march deposits and contain sorted sands and silts and fine upwards below the soft clay/peat deposits and historic overbank deposits are generally derived from high-stage water flow events.

A historic aerial from 1970 (Exhibit 2-2) illustrates evidence of historic channels traversing throughout the footprint of TS30L. Areas where historic channels cross beneath the existing levee

may have different subsurface conditions compared to surrounding basin deposits and contain larger fractions of sand or gravel.



**Exhibit 2-2 : Historic aerial from 1970 illustrating interweaving historic channels and overbank deposits along TS30L.**

## **2.3 Regional and Site Hydrogeology**

This section provides the regional and site hydrogeology background based on review of the groundwater evaluation report prepared by Montgomery Watson Harza (MWH) and groundwater levels as encountered during subsurface explorations.

### **2.3.1 Regional Hydrogeology**

San Joaquin County encompasses approximately 1,440 square miles in central California, and includes rivers, streams, sloughs, marshes, wetlands, channels, harbors, and underground aquifers. The regional groundwater flow pattern in Stockton is generally westward from the Sierra Foothills toward the Delta. Measurements over the past 40 years show a continuous decline in groundwater levels in near Stockton. Groundwater levels have declined at an average rate of 1.7 feet per year and have dropped as much as 100 feet in some areas.

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### 2.3.2 Site Hydrogeology

The groundwater at the site is greatly influenced by the San Joaquin River due its proximity to the river and fluctuates daily due to the tidal action in the Delta. Since the project area is dominated by a wet season and dry season weather pattern throughout the year, with the wet season generally spanning from November to April, groundwater is generally highest in the late spring and lowest in late fall. Annual precipitation in 2019-2020 was markedly lower than average annual rainfall for that time of year. As a result, higher groundwater levels may be possible in wetter seasons than those encountered and measured during site investigation. Additionally, we understand through communication with SJAFCA that the Brookside Lake is supplied with water pumped from the San Joaquin River rather than from influent flow from subsurface groundwater. Furthermore, the depth of the Brookside Lake generally ranges from 4 to 6 feet.

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### **3.0 RISK ASSESSMENT**

#### **3.1 RD 2074 – Sargent-Barnhart Tract – Unit 2, Tenmile Slough Segment, Semi-Quantitative Risk Assessment (SQRA) Report**

The United States Army Corps of Engineers (USACE) Sacramento District (CESPK) and the Jacksonville District (CESAJ) Risk Cadre have completed the Semi-Quantitative Risk Assessment (SQRA) for levee segment Sargent-Barnhart Tract - Unit 2, Tenmile Slough (Segment ID 5204000352). The SQRA was completed to provide risk informed design guidance for levee modifications currently in Preconstruction, Engineering, and Design (PED) for Reach TS30L. The SQRA consisted of a virtual site visit, data reconnaissance and review, a facilitated Potential Failure Mode Analysis (PFMA), the development of a HEC- Life Loss and Direct Damage Estimation (LifeSim) consequence model, and an SQRA of the potential failure modes (PFMs) judged to be risk-drivers.

The SQRA identified that breach of TS30L would result in deep flood water depths in an area that is densely populated with single family residential dwellings which would result in potential large consequences both in human casualties and property damage.

Thirty potential failure modes (PFM) were identified for consideration by the Risk Cadre team during their initial assessment. Twenty-six were not developed in detail as they were not considered to be “risk-drivers” for the project; however, the following four failure modes were carried forward through the elicitation and risk quantification process:

- PFM 07: Wave action erodes waterside slope
- PFM 17: Backwards Erosion Piping (BEP) through foundation sands –existing defect in clay blanket
- PFM 18: BEP through foundation sands – blowout of thin clay blanket
- PFM 22: Slope stability failure

The highest risk PFM identified by the SQRA is Backward Erosion Piping (BEP) through foundation sands by an existing defect in clay blanket (PFM 17). The most likely location for initiation was either at the transmission tower located on the toe of the levee where the tower’s foundation piles likely penetrate the clay blanket or adjacent to swimming pools which are commonly located a few feet landside of the toe.

An additional risk driver included BEP through foundation sands resulting from a blowout within a thinner area of the landside clay blanket. In this failure mode, seepage pressure below the landside clay blanket would need to be greater than the weight of the soil above sand layer.

Finally slope stability (PFM 22) of the existing TS30L levee was identified as an additional PFM that may lead to breach of TS30L under design flood conditions, particularly when considering future sea level rise, given the construction history of the levee and past performance observations.

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Waterside levee erosion due to wave runup (PFM 07) was determined to not be a risk driver for the project since coincident probabilities between flood conditions and a significant wind event are very low. Additionally, the small fetch distance would result in minor wave runup onto the waterside levee slope.

The SQRA Risk Cadre concluded that a cutoff wall will significantly reduce the risk of BEP through foundation soils, and that a cutoff wall on the upstream and centerline of the embankment showed similar effectiveness at reducing risk. As previously described, the approved plan identified in the feasibility study (Section 2.1.5) recommended a cutoff wall, levee reshaping and waterside erosion protection for TS30L. Risk estimates for with-project condition (cutoff wall and levee reshaping), show that the proposed modifications reduce risk below allowable risk thresholds, except the use of waterside erosion protection. Further discussion on each PFM, detailed failure mode descriptions for each of the “risk driving” PFMs, along with a discussion of the other twenty-six failure modes that were not quantified, please consult the SQRA Report provided in Appendix F.

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## 4.0 SITE INVESTIGATION

This portion of the report documents the information-gathering phase of our evaluation. Site reconnaissance, literature review, and field exploration; were performed to develop the project's subsurface conditions.

### 4.1 General

Figure 1 shows the approximate project boundaries, and Figure 3 shows the approximate locations of subsurface exploration locations. During these investigations, field engineers and geologists described the surface and subsurface soil, rock, and ground water conditions observed at the site using the procedures cited in the American Society for Testing and Materials (ASTM), Volume 04.08, "*Soil and Rock; Dimension Stone; and Geosynthetics*" as general guidelines for field and laboratory procedures. The field engineers and geologists described the soil color using the general guideline procedures presented in the Munsell Soil Color Chart.

### 4.2 Surface Conditions

At the time of our site investigation the following site conditions were observed:

- The ground surface in the proposed project construction area is generally level. The project area is generally developed with an existing levee, residential properties on the landside, and an agricultural field and an irrigation ditch on the waterside.
- The levee crest is surfaced with "chip seal" asphalt. The landside slope and about the upper half of the waterside slope is surfaced with gravel. The lower half of the waterside slope is surfaced with dense vegetation (grasses, shrubs, and trees).
- There is an existing overhead electrical utility line approximately located in the center of the reach near 28+00. The existing electrical transmission tower supports six (6) overhead power lines and encroaches approximately 5 feet into the landside levee slope at the toe of the levee. The line is owned by Pacific Gas and Electrical (PG&E) and is classified in PG&E's inventory as being a 230kV double line transmission tower.
- existing sanitary sewer force main (SSFM) is situated approximately 25 feet from the waterside toe of the levee in the southern 400 feet of the levee alignment between project stations 1+00 to 4+00. There are additional utility lines at the site that are mostly located on the southern end of TS30L, including a gas line, communication line, electrical pole, and an abandoned pipe.

### 4.1 Subsurface Explorations

The subsurface soil, rock, and groundwater conditions were investigated by drilling exploratory borings and performing CPTs. The subsurface information obtained from these investigation

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methods are described in subsequent sections of the report. Detailed descriptions of the soil, rock, and ground water conditions encountered at exploration location is presented in the exploration logs provided in Appendix A and B of the Geotechnical Data Report (GDR) for Reach TS30L. The soil, rock, and ground water conditions below the explorations depths at the project site are unknown.

#### 4.1.1 USACE TS30L Study Exploratory Borings, 2020

USACE provided engineering oversight during drilling of eleven exploratory soil borings, and twenty-one Cone Penetration Tests (CPTs) at the TS30L project site from March to April 2020 to support the current design efforts. Borings were performed by Geo-Ex Subsurface Exploration using a CME 55 truck-mounted drilling rig. The drilling rig used a 6-inch solid-stem auger drilling method to advance the boring from ground surface to generally about groundwater elevation, then switched to mud rotary drilling method to advance the boring to completion to about 60 to 90 feet below ground surface (bgs). The upper 5 feet of each exploration were hand-augered prior to performing the exploration to avoid damaging undetectable utilities. The drillers installed casing to about 25 feet bgs, or generally through and about 5 to 8 feet below the levee, prior to switching to mud rotary for borings located along the levee centerline. All drill fluids and cuttings generated during drilling were disposed of in drums. All soil specimens were transported to the USACE storage facility at Bryte Yard located in West Sacramento, California. A hammer efficiency test was performed on the CME 55 drill rig used to perform the soil borings and is shown in Appendix J of the GDR.

The USACE geologist logged each exploratory boring using the Unified Soil Classification System (USCS) and ASTM D2488 as a guideline. The CME 55 drilling rig used 2.0-inch (in) outside diameter (OD)/1.375-in inside diameter (ID) Standard Penetration Test (SPT) split-spoon drive samplers in accordance with ASTM 1586, 3.0-in OD/2.4-in ID thick-walled ring lined drive samplers (“Mod-Cal” sampler), and 3.0-in OD/2.875-in ID thin-walled Shelby push samplers to collect soil samples. The samples were taken generally every 2.5 feet. SPT and Mod-Cal field-measured blow counts shown on the boring logs were corrected to  $N_{60}$  values based on hammer efficiency ratings and for drill rod length and borehole diameter as determined in accordance with ASTM D6066. Down-pressure measurements taken during Shelby tube sampling are shown on the boring logs.

Additionally, USACE provided engineering oversight during the advancing of twenty-one CPTs throughout TS30L. CPTs were performed by a 20-ton truck-mounted CPT drilling rig and were advanced to completion to about 70 to 100 feet bgs. Seismic testing was performed on three CPTs. Finally, the upper 5 feet of each exploration was hand-augered prior to performing the exploration. Bedrock refusal or refusal within cemented hard-consolidated soil did not occur in any of the subsurface exploratory excavations.

Prior to accessing the project site and performing the explorations, Rights-of-Entries and Drilling Program Plan (DPP) was obtained by USACE, soil boring permits were obtained by Geo-Ex Subsurface Exploration, and the encroachment permits were obtained by SJAFCA. Explorations

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were backfilled per the San Joaquin County Environmental Health Soil Boring Permit requirements.

USACE explorations completed within the Reach TS30L project area in March and April of 2020 are shown in Table 2 within the Reach TS30L GDR. Additionally, Figures 3 show the approximate locations of all USACE borings and CPTs.

#### 4.1.1.1 Groundwater Level from Exploratory Borings

When groundwater was encountered in the exploratory borings the elevation of the groundwater was recorded in the boring logs. The water elevations should be considered initial and not steady-state water levels, and therefore, may not be the same as the local groundwater table. Soil boring explorations were conducted in the wet season (February and March 2020) when groundwater is generally at its highest level for the year.

#### 4.1.1.2 Groundwater Level from CPTs

Pore pressure dissipation tests were performed in four CPTs during the USACE 2020 drilling program. The pore pressure dissipation tests resulted in groundwater elevations ranging from about -5 to -12 feet, and an average elevation of about -9 feet. The tests were conducted in February and March of 2020 when groundwater is generally at its highest for the year. Pore pressure dissipation tests are shown in Appendix B.

There are numerous groundwater monitoring wells located throughout the overall LSJ project area, however there is not a monitoring well located near the Reach TS30L project site. There is an active monitoring well (Station 379783N1213405W001) located about 1.5 miles east of the project site, which shows an average groundwater elevation of about -10 feet since 2013.

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## 5.0 LABORATORY TESTING

The CESPCK and DWR performed laboratory tests on selected soil samples taken from the subsurface exploratory excavations to determine the geotechnical characteristics and engineering properties. These engineering material properties were used in the seepage and stability models and to develop the geotechnical engineering design recommendations for earthwork and ground improvements.

### 5.1 General

Laboratory tests were performed to determine the index properties, dry density, and shear strength of soil samples. The test samples were selected from materials and locations where estimates of engineering properties were required for the geotechnical engineering evaluations.

### 5.2 Soil testing

All soil specimens collected were transported to the USACE storage facility at Bryte Yard located in West Sacramento, California. The soil samples were further evaluated if needed and then sent to a USACE soils lab located near Prado Dam in San Bernardino County.

All the laboratory tests were performed in accordance with the ASTM procedures. A list of type of laboratory test performed is provided below. A detailed description of each laboratory test is provided within the GDR.

- ASTM D 422: Sieve Analysis
- ASTM D 1140: No. 200 Sieve Wash
- ASTM D 2216: Soil Moisture Content
- ASTM D 2435: One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- ASTM D 2850: Triaxial Shear Test, Unconsolidated-Undrained
- ASTM D 2974: Organic Matter Determination
- ASTM D 3080: Direct Shear Test
- ASTM D 4318: Atterberg Plasticity Indices
- ASTM D 4647: Dispersive Clay Soil Determination
- ASTM D 4767: Triaxial Shear Test, Consolidated-Undrained
- ASTM D 5084: Hydraulic Conductivity
- ASTM D 7263: Drive Tube Density-Moisture Determination

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Appendix A presents a summary of the test results currently available. Individual laboratory test data sheets and test results are presented in Appendix B of the GDR.

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## **6.0 SITE CHARACTERIZATION**

This section presents the methodology used for reach development, cross section development and selection, soil layer model development, and discussion of the soil parameters used in the analyses.

### **6.1 Reach Development**

The overall LSJ project was divided into specific levee reaches, based on their location. The TS30L Reach was divided for analytical purposes into three subreaches representing similar through- and under-seepage conditions and slope stability conditions based on geomorphology, subsurface soil information, past performance records, existing levee geometry, existing levee conditions and utility penetrations. Based on these factors project stationing for each subreach include: 1+00 to 4+50 (Subreach A), 4+50 to 51+50 (Subreach B), and 51+50 to 61+00 (Subreach C).

### **6.2 Cross Section Development and Selection**

Cross sections were developed about every 500 to 1,000 feet along the levee centerline alignment. The subsurface model for each cross section generally utilized adjacent subsurface explorations. After development of the subsurface model for each cross section, a critical cross section was selected based on the levee geometry, embankment and foundation material type and associated seepage and shear strength material properties. Factors that may have attributed to the selection of different cross sections include sections with steeper slopes, thin landside blankets, presence of thin “stringer” soil layers within the blanket, and waterside or landside encroachments that may cut into the blanket layer, and general representative areas. In some cases, several models were developed, and results computed, if the critical location was not obvious.

### **6.3 Soil Modeling**

Subsurface investigation (soil borings, CPTs, and laboratory testing) data obtained by USACE and others were used to develop a simplified subsurface stratigraphy for reach TS30L. Individual soil layers and their respective depths below levee crown were identified based on their unique geotechnical engineering properties.

#### **6.3.1 Soil Categories**

The soil layers were categorized into general types of soils based on their soil mechanics behavior and their formation environment. The three general types of soils used in our model included: clay-like soils, intermediate-like soils, and sand-like soils. Clay-like soils generally include the new levee embankment that represents new levee fill placement and levee fill placed as part of the second levee raise in 1988, undocumented levee embankment that represents the existing levee embankment prior to the second levee raise in 1988, organic clay, and sandy lean clay to fat clay. Intermediate soils generally include silty sand, clayey sand, and sandy silt. Sand-like soils generally include poorly-graded sand with silts. The clay-like soils exhibit low permeability, clay-

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like behavior during shear (undrained strength under short-term loading and drained strength under long-term loading) and are resistant to internal erosion. The intermediate soils generally contain varying percentages of non-plastic to low-plastic fines (generally less than 50% by weight), exhibit moderate permeability, may behave like clay or sand during shear depending on the fines fraction and type of fine material, and less likely to be resistant to internal erosion as the clay-like soils. The sand-like soils generally exhibit high permeability, have very little resistance to internal erosion, and behave like sand or gravel in shear (drained strengths under short-term and long-term loading).

The above soil categories were defined based on CPT interpretations, boring log soil descriptions, field observations and laboratory test results.

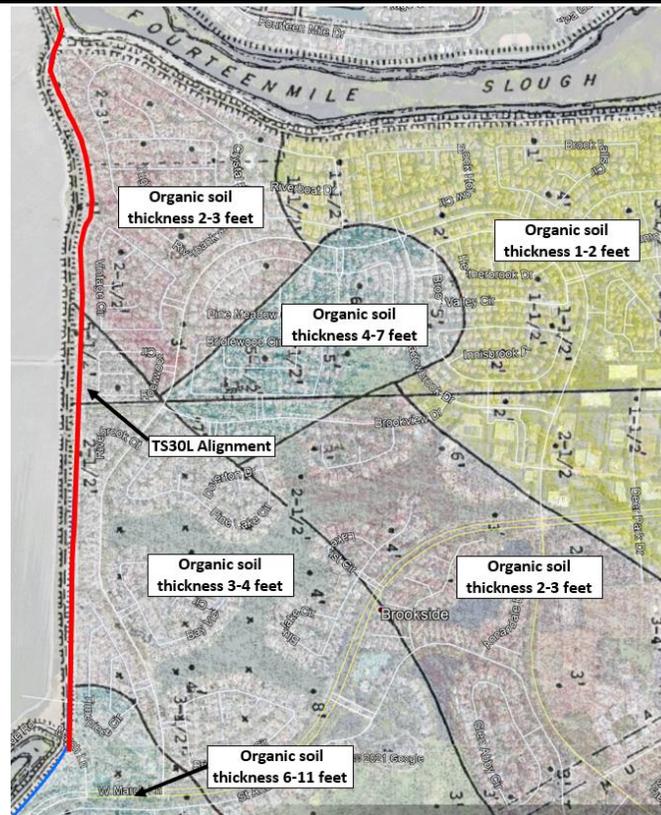
### 6.3.2 Vertical Soil Layer Screening

General soil layers were assigned to each individual boring log and CPT log based on the boring log soil classification and CPT SBTn values. Certain general soil layers were present throughout the reach with varying depths and thicknesses, such as the clay blanket and underlying aquifer layer. Certain soil layers were present in select locations and were not consistent throughout the reach, such as the silty sand to sandy silt “stringer” layers present within the clay blanket, near surface organic clay layers, or isolated near surface granular material indicative of an infilled historic channel or overbank deposit.

### 6.3.3 Horizontal Grouping/Rescreening of Vertical Soil Layers

After vertical screening, the model layers are constructed by considering the context of each boring and CPT with respect to the others in the reach in order to create spatial extents horizontally of specific soil deposits along TS30L. Considerations during this iterative process included: surficial geology, depositional environment (esp. energy during deposition), and post-depositional changes.

Based on previous exploration studies performed on TS30L and the nearby adjacent residential parcel, Kleinfelder noted that the organic material generally becomes thicker moving south along TS30L. A schematic illustration, developed by Kleinfelder (Kleinfelder, 1989), delineating estimated organic thickness throughout the project area in relation to TS30L is provided in Exhibit 6-1.



**Exhibit 6-1 : Spatial distribution of organic material thickness along TS30L. Base schematic has been adopted from Kleinfelder's Geotechnical Investigation Report for Proposed Brookside Development (Kleinfelder, 1989).**

### 6.3.4 Soil Layer Modeled Concept

The soil layers as categorized above were interpreted to represent a modeled concept such as levee fill, landside blanket, aquifer, aquiclude, or aquitard layers. The modeled concepts may be further developed to depict specific subsurface conditions or model situations (seepage block, no waterside blanket, etc.) based on engineering judgment.

## 6.4 Groundwater Conditions

Based on groundwater elevations encountered in the soil borings and CPTs, we have used a design groundwater elevation of -7 feet for our slope stability models that do not use steady-state water surface information imported from our seepage models, such as post-construction slope stability, along with for our seismic analysis and settlement analysis.

Fluctuations in the level of groundwater may occur due to variations in rainfall, local irrigation, or farming practice, as well as other factors not evident at the time measurements were made. Furthermore, irrigation conditions of nearby properties can produce varying groundwater conditions. Perched groundwater and seeps may be encountered during excavations, as noted in

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previous test pit explorations conducted during development of the housing area adjacent to TS30L.

## **6.5 Seepage Parameters**

Soil seepage parameters are shown in the Soil Parameter Table presented in Appendix D. Soil seepage parameters are generally based on laboratory test results, correlations, USACE and DWR LEP guidance (DWR, 2015), and engineering judgement. Laboratory testing specifically related to soil seepage parameters include No. 200 sieve wash, grain size distribution, and hydraulic permeability tests. A discussion on evaluating and selecting the design soil seepage parameters is provided in Appendix D.

### **6.5.1 Clay-Like Soils**

Clay-like soils generally describe organic clays, lean to fat clays, and sandy lean clays present throughout the site. Clay-like soils exist within the near surface generally throughout the site, which creates a general “blanket” condition throughout the site. Blanket thickness generally increased from north to south along TS30L. The hydraulic conductivity properties of clay-like soils are presented in the Soil Parameter Summary Table in Appendix D.

### **6.5.2 Intermediate Soils**

Intermediate soils generally describe non-plastic to low plastic silty to clayey sands and sandy silts. Intermediate soils tended to be present as thin layers, or “stringers”, in select areas within the reach. The hydraulic conductivity properties of intermediate soils are presented in the Soil Parameter Summary Table in Appendix D.

### **6.5.3 Sand-Like Soils**

Sand-like soils generally describe poorly graded sands and gravels, silty sands, and non-plastic silts. Sand-like soils generally exist below the clay blanket throughout the site with the sand-like material generally being shallower in the north portion of the site compared to the southern portion of the site. Isolated areas of sand-like material were encountered within thicker blanket sections in the southern portion of the site, indicative of a historic channel or overbank deposit during high flow stages in Tenmile slough. The hydraulic conductivity properties of sand-like soils are presented in the Soil Parameter Summary Table in Appendix D.

## **6.6 Soil Shear Strength**

Soil strength parameters are shown in the Soil Parameter Summary Table in Appendix D. Soil strength parameters are generally based on laboratory test results, soil index property correlations, CPT results, USACE and DWR LEP guidance, and engineering judgement. The shear strength of cohesionless materials (e.g., sands, silty sand, non-plastic silts) in the embankment and foundation was estimated from the correlation between SPT blow counts and the friction angle  $\phi$ .

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Laboratory testing specifically related to cohesive soil strength parameters include consolidated-undrained (CU), un-consolidated-undrained (UU) triaxial tests and drained direct shear tests. Field testing specifically related to cohesive soil strength parameters include in-situ vane shear tests conducted in the previous DWR explorations, pocket penetrometer, and CPTs. A discussion on evaluating and selecting the design soil strength parameters is provided in Appendix D.

## 7.0 GEOTECHNICAL EVALUATION CRITERIA AND METHODOLOGY

Based on the material behavior and properties extrapolated from field and laboratory data, subreaches were analyzed under various hydraulic loading conditions. The following sections present a discussion of the hydraulic loading conditions, performance modes of failure, and the geotechnical evaluation criteria and methodology used for the seepage and stability analyses of the models.

### 7.1 Loading Conditions

The existing TS30L levee was evaluated for the 1:200 Annual Exceedance Probability (AEP), and the Hydraulic Top of Levee (HTOL) water surface elevation. Based on USACE and DWR guidelines, the HTOL is determined to be the lesser of the 1:200 AEP plus 3 feet and the 1:500 AEP water surface elevation. For reach TS30L, HTOL was determined to be the 1:500 AEP water surface elevation. Furthermore, TS30L has superiority over other levees in the delta front; therefore, the 1:200 AEP plus 3 feet would result in overtopping of adjacent levee and is not an unrealistic water surface elevation loading condition. Design water surface elevations (DWSE) used for design are summarized in Table 7-1 below:

**Table 7-1: Summary of Water Surface Elevations**

Condition	Water Surface Elevation (feet)
1:200 AEP (0.5% ACE)	13.60
1:500 AEP (0.2% ACE)	14.34 <sup>1</sup>
1:200 AEP plus 3 ft	16.60 <sup>2</sup>

*Note: <sup>1</sup> HTOL; <sup>2</sup> Unrealistic WSE because levees around TS30L would overtop before this water elevation is achieved along TS30L.*

The San Joaquin River is influenced by tidal forces in this area; therefore, the water surface elevations above were considered at high tide elevations and are considered median [i.e., 50% conditional non-exceedance (CNE)] water surface values. DWSE were developed by CESP/K Hydraulic Design Section, with design methodology used to calculate water surface elevations documented in the 100% TS30L Hydraulic Basis of Design report.

Based on the Hydraulic Basis of Design report, a perimeter levee along the interior island of Wright-Elmwood Tract, located west of the Reach TS30L levee, would need to fail in order to inundate the entire Wright-Elmwood Tract area. The inundation of the Wright-Elmwood Tract leads to the 200-year DWSE of 13.60 feet. As previously noted, it is our understanding that the levee has never been loaded; thus, historical floods in the region, which nearly reached the 100-year flood elevation in winter 1997-1998, have yet to breach the farmland levee protecting Wright-Elmwood Tract.

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## 7.2 **Modes of Failure**

The performance modes of failure evaluated include (in order of contribution to overall performance):

1. Underseepage foundation piping (e.g., maximum vertical exit gradients and locations)
2. Embankment through-seepage piping from controlled erosion leaking or levee embankment erosion (seepage gradient value, location, and levee soil type)
3. Landside embankment and foundation slope stability (e.g., steady seepage conditions)
4. Pipe and culvert backfill piping failure (e.g., soil backfill method, design, and materials)
5. Waterside slope stability (e.g., rapid drawdown)
6. Seismic foundation stability (e.g., liquefaction or lateral spreading susceptibility)

Items 1 through 4 above are considered critical modes of failure that occur during flood loading of the embankment that have a significant effect on the selection of remediation measures (cutoff walls, berms, etc.). The rate at which a 200-year flood stage would recede over time is expected to be slow since water retained within the Wright-Elmwood Tract would likely need to be pumped out of the tract to some capacity after river flood waters recede. Given these conditions flood waters are expected to be sustained for some time but would recede at about 1 foot per day or more once flood water begins to recede. As a result, Item 5 is an important mode of failure after peak flood elevations are reached for a prolonged period, saturating the levee embankment then lower quickly once flood begin to water recede (e.g., rapid drawdown); however, it is not expected to have a significant effect on the Reach TS30L levee since maximum floodwaters recede concurrently. Item 6 is evaluated only for the non-flood periods since the chances of a flood and seismic event occurring simultaneously are highly unlikely. The seismic analyses evaluate levee foundation stability in terms of deformations caused by liquefaction or associated lateral spreading of the levee. This could result in the reduction of levee height and/or actual levee failure.

### 7.2.1 **Embankment and Foundation Underseepage Piping**

Under seepage was evaluated to identify the foundation seepage conditions and threat of levee instability due to internal erosion and piping of the foundation materials. Gradients were evaluated by first developing a finite element model (FEM) of subsurface soil layer geometry, soil seepage properties, and flood loading conditions. Seepage analyses were developed using SEEP/W modeling software, which is part of the Geostudio version 2020 computer program developed by GEOSLOPE, Ltd.

Given that TS30L is a setback levee with an existing embankment composed primarily of fine-grained material, steady-state conditions may not develop over the duration of the design flood. A transient seepage analysis was considered by the team, but uncertainties regarding the flood duration and variation of water surface elevations with time led the team to continue with the steady-state seepage analysis. The team considers this an applicable conservative approach.

USACE guidance recommends a threshold exit gradient of 0.5 at the landside levee toe and 0.8 at the toe of any berm away from the levee toe for the DWSE. This exit gradient is measured across the thickness of the landside impervious top stratum (clay blanket) or toe of seepage berms based on the Engineering Manual (EM) 1110-2-1913 and CESPCK EDG-03, April 2008. Additionally, ditches and other depressions are considered when calculating the exit gradient for a critical location. No threshold exit gradient criteria is set for higher WSEs; however, exit gradient under hydraulic top of levee (HTOL) conditions were considered in accordance with DWR LEP standards. Under HTOL conditions exit gradients are increased to 0.6 at the landside levee toe and 0.9 at the toe of any berm away from the levee toe. HTOL is greater than the DWSE but by less than 1 foot. Increased factor of safety criteria for exit gradient and slope stability offset this marginal increase in WSE, which was verified during the 65% design and analysis; therefore, HTOL was not considered in 95% design and analysis.

Furthermore, in areas where the levee alignment creates areas of concentrated seepage forces, such as a 90-degree angle turn in a levee, 2-Dimensional gradients calculated were increased in accordance with the recommendations contained in the Urban Levee Evaluation Guidance Document (URS, 2015). Although the Guidance Document was prepared for feasibility level evaluations, it was judged appropriate for use in this application. TS30L is generally straight; however, we considered 3D effects for an area within Subreach C.

Finally, the team considered levee performance history when developing conclusions. TS30L has not been hydraulically loaded; however, longitudinal cracking has been noted along the southern portion of the levee as noted in Section 2.1.6.

### 7.2.2 Through-Levee Seepage

If the phreatic surface daylights on the landside levee slope and if the embankment materials consist of non- to low-plasticity erodible soils, such as sands and silts, it may indicate a potential for through-levee seepage related slope distress. Through-levee seepage can soften a levee embankment causing sloughing and erosion of the landside slope, and/or internal piping. Non- to low-plasticity erodible soils are more susceptible to internal piping and concentrated leak erosion than plastic soils such as clays, clayey sands, and clayey gravels. Therefore, embankments with cohesionless materials that have the phreatic surface exiting above the landside toe should be considered susceptible to internal piping or concentrated leak erosion (CLE) from through-levee seepage.

Through-levee seepage causing internal piping or concentrated leak erosion that can lead to failure of the levee embankment was evaluated based on a qualitative assessment of the materials composing the levee embankment. Levee embankment along TS30L is generally composed of cohesive materials; therefore, internal erosion, in the form of internal piping or concentrated leak erosion, through the levee embankment due to through-levee seepage is not expected.

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### 7.2.3 Embankment Stability

Slope stability analyses were conducted to evaluate the slope stability of the embankment and foundation of the levees. Representative cross-sections were selected for reach TS30L based on the embankment material composition, foundation materials, levee geometry, and the net head on the levee at the DWSE. The analyses evaluated the stability of the landside slope under steady-state seepage conditions, stability during construction of slurry trench (as well as the stability of the trench itself), end of construction stability, long-term static stability, and stability of the waterside slope under rapid-drawdown conditions. For the landside stability, the phreatic surface modeled in the levee embankment was determined from finite element flow net analysis (SEEP/W).

Levee slope stability analyses were performed in general accordance with USACE EM 1110-2-1913, (USACE, 2000) at the DWSE. The required minimum factors of safety presented in EM 1110-2-1913 (USACE, 2000) for the DWSE are:

- End of construction (waterside and landside): 1.3
- Steady-state seepage (landside): 1.4
- Rapid drawdown (waterside): 1.2

The loading conditions for this reach are expected to be long with elevated pool levels likely to persist for long periods prior to drawdown. Steady-state seepage is generally the controlling load case for slope stability, particularly on the landside slope. In evaluating the landside slope and trench stabilities during construction of the slurry trench, the minimum factor of safety requirement was the same as the end of construction case (1.3).

In addition to the above requirements, an additional case which considers the hydraulic top of levee (HTOL) was considered in accordance with DWR LEP standards. Under HTOL conditions steady-state seepage factor of safety is reduced to 1.2. Considering the lower factor of safety used under HTOL conditions and the HTOL water surface elevations being less than 1 foot higher than DWSE, this load case is not expected to control and was not modeled for this reach.

The existing conditions (without-project) were evaluated first under seepage and slope stability considering steady-state seepage conditions. If the cross-sections developed for without-project conditions did not meet seepage or slope stability criteria, no further slope stability load cases were considered for a particular cross-section under without-project conditions. Remaining slope stability load cases were evaluated under with-project conditions.

Stability calculations were performed using the SLOPE/W model, part of the Geostudio version 2020 computer program developed by GEOSLOPE, Ltd. Spencer's method of analysis was used for all calculations. The automated grid-based search was used, beginning with a starting circle that intersected the levee slope close to the toe and crest hinge points on the slope. Embankment stability was evaluated using circular and block failure surfaces. Conceptual desiccation cracks

were used to eliminate the tension zone at the head of slip circles where the embankment was composed of cohesive material. Crack depths were determined by iterating the depth of the crack to find the minimum factor of safety (FOS) and were capped to 4 feet based on DWR LEP guidance. Once the minimum FOS was determined, the cracks were subsequently modeled as filled with water.

For rapid drawdown analyses, it is typically assumed that the floodwaters recede from the peak flood stage to the waterside levee toe elevation at a rate that exceeds the rate of pore pressure dissipation in the levee embankment (appropriate for cohesive embankment material). Rapid drawdown analyses are typically performed using the Duncan, Wright, and Wong three-stage method, using estimated conservative values for the drained and undrained strength envelopes.

The minimum FOS slip surface is generated by the slope stability program without regard to the slope performance implications. The geotechnical engineer must evaluate the results of the program to determine if the slip surface generated is a reasonable measure of the embankment or slope performance. Slip surfaces that are not of a sufficient length or depth in the slope may not have a significant impact on performance. These small or shallow slip surfaces can be the result of either an unrealistic artifact of the model or a realistic indication of the model that may not affect actual levee slope stability performance. Significant slip surfaces were defined as those that were expected to lead to embankment failure during flood loading conditions. Non-significant slip surfaces were defined as those that might result in some slope movements but were not expected to result in serious slope distress during flood loading.

Minimum FOS slip surface determined by the slope stability program was considered critical if the slip circle penetrates the theoretical levee prism. This typically results in a condition where the critical surface is approximately a minimum of 3 ft deep at the deepest point (i.e., tallest slice height) for the slip surface. For slopes where slip surfaces did not initially meet the 3 ft depth criteria; the slope stability program search parameters were adjusted to determine a critical surface. Measures used include either adding requirements for a minimum weight of the total slip area or restricting the location of slip surface. These manipulations were iterated until the minimum FOS slip surface deepened and lengthened, subsequently penetrating the theoretical levee prism.

#### 7.2.4 “Soft” Soil Conditions

Based on Section 5.9.4 of the ULDC guidance document (Guidance Document for Geotechnical Analyses, dated April 2015 and prepared by URS for the DWR Levee Evaluation Program), “soft” soil embankment stability condition can occur when specific cohesive soils are hydraulically loaded quickly enough to cause the cohesive soils strength to behave in the undrained state.

The DWR guidance document states this condition typically occurs when cohesive soils with an OCR less than 2 to 3 exist within the upper 20 feet of the foundation profile. Due to the presence of near-surface, high plastic cohesive soils with an OCR less than 2 to 3 throughout TS30L, embankment slope stability considered “soft” soil loading conditions as an additional load case. This analysis case addresses high water conditions, and thus, slope stability failures would be

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expected to result in potentially uncontrolled landside flooding. The required FS to meet landside slope stability criteria for this case is  $FS \geq 1.4$ .

### 7.2.5 During Conditions

The embankment's stability was evaluated for the during construction condition, for both the landside stability and trench stability. Static groundwater conditions were used for this load case. For during construction conditions, the required FS to meet landside slope stability criteria for this case is  $FS \geq 1.3$ .

### 7.2.6 Utilities

We understand that utilities will be evaluated and addressed in the Civil DDR regarding location and relocation of utilities within the project footprint as needed. However, in our analysis we have considered the transmission tower foundation located near project station 28+00, and the existing sanitary sewer force main located south of 4+00 to March Lane. Additional information regarding existing utilities is presented in the evaluation of each individual subreach presented in Section 9.

### 7.2.7 Seismic Analysis

Stockton is located in a low to moderate area of seismic risk for California. The primary source for strong ground motion is the Hayward fault located about 68 miles west of the site. The nearest fault source is the Great Valley 06 (Midway) fault located about 23 miles southwest of the site; however, this fault is considered to have a small likelihood for seismic activity and may be considered active over very long periods. A seismic evaluation was performed, and a summary of the evaluation is presented in Section 8.0.

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## 8.0 SEISMIC ANALYSIS SUMMARY

### 8.1 Introduction

Levee modification projects for seepage and stability remediation, such as this project, normally do not include mitigation for potential deformation resulting from seismic loads since large flood events and large seismic events each have a low probability of occurrence, and the joint probability is extremely small. Furthermore, adjacent levees would need to fail in order for the TS30L levee to be loaded from a hydraulic event. Therefore, modifications to the levee embankment and any potential levee improvements from seismic damage are not considered. This evaluation has been conducted for the purpose of understanding the performance during a seismic event, and for purpose of remediation planning after an event.

The key results are summarized below, including a discussion of expected performance of the levee system after a seismic event, a discussion of potential damage to the levee embankment within the reach, and likely remediation options in the event of damage.

### 8.2 Analysis Methodology

The seismic performance evaluation assessed levee performance during and immediately after a seismic event for this reach. The assessment determined that liquefiable soils are present throughout the project site. Soil liquefaction results from loss of strength during cyclic loading. The soil considered most susceptible to liquefaction is clean, loose, saturated, uniformly graded, fine-grained sand below the groundwater table. Empirical evidence has also indicated that low plasticity silt and clay are also potentially liquefiable depending on the water content and plasticity of the silt or clay.

For liquefaction assessment, two critical safety factors were computed:

- $FS_{liq}$  is the minimum factor of safety against liquefaction triggering. This represents the initiation of liquefaction anywhere in the analyzed levee cross-section. The minimum  $FS_{liq}$  used against liquefaction triggering was 1.0.
- FS is the minimum factor of safety against instability initiated by liquefaction. This represents the minimum factor of safety for instability in the levee cross-section should liquefaction occur anywhere in the cross-section. The minimum FS used against instability initiated by liquefaction was 1.0.

Each soil boring and CPT was first evaluated for liquefaction triggering. Per USACE ETL 1110-2-580 (USACE, 2013), the minimum  $FS_{liq}$  used was 1.0, and the liquefaction triggering methodology was based on the 1996/1998 NCEER workshops. Liquefaction triggering was evaluated to a max depth of 50 feet below the landside toe and utilized the seismic parameters of Peak Ground Acceleration (PGA) and Moment Magnitude (M). Liquefaction triggering for CPTs

was evaluated using the software CLiq Ver. 2.0 developed by Geologismiki. Liquefaction susceptibility for soil borings was evaluated using susceptibility criteria presented in the ULDC guidance document (DWR, 2015) for both coarse and fine-grained materials. Additionally, susceptibility to liquefaction triggering depends largely on the percentage of fines, along with the plasticity of those fines, within a predominantly sandy layer. Thus, the liquefaction susceptibility of fine-grained material along with clayey sands were evaluated considering criteria presented by Bray and Sancio (2006).

Based on the continuity of data and ability for CPTs to delineate liquefiable and non-liquefiable more definitively as compared to soil borings, liquefaction induced settlement was evaluated using only CPT data. Liquefaction induced settlement for CPTs was evaluated using the 1996/1998 NCEER and Moss et al 2006 methodologies. Furthermore, post-liquefied residual strengths were estimated using soil borings and guidelines presented by Seed and Harder (1990), which correlates corrected clean sand blow counts ( $(N_1)_{60,cs}$ ) to residual shear strengths, to assess post-liquefaction slope stability.

Finally, a Probabilistic Seismic Hazard Analysis (PSHA) was performed to evaluate the Peak Ground Acceleration (PGA) and Moment Magnitude (M) values for the project site. The PSHA uses the following inputs: Latitude and longitude, exceedance probability of the seismic event, spectral period, and shear wave velocity of the upper 30 meters of the site ( $V_{s30}$ ). A return period of 224 years, or 20% in 50 years, was selected for the exceedance probability of the seismic event.

### **8.3 Conclusions**

USACE performed three seismic CPTs during the drilling program to determine the site  $V_{s30}$  value. The seismic CPTs were performed generally on the southern, middle, and northern portions of the project site on explorations CF-20-04, CF-20-08, and CF-20-14, respectively. The seismic CPTs results in a  $V_{s30}$  value of 248 m/s, 210 m/s, and 265 m/s for explorations CF-20-04, CF-20-08, and CF-20-14, respectively. The average  $V_{s30}$  value was evaluated to be about 240 m/s, which corresponds to a Site Class D according to the National Earthquake Hazards Reduction Program (NEHRP); however, given the thickness of some of the higher water content very soft to soft organic clay below the levee, with undrained shear strengths less than 1,000 psf, portions of the levee alignment are classified as Site Class E in accordance with ASCE-7-16 (ASCE, 2016). The Unified Hazard Tool (UHT) from USGS provides hazard data, calculations, deaggregations, earthquake probabilities and rates. The current version of the UHT is using the 2014 National Seismic Hazard Model (NSHM). The UHT doesn't allow the user to input a specific  $V_{s30}$  value, but instead provides pre-selected  $V_{s30}$  values for various Site Classes. Therefore, a pre-selected  $V_{s30}$  value of 259 m/s was used for the regional PSHA analysis. The PSHA analysis resulted in a PGA value of 0.20g and M value of 6.6. It is important to note the UHT does not communicate uncertainty with these results.

Based on the liquefaction triggering assessment evaluated using the above PGA and M values, select areas of the soil foundation are susceptible to liquefaction and strength loss. Generally, potentially liquefiable materials lie below the native clay blanket between elevations -10 to -20

feet, along with a deeper potentially liquefiable layer between elevations -30 and -40 feet, with the shallowest liquefiable material largely being in the northern portion of TS30L. Normalized clean sand blowcounts ( $(N_1)_{60,cs}$ ) within these two layers range from 12 to 20 blows per foot and 14 to 21 blows per foot, respectively. Liquefaction susceptibility evaluated using CPT data generally corresponded to soil borings liquefaction susceptibility, with some thicker potentially liquefiable layers being identified in the CPT data due to the continuousness of the CPT data compared to soil borings. Based on these results, estimated liquefaction induced settlement were estimated to be on the order of 1 to 6 inches throughout the levee alignment, with potentially larger settlement possible at isolated locations where potentially liquefiable sandy deposits are thicker. Finally, based on range of  $(N_1)_{60,cs}$  blowcounts in the potentially liquefiable material (ranging from 12 to 21 blows per foot) and residual shear strength correlations presented by Seed and Harder (1990), we estimate post-liquefaction residual shear strength may range from 350 to 800 psf.

Considering the depth of potentially liquefiable material and estimated post-liquefaction residual shear strengths, post-liquefaction seismic slope stability was evaluated to verify stability of the levee slopes following a seismic event. Slope stability models utilized a residual shear strength of 400 psf for post-liquefaction stability for all liquefiable layers and undrained shear strengths presented in Appendix D. Under post-liquefaction conditions, if the factors of safety (FS) are less than 1, a flow slide is anticipated, and displacements will likely be large and unacceptable for design. If factors of safety are greater than 1, but less than 1.3 incremental seismic slope deformations are likely but will be progressive and likely acceptable depending on the consequences of slope movement, and if factors of safety are greater than 1.3, negligible seismic deformation is anticipated.

Seismic slope stability was conducted where potentially liquefiable material is thickest, which corresponds to approximately STA 36+00. We have modeled slope geometry in this section using proposed levee reshaping geometry and a generalized subsurface profile based on nearby explorations. Under these conditions, post-liquefaction slope stability factor of safety for the landside and waterside slopes 2.14 and 2.20 respectively. Therefore, negligible post-liquefaction seismic slope deformation is anticipated on landslide and waterside slopes throughout the reach.

Considering TS30L is a dryland levee, in the locations of potential liquefaction, the levee could become compromised due to liquefaction settlement or seismic slope movement rendering the levee incapable of safely retaining high water. However, the probability of coincident loading from a 200-year seismic event and a 200-year hydraulic event is relatively low. In accordance with the draft ETL 1110-2-580 "Guidelines for Seismic Evaluation of Levees" and California DWR "Urban Levee Design Criteria", seismically induced deformation of the TS30L levee segment may be considered acceptable if restoration to at least a 10-year level of flood protection can be accomplished within 6 to 8 weeks after degradation occurrence. Within one year, the 200-year level of flood protection with 3 feet of freeboard should be restored. Additional information regarding liquefaction analysis, result printouts, slope stability results, and material properties are provided in the slope stability model provided in Appendix C.

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**8.4 Recommendations**

Given the results of our liquefaction assessment and subsequent post liquefaction seismic slope stability analysis, we recommend that general directions for post-seismic event inspection be implemented in the Operations and Maintenance (O&M) manual, and that detailed requirements be included to address the temporary and permanent repairs necessary for any damage from seismic events.

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## 9.0 EXISTING CONDITION ANALYSIS

TS30L was divided into three separate subreaches (A, B, and C) as described in Section 6.1. Subreaches were selected based on areas of the levee having similar subsurface stratigraphy, waterside geometry, past performance, landside geometry, and existing utilities. USACE levee mile stationing is not available for non-Project levees. USACE implemented project-specific stationing which commenced at the center of March Lane (1+00) in the southern portion of the levee and ended at the intersection of the TS30L and Fourteenmile Slough levee (61+00). This section provides a detailed summary of the analyses performed for each subreach.

### 9.1 Subreach A

This section presents the existing condition analysis within Subreach A, which is from Station 1+00 to 4+50. A cross-section located at 4+00 was selected to represent this subreach.

#### 9.1.1 Existing Levee Geometry and Features

Based on existing as-built drawings and previous geotechnical reports, the existing TS30L levee was constructed in three separate phases within this subreach. The original levee height was constructed to approximately elevation 3 to 4 feet (NGVD29), then raised in 1983 to approximately elevation 8 to 9 feet (NGVD29; converted NAVD88 elevations are approximately 10 to 11 feet), with a crest width of approximately 14 to 16 feet, waterside slope of approximately 3H:1V, and landside slope of approximately 2.9H:1V. Based as-built drawings from June 1988, the existing levee at station 4+00 was raised again resulting in a crest elevation of approximately 16 feet (NGVD29; converted NAVD88 elevation is approximately 18 feet), with a levee crest width of approximately 20 feet, waterside slope of 3H:1V and new landside slope of 2H:1V. The levee has remained unaltered since construction completed in 1988. Since that time, a concrete lined irrigation ditch about 1 to 2 feet in depth, located directly adjacent to the existing levee landside toe, was constructed to divert sheet flow from the landside levee slope away from the nearby residential houses. Further details and information regarding the construction history of TS30L can be found in Section 2.1.1 of this report.

Additionally, waterside surface conditions are generally higher in this subreach compared to other areas of TS30L, likely due to the presence of March Lane, with waterside elevations around 8 feet extending approximately 150 to 160 feet beyond the waterside levee toe. As a result, the distance of the seepage path compared to other areas along TS30L is substantially longer, potentially reducing landside gradients and increasing factors of safety in this subreach. Finally, an existing sanitary sewer force main (SSFM) is located waterside of the levee centerline, approximately 25 feet from the existing waterside toe from 1+00 to 4+00. North of 4+00 the SSFM runs west into the Wright-Elmwood Track adjacent to the existing waterside ditch. The SSFM runs parallel to the waterside ditch throughout the remainder of the project site.

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### 9.1.2 Explorations and Geophysical Testing Summary

There are four USACE CPTs in this subreach, including one crest locations, one waterside toe exploration and two landside toe borings (in order by increasing station): CF-20-04, CF-20-01, CF-20-16, and 2F-20-05.

Additionally, there were several historic borings within this reach available to develop subsurface conditions. These historic explorations include two DWR exploratory borings (WR2074\_007B and WR2074\_010B), one CPT (WR2074\_012C), one in-situ vane shear test (WR2074\_002V), one historic USACE boring (K169-2F-79-11), along with a number of borings conducted by Kleinfelder and Moore & Taber (K024-B-1, K024-B-26, K081-B-31, and K081-B-47).

Explorations reveal that there is a waterside and landside native fine-grained blanket within this section of levee consisting of organic clay or high plasticity clay, below the native blanket lies a thin lens of lean clay approximately 3 to 4 feet thick follow by 4- to 6-foot-thick silty sand aquifer. Interbedded layers of lean clay and silty sand to poorly graded sand generally lie beneath the silty sand throughout the remainder of the stratigraphy.

### 9.1.3 Embankment Soil Characterization

The most recently placed levee fill soils, post-1988 construction (documented levee fill material or “new embankment”), are composed primarily of lean clay soils with isolated layers of higher plasticity clay or organic clay located near the boundary between the native ground surface and levee fill. The fill material initially placed to construct the original levee along with the levee raise in 1983, pre-1988 construction (undocumented levee fill material or “farm” levee), is generally composed of lean to fat clay with lenses approximately 1 to 2 feet thick composed of organic clay and silt soils.

### 9.1.4 Foundation Soil Characterization

The foundation soils in this reach are characterized by predominantly fine-grained soils in the upper 8 to 12 feet lying below the levee material and acting as a native blanket, followed by an approximately 4- to 6-foot-thick silty sand aquifer. The sandy shallow aquifer is underlain by an approximately 4 to 5-foot-thick lean clay layer overlying a 15 to 20-foot-thick silty sand aquifer. Interbedded lean-to-fat clay and silty sand to sand layers are located below the granular aquifer zone and was encountered throughout the remainder of the borings and CPTs.

### 9.1.5 Layer Modeling Considerations

Model layers were constructed in accordance with the vertical and horizontal analysis model development screening process for each cross-section analyzed using the boring context comparisons within the subreach and general geomorphology models as described in the methodology section of this report. The embankment is modeled with the pre-1988 levee fill material (undocumented levee fill) and post-1988 levee material (documented levee fill) and is delineated by the as-built cross section provided in Appendix J of the GDR. Based on the relevant

borings in the area, generalized soil subsurface conditions consist of 6 to 8 feet of the organic clay lying below the levee material acting as a native blanket, followed by a 3- to 4-foot-thick layer of lean clay, underlain by an approximately 4- to 6-foot-thick silty sand aquifer. The sandy shallow aquifer lies above an approximately 4 to 5-foot-thick clay layer that is underlain by a 15 to 20-foot-thick silty sand aquifer. Interbedded lean-to-fat clay and silty sand to sand layers are located at depth throughout the remainder of the applicable soil column. Given the geomorphology of the area and depositional environment of carving historic channels and overbank deposits overlain by tidal delta deposits, lateral continuity of granular layers is likely not present in near surface coarse-grained deposits; however longitudinal continuity in these layers extending both landside and waterside of the levee is probable.

#### 9.1.6 Cross-Section Selection

The cross-section location was selected at 4+00 near borings K169-2F-79-11, K024-B-1, K024-B-26, K081-B-31, K081-B-47, WR2074\_007B and WR2074\_010B along with CPTs CF-20-04, CF-20-01, CF-20-16, and WR2074\_012C. These borings and CPTs indicated a condition where a sandy aquifer zone may be located underneath a near-surface thick blanket stratum, and a thick organic clay layer was directly underneath the levee embankment.

#### 9.1.7 Material Properties

The seepage and strength parameter used for design are summarized in the Soil Parameter Summary Table presented in Appendix D. Details regarding the statistical analysis and procedures used to determine the appropriate material properties is presented in the Soil Parameter Selection Chapter in Appendix D.

#### 9.1.8 Seepage Results

Based on the generalized stratigraphy described in the above sections, underseepage exit gradients at 4+00, were calculated to be 0.44 ft/ft at the bottom of the landside ditch under and 0.42 ft/ft approximately 150 feet from the levee toe at the DWSE, which is below the threshold value for exit gradient criteria (0.5 ft/ft and 0.8 ft/ft respectively). Additionally, embankment through seepage analyses results indicate that the phreatic surface and break out point is slightly above the levee toe but given the levee embankment material and rate of flow at the toe of the landside levee, erosion of the levee embankment through CLE or piping is unlikely.

#### 9.1.9 Slope Stability Results

Additionally, embankment's stability was evaluated using circular and block failure surfaces, and the existing condition steady-state stability analysis resulted in a minimum factor of safety for landside stability of 1.28 for DWSE conditions and is less than the threshold value for static slope stability criteria ( $FS > 1.4$ ). Considering the insufficient factors of safety under steady state conditions no further load case (end of construction, rapid drawdown, etc.) were modeled under the existing conditions geometry.

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### 9.1.10 Utility Penetration Assessment

A 30-inch diameter sewer force main (SSFM) crosses through the embankment near 1+00 and runs parallel along the waterside toe, approximately 25 feet away, to 4+00 at which point it crosses into the Wright-Elmwood Tract. The SSFM serves the northern portion of Stockton, CA and was built after the completion of the final levee raise in 1988, around 1994. The SSFM is the only sewer line that serves this area; therefore, relocating the line would involve significant time and cost. Furthermore, an existing gas line and telecommunication line is located at approximately 2+00. Additional discussions for the sewer force main along with other existing utilities near March lane, including existing easements along with the line's subsurface location and depth below the ground surface, will be provided in the Civil DDR. Construction plans for the SSFM are provided in Appendix J of the GDR.

## 9.2 Subreach B

This section presents the existing condition analysis generally from stations 4+50 to 51+50. Cross-sections located at stations 8+00, 17+00 and 47+00 were selected to represent this section. Station 8+00 represents the area with the thickest organic layer below the existing levee as encountered in 2F-20-01. Station 17+00 represented an area on the landside where the inland lake, Brookside Lake, cuts into the landside blanket approximately 300 feet from the landside levee toe. Additionally, shallow granular material was encountered below soft organic material at this location, indicative of a historic channel, in the historic borings conducted approximately 100 feet south of 2F-20-02. Station 47+00 represents the area with the shallowest aquifer layer in the reach as encountered in 2F-20-03. All three stations provide unique features that substantiated seepage and stability modeling at each location to refine levee improvement measures.

### 9.2.1 Existing Levee Geometry and Features

Based on existing as-built drawings and previous geotechnical reports, the existing TS30L levee was constructed in three separate phases. The original levee height was constructed to approximately elevation 3 to 4 feet (NGVD29), then raised in 1983 to approximately elevation 8 to 9 feet (NGVD29; converted NAVD88 elevations are approximately 10 to 11 feet), with a crest width of approximately 14 to 16 feet, waterside slope of approximately 3H:1V, and landside slope of approximately 2.9H:1V. Based as-built drawings from June 1988, the existing levee at station 8+00, 17+00 and 47+00 was raised a second time by approximately 7 feet at the centerline and 21 feet at the landside toe, resulting in a crest elevation of approximately 16 feet (NGVD29; converted NAVD88 elevation is approximately 18 feet), with a levee crest width of approximately 20 feet, waterside slope ranging from 3H:1V to 4H:1V and new landside slope ranging from 2H:1V to 2.2V:1H. The levee has remained unaltered since construction completed in 1988. Since that time, a concrete lined irrigation ditch about 1 to 2 feet in depth, located directly adjacent to the existing levee landside toe, was constructed to divert sheet flow from the landside levee slope away from the residential house. Further details and information regarding the construction history of TS30L can be found in Section 2.1.1 of this report.

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## 9.2.2 Explorations and Geophysical Testing Summary

There are four USACE exploratory borings and nine CPTs in this subreach, including two crest locations, four waterside toe explorations and seven landside toe borings (in order by increasing station): 2F-20-01, CF-20-05, 2F-20-09, 2F-20-02, CF-20-02, CF-20-06, CF-20-18, 2F-20-06, CF-20-08, CF-20-09, CF-20-19, 2F-20-11, CF-20-10, 2F-20-03, CF-20-11, CF-20-20, 2F-20-07, CF-20-21, 2F-20-12, CF-20-12, and CF-20-13. Additionally, there is one DWR boring, one vane shear, and four DWR CPTs in this subreach, all located along levee crest (in order by increasing station): WR2074\_013C, WR2074\_014C, WR2074\_011B, WR2074\_003V, WR2074\_015C, WR2074\_16C.

Finally, there are several historic borings within this reach available to refine subsurface conditions. These historic explorations include three historic USACE boring (K169-2F-79-02, K169-2F-79-06 and K169-2F-79-07), along with a number of borings conducted by Kleinfelder and Moore & Taber: K081-B-63, K081-B-4, K024-B-8, K081-B-30, K024-B-6, K081-B-46, K670-TP-6, K024-B-6, K024-B-25A, K024-B-25B, K024-B-25, K081-B-5, K670-TP-5, K670-TP-1, K024-B-9, K024-B-5, K081-B-29, K081-B-45, K670-TP-2, K670-TP-3, K081-B-64, K081-B-44, K081-B-6, K672-TP-10, K671-TP-4, K081-B-28, K024-B-24, K671-TP-6, K024-B-3, K672-TP-12, K081-B-7, K081-B-27, K024-B-2, K672-TP-13, K081-B-43, K024-B-23, K672-TP-14, K081-B-8, and K024-B-1.

## 9.2.3 Embankment Soil Characterization

The most recently placed levee fill material, post-1988 construction (documented levee fill material or “new embankment”), are composed primarily of lean clay soils with isolated layers of higher plasticity clay or organic clay located near the boundary between the native ground surface and levee fill. The fill material initially placed to construct the original levee along with the levee raise in 1983, pre-1988 construction (undocumented levee fill material or “farm” levee), is generally composed of lean to fat clay with lenses, approximately 1 to 2 feet thick, composed of organic clay and silt.

## 9.2.4 Foundation Soil Characterization

The foundation soils in this reach are characterized by predominantly fine-grained soils from the surface to depths of about 5 to 20 feet below ground surface (bgs). Below the fine-grained blanket, there is a sandy aquifer zone that is about 5 to 31 ft thick. A clay aquitard is located below the sandy aquifer zone.

## 9.2.5 Layer Modeling Considerations

Explorations reveal that there is generally a waterside and landside blanket within this section of levee; however, the blanket thickness decreases in thickness along the reach in isolated areas indicative of the infilled historic channels throughout the subreach. Additionally, the waterside ditch tends to cut through a portion of the waterside native clay blanket. In areas where shallower coarse-grained layers are present, the waterside blanket is likely fully penetrated by the waterside

ditch. Model layers were constructed in accordance with the vertical and horizontal analysis model development screening process for each cross-section analyzed using the boring context comparisons within the reach and general geomorphology models as described in the methodology section of this report.

The existing levee embankment is modeled with the pre-1988 construction levee (undocumented levee fill material or “farm” levee) and post-1988 construction (documented levee fill or “new embankment”) levee geometry, as shown on the 1988 as-built drawings. Boring 2F-20-01, 2F-20-09 and CPT CF-20-05, near cross section 8+00, indicated a condition where an approximately 8-foot-thick very soft to soft organically rich clay layer lies beneath the existing levee. The organic layer is underlain by an approximately 5 to 7 feet of lean to fat clay followed by an approximately 10- to 17-foot-thick silty sand to sand with silt aquifer. The sandy aquifer is underlain by an approximately 15 to 20-foot-thick clay aquitard.

Boring 2F-20-03 and CPT CF-20-12, near cross section 47+00, indicate a condition where an approximately 4 to 8-foot-thick blanket stratum was underlain by an approximately 10 to 14-foot-thick poorly graded sand with silt to silty sand aquifer. The shallow aquifer is underlain by approximately 4 to 6 feet of lean clay, followed by a second granular aquifer approximately 4 to 5 feet thick. Below this aquifer layer lies a thick clay aquitard approximately 18 to 20 feet thick, followed by interbedded layers of sand and clay approximately 5 to 7 feet thick.

Additionally, historic borings K024-B-6, K024-B-25A, and K024-B-25B, near cross section 17+00, show similar signs of a shallow silty sand to sand with silt aquifer under a 5- to 6-foot-thick organic clay layer. The shallow aquifer ranges from 15 to 20 feet thick and is underlain by a clay aquitard approximately 10 to 20 feet thick, followed by interbedded layers of sand and clay approximately 5 to 8 feet thick. Thin layers of silty sand about 1 to 3 feet thick were characterized within the thick clay aquitard.

The soil stratigraphy shown in the borings at each cross section (8+00 - Boring 2F-20-01, 2F-20-09 and CPT CF-20-05, 17+00 - K024-B-6, K024-B-25A, and K024-B-25B, and 47+00 - 2F-20-03 and CPT CF-20-12) were generally consistent, except for boring 2F-20-02 near 17+00, which does not show the presence of a shallow aquifer. Boring 2F-20-02 was slightly drilled further north of K024-B-6, K024-B-25A, and K024-B-25B; therefore, discrepancy in subsurface conditions between these two locations may be a result of a discrete historic channel that has been infilled with marsh deposits.

### 9.2.6 Cross-Section Selection

Three cross-section location were selected for this subreach: 8+00 near boring 2F-20-01, 2F-20-09 and CPT CF-20-05, 17+00 near boring 2F-20-02, K024-B-6, K024-B-25A, and K024-B-25B, and 47+00 near boring 2F-20-03 and CPT CF-20-12. These cross sections represent (1) an area along the alignment with the thickest layer of very soft to soft organic material (8+00) (2) an area on the landside where the inland lake, Brookside Lake, cuts into the landside blanket (17+00), and (3) an area with the shallowest aquifer layer encountered along TS30L (47+00).

### 9.2.7 Material Properties

The seepage and strength parameter used for design are summarized in the Soil Parameter Summary Table presented in Appendix D. Details regarding the statistical analysis and procedures used to determine the appropriate material properties is presented in the Soil Parameter Selection Chapter in Appendix D.

### 9.2.8 Seepage Results

Based on the generalized stratigraphy described in the above sections, underseepage exit gradients at the three representative cross sections described above are summarized in the below table.

**Table 9-1 : Summary of Calculated Exit Gradient Along Subreach B**

Cross section Location	Exit Gradient at Levee Toe (ft/ft) <sup>1,2</sup>	Exit Gradient at 150 feet from Levee Toe (ft/ft) <sup>3</sup>
8+00	0.27	0.18
17+00	>>1 (1.49)	0.67
47+00	>>1 (3.25)	>>1 (1.46)

<sup>1</sup>Exist gradients at the levee toe were calculated from the bottom of the landside ditch.; <sup>2</sup>EM 1110-2-1913 requires gradient less than 0.5 at DWSE; <sup>3</sup>EM 1110-2-1913 requires gradient less than 0.8 at DWSE.

As summarized above, exit gradients at station 17+00 and 47+00 were above the threshold value for exit gradient criteria (0.5 ft/ft); however, acceptable exit gradients were calculated at station 8+00. Additionally, embankment through seepage analyses results indicate that the phreatic surface and break out point is slightly above the levee toe but given the levee embankment material and rate of flow at the toe of the landside levee, erosion of the levee embankment through CLE or piping is unlikely.

### 9.2.9 Slope Stability Results

Embankment stability was evaluated using circular and block failure surfaces for cross sections 8+00, 17+00, and 47+00 under steady state seepage conditions. Slope stability results for the three representative cross sections described above for steady-state seepage (SSS), end of construction (EOC), rapid drawdown (RDD), and “soft” soil conditions (SSC) are summarized in the below table.

**Table 9-2 : Summary of Slope Stability Factors of Safety Along Subreach B**

Cross section Location	SSS (DWSE) <sup>1</sup>	EOC <sup>2</sup>	RDD <sup>3</sup>	SSC <sup>4</sup>
8+00	1.09	---	---	---
17+00	0.51	---	---	---
47+00	0.39	---	---	---

<sup>1</sup>EM 1110-2-1913 requires FS greater than 1.4; <sup>2</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>3</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>4</sup>DWR LEP requires FS greater than 1.4.

As summarized above, landside slope stability at stations 8+00, 17+00 and 47+00 were below acceptable factors of safety for static slope stability criteria under steady state conditions ( $FS > 1.4$ ). Considering the insufficient factors of safety under steady state conditions no further load case (end of construction, rapid drawdown, etc.) were modeled under the existing conditions geometry.

#### 9.2.10 Utility Penetration Assessment

An overhead power line crosses over the levee at approximately 28+00. The existing electrical transmission tower supports six (6) overhead power lines and encroaches approximately 5 feet into the landside levee slope for the toe of the levee. The line is owned by Pacific Gas and Electrical (PG&E) and is classified in PG&E's inventory as being a 230kV double line transmission tower. Currently, there have been no as-built drawings or construction records available for review. The tower foundation type and depths are unknown; however, it is likely founded on a pier or pile foundation given the geometry of the base of the tower. This section may be revised if additional information related to the design or construction of the tower (i.e., As-Built, plans, etc.) becomes available.

### 9.3 Subreach C

This section presents the existing condition analysis generally from 51+50 to 61+00. A cross-section located at Station 57+00 was selected to represent this subreach.

#### 9.3.1 Existing Levee Geometry and Features

Based on existing as-built drawings and previous geotechnical reports, the existing TS30L levee was constructed in three separate phases. The original levee height was constructed to approximately elevation 3 to 4 feet, then raised in 1983 to approximately elevation 8 to 9 feet (NGVD29; converted NAVD88 elevations are approximately 10 to 11 feet), with a crest width of approximately 14 to 16 feet, waterside slope of approximately 3H:1V, and landside slope of approximately 2.9H:1V. Based as-built drawings from June 1988, the existing levee at station 57+00 was raised a second time by approximately 7 feet, resulting in a crest elevation of approximately 15 feet (NGVD29; converted NAVD88 elevation is approximately 17 feet), with a levee crest width of approximately 20 feet, waterside slope of 3.3H:1V and new landside slope of 2.5V:1H. The levee has remained unaltered since construction completed in 1988. Since that time, a concrete lined irrigation ditch about 1 to 2 feet in depth, located directly adjacent to the existing levee landside toe, was constructed to divert sheet flow from the landside levee slope away from the residential house. Further details and information regarding the construction history of TS30L can be found in Section 2.1.1 of this report.

#### 9.3.2 Explorations and Geophysical Testing Summary

There are two USACE exploratory borings and four CPTs in this subreach, including two crest locations, one waterside toe explorations and three landside toe borings (in order by increasing station): CF-20-14, CF-20-22, CF-20-03, 2F-20-08, CF-20-15, and 2F-20-04. Additionally, there

is one DWR exploratory boring, one CPT, and one in-situ vane shear test in this subreach, all located along levee crest (in order by increasing station): WR2074\_017C, WR2074\_008B, and WR2074\_004V. The explorations were generally spaced about every 500 linear feet of levee. Explorations reveal that there is a waterside and landside blanket within this section of levee, and thin 1 to 3 feet thick lenses of silty sand to sandy silt within the blanket zone.

### 9.3.3 Embankment Soil Characterization

The most recently placed levee fill soils, post-1988 construction (documented levee fill or “new embankment”), are composed primarily of lean clay soils with isolated layers of higher plasticity clay or organic clay located near the boundary between the native ground surface and levee fill. The fill material initially placed to construct the original levee along with the levee raise in 1983, pre-1988 construction (undocumented levee fill or “farmers” levee), is generally composed of lean to fat clay with lenses approximately 1 to 2 feet thick composed of organic clay and silt.

### 9.3.4 Foundation Soil Characterization

The foundation soils in this reach are characterized by predominantly fine-grained soils from surface to depths of about 21 to 30 feet bgs. Thin lenses of about 2 to 4 feet thick that consist of clayey sand to sandy silt are shown within the fine-grained blanket. Below the fine-grained blanket, there is a sandy aquifer zone that is about 5 to 22 ft thick. A clay aquitard is located below the sandy aquifer zone.

### 9.3.5 Layer Modeling Considerations

Model layers were constructed in accordance with the vertical and horizontal analysis model development screening process for each cross-section analyzed using the boring context comparisons within the reach and general geomorphology models as described in the methodology section of this report. The embankment is modeled with the pre-1988 construction (undocumented levee fill material or “farm” levee) levee material and post-1988 construction (documented levee fill material or “new embankment”) levee material, as shown on the 1988 as-built drawings. Boring 2F-20-08 and CPTs CF-20-15 and CF-20-03 indicated a condition where an approximately 25 to 35-foot-thick blanket stratum was underlain by an approximately 9 to 15-foot-thick poorly graded sand with silt and silty sand aquifer. Thin clayey sand to sandy silt lenses, or “stringers”, about 2 to 4 feet thick were characterized within the blanket stratum at shallow depths. The sandy aquifer is underlain by an approximately 9 to 19-foot-thick clay aquitard. The soil stratigraphy shown in boring 2F-20-08 and CPTs CF-20-15 and CF-20-03 were generally consistent with each other. Furthermore, the waterside ditch most likely cuts through the upper portion of the waterside blanket and connects with the shallow clayey sand to sandy silt lenses within the blanket.

### 9.3.6 Cross-Section Selection

The cross-section location was selected at 57+00 near boring 2F-20-08 and CPTs CF-20-15 and CF-20-03. This boring and CPTs indicated a condition where a sandy aquifer zone was located

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underneath a near-surface thick blanket stratum that contained shallow, thin clayey sand to sandy silt lenses, or “stringers”, as well as soft organic clay soils directly underly the embankment.

### 9.3.7 Material Properties

The seepage and strength parameter used for design are summarized in the Soil Parameter Summary Table presented in Appendix D. Details regarding the statistical analysis and procedures used to determine the appropriate material properties is presented in the Soil Parameter Selection Chapter in Appendix D.

### 9.3.8 Seepage Results

Based on the generalized stratigraphy described in the above sections, underseepage analysis indicates that the vertical landside exit gradient is 0.56 ft/ft under DWSE for the near surface “stringer” layers of clayey sand and sandy silt near the toe of the levee and is marginally below the threshold value for exit gradient criteria. The vertical landside exit gradient increases to 0.64 ft/ft when a factor of 1.15 is applied to the exit gradient to represent 3D hydraulic loading affects, as recommended by DWR LEP guidance, and is above the threshold value for exit gradient. The vertical landside exit gradient is 0.16 ft/ft under DWSE approximately 150 feet away from the levee toe in the granular “stringer” layer.

The vertical landside exit gradient is 0.08 ft/ft for the full blanket at the toe of the levee. The vertical landside exit gradient for the full blanket increases to 0.09 ft/ft when a factor of 1.15 is applied to the exit gradient to represent 3D hydraulic loading affects and is below the threshold value for exit gradient criteria. The vertical landside exit gradient is 0.09 ft/ft for the full blanket approximately 150 feet from the toe of the levee and is below the threshold value for exit gradient criteria. Additionally, embankment through seepage analyses results indicate that the phreatic surface and break out point is slightly above the levee toe but given the levee embankment material and rate of flow at the toe of the landside levee, erosion of the levee embankment through CLE or piping is unlikely.

### 9.3.9 Slope Stability Results

Additionally, embankment’s stability was evaluated using circular and block failure surfaces, and the existing condition steady-state stability analysis resulted in a minimum factor of safety for landside stability of 1.24 for DWSE conditions and is less than the threshold value for static slope stability criteria ( $FS > 1.4$ ). Considering the insufficient factors of safety under steady state conditions no further load case (end of construction, rapid drawdown, etc.) were modeled under the existing conditions geometry.

### 9.3.10 Utility Penetration Assessment

No known utilities penetrate the levee within this reach. The SSFM is located on the western edge of the water side ditch approximately 300 feet from the waterside levee toe and is approximately 10 feet below the existing waterside ground surface.

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## **10.0 POTENTIAL IMPROVEMENT MEASURES**

This section describes the potential improvement measures evaluated for reaches not meeting criteria for seepage or slope stability. The measures presented herein are those typically used for levees in the Sacramento and San Joaquin Valley. Not all measures were modeled at each location. Some improvement measures were eliminated based on engineering judgment and feasibility of implementation.

### **10.1 Seepage Cutoff Walls**

A seepage cutoff wall is a positive seepage control measure that provides a vertical barrier to the horizontal subsurface flow. Seepage cutoff walls may be either Category 1 or Category 2 cutoff walls (Bruce, 2009). Category 1 cutoff walls are formed by excavation under slurry using a hydro-cutter, hydraulic excavator, or hydraulic or mechanical clamshell. Category 2 cutoff walls are formed by mixing the in-situ soil with cement and bentonite slurry using deep mixing methods (DMM). Category 2 cutoff walls depths are determined by evaluation of potential low-permeability tie in layers and can extend deeper below the surface than Category 1 cutoff walls. In both types of walls, the depths of the cutoff walls include an additional depth increment for the key-in to the low-permeability layer of approximately 3 to 5 ft. The actual constructed cutoff wall depth is expected to vary during construction, and an additional 10 ft is typically allowed in the construction contract. Hydraulic long-stick excavators, which are the most frequently used method in the local region, are limited to approximately 80 feet. For cutoff walls with any potential for deeper invert elevations, Category 1 walls using clam-shell methods or Category 2 walls using DMM are typically specified.

### **10.2 Seepage Berms**

Seepage berms provide additional weight at the levee toe to control uplift pressures and manage seepage away from the embankment. Depending on the foundation conditions, four seepage categories are available for mitigation.

- Impervious berms restrict landside upward seepage and are sized (thickness) to prevent uplift failure. These berms are constructed of type I material.
- Semi-pervious berms allow more seepage to pass vertically through the berm than impervious berms and are constructed of type II material.
- Sand berms allow the most seepage to pass vertically through the berm but still provide additional weight to prevent internal erosion.
- Free-draining berms are constructed of random fill over a rock/sand drainage layer that is typically connected to a collector pipe system or drainage ditch.

### **10.3 Stability Berms**

Stability berms can provide a buttress to the embankment where slope stability is a concern. Berms essentially provide the same effect as flattening embankment slopes but are generally more effective because of concentrating additional weight near the toe of the potential failure surface and forcing a change in the potential failure path. They are typically one-half to two-thirds of the height of the main embankment.

#### **10.4 Pressure Relief Wells**

Pressure relief wells may be installed along the landside toe of a levee to reduce uplift pressure which may otherwise cause sand boils and piping of foundation material. Wells accomplish this by intercepting and providing controlled outlets for seepage that would otherwise emerge uncontrolled landward of the levee. Pressure relief well systems are used where pervious strata underlying a levee are too deep or too thick to be penetrated by a cutoff wall or toe drains, or where space for a landside berm is limited.

Relief well should adequately penetrate pervious strata and be spaced sufficiently close to intercept enough seepage to reduce exist gradients acting beyond the wells. Discharge from the relief wall is collected via a piped system or a v-ditch to manage the seepage flow from wells to a sump or basin for pumping to an approved outlet location. A relief well requires a small footprint after being installed; however, relief wells required periodic maintenance and frequently suffer loss in efficiency with time, typically due to clogging of well screens by muddy water, bacteria growth, and carbonate incrustation.

#### **10.5 Levee Slope Toe Drains**

Where a levee is situated on deposits of pervious material overlain by little or no impervious material, a partially penetrating toe trench, can improve seepage conditions at or near the levee toe. Where the pervious stratum is thick, a drainage trench of any practicable depth would attract only a small portion of the seepage flow and detrimental underseepage would bypass the trench. Consequently, the main use of a pervious toe trench is to control shallow underseepage and protect the area in the vicinity of the levee toe, reducing the excess pore-pressure at the toe of the embankment. This measure consists placing a perforated pipe in a trench parallel to and offset from the levee toe. The trench is backfilled with sand or gravel to collect the seepage, thus reducing the excess pore-pressure at the toe of the embankment.

#### **10.6 Embankment Regrading**

Embankment regrading consists of degrading of the existing embankment to remove unsuitable embankment materials and reconstructing the embankment with suitable fill material (i.e., homogenous, and impervious material not susceptible to piping). Embankment widening or slope regrading may also be performed for embankments that do not meet seepage or stability requirement or minimum geometrical criteria. This measure can be used to improve through

seepage as well but may tend to be difficult at sites where there is limited space which may inhibit efficient grading procedures.

### **10.7 Waterside Impervious Fill**

Waterside impervious fill consists of degrading a portion of the existing waterside slope of the embankment to remove unsuitable embankment materials and reconstructing the waterside slope of the embankment with impervious fill material (i.e., homogenous, and impervious material not susceptible to piping). This measure can be used to improve through levee seepage and is somewhat less invasive than a full embankment reconstruction. This mitigation method also reduces seepage related slope stability issues since it can reduce seepage forces within the embankment and at the landside levee toe.

### **10.8 O&M Corridor Deficiencies**

The O&M corridors on the landside and waterside of the embankment are expected to achieve minimum standards: 20 ft landside and 15 ft waterside easements; however, narrower easements may be allowed based on a combination of factors, including original design intent, past performance, inability to achieve additional easement for external reasons (e.g., environmental, political, cultural, economic, etc.). Acceptance of limited easement corridors is at the discretion of the levee program safety engineer and district program safety engineer.

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## 11.0 POST-IMPROVEMENT CONDITIONS ANALYSIS

This section presents the with-project condition analysis for reaches not meeting criteria for the existing condition. For reaches meeting criteria, the with-project condition is the same as the existing condition.

### 11.1 Selected Mitigation Methods

The seepage control measures considered include a seepage berm, relief well system, drain at the toe of the landside slope and cutoff wall. The seepage berm was not selected due to lack of adequate space between the levee to and adjacent residential development to construct a seepage berm. A relief well system and drain at the toe of the levee slope was considered but not selected due to the maintenance requirements involved with maintaining relief well and drain integrity over time. Given TS30L is a setback levee that will only be loaded infrequently, constructing a seepage mitigation that does not require continual maintenance and rehabilitation over time is preferred. Based on site constraint and subsurface conditions, a cutoff wall was considered the most appropriate seepage control measure to construct.

Stability control measures considered included levee reshaping, landside drained stability berm, and ground improvement methods. Levee reshaping is feasible given the available space waterside of the current levee alignment but may require additional land acquisition. Given the site constraints landside of the levee toe due to the adjacent Brookside residential development, a stability berm was not considered feasible without significant land acquisition which would be unrealistic and uneconomical. Additionally, installing a drained stability berm may have constructability, operation, and maintenance issues due to limited room between the landside toe and the adjacent residential development. In-situ strengthening of the existing levee slope was considered by means of deep mixing method (DMM) or mass soil mixing (MSM) in the upper 10 to 20 feet near the landside toe; however, this would require a specialty contractor, which would not be cost effective compared to levee reshaping. Additionally, in-situ slope reinforcement could not be used as a seepage control measure in tandem; therefore, additional seepage control measures would need to be implemented.

Based on the above comparison of appropriate seepage and stability control measures, a combination of seepage cutoff wall and levee reshaping was determined to be the most suitable given the site constraints and subsurface conditions. Levee reshaping will generally be used to address levee slope stability concerns and a cutoff wall will be used to address excessive exit gradients at the levee toe and beyond the landside levee toe. Furthermore, levee reshaping will aid in mitigating areas along the levee that have shown signs of longitudinal cracking along the waterside hinge in the southern area of the existing levee (See Section 2.1.6). In addition, given the differing permeability characteristics between the pre-1988 construction (undocumented levee fill or “farm”) levee material and post-1988 construction (documented levee fill or “new embankment”) levee material, seepage mitigation using a cutoff wall will aid in reducing seepage forces at the landside toe and increase landside slope stability under steady state conditions.

It is the District's experience that when a cutoff wall can be constructed by trench method, located along the centerline of the levee, available space to locate slurry mixing ponds, and requires cutoff wall depths of less than 80 feet below the ground surface, a slurry trench construction method is more efficient and economical. Since the proposed cutoff wall is likely less than 80 feet below ground surface and no loading conditions prohibit the use of soil bentonite (SB) cutoff wall, a SB cutoff wall constructed along the centerline of the existing levee was selected as the superior cutoff wall method.

The cutoff wall alignment was selected on the levee centerline to avoid potential constructability issues related to shallow groundwater and excavation of the older levee embankment. Additionally, construction stability of the slurry trench is very sensitive to surcharge loads. It is SPK District policy that SB slurry trench method walls are not allowed to be placed at the toe of an existing levee unless all surcharge loads such as the remaining undegraded portion of the embankment are removed to eliminate the surcharge load, thus requiring further earthwork than a centerline alignment.

## **11.2 Subreach A**

The section from Station 1+00 to 4+50 did not meet the stability criteria for the existing condition; therefore, stability mitigation is recommended. This section presents the with-project condition analyses for Station 4+00.

### **11.2.1 Improvement Measures Considered**

Levee reshaping was not selected to mitigate landside slope stability concerns because the levee shift toward the west to flatten the landside slope would encroach on the existing SSFM running parallel to the waterside toe of the levee, which was not acceptable by the City of Stockton. Additionally, estimated long term settlement of the SSFM from shifting the levee embankment closer to the SSFM will likely compromise the integrity of the existing SSFM; therefore, the City of Stockton would need to relocate the SSFM line, which would result in substantial time delays and increase costs of the project.

Consequently, instead of reshaping the existing levee in this area, a seepage cutoff wall is proposed along the centerline of the existing levee embankment to alleviate high seepage forces in the existing embankment at the landside toe under steady state conditions. The high seepage forces are a result of the permeability contrast between the pre-1988 construction (undocumented or "farmers") levee fill material and post-1988 construction (documented or "new embankment") levee fill material. Additionally, the seepage cutoff wall will help reduce seepage forces in the shallow silty sand layer which will increase effective stress at the landside toe and increase landside slope stability.

The seepage cutoff wall will extend from the degrade elevation of elevation 10.5 feet down to elevation -21 feet (totaling a 31.5-foot cutoff wall). The proposed cutoff wall will extend from 2+50 to 4+50. Slight variations in exact cutoff wall termination are expected based on exiting

utilities and site constraints; however, the cutoff wall beginning/end shall not deviate more than 25 feet unless evaluated by the geotechnical engineer. South of 2+50 the levee merges into March Lane and is under less hydraulically loaded along this stretch from the Wright-Elmwood Tract. Additionally, the landside slope south of 2+50 will be covered by approximately two (2) feet of 18-inch ripap, which increases the landside stability. Considering these two items, no improvements are required south of 2+50. The proposed levee improvements along this reach (i.e., cutoff wall) may begin to transition back to existing conditions south of 2+50.

Aside from the inclusion of seepage cutoff wall described above, generalized subsurface conditions within the embankment and foundation soil used in the existing condition analysis in Section 8 remained the same in the with-project condition. Additionally, the layer modeling for this cross-section is the same as the existing condition, with the exception of the seepage cutoff wall.

### 11.2.2 Material Properties

The seepage and strength parameter used for design are the same parameters used in the existing analysis; however, seepage and strength properties were added to model the seepage cutoff wall. A summary of the soil parameters used for seepage and slope stability analyses is provided in the Soil Parameter Summary Table presented in Appendix D and supplemental information in Section 9.1.7.

### 11.2.3 Seepage Results

The foundation seepage analysis indicates that the vertical landside exit gradient is 0.23 ft/ft at the bottom of the landside ditch and 0.29 ft/ft approximately 150 feet away from the levee toe for the sandy aquifer zone and is below the threshold value for exit gradient criteria. Additionally, embankment through seepage analyses results indicate that the phreatic surface and break out point is slightly lower as compared to the existing condition.

### 11.2.4 Slope Stability Results

Below is a summary of the slope stability results along Subreach A for steady-state seepage (SSS), end of construction (EOC), rapid drawdown (RDD), “soft” soil conditions (SSC), during construction (DC), and long-term waterside stability (long-term WSS).

**Table 11-1 : Summary of Slope Stability Factors of Safety Along Subreach A**

Cross Section Location	SSS (DWSE) <sup>1</sup>	EOC <sup>2</sup>	RDD <sup>3</sup>	SSC <sup>4</sup>	DC <sup>5</sup>	Long-term WSS <sup>6</sup>
4+00	1.42/1.58 <sup>7</sup>	2.33	2.63	1.41/1.46 <sup>7</sup>	3.38 <sup>8</sup> /3.08 <sup>9</sup>	2.95

<sup>1</sup>EM 1110-2-1913 requires FS greater than 1.4; <sup>2</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>3</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>4</sup>DWR LEP requires FS greater than 1.4; <sup>5</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>6</sup>EM 1110-2-1913 requires FS greater than 1.5; <sup>7</sup>Block failure factor of safety; <sup>8</sup>Slurry trench wall factor of safety; <sup>9</sup>Slurry trench landside slope factor of safety.

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#### 11.2.4.1 Steady-State Condition

The embankment's stability was evaluated for the steady-state condition (200-yr) using circular and block failure surfaces, and the with-project condition resulted in a minimum factor of safety for landside stability of 1.42 and 1.58 respectively. Factors of safety under steady-state conditions are above the threshold value for static slope stability criteria.

#### 11.2.4.2 End-Of-Construction Condition

The embankment's stability was evaluated for the end-of-construction condition, and the with-project condition resulted in a minimum factor of safety for landside stability of 2.33 and is above the threshold value for end of construction slope stability criteria.

#### 11.2.4.3 Rapid Drawdown Condition

The embankment's stability was evaluated for the rapid drawdown condition, and the with-project condition resulted in a minimum factor of safety for waterside stability of 2.63 and is above the threshold value for rapid drawdown slope stability criteria.

#### 11.2.4.4 "Soft" Soil Condition

The embankment's stability was evaluated for the "soft" soil condition using circular and block failure surfaces, and the with-project condition resulted in a minimum factor of safety for landside stability of 1.41 and 1.46 respectively and is above the threshold value for slope stability criteria under "soft" soil conditions.

#### 11.2.4.5 During Construction

The embankment's stability was evaluated for the during construction condition, for both the landside stability and trench stability. For during construction condition on the trench stability, the with-project condition resulted in a minimum factor of safety for landside stability of 3.38 and is above the threshold value for temporary slope stability criteria. For during construction condition on the landside stability, the with-project condition resulted in a minimum factor of safety for landside stability of 3.08 and is above the threshold value for temporary slope stability criteria.

#### 11.2.4.6 Long-term Waterside Condition

As a result of flattening the landslide slope and to reduce the waterside footprint of the regraded levee, the waterside slope generally is steeper along the reach compared to existing conditions. As a result, long-term slope stability of the waterside slope under drained conditions was analyzed to verify acceptable stability. The embankment's waterside slope stability evaluated under drained conditions, with-project conditions resulted in a minimum factor of safety for waterside stability of 2.63 and is above the threshold value for static slope stability criteria.

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### 11.2.5 Utility Penetration Assessment

The utility penetration assessment is the same as that in the existing condition.

## 11.3 Subreach B

The section from Station 4+00 to 51+50 did not meet the seepage or stability criteria for the existing condition; therefore, seepage mitigation is required. This section presents the results of the with-project conditions including levee reshaping to 3:1 landside slopes and 2.5:1 waterside slopes, as well as an SB cutoff wall tipped to elevations between -15 and -42 feet-NAVD88.

### 11.3.1 Improvement Measures Considered

The seepage control measures considered included a seepage berm, relief well system, and a cutoff wall. The seepage berm was not selected because there is no space for the seepage berm on the landside due to close proximity of the Brookside residential development. A relief well system was considered but not selected because there is a tie in layer that would allow for a seepage cutoff wall. A cutoff wall was selected on the levee centerline to avoid potential constructability issues related to shallow groundwater and excavation of the older levee embankment. The cutoff wall tip elevation was selected to be elevation -42 feet. The purpose of the cutoff wall would be to act as a fully penetrating cutoff wall, or to cut off the sandy aquifer zone underlying the thin blanket and tie in the cutoff wall into the clay aquitard.

A cutoff wall will also act as a stability control measure for this subreach, as it will reduce the seepage forces near the landside toe. In addition to the cutoff wall, levee reshaping is recommended from 4+50 to 51+50 with a recommended new landside slope of 3H:1V and waterside slope of 2.5H:1V. Therefore, we modeled the with-project condition for 4+50 to 51+50 with a landside slope of 3H:1V and waterside slope of 2.5H:1V.

Aside from the inclusion of seepage or stability mitigation measures described above, generalized subsurface conditions within the embankment and foundation soil used in the existing condition analysis in Section 8 remained the same in the with-project condition. Additionally, the layer modeling for this cross-section is the same as the existing condition, with the exception of the added levee reshaping.

### 11.3.2 Material Properties

The seepage and strength parameter used for design are the same parameters used in the existing analysis; however, seepage and strength properties were added to model the cutoff wall seepage and slope mitigation feature. A summary of the soil parameters used for seepage and slope stability analyses is provided in the Soil Parameter Summary Table presented in Appendix D.

### 11.3.3 Seepage Analysis Results

Below is a summary of the exit gradients for the steady-state seepage analyses modeling the DWSE and with-project conditions.

**Table 11-2 : Summary of Exit Gradients Along Subreach B**

Cross section Location	Exit Gradient at Landside Toe (ft/ft) <sup>1,2</sup>	Exit Gradient 150 feet from Landside Toe (ft/ft) <sup>3</sup>
8+00	0.21	0.08
17+00	0.09	0.00
47+00	0.11	0.21

<sup>1</sup>Exit gradients at the levee toe were calculated from the bottom of the landside ditch.; <sup>2</sup>EM 1110-2-1913 requires gradient less than 0.5 at DWSE; <sup>3</sup>EM 1110-2-1913 requires gradient less than 0.8 at DWSE.

The gradient is calculated to the top of the sandy aquifer immediately below the blanket layer. Additionally, the embankment through seepage analyses results indicates that the phreatic surface and break out point are significantly reduced by the SB cutoff wall as compared to the existing condition

### 11.3.4 Slope Stability Results

Below is a summary of the slope stability results along Subreach B for steady-state seepage (SSS), end of construction (EOC), rapid drawdown (RDD), “soft” soil conditions (SSC), during construction (DC) and long-term waterside stability (long-term WSS).

**Table 11-4 : Summary of Slope Stability Factors of Safety Along Subreach B**

Cross section Location	SSS (DWSE) <sup>1</sup>	EOC <sup>2</sup>	RDD <sup>3</sup>	SSC <sup>4</sup>	DC <sup>5</sup>	Long-term WSS <sup>6</sup>
8+00	1.49/1.59 <sup>7</sup>	2.66	1.44	1.49/1.51 <sup>7</sup>	2.17 <sup>8</sup> /2.82 <sup>9</sup>	1.74
17+00	2.02/2.13 <sup>7</sup>	2.59	1.45	1.80/1.77 <sup>7</sup>	2.06 <sup>8</sup> /3.51 <sup>9</sup>	1.77
47+00	1.89/2.14 <sup>7</sup>	2.02	1.64	1.87/1.98 <sup>7</sup>	1.93 <sup>8</sup> /4.55 <sup>9</sup>	2.05

<sup>1</sup>EM 1110-2-1913 requires FS greater than 1.4; <sup>2</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>3</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>4</sup>DWR LEP requires FS greater than 1.4; <sup>5</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>6</sup>EM 1110-2-1913 requires FS greater than 1.5; <sup>7</sup>Block failure factor of safety; <sup>8</sup>Slurry trench wall factor of safety; <sup>9</sup>Slurry trench landside slope factor of safety.

#### 11.3.4.1 Steady-State Condition

The embankment’s stability was evaluated for the steady-state condition (200-yr) using circular and block failure surfaces, and the with-project condition resulted in a minimum factor of safety for landside stability are provided in Table 11-4 and are above the threshold value for static slope stability criteria.

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#### 11.3.4.2 End-Of-Construction

The embankment's stability was evaluated for the end-of-construction condition, and the with-project condition resulted in a minimum factor of safety for landside stability are provided in Table 11-4 and are above the threshold value for end of construction slope stability criteria.

#### 11.3.4.3 Rapid Drawdown Condition

The embankment's stability was evaluated for the rapid drawdown condition, and the with-project condition resulted in a minimum factor of safety for waterside stability are provided in Table 11-4 and are above the threshold value for rapid drawdown slope stability criteria.

#### 11.3.4.4 "Soft" Soil Condition

The embankment's stability was evaluated for the "soft" soil condition using circular and block failure surfaces, and the with-project condition resulted in a minimum factor of safety for landside stability are provided in Table 11-4 and are above the threshold value for slope stability criteria under "soft" soil conditions.

#### 11.3.4.5 During Construction

The embankment's stability was evaluated for the during construction condition, for both the landside stability and trench stability. For during construction condition on the trench stability, the with-project condition resulted in a minimum factor of safety for landside stability are provided in Table 11-3-2 and are above the threshold value for temporary slope stability criteria. For during construction condition on the landside stability, the with-project condition resulted in a minimum factor of safety for landside stability are provided in Table 11-4 and are above the threshold value for temporary slope stability criteria.

#### 11.3.4.6 Long-term Waterside Condition

As a result of flattening the landslide slope and decreasing the waterside footprint of the regraded levee, the waterside slope generally is steeper along the reach compared to existing conditions. As a result, long-term slope stability of the waterside slope under drained conditions was analyzed to verify acceptable stability. The embankment's waterside slope stability evaluated under drained conditions, with-project conditions are provided in Table 11-4 and are above the threshold value for static slope stability criteria.

### 11.3.5 Utility Penetration Assessment

The utility penetration assessment is the same as that in the existing condition. Cutoff wall extends through this area so potential defects leading to preferential seepage paths along one of the pier foundations supporting the existing transmission tower is negligible.

Considering levee improvements proposed near the transmission tower (cutoff wall and levee reshaping), coordination with PG&E will be required. Based on the capacity of the transmission tower and CALOHSAs standards, a minimum clearance of 20 feet from the powerlines must be maintained during construction. Based on typical 230 kV steel framed transmission towers, the lowest powerline connects to the tower approximately 60 feet above the ground surface, therefore given the location of the tower and sag of the powerlines at this location, the equipment will have approximately 30 feet to operate their equipment. Measures shall be taken in construction to safely construct the cutoff wall and reshape the levee embankment at this location.

#### **11.4 Subreach C**

The section from Station 51+50 to 61+00 did not meet the seepage or stability criteria for the existing condition; therefore, seepage mitigation is required. This section presents the with-project condition analysis.

##### **11.4.1 Improvement Measures Considered**

The seepage control measures considered include a seepage berm, relief well system, and cutoff wall. The seepage berm was not selected because there is no space for the seepage berm on the landside due to close proximity of the Brookside residential development. A relief well system was considered but not selected because there is a tie in layer that would allow for a seepage cutoff wall. A cutoff wall was selected on the levee centerline to avoid potential constructability issues related to shallow groundwater and excavation of the older levee embankment. The cutoff wall tip elevation was selected to be elevation -25 feet. The purpose of the cutoff wall would be to act as a “stitching” wall, or to cut off the thin clayey sand to sandy silt “stringer” layers within the clay blanket.

A cutoff wall will also act as a stability control measure for this subreach, as it will reduce the seepage forces near the landside toe. In addition to the cutoff wall, levee reshaping is recommended from 51+50 to 61+00 with a recommended new landside slope of 3H:1V and waterside slope of 2.5H:1V. Therefore, we modeled the with-project condition for 51+50 to 61+00 with a landside slope of 3H:1V and waterside slope of 2.5H:1V.

Aside from the inclusion of seepage or stability mitigation measures described above, generalized subsurface conditions within the embankment and foundation soil used in the existing condition analysis in Section 8 remained the same in the with-project condition. Additionally, the layer modeling for this cross-section is the same as the existing condition, with the exception of the added levee reshaping.

##### **11.4.2 Material Properties**

The seepage and strength parameter used for design are the same parameters used in the existing analysis; however, seepage and strength properties were added to model the cutoff wall seepage

and slope mitigation feature. A summary of the soil parameters used for seepage and slope stability analyses is provided in the Soil Parameter Summary Table presented in Appendix D.

### 11.4.3 Seepage Analysis Results

The underseepage analysis indicates that the vertical landside exit gradient is 0.39 ft/ft for the near surface “stringer” layers of clayey sand and sandy silt near the bottom of the landside ditch and is below the threshold value for exit gradient criteria. The vertical landside exit gradient increases to 0.45 ft/ft when a factor of 1.15 is applied to the exit gradient to represent 3D hydraulic loading affects, as recommended by DWR LEP guidance, and is below the threshold value for exit gradient. The vertical landside exit gradient is 0.14 ft/ft under DWSE approximately 150 feet away from the levee toe in the granular “stringer” layer.

The vertical landside exit gradient is 0.07 ft/ft for the full blanket at the toe of the levee. The vertical landside exit gradient for the full blanket increases to 0.08 ft/ft when a factor of 1.15 is applied to the exit gradient to represent 3D hydraulic loading affects and is below the threshold value for exit gradient criteria. The vertical landside exit gradient is 0.04 ft/ft for the full blanket approximately 150 feet from the toe of the levee and is below the threshold value for exit gradient criteria. Additionally, embankment through seepage analyses results indicate that the phreatic surface and break out point are significantly reduced by the waterside slope blanket as compared to the existing condition.

### 11.4.4 Slope Stability Results

Below is a summary of the slope stability results along Subreach C for steady-state seepage (SSS), end of construction (EOC), rapid drawdown (RDD), “soft” soil conditions (SSC), during construction (DC) and long-term waterside stability (long-term WSS).

**Table 11-5 : Summary of Slope Stability Factors of Safety Along Subreach C**

Cross Section Location	SSS (DWSE) <sup>1</sup>	EOC <sup>2</sup>	RDD <sup>3</sup>	SSC <sup>4</sup>	DC <sup>5</sup>	Long-term WSS <sup>6</sup>
57+00	1.47/1.59 <sup>7</sup>	1.92	1.47	1.58/1.65 <sup>7</sup>	3.08 <sup>8</sup> /5.19 <sup>9</sup>	1.95

<sup>1</sup>EM 1110-2-1913 requires FS greater than 1.4; <sup>2</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>3</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>4</sup>DWR LEP requires FS greater than 1.4; <sup>5</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>6</sup>EM 1110-2-1913 requires FS greater than 1.5; <sup>7</sup>Block failure factor of safety; <sup>8</sup>Slurry trench wall factor of safety; <sup>9</sup>Slurry trench landside slope factor of safety.

#### 11.4.4.1 Steady-State Condition

The embankment’s stability was evaluated for the steady-state condition (200-yr) using circular and block failure surfaces, and the with-project condition resulted in a minimum factor of safety for landside stability of 1.47 and 1.59 respectively. Factors of safety under steady-state conditions are above the threshold value for static slope stability criteria.

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#### 11.4.4.2 End-Of-Construction Condition

The embankment's stability was evaluated for the end-of-construction condition, and the with-project condition resulted in a minimum factor of safety for landside stability of 1.92 and is above the threshold value for end of construction slope stability criteria.

#### 11.4.4.3 Rapid Drawdown Condition

The embankment's stability was evaluated for the rapid drawdown condition, and the with-project condition resulted in a minimum factor of safety for waterside stability of 1.47 and is above the threshold value for rapid drawdown slope stability criteria.

#### 11.4.4.4 "Soft" Soil Condition

The embankment's stability was evaluated for the "soft" soil condition using circular and block failure surfaces, and the with-project condition resulted in a minimum factor of safety for landside stability of 1.58 and 1.65 respectively are above the threshold value for slope stability criteria under "soft" soil conditions.

#### 11.4.4.5 During Construction

The embankment's stability was evaluated for the during construction condition, for both the landside stability and trench stability. For during construction condition on the trench stability, the with-project condition resulted in a minimum factor of safety for landside stability of 3.08 and is above the threshold value for temporary slope stability criteria. For during construction condition on the landside stability, the with-project condition resulted in a minimum factor of safety for landside stability of 5.19 and is above the threshold value for temporary slope stability criteria.

#### 11.4.4.6 Long-term Waterside Condition

As a result of flattening the landslide slope and to reduce the waterside footprint of the regraded levee, the waterside slope generally is steeper along the reach compared to existing conditions. As a result, long-term slope stability of the waterside slope under drained conditions was analyzed to verify acceptable stability. The embankment's waterside slope stability evaluated under drained conditions, with-project conditions resulted in a minimum factor of safety for waterside stability of 1.95 and is above the threshold value for static slope stability criteria.

### 11.4.5 Utility Penetration Assessment

The utility penetration assessment is the same as that in the existing condition.

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## **11.5 Embankment Settlement**

The project site is underlain by a layer of organic clay and, approximately 3 to 8 feet thick silt with interbedded lenses of peat, along with interbedded layers of lean to high plasticity clay and silty sand to sand. Near surface fine-grained material generally ranges from 10 to 20 feet thick and is very soft to medium stiff. Sand layers underlying the near surface fine-grained material generally ranges from 5 to 15 feet thick. Based on the depositional environment of the subsurface material, the near surface fine-grained materials are likely normally consolidated to slightly overconsolidated.

Considering the shift in the levee centerline further waterside to flatten the existing landslide slope, the new waterside toe of the levee will likely be placed on compressible fine-grained material and will be subject to total and differential settlement due to immediate, consolidation and secondary settlement. Settlement associated with the new levee construction was evaluated and accounted for when establishing appropriate roadway resurfacing recommendations for the levee access road after construction. Based on the results of the settlement analysis, the top of the levee crest elevation for construction may need to be increased appropriately to account for the estimated primary consolidation settlement if total settlement is unacceptable.

Soil consolidation parameters were estimated from USACE laboratory consolidation tests, historic consolidation tests, and approximated using soil properties using established soil correlations . Estimation of anticipated elastic settlement, primary consolidation settlement, and secondary compression settlement were performed using guidelines presented in EM 1110-1-1904 Settlement Analysis (USACE, 1990). Long-term settlement will be in a nonuniform dimpled manner due to varying thicknesses of compressible clay throughout the alignment along with the magnitude of vertical loading applied at each location.

### **11.5.1 Soil Properties**

Soil profiles were created using borings and CPTs at approximately every 500-foot station to evaluate settlement. Material parameters used for settlement analyses were selected based on consolidation and strength testing performed on samples collected during field investigations, along with CPTs. The resulting material parameters are outlined in Table 11-6 were used in the settlement analyses.

**Table 11-6: Summary of Soil Parameters for Settlement Analysis**

Soil	Unit Weight (pcf)	$E_s$ (psf)	$e_o$ <sup>1</sup>	$C_c$ <sup>2</sup>	$C_s$ <sup>3</sup>
Documented Levee Fill (CL)	120	250,000	0.70	0.37	0.06
Undocumented Levee Fill (CL/CH)	110	200,000	1.34	0.61	0.12
Organic Clay (OH)	85	125,000	3.33	2.03	0.41
Lean Clay (CL)	120	225,000	0.73	0.29	0.06
High Plasticity Clay (CH)	110	200,000	1.11	0.45	0.07
Silty Sand (SM)	125	1,000,000	---		
Sand (SP)	125	1,500,000	---		

<sup>1</sup>Initial void ratios were obtained from consolidation, triaxial tests, or using the phase relationship equation  $e_o S = w_n G_s$ , where  $S$  = Soil saturation (assumed  $S=1$ ),  $w_n$  = natural water content, and  $G_s$  = Soil specific gravity (assumed equal to 2.7).

<sup>2</sup>Compression Index obtained from consolidation tests or estimated using correlations presented by Kulhawy and Mayne (1990).

<sup>3</sup> Recompression Index obtained from consolidation tests or estimated using correlations presented by Nagaraj and Murty, (1985).

Stress history of the compressible soils were evaluated based on consolidation testing performed for the project, using preconsolidation pressures estimated by the Casagrande and Pacheco method.; however, considering cohesive material are generally lightly over consolidated ( $OCR < 2$ ) we have conservatively assumed normally consolidated conditions ( $OCR = 1$ ) for our settlement analysis in the upper 30 feet of the native clay material lying below the existing TS30L levee. Given the placement history of the previously placed levee fill material, all existing levee fill material, both pre-1988 and post-1988 construction, was presumed to have an  $OCR = 3$ . Time needed to reach total consolidation settlement was not calculated since it does not affect construction sequencing or post-project events.

Finally, considering the presence of organically rich soil below the levee secondary compression is probable at the site. Secondary compression is associated with volume reduction without significant pore water pressure changes. In soil composed of soft clay, silt and organic matter, such as those present beneath TS30L, secondary compression may contribute to settlement. Estimates of secondary compression consider the coefficient of secondary compression,  $C_a$ , with similar equations to calculate primary consolidation. Typically, estimates for this value are based as the ratio between the coefficient of secondary compression and the coefficient of virgin compression curve ( $C_c$ ). Generally, this ratio ranges from 0.025 to 0.085 for clay and organic material. Based on  $C_c$  values used for settlement analysis and thickness of the organic clay layer, an additional 2 inches of settlement is anticipated due possible secondary compression in organic clay.

### 11.5.2 Settlement Analysis Results

Based on the analysis presented herein, total settlement calculated approximately every 500 feet over the length of TS30L are summarized in the below table. Total settlement estimates below include immediate settlement and generally ranged from 1 to 3 inches; therefore, long term consolidation and secondary compression generally range from 2 to 5 inches.

**Table 11-7 Summary of Soil Parameters for Settlement Analysis**

<b>Station</b>	<b>Total Settlement (inches)</b>
5+00	4 to 6
11+00	6 to 8
15+00	6 to 8
21+00	6 to 8
25+00	6 to 8
31+00	4 to 5
35+00	6 to 7
41+00	2 to 3
45+00	2 to 6
51+00	1 to 3
55+00	2 to 4
61+00	3 to 4

Settlement calculations were based on estimated vertical loads resulting from the shift of the levee centerline because of flattening the landside slope to 3H:1V; however, the magnitude of fill placed waterside of the existing levee alignment varies along TS30L, depending on existing waterside levee slopes and waterside ground conditions beyond the levee toe. As a result, larger settlements are possible in areas where larger vertical loads are present. The above settlement values will be refined based on civil cross sections acquired during 100% design. No settlement of the levee embankment is anticipated south of 4+50 since the existing levee alignment will remain unchanged in this area.

## 12.0 CONCLUSIONS

The conclusions presented in this section were developed based on the evaluation presented in Sections 8 and 10.

### 12.1 Existing Conditions

#### 12.1.1 Seepage Results

Based on seepage analyses, one reach meets acceptable exit gradient criteria for underseepage and two require seepage mitigation. All cross-sections were analyzed assuming fully saturated conditions at the DWSE elevation and steady-state conditions had sufficient time to develop. We have summarized the calculated exit gradients for each section in Table 12-1 below.

**Table 12-1 : Exit Gradient**

Section	Cross section Location	Exit Gradient at Levee Toe (ft/ft) <sup>1,2</sup>	Exit Gradient at 150 feet from Levee Toe (ft/ft) <sup>3</sup>
Subreach A (1+00 to 4+50)	4+00	0.44	0.42
Subreach B (4+00 to 51+50)	8+00	0.27	0.18
Subreach B (4+00 to 51+50)	17+00	>>1 (1.49)	0.67
Subreach B (4+00 to 51+50)	47+00	>>1 (3.25)	>>1 (1.46)
Subreach C (51+50 to 61+00)	57+00	0.56/0.64 <sup>4</sup>	0.16

<sup>1</sup>Exist gradients at the levee toe were calculated from the bottom of the landside ditch.; <sup>2</sup>EM 1110-2-1913 requires gradient less than 0.5 at DWSE; <sup>3</sup>EM 1110-2-1913 requires gradient less than 0.8 at DWSE; <sup>4</sup>Considers 3D amplification factor.

#### 12.1.2 Through-Levee Seepage Results

If the phreatic surface daylights on or above the landside levee slope at the DSWE and if the embankment materials consist of non- to low-plasticity erodible soils, such as sands and silts, it may indicate a potential for through seepage related slope distress. Through-levee seepage can soften a levee embankment causing sloughing and erosion of the landside slope, and/or internal piping.

SEEP/W results can be used to estimate the location of the phreatic surface breakout point along the levee embankment. Based on the plasticity index of the material located within the existing levee and the anticipated plasticity index of the soil material to be used to reshape the levee being greater than 8, the susceptibility of erosion of the existing and proposed levee material resulting in a though embankment piping failure or CLE failure for Subreach A through C is negligible.

#### 12.1.3 Slope Stability Results

Below is a summary of post-improvement slope stability results along TS30L for steady-state seepage (SSS), end of construction (EOC), rapid drawdown (RDD), “soft” soil conditions (SSC), during construction (DC) and long-term waterside stability (long-term WSS). Detailed analysis results for each cross section are presented in Appendix E.

**Table 12-2: North Levee Setback Slope Stability Factor of Safety**

Section	Cross Section Location	SSS (DWSE) <sup>1</sup>	EOC <sup>2</sup>	RDD <sup>3</sup>	SSC <sup>4</sup>
Subreach A (1+00 to 4+50)	4+00	1.28	---	---	---
Subreach B (4+00 to 51+50)	8+00	1.09	---	---	---
Subreach B (4+00 to 51+50)	17+00	0.51	---	---	---
Subreach B (4+00 to 51+50)	47+00	0.39	---	---	---
Subreach C (51+50 to 61+00)	57+00	1.24	---	---	---

<sup>1</sup>EM 1110-2-1913 requires FS greater than 1.4; <sup>2</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>3</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>4</sup>DWR LEP requires FS greater than 1.4.

## 12.2 Post-Improvement Conditions

### 12.2.1 Seepage Results

Based on the seepage analyses considering post-improvement conditions, all sections analyzed met acceptable exit gradient criteria for steady-state seepage at the DWSE. We have summarized the calculated exit gradients for each section in Table 12-3 below.

**Table 12-3 : Exit Gradient Results**

Section	Cross section Location	Exit Gradient at Levee Toe <sup>1,2</sup>	Exit Gradient at 150 feet from Levee Toe <sup>2</sup>
Subreach A (1+00 to 4+50)	4+00	0.23	0.29
Subreach B (4+00 to 51+50)	8+00	0.21	0.08
Subreach B (4+00 to 51+50)	17+00	0.09	0.0
Subreach B (4+00 to 51+50)	47+00	0.11	0.21
Subreach C (51+50 to 61+00)	57+00	0.39/0.45 <sup>4</sup>	0.14

<sup>1</sup>Exist gradients at the levee toe were calculated from the bottom of the landside ditch.; <sup>2</sup>EM 1110-2-1913 requires gradient less than 0.5 at DWSE; <sup>3</sup>EM 1110-2-1913 requires gradient less than 0.8 at DWSE; <sup>4</sup>Considers 3D amplification factor.

### 12.2.2 Through Seepage Results

If the phreatic surface daylight on or above the landside levee slope at the DSWE and if the embankment materials consist of non- to low-plasticity erodible soils, such as sands and silts, it may indicate a potential for through seepage related slope distress. Through seepage can soften a levee embankment causing sloughing and erosion of the landside slope, and/or internal piping.

SEEP/W results can be used to estimate the location of the phreatic surface breakout point along the levee embankment. Based on the plasticity index of the material located within the existing levee and the anticipated plasticity index of the soil material to be used to reshape the levee being

greater than 10, the susceptibility of erosion of the existing and proposed levee material resulting in a though embankment piping failure or CLE failure for Subreach A through C is negligible.

### 12.2.3 Slope Stability Results

Below is a summary of post-improvement slope stability results along TS30L for steady-state seepage (SSS), end of construction (EOC), rapid drawdown (RDD), “soft” soil conditions (SSC), during construction (DC) and long-term waterside stability (long-term WSS). Detailed analysis results for each cross section are presented in Appendix E.

**Table 12-4: North Levee Setback Slope Stability Factor of Safety**

Section	Cross Section Location	SSS (DWSE) <sup>1</sup>	EOC <sup>2</sup>	RDD <sup>3</sup>	SSC <sup>4</sup>	DC <sup>5</sup>	Long-term WSS <sup>6</sup>
Subreach A (1+00 to 4+50)	4+00	1.42/1.58 <sup>7</sup>	2.33	2.63	1.41/1.46 <sup>7</sup>	3.38 <sup>7</sup> /3.08 <sup>8</sup>	2.63
Subreach B (4+00 to 51+50)	8+00	1.49/1.59 <sup>7</sup>	2.66	1.44	1.49/1.51 <sup>7</sup>	2.17 <sup>8</sup> /2.82 <sup>9</sup>	1.74
Subreach B (4+00 to 51+50)	17+00	2.02/2.13 <sup>7</sup>	2.59	1.45	1.80/1.77 <sup>7</sup>	2.06 <sup>8</sup> /3.51 <sup>9</sup>	1.77
Subreach B (4+00 to 51+50)	47+00	1.89/2.14 <sup>7</sup>	2.02	1.64	1.87/1.98 <sup>7</sup>	1.93 <sup>8</sup> /4.55 <sup>9</sup>	2.05
Subreach C (51+50 to 61+00)	57+00	1.47/1.59	1.92	1.47	1.57/1.65	3.08 <sup>8</sup> /5.19 <sup>9</sup>	1.95

<sup>1</sup>EM 1110-2-1913 requires FS greater than 1.4; <sup>2</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>3</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>4</sup>DWR LEP requires FS greater than 1.4; <sup>5</sup>EM 1110-2-1913 requires FS greater than 1.3; <sup>6</sup>EM 1110-2-1913 requires FS greater than 1.5; <sup>7</sup>Block failure factor of safety; <sup>8</sup>Slurry trench wall factor of safety; <sup>9</sup>Slurry trench landside slope factor of safety.

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## 13.0 RECOMMENDATIONS

The geotechnical engineering recommendations are presented in this section. The recommendation covered include levee modification (e.g., berms, cutoff walls, levee reshaping, construction methods, tie-in depths, etc...) and details for the improvement measures, earthwork, quality control/assurance considerations for soils and other material testing, and instrumentation and post-construction monitoring.

Based on the 95% geotechnical analysis results, we recommend seepage mitigation be conducted within Subreach A, B and C, which spans from 2+50 to 61+00. Based off site conditions and depth of improvement, we recommend Soil-Bentonite (SB) cutoff wall through the existing levee centerline be used for seepage mitigation. Furthermore, we recommend stability mitigation, by levee reshaping, from 4+50 to 61+00. South of 2+50 the levee merges into March Lane and is under less hydraulically loaded along this stretch from the Wright-Elmwood Tract. Additionally, the landside slope south of 2+50 will be covered by approximately two (2) feet of 18-inch riprap, which increases the landside stability. Considering these two items, no improvements are required south of 2+50. The proposed levee improvements along this reach (i.e., cutoff wall) may begin to transition back to existing conditions south of 2+50. Slight variations in exact cutoff wall termination are expected based on exiting utilities and site constraints; however, the cutoff wall beginning/end shall not deviate more than 5 feet unless evaluated by the geotechnical engineer.

High seepage forces at the landside toe resulted in a slope stability factor of safety lower than the threshold value of 1.4 for Subreach A through C. Installing an SB cutoff wall from 2+50 to 61+00 reduces high seepage forces at the landside toe due to underseepage within the shallow aquifer layers, along with the permeability contrast between the pre-1988 (undocumented or “farmers”) levee fill material and post-1988 construction (documented or “new embankment”) levee fill material within the levee embankment.

Reducing seepage forces alone were insufficient to meet stability requirements in some areas; therefore, additional stability mitigation included reshaping the levee landside and waterside slopes to further increase landside stability factors of safety. This section will be evaluated and updated during the 100% design submittal as needed.

### 13.1 Cutoff Wall Alignment

Construct a seepage cutoff wall throughout Reach TS30L from 2+50 to 61+00 located along the existing levee centerline. South of 2+50 the levee merges into March Lane and is not being hydraulically loaded along this stretch anymore from the Wright-Elmwood Tract. Therefore, no improvements are proposed south of 2+50. The proposed cutoff wall may begin to transition back to existing conditions south of 2+50. Slight variations in exact cutoff wall termination are expected based on exiting utilities and site constraints; however, the cutoff wall beginning/end shall not deviate more than 25 feet unless evaluated by the geotechnical engineer.

Construct a working platform for the cutoff wall at approximately 2/3 of the levee height (approximately 1/3 degrade from the top of the levee). Degrade the levee embankment to elevation +10.5 feet. This elevation shall be the design degrade elevation within the reach for an SB slurry wall method cutoff wall. A consistent elevation should be used for the entire reach.

The cutoff wall location for all SB walls is a centerline alignment by District practice which is based on experience. Construction stability of the slurry trench is very sensitive to surcharge loads; therefore, SB Slurry trench method walls are not allowed to be placed at the toe of an existing levee unless all surcharge loads such as the remaining undegraded portion of the embankment are removed to eliminate the surcharge load, thus requiring further earthwork than a centerline alignment.

### **13.2 Cutoff Wall Dimensions**

The cutoff wall width shall be 3 ft with a tip elevation of -21 feet from 2+50 to 4+50, -42 feet from 4+50 to 51+50, and -25 feet from 51+50 to 61+00. Tie-in layers are not perfectly horizontal in the field; therefore, the cutoff wall may be deepened to a maximum of ten (10) feet based upon examination of bucket cuttings. As a result, the depth of the cutoff wall may be deepened or shortened by 10 feet, based on subsurface conditions encountered during construction, without any contract or quantity modifications. The tie-in layer shall be verified by the QC during construction.

### **13.3 Cutoff Wall Material Type**

The cutoff wall should be composed of Soil-Bentonite (SB) backfill. Soils obtained from the slurry trench excavation, the borrow area, existing levee degrade, other required excavations, or combination thereof may be used in the SB slurry cutoff wall backfill provided that the gradation requirements specified below must be met.

<b>Sieve Size or Number</b>	<b>Percent (%) Passing by Dry Weight</b>
2-inch	100
No. 4	40 to 100
No. 40	25 to 90
No. 200	20 to 60

Subsurface material at the site in the area of the cutoff wall generally consists of fine-grained soils with isolated granular layers; therefore, standalone on-site material is likely not suitable for SB wall construction; therefore, import granular fill (sand or pea gravel) will be necessary. In addition, the soil must be free of roots, debris, concentrations of organic materials, and all other deleterious material that may adversely affect the properties of the backfill. Screening of materials may be required to achieve the stated gradation requirements for soil to be used as backfill.

### **13.4 Cutoff Wall Construction Method**

The cutoff wall for this reach can be constructed with the slurry trench method. Construction stability of the slurry trench is very sensitive to surcharge loads; therefore, the cutoff wall location for all SB walls is a centerline alignment by District practice which is based on experience. As a result, SB Slurry trench method walls are not allowed to be placed at the toe of an existing levee unless all surcharge loads such as the remaining undegraded portion of the embankment are removed to eliminate the surcharge load, thus requiring further earthwork than a centerline alignment.

Excavation of the slurry trench cutoff wall must be accomplished by use of any suitable earth moving equipment including long reach excavators, clam shell excavators, or other approved equipment. Earth moving equipment must be capable of excavating the required minimum width of trench in a single pass of the excavating equipment. And the equipment must be able to reach a minimum of ten (10) feet deeper than the maximum proposed cutoff wall depth (elevation -40 feet).

Excavate the slurry trench from the working surface (Elevation 10.5 feet) to prevent off-site movement of waste materials, and slurry spills. Additionally, during construction, the level of the slurry in open trenches must be at all times maintained a minimum of three (3) feet above the groundwater level and a maximum of eighteen (18) inches below the working surface until the placement of SB backfill material is complete.

When the bottom of the cutoff wall trench is reached, the bottom surface must be probed along the trench centerline, using a weighted tape, cable, or other approved device, to determine that the contract depth is obtained. Probing must be used to determine if there is debris or excessive sediment on the trench bottom that must be removed prior to continuing backfilling.

Spoils generated by the cutoff wall construction that do not meet the requirement for use in the various fill areas (levee reshaping or cutoff wall) of the project are the property of the Contractor and must be disposed of off-site, in accordance with all federal, state, and local regulations and codes, such as the Clean Water Act and the National Historic Preservation Act.

#### **13.4.1 Lead-in Trenches**

Lead-in trenches for an SB slurry trench cutoff wall heading should consist of a 1H:1V slope and must be constructed parallel to the levee's alignment. Stability of lead-in trench shall be verified during construction by profiling the backfill slope. If in-situ material is not able to maintain a 1H:1V slope, lead-in trench slopes shall be flattened to 2H:1V. The lead-in trench must extend beyond the specified cutoff wall beginning and ending limits. At locations within the length of cutoff wall excavation where the cutoff wall tip elevation drops in the direction of excavation by 5 feet or more, the Contractor must cut an in-trench transition slope no steeper than 1H:1V. The in-trench transition slope must begin in the shallow wall section and reach the trench tip elevation for the deeper wall section.

Connections between headings require at least 50 feet overlap between the current and previous headings. This connection requirement would apply if, for some reason, the cutoff wall heading

could not be entirely constructed from STA 2+50 to 61+00 in one construction season or one construction contract. Construction beyond one season is not anticipated to occur.

#### **13.4.2 Soil-Bentonite Backfill Placement**

Free dropping of SB backfill through the slurry is not permitted. The SB backfill must be placed so that it will slide down the forward face of the SB backfill slope. Placement must be continuous from the beginning of the trench in the direction of the excavation to the end of the trench. Placement operations must proceed in such a manner that the slope of the initially placed SB backfill is maintained.

### **13.5 Slurry Mixing Areas**

Provide staging areas for slurry mixing ponds along the project alignment such that the pumping distance of the bentonite slurry is no greater than 5,000 linear feet. Maximum slurry transport distance is based on previous project experience within the District; therefore, longer slurry transport may be acceptable on a case by case basis, provided slurry quality is maintained over the proposed distance. When bulk mixing of the slurry backfills, use earth-moving equipment. The mixing area must either be an enclosed volume, bounded on the floor and walls by structural material such as concrete or steel, or a bermed impoundment suitable for containing the backfill materials.

The width of the levee, based on a levee degrade elevation of 10.5 feet (NAVD88), is approximately 75 to 80 feet wide at existing turnaround locations located at approximately 10+00, 27+00 and 45+00. Existing turnarounds on the levee may provide sufficient space for soil bentonite mixing, as well as alongside the cutoff wall trench once the levee is degraded. Waterside areas located away from the existing levee may provide sufficient space for bentonite mixing ponds provided these areas are not subject to environmental restrictions and are not located within the footprint of the levee after it has been reshaped. If neither of these options are viable, slurry mixing may be performed in batch plant tanks located on the on the waterside of the levee crest.

### **13.6 Clay Cap**

#### **13.6.1 Initial Clay Cap**

For cutoff walls constructed using the slurry trench method (SB walls), excavate a 3 ft deep trench that is 12 ft wide with 1:1 side slope along the cutoff wall alignment. This trench is then backfilled with Type I impervious material to the working platform's grade for cutoff wall construction, and the cutoff wall is installed through the Type I impervious material. This is required even though the levee is composed primarily of clay. This excavation and replacement purpose is to create an improved zone of compacted clay around the top of the cutoff wall, creating a strong connection between the top and the cutoff wall and the fill above.

Based on the current grading plans, flattening the existing slope may encroach into the initial clay cap by approximately 2 to 3 feet; however, given the 3:1 landslide slope, we do not anticipate that

the bottom of the clay cap will be disturbed during grading operations. Cutting into a portion of the initial clay cap is acceptable provided that settlement of the SB wall is substantially complete based on settlement monitoring data and the bottom of the clay cap remains undisturbed. If necessary, the SB cutoff wall may need to be moved 5 to 10 feet towards the waterside to restrict substantially disturbing the clay cap above the SB cutoff wall.

### 13.6.2 Temporary Clay Cap

A temporary soil cap must be placed within two (2) days of completing the SB backfill over each one hundred (100) foot reach along the trench. This temporary soil cap soil protects the cutoff from damage due to construction traffic damage and prevents drying of the top of the cutoff wall while the cutoff wall cures. No construction activity on top of the cutoff wall will be permitted until placement of the temporary clay cap and initial settlement of the backfill has occurred.

The temporary soil cap must be constructed using Soil Type 1 or Soil Type 2 material placed without compactive effort. The temporary soil cap must be removed upon completion of settlement monitoring of the cutoff wall if settlement within the cutoff wall has substantially completed. The temporary soil cap must be a minimum of two (2) feet thick and must extend on either side of the centerline of the cutoff wall a minimum of four (4) feet. If any depression develops within the completed SB slurry cutoff wall area, it must be repaired by placing additional trench cover soil. Trench cover soil must be SB backfill if the depression is observed during cutoff wall construction and Soil Type 1 material if the depression is observed after the removal of the temporary soil cap. After removal of the temporary soil cap, the permanent construction cap shall be constructed above the cutoff wall.

## 13.7 Settlement Plates

The SB material is very wet when placed and therefore subject to consolidation under its own weight over time. Experience has shown that most of the consolidation for SB slurry walls is over in about 2 weeks (for 3-foot-wide walls, less for thinner, more for thicker walls). Settlement plates shall be installed every five hundred (500) lineal feet as a minimum. Additional settlement monitors may be required during construction at the direction of the Contracting Officer.

Settlement plates must be installed as soon as the wall has reached sufficient strength to support it. Settlement plate monitoring surveys must be completed daily for 21 calendar days from the date of the first survey of the installed plates. These settlement plates should be monitored to verify adequate consolidation has transpired in the soil bentonite material prior to commencing earthwork.

## 13.8 Limits of Construction

Construct the cutoff wall in one segment from 2+50 to 61+00. The limits of the full depth wall down to elevation -42 feet occur from station 4+50 to 51+50 and then shallows to elevation -21 from 2+50 to 4+50 and elevation -25 feet from 51+50 to 61+00. Slight variations in exact cutoff

wall termination are expected based on existing utilities and site constraints; however, the cutoff wall beginning/end shall not deviate more than 25 feet unless evaluated by the geotechnical engineer.

### **13.9 Levee Reconstruction and Reshaping**

Once the cutoff wall has been installed, place a temporary cap atop the wall, and SB cutoff wall has cured and settled sufficiently, reconstruct the levee. The temporary clay cap should be removed before reconstruction. The extent of curing necessary will be dictated by settlement monitoring and defined in the project technical specifications. Reconstruct the levee above the working platform using Type I impervious fill extending from the initial clay cap to the original ground surface or to the design levee crest elevation in that portion of the levee overlying the cutoff wall. No separate permanent clay cap is needed since this levee is composed entirely of clay. Levee embankment fill can be used in all other areas of the levee section. At a minimum, slopes should be regraded as follows:

- i. Waterside slopes.
  1. Station 4+50 to 61+00: 2.5H:1V
- ii. Landside slopes.
  1. Station 4+50 to 61+00 3H:1V

The existing levee dimensions from 1+00 to 4+50 shall remain unchanged to prevent damage to the existing sanitary sewer force main (SSFM) situated approximately 25 feet from the existing waterside levee toe and extending along the existing levee from 1+00 to 4+00.

### **13.10 Fill Materials**

Suitable materials must consist of materials classified in accordance with ASTM D2487 as CL, CL-ML, ML, SC, SM, SP-SM, and SP-SC, meeting the additional requirements of Section 13.10.1 and Section 13.10.2, and be free from debris and organic material as defined herein.

#### **13.10.1 Levee Embankment Fill - Soil Type 1**

Soil Type 1 levee fill material must be suitable material obtained from the approved offsite borrow sources, must consist of low to medium plasticity soils classified in accordance with ASTM D2487 as lean clay (CL), clayey sand (SC), silty sand (SM), or silt (ML), must have no visible concentrations of organic content and must meet the following requirements:

Gradation	
Sieve Size	Percent Passing
2-inch	100
No.4	>85
No. 200	$40 < f_c < 90$
Liquid Limit (LL)	<50
Plasticity Index (PI)	$8 < PI < 30$

$f_c =$  fines content (% less than No. 200 Sieve)

Bentonite spoils from SB cutoff wall construction may not be blended into Soil Type 1 fill material; however, excavated in-situ material, may be used as Soil Type 1 fill if it meets requirements outlined above.

Blended material may be used if blending procedure and resulting material consistency has been substantiated by laboratory testing and approved by USACE. Materials must be blended at the borrow site or approved stockpile area. Blending of materials is not allowed on the levee embankment fill.

### 13.10.2 Levee Embankment Fill - Soil Type 2

Soil Type 2 must be suitable material obtained from levee degrade or approved offsite borrow source and must meet the requirements tabulated below. Soil Type 2 must have no visible concentrations of organic content and must meet the following requirements.

Gradation	
Sieve Size	Percent Passing
2-inch	100
No. 200	$10 < f_c < 40$
Liquid Limit (LL)	<50
Plasticity Index (PI)	$8 < PI < 30$

$f_c =$  fines content (% less than No. 200 Sieve)

Excess material produced by soil-bentonite cutoff wall excavation and construction can be used as levee embankment fill Type 2 if fill meets specified requirements for Type 2 materials.

Blended material may be used if blending procedure and resulting material consistency has been substantiated by laboratory testing and approved by USACE. Materials must be blended at the borrow site or approved stockpile area. Blending of materials is not allowed on the levee embankment fill.

### 13.10.3 Impervious Structural Levee Backfill

If structural backfill is placed within the levee prism, it must be compacted Levee Embankment Fill (Soil Type 1). Structural backfill placed outside the levee prism must be compacted Levee Embankment Fill (Soil Type 2). Blended material may be used if blending procedure and resulting

material consistency has been substantiated by laboratory testing and approved by USACE. Materials must be blended at the borrow site or approved stockpile area. Blending of materials is not allowed on the levee embankment fill. Screening of oversized material, if necessary, to meet the specified gradation criteria, is to be performed at borrow source prior to importing onsite.

#### **13.10.4 Existing Levee Material**

Provided that the levee fill meets the requirements for Soil Type 1 or 2 as specified in Sections 13.10.1 and 13.10.2, re-used the existing levee material to the maximum extent possible.

Blended material may be used if blending procedure and resulting material consistency has been substantiated by laboratory testing and approved by USACE. Materials must be blended at the borrow site or approved stockpile area. Blending of materials is not allowed on the levee embankment fill.

#### **13.11 Clearing, Grubbing and Stripping for the Levee Embankment**

The levee embankment should be cleared, grubbed, and stripped of vegetation, out of service utilities and other deleterious materials. The clearing operations must consist of the complete removal of obstructions above the ground surface except trees specifically designated to be removed will be cut by others. All stumps, down timber, snags, brush, vegetation, old piling, rock, stone, concrete rubble, abandoned structures, retaining walls, irrigation piping, hoses, and sprinklers and similar materials and items must be cleared within the limits of grading and levee degrade. Vegetation to be removed must consist of all woody plants and other vegetation higher than 3 inches above the ground surface.

Grubbing must consist of the removal of all stumps, roots, buried logs, old piling, old paving, buried irrigation piping, and other objectionable material as applicable. All roots greater than 1/2-inch diameter of any length and roots greater than 6 inches in length encountered during levee excavation must be removed. Grub all trees larger than 1.5 inches in trunk diameter to a depth of 3 ft soil feet below the existing surface to remove any large roots or other deleterious material. The project geotechnical engineer or his/her representative should approve the use of any soil materials generated from the clearing and grubbing activities. All logs, limbs, and other debris which are the products of the clearing and grubbing operations must be disposed of offsite at an approved waste facility.

Excavate the cavities from grubbing activities to a sufficient width so that holes can be backfilled. Cavities shall be backfilled with Soil Type 1 material. Sufficient backfill soil should be placed and compacted in order to match the surrounding elevations and grades. The project geotechnical engineer or his/her representative should observe and approve the preparation of the cavities and holes prior to placing and compacting engineered fill soil in the cavities and holes. Remove all rocks greater than 3 inches in greatest dimension from the top 12 inches of the soil.

Strip surfaces of excavations and fill foundations of heavy growth of crops, grass weeds and other vegetation. The entire area within the limits of grading and levee degrade and 2 feet outside of

these limits as needed must be stripped to remove crops, weeds, grass, and other vegetative materials. Strip to a minimum depth of 6 inches (measured perpendicular to the levee slope). Deeper stripping may be required in areas where concentrations of organic soils or tree roots are encountered. All stockpile areas must be stripped to a depth of 6 inches before material is stockpiled. Stripped material must be legally disposed of offsite. Additionally, no stripped material can be stockpiled on existing levee slopes.

The existing pavement section on top of the levee crown must be stripped to remove the existing aggregate surfacing. Stripped aggregate base below the asphalt concrete may be salvaged for respread if the material meets the requirements for aggregate material.

### **13.12 Placement of Engineered Earth Fill**

Engineered fills should be constructed with material meeting levee embankment Soil Type 1 or Soil Type 2. Engineered fills should be constructed by placing uniformly moisture-conditioned soil in maximum 6-inch-thick, loose lifts (layers) prior to compacting.

#### **13.12.1 Compaction Requirement**

After a layer of material has been dumped and spread, it must be harrowed to break up the fill materials to eliminate all clods and to obtain uniform moisture distribution. Harrowing must be performed with a heavy disk plow, or other approved harrow, to the full depth of the layer. If one pass of the harrow does not accomplish the breaking up of the materials, additional passes of the harrow must be required. The earthwork contractor should compact each loose soil lift with a tamping foot compactor such as a Caterpillar (CAT) 815 Compactor or equivalent as approved by our project engineer or the project engineer's field representative. A smooth steel drum roller compactor should not be used to compact loose soil lifts for construction of engineered fills.

Fill compaction for all soils, including recompacted native fill must comply with the following minimum requirements (maximum dry density in accordance with ASTM D698):

<b>Location</b>	<b>Relative Compaction (%)</b>
Subgrade to Receive Engineered Fill	95%
Levee Embankment, Ramps and Roadways Fill	97%
Structural Backfill	97%
12 Inches Beneath Aggregate Base	98%
Non-Structural Fill within the Project	92%

#### **13.12.2 Moisture Content Requirement**

The materials in each layer of the fill must contain the specified amount of moisture, within the limits specified below. Material that is not within the specified moisture content limits outlined below after compaction must be reworked to obtain the specified moisture content, regardless of density. The moisture content after compaction must be within the limits of 2 percentage points

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below to 2 percentage points above optimum moisture content as determined by ASTM D698 for subgrade to receive fill, levee embankment, ramps, and roadways, and structural backfill.

### 13.12.3 Quality Control

The moisture content, density, and relative percent compaction of all engineered fills should be tested by the project engineer's field representative during construction to evaluate whether the compacted soil meets or exceeds the minimum compaction and moisture content requirements. The earthwork contractor shall assist the project engineer's field representative by excavating test pads with the on-site earth moving equipment. The field and laboratory QC tests should be performed consistent with the testing frequencies as follows; ASTM D 698 1 per 1,000 CY or with material change; ASTM D 2922 1 per 100 CY (8" loose lift by 60' x 60'); ASTM D 3017 1 per 100 CY (8" loose lift by 60' x 60'); or as modified by the project engineer to better suit the site conditions.

## 13.13 Levee Grading

### 13.13.1 Benching

Benching into the existing levee embankment or existing side slopes is required in order to place and compact Type 1 and Type 2 material in horizontal layers. The slopes should be benched by making 8-in (vertical) stepped cuts into the slopes. Each layer of fill material applied on a levee must be benched into the levee section individually in four (4) to six (6) inch uncompacted layers.

### 13.13.2 Fill Slope Grading

Fill slopes should be graded in horizontal lifts to the lines and grades shown on the grading plans. The design finished grade of a fill slope should be achieved by over building the slope face and then cutting it back to the design finished grade. Fill slopes should not be graded (extended horizontally) by compacting moisture conditioned, loose soil lifts on the slope face, as thin veneer layers; in other words, do not construct engineered fill slopes by placing and compacting successive thin layers (veneers) of soil over the fill slope face at an inclination that is roughly coincident with the final fill slope horizontal to vertical slope ratio. The in-slope edge of each horizontal lift should be benched into the firm, competent, and relatively unyielding soil of the natural ground slope.

Benches should be graded with a minimum slope gradient of 2 percent towards the inside fill slope surface; in other words, the bench slope gradient should cause surface water to drain towards the fill slope side of the bench (not over and down the fill slope face). Fill soils used to construct slopes should be uniformly moisture conditioned, placed in loose lifts, and compacted as described in Section 13.12.

### 13.13.3 Staged Levee Reconstruction

Fill placement will cause a rise in pore pressures, and as a result, a reduction in shear strength within the near-surface soft foundation soils. Placement of excessive fill material may result in slope failures during grading operations. Piezometers should be installed near the new waterside

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toe and within the near surface soft foundation soils, to measure the increase in soil pore water pressure with fill placement and verify satisfactory levels of soil pore water pressures are not exceeded during grading. Acceptable levels of soil pore water pressure shall be determined by means of slope stability modeling and will be addressed in the subsequent 100% design submittal.

### **13.14 Asphalt Pavement Subgrade Preparation**

The prepared finished grade or finished subgrade soil surface can be proof rolled with a fully loaded 4,000-gallon capacity water truck with the rear of the truck supported on a double-axle, tandem-wheel, undercarriage, or approved equivalent. The minimum tire pressure should be 65 pounds per square inch (psi). The proof rolled surface should be visually observed by the project engineer or the project engineer's field representative to be firm, competent, and relatively unyielding. The project engineer or the project engineer's field representative may also evaluate the surface material by hand probing with a ¼-inch-diameter steel probe; however, this evaluation method should not be performed in place of proof rolling as described in the preceding.

### **13.15 Construction Instrumentation and Monitoring**

Piezometers should be installed every 500 feet, generally near the new waterside toe and within the near-surface soft foundation soils. Piezometers shall extend below static groundwater. Groundwater was encountered between elevation -5 and -12 feet during USACE borings and CPTs. Additionally, previous explorations encountered groundwater generally between elevation -5 to -10 feet. Based on groundwater conditions, piezometers shall be installed to at least elevation -16 feet. Fluctuations in the level of groundwater may occur overtime; therefore, deeper piezometer installations may be necessary if groundwater elevations are deeper than elevation -16 feet, particularly if sustained periods of dry weather exist prior to construction. After piezometer installation is complete and before placing fill material along the waterside slope, in-situ pore pressure shall be measured in each piezometer after pore pressures have stabilized.

Finally, protection of the SSFM is the responsibility of the Contractor; however, instrumentation such as inclinometers or settlement monuments may be desirable along the existing SSFM to monitor the existing line for movement during construction.

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## 14.0 REFERENCES

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- ASTM D698, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).*
- ASTM D1140, *Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75-um) Sieve.*
- ASTM D1586, *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.*
- ASTM D2216, *Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.*
- ASTM D2435, *Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading.*
- ASTM D2487, *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).*
- ASTM D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).*
- ASTM D2850, *Standard Test Methods for Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils.*
- ASTM D2922, *Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).*
- ASTM D2974, *Standards Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils.*
- ASTM D3017, *Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).*
- ASTM D3080, *Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions.*
- ASTM D4318, *Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.*
- ASTM D4647, *Standard Test Methods for Identification and Classification of Dispersive Clay Soils by the Pinhole Test.*

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ASTM D5084, *Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter*.

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## 15.0 LIMITATIONS

The following limitations apply to this report:

1. The information presented in this report is based on the site conditions as they existed at the time, we or others performed the surface and subsurface field investigations. The elevation or depth to the ground water table underlying the project site may differ with time and location. Therefore, if the depth to the ground water table is noted in our exploratory borings and/or trenches is only representative of the specific time and location where it was observed.

2. The project site map shows approximate exploratory borings and/or trench locations. Several of the borings were located by field surveying techniques, others by a combination of handheld Global Positioning System (GPS) devices and/or by pacing distances from identifiable site features. Borings located by handheld GPS devices or pacing should not be considered as accurate as those located by professional surveyors, but in any case, are as accurate as necessary and meet the current standard for geotechnical engineering practice.

3. The geotechnical investigations did not include an evaluation of the project site for the presence of hazardous materials. Although, we did not observe the presence of hazardous materials at the time of the field investigation all project personnel should be careful and take the necessary precautions should hazardous materials be encountered during construction.

Appendix E  
**Memorandum for Record,  
Aquatic Resource Delineation  
for Lower San Joaquin River at  
Tenmile Slough**

## Memorandum for Record

Subject: Aquatic Resource Delineation for Lower San Joaquin River, at Tenmile Slough

USACE Employees: Nicky Schleeter, Bert Skillen

The U.S. Army Corps of Engineers (Corps), along with its non-Federal sponsor, the Central Valley Flood Protection Board, and local sponsor, the San Joaquin Area Flood Control Agency (SJAFCA), are proposing to shift the levee prism towards the water side and install a soil-bentonite cutoff wall in the levee along Tenmile Slough to improve flood protection in Stockton California.

The general authority for flood control investigations in the San Joaquin River Basin arises under the Flood Control Act of 1936 (Public Law [PL] 74-738), Sections 2 and 6 and amended by the Flood Control Act of 1938 (PL 75-761). Further studies of the river system were requested in the May 8, 1964 resolution adopted by the Committee on Public Works of the House of Representatives. The LSJRFS is in accordance with Section 905(b) Analysis (Water Resources Development Act (WRDA) 1986) dated 23 September 2004, approved by the South Pacific Division (SPD) Commander, on June 10, 2005. The Section 905(b) Analysis was prepared with funds identified in House Report 108-357 (Conference Report to accompany H.R. 2745 for the Energy and Water Development Appropriations Act of 2004) for use under the Sacramento-San Joaquin River Basins Comprehensive Study to evaluate ecosystem restoration (ER), flood risk management (FRM) and related purposes for the Lower San Joaquin River (LSJR). House Report 105-190, which accompanied the Energy and Water Development Appropriations Act of 1998 (PL 105-62), identified initial funding and directed USACE to conduct a Comprehensive Study. The Section 905(b) Analysis determined that there were potential FRM and ER projects in the LSJR area. To address FRM, the San Joaquin River Basin Lower San Joaquin River, CA Final Integrated Interim Feasibility Report/Environmental Impact Statement/Environmental Impact Report was published January 2018 (2018 IIFR/EIS/EIR). The TS\_30\_L levee improvement project is covered by the 2018 IIFR/EIS/EIR but an Aquatic Resources Delineation was not conducted.

A Wetland Delineation was conducted on March 9, 2021 by the Corps. The survey followed the standards and guidelines of the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Regional Supplement Version 2.0 of September 2008 (Corps, 2008). Field technicians used professional judgement and prior experience to identify aquatic resources on site. Observations were recorded using Samsung Galaxy cell phone and ESRI's Survey 1, 2, 3 application. Mapping was completed using aerial imagery, and the photographs taken in the field and area calculations were completed in ESRI's Geographic Information System program, ARCMAP. Aquatic Resources Maps are included in Enclosure A.

The project area is approximately 47-acre project site is located on Tenmile Slough, latitude 37.988302°, longitude -121.368867°, between the San Joaquin River and White Slough, in the city of Stockton, San Joaquin County, California. A maintained agricultural ditch runs the length of the project site approximately 50 feet from the levee toe. In some areas the banks of the ditch are not well defined, creating a gradual slope up to the levee toe. Wetland vegetation has established in these areas, which then transitions into blackberry, willow, and non-native grasses towards the levee slope. The slope of the levee is maintained by the Reclamation

District 17 (RD 17) to be free of vegetation and is protected by gravel. Approximately 2.86 acres of aquatic resources, consisting of 2.26 acres of irrigation ditch, and 0.6 acres of wetlands are present within the survey area (see Table 1).

<b>Table 1: Aquatic Resource</b>			
<b>Aquatic Resource ID</b>	<b>Type of Resource</b>	<b>Area (SQFT)</b>	<b>Area (acre)</b>
AD001	Irrigation Ditch	53,057	1.22
AD002	Irrigation Ditch	44,041	1.01
AD003	Irrigation Ditch	1,498	0.03
<b>Irrigation Ditch Total</b>		<b>98,596</b>	<b>2.26</b>
FW001	Wetland	3,704	0.09
FW002	Wetland	9,696	0.22
FW003	Wetland	543	0.01
FW004	Wetland	4,766	0.11
FW005	Wetland	436	0.01
FW006	Wetland	1,180	0.03
FW007	Wetland	2,939	0.07
FW008	Wetland	313	0.01
FW009	Wetland	1,551	0.04
FW010	Wetland	676	0.02
FW011	Wetland	424	0.01
<b>Wetland Total</b>		<b>26,228</b>	<b>0.60</b>
<b>Total Resources</b>		<b>124,824</b>	<b>2.86</b>

The US Fish and Wildlife Service, National Wetland Inventory (NWI) provides information on the aquatic resources (USFWS, 2021). The NWI identifies the levee crown to the land side of the agricultural ditch as freshwater forested/shrub wetland. This water type is further defined as a palustrine system that includes nontidal wetlands that flood seasonally and are dominated by trees and shrubs that are less than 6 feet tall.

The United States Department of Agricultural, Natural Resource Conservation Service website provided soil maps (USDA, 2021). The soil types surrounding the project area are Egbert mucky clay loam, Fluvaquents, Peltier mucky clay loam, Ryde-Peltier complex and Valdez silt loam. The levee crown to the land side of the agricultural ditch is classified as water. The Soil Map and additional information is included in the Maps enclosure.

True data points were challenging to collect (Enclosure B). The bank between the irrigation ditch and the levee slope was dense with blackberry in many locations. In other locations there was a steep drop off that was unsafe to survey. Photographs were taken to document on the ground data (Enclosure C). Only upland locations were accessible from the levee side of the irrigation ditch, herbaceous ground cover included non-native grasses, poison hemlock, Italian thistle, however bulrush (*Scirpus* spp.) and Cordgrass (*Spartina* spp.) were visible in some areas of the irrigation ditch. The areas with wetland vegetation were compared against areal images and LiDAR of the site and where appropriate they have been labeled as freshwater wetlands. Aquatic Resources maps have been enclosed for reference, Enclosure A.

The discharges of dredged or fill material occurring below the ordinary high water in non-tidal waters of the United States; or below the high tide line in tidal waters of the United States; or within the lateral extent of wetlands adjacent to these waters, typically require Department of the Army authorization and the issuance of a permit under Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq.*). The June 2020 Navigable Waters Protection Rule redefined jurisdictional waters of the US.

According to 33 CFR 328.3:

(A)(2) defines tributaries (including ditches) as a naturally occurring surface water channel...”

B(5) defines ditches that are not (A)(1), (A)(2) or (A)(4) waters, to be non-jurisdictional

C(1) defines adjacent wetlands as “a wetland that is abutting, or touching at least one point or side of an (A)(1), (A)(2) or (A)(4) water”.

(C)(2) a ditch is defined as “a constructed or excavated channel used to convey water.”

The irrigation ditches were constructed prior to 1910 and are maintained for agricultural use. There was no available documentation prior to 1910 to determine if the ditches were constructed in uplands, a tributary, or a wetland. Without further evidence, the ditches are assumed to be non-natural features. As these ditches are presumed to have been constructed in uplands, they do not meet the definition for adjacent wetlands. Therefore, they do meet the definition of 33 CFR 328.3 (B)(5) and are non-jurisdictional features under Section 404 of the Clean Water Act. The wetlands that have established within and adjacent to the ditches are also non jurisdictional because they do not meet the definition of 33 CFR 328.3 A(4) adjacent wetlands.

Section 401 of the Clean Water Act gives the state authority to regulate activities resulting to discharge into waters of the U.S. therefore the site may be subject to regulation by the California Regional Water Quality Control Board (CRWCB), under the Porter-Cologne Water Quality Control Act, as amended (California Water Code § 1300 *et seq.*). The Corps will submit a Discharges of Dredged or Fill Material into Waters of the State application to the CRWQCB.

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Enclosures:

- A. Maps
- B. Data Sheets
- C. Photo Log

DETERMINATION:

The project site has approximately 2.86 acres of aquatic resources. These resources are not jurisdictional under section 404 of the clean water act as defined in 33 CFR 328.3.

PREPARED BY

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Sacramento District

DATE:

Bert Skillen  
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DISTRICT QUALITY CONTROL:

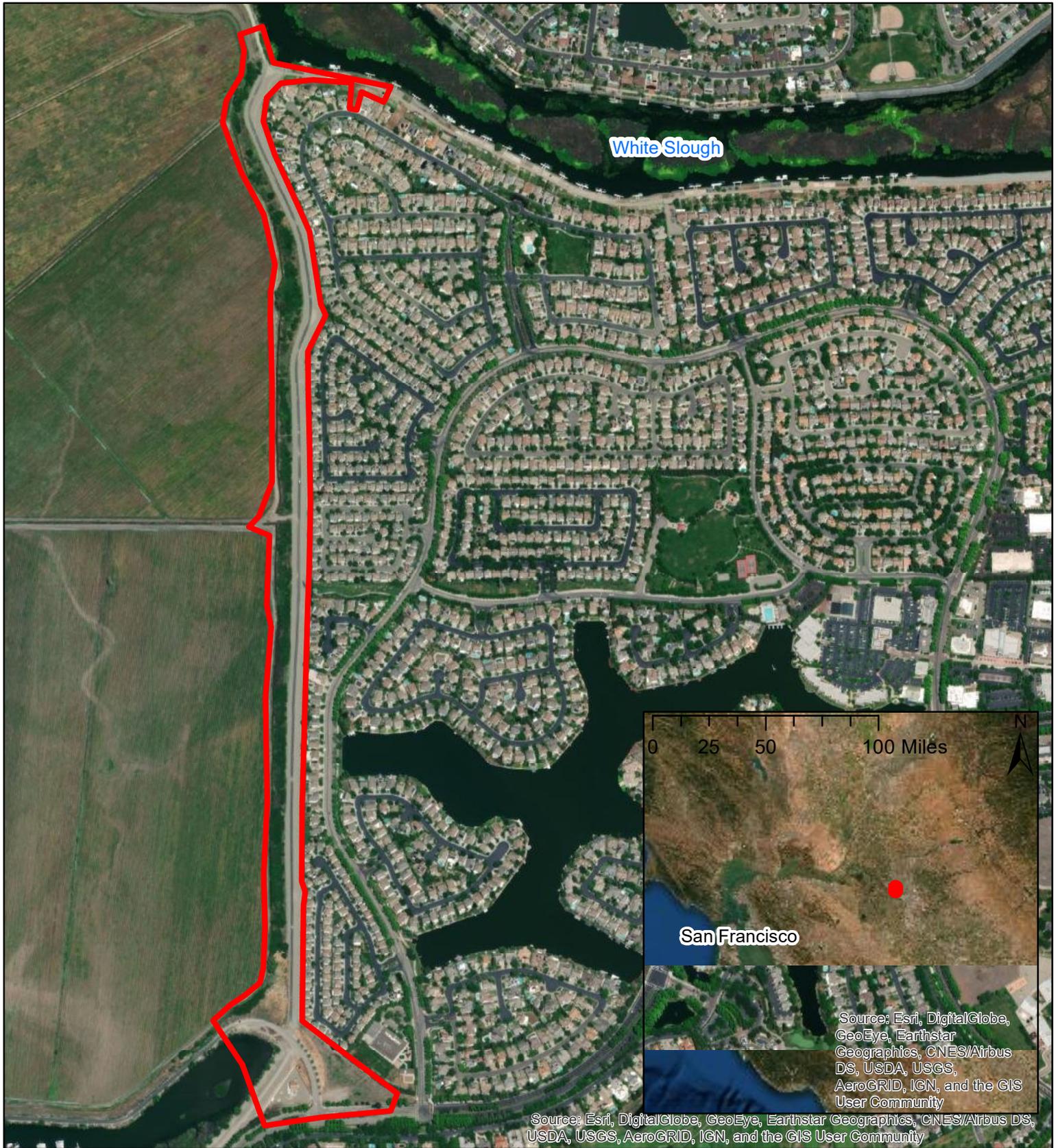
Mariah Brumbaugh  
NEPA Regional Technical Specialist  
U.S. Army Corps of Engineers  
Sacramento District

DATE:

APPROVED BY:

DATE:

Andrea Meier  
Chief, Environmental Analysis Branch  
U.S. Army Corps of Engineers  
Sacramento District



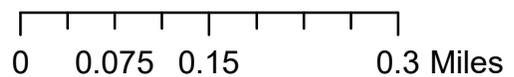
# Lower San Joaquin River Tenmile Slough Wetland Delineation Study Area

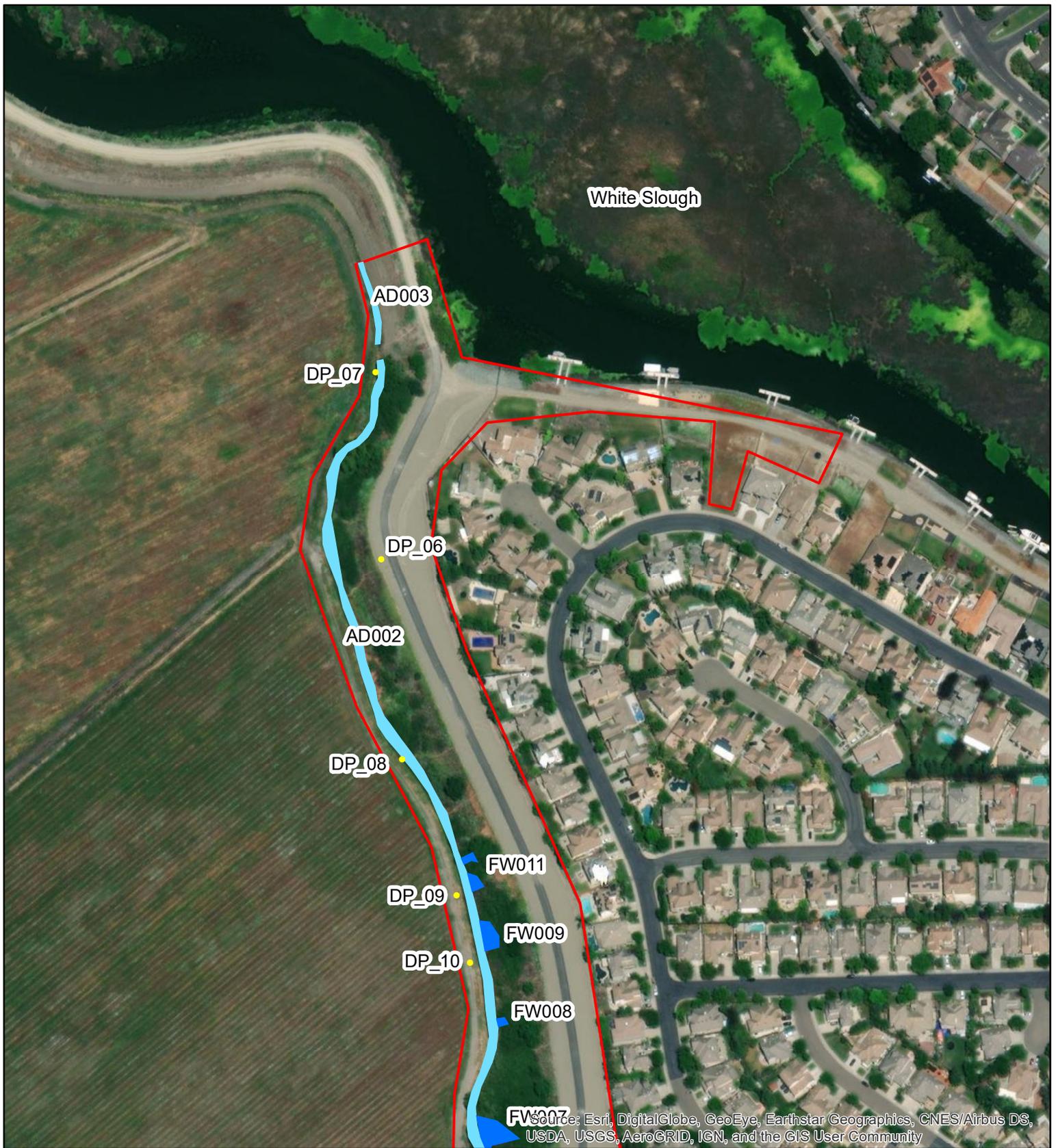
U.S. Army Corps of Engineers  
1325 J. Street  
Sacramento, CA 95814  
916-557-6732

April 2021

### Legend

 Study Area





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

# Lower San Joaquin River Tenmile Slough Wetland Delineation Aquatic Resources Map 4

0 0.025 0.05 0.1 Miles

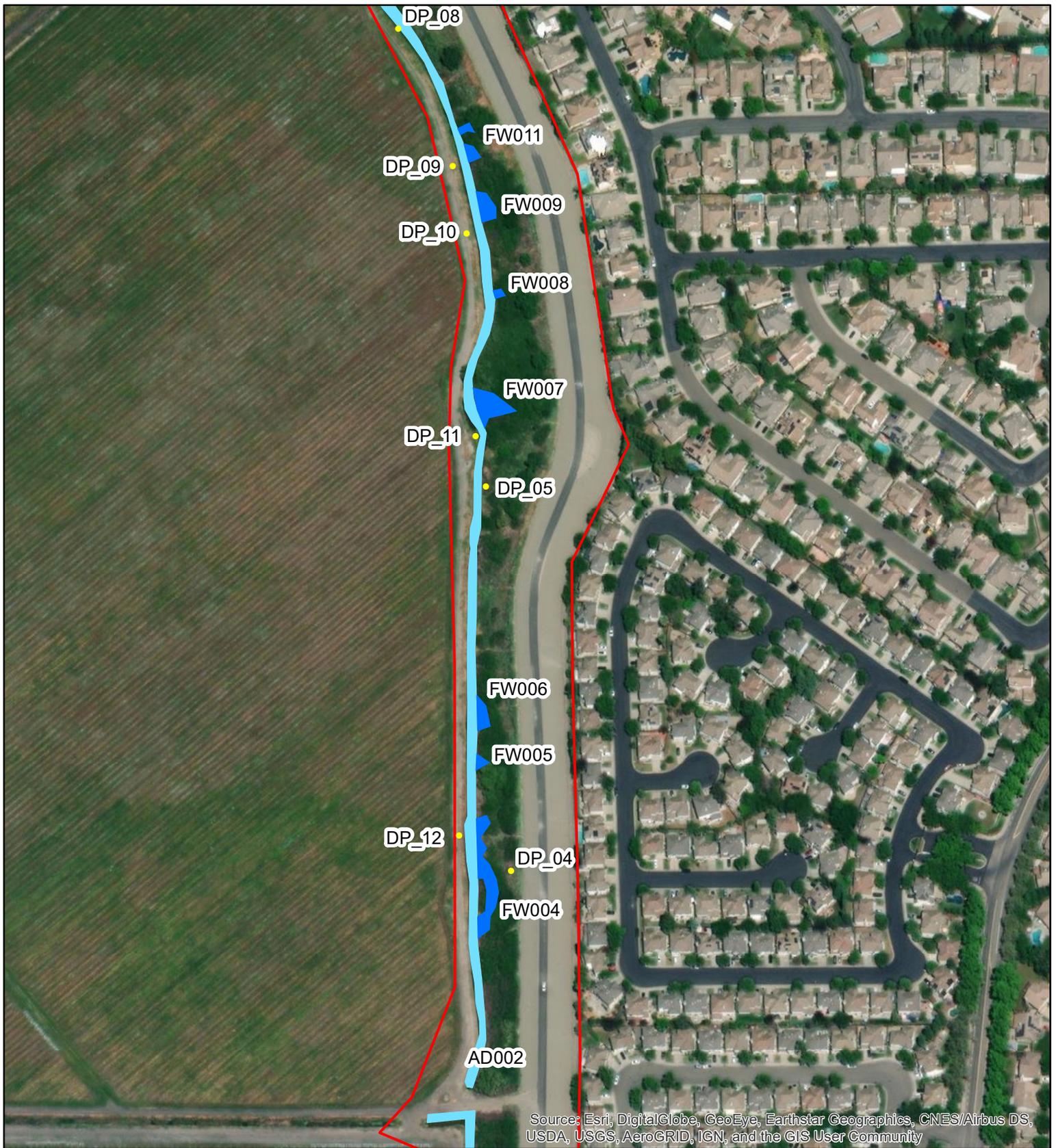
## Legend

- Data Point
- Study Area
- Irrigation Ditch
- Wetland

U.S. Army Corps of Engineers  
1325 J. Street  
Sacramento, CA 95814  
916-557-6732

April 2021





# Lower San Joaquin River Tenmile Slough Wetland Delineation Aquatic Resources Map 3

0 0.025 0.05 0.1 Miles

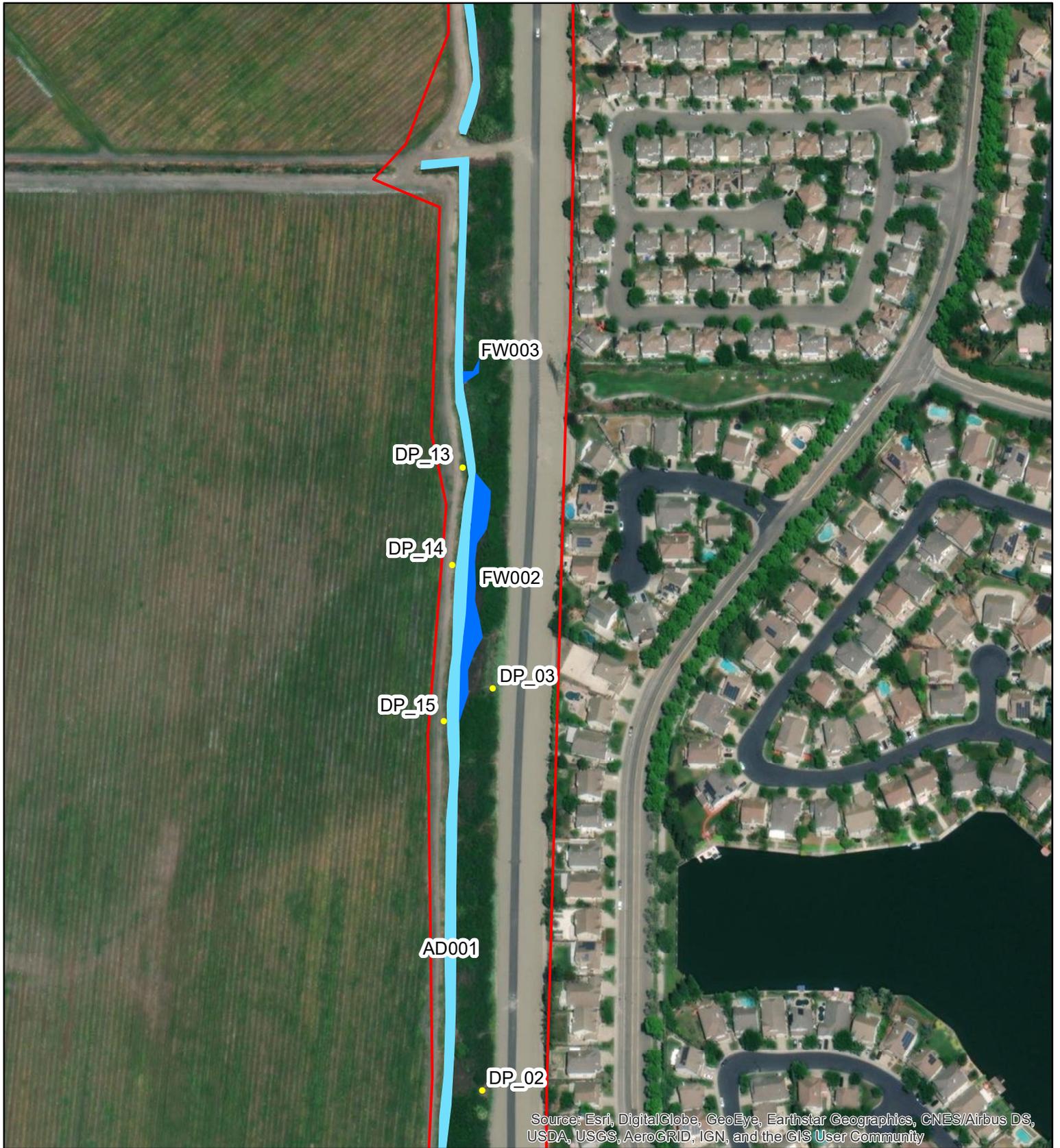
## Legend

- Data Point
- Study Area
- Irrigation Ditch
- Wetland

U.S. Army Corps of Engineers  
1325 J. Street  
Sacramento, CA 95814  
916-557-6732

April 2021





# Lower San Joaquin River Tenmile Slough Wetland Delineation Aquatic Resources Map 2

0 0.025 0.05 0.1 Miles

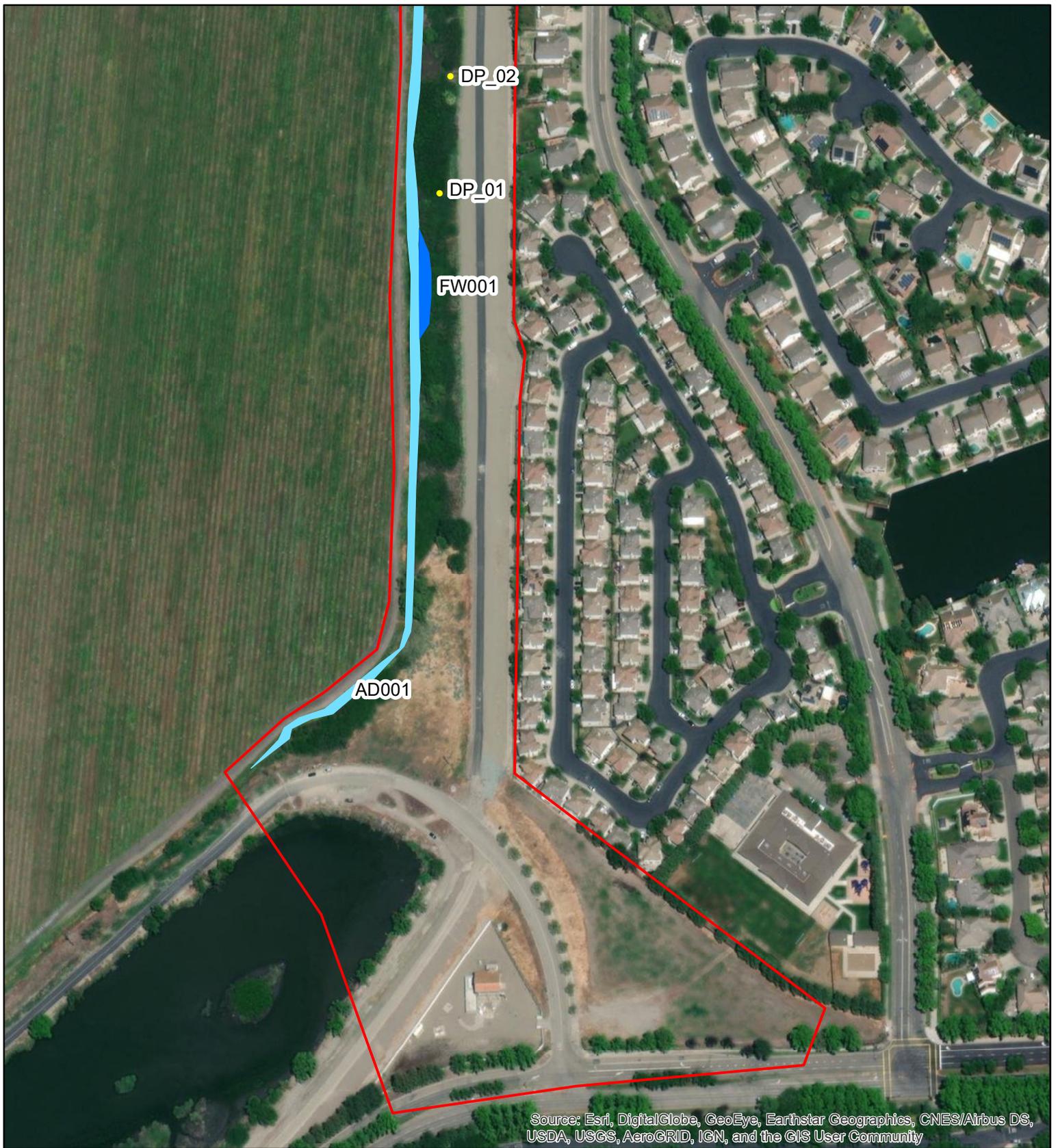
## Legend

- Data Point
- Study Area
- Irrigation Ditch
- Wetland

U.S. Army Corps of Engineers  
1325 J. Street  
Sacramento, CA 95814  
916-557-6732

April 2021





# Lower San Joaquin River Tenmile Slough Wetland Delineation Aquatic Resources Map 1

0 0.025 0.05 0.1 Miles

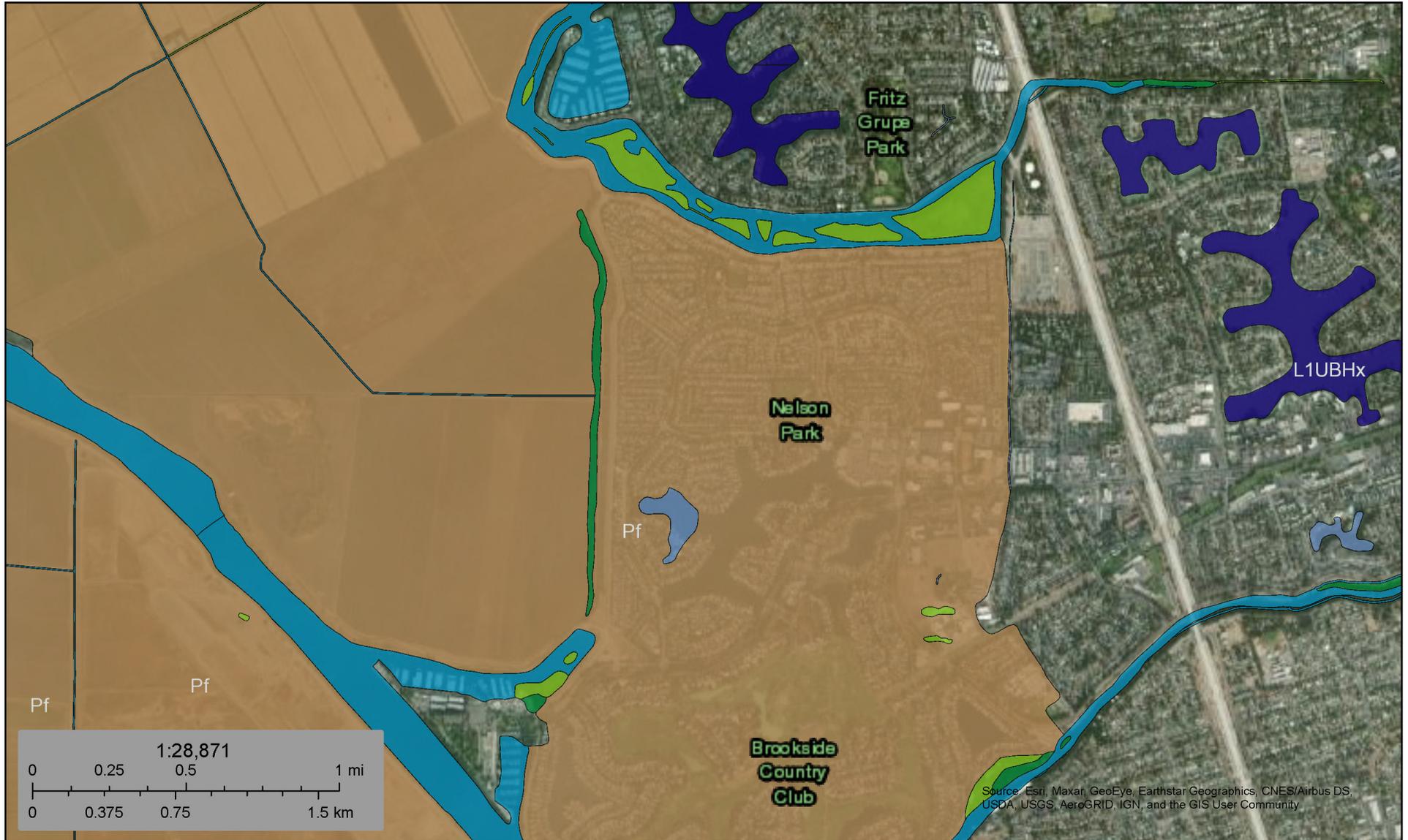
## Legend

- Data Point
- Study Area
- Irrigation Ditch
- Wetland

U.S. Army Corps of Engineers  
1325 J. Street  
Sacramento, CA 95814  
916-557-6732

April 2021





April 9, 2021

**Wetlands**

- |  |   |  |
|--|---|--|
|  Estuarine and Marine Deepwater |  Freshwater Emergent Wetland       |  Lake     |
|  Estuarine and Marine Wetland   |  Freshwater Forested/Shrub Wetland |  Other    |
|  |  Freshwater Pond                   |  Riverine |

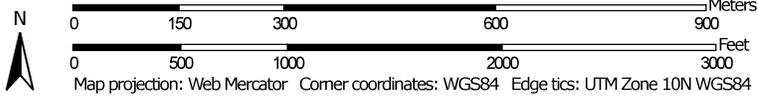
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Soil Map—San Joaquin County, California  
(Tennile Slough)



Soil Map may not be valid at this scale.

Map Scale: 1:10,700 if printed on A portrait (8.5" x 11") sheet.



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

**Warning: Soil Map may not be valid at this scale.**

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Joaquin County, California

Survey Area Data: Version 14, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 16, 2020—Jun 19, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
152	Egbert mucky clay loam, partially drained, 0 to 2 percent slopes	75.9	40.0%
159	Fluvaquents, 0 to 2 percent slopes, frequently flooded, MLRA 16	0.8	0.4%
204	Peltier mucky clay loam, partially drained, 0 to 2 percent slopes, MLRA 16	6.1	3.2%
233	Ryde-Peltier complex, partially drained, 0 to 2 percent slopes, MLRA 16	72.1	38.0%
261	Valdez silt loam, organic substratum, partially drained, 0 to 2 percent slopes, MLRA 16	9.3	4.9%
W	Water	25.5	13.5%
<b>Totals for Area of Interest</b>		<b>189.7</b>	<b>100.0%</b>

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lower San Joaquin River City/County: San Joaquin County Sampling Date: March 9, 2021  
 Applicant/Owner: \_\_\_\_\_ State: CA Sampling Point: 01/10:27am  
 Investigator(s): Nicole Schleeeter, Bert Skillen Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): \_\_\_\_\_  
 Subregion (LRR): \_\_\_\_\_ Lat: 37.98211 Long: -121.36923 Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No _____ Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b> Yes _____ No <input checked="" type="checkbox"/>
Remarks: Could not safely get down to the OHWM. Data Point taken upland of wetland.	

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)  Total Number of Dominant Species Across All Strata: _____ (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B)  Prevalence Index = B/A = _____
<b>Sapling/Shrub Stratum (Plot size: _____)</b>				
1. <u>Salix</u>	10	N	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	<b>Hydrophytic Vegetation Indicators:</b> ___ Dominance Test is >50% ___ Prevalence Index is ≤3.0 <sup>1</sup> ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
_____ = Total Cover				
<b>Herb Stratum (Plot size: _____)</b>				
1. <u>Italian Thistle (Carduus pycnocephalus)</u>	65	Y	none	
2. <u>Unidentified grasses</u>	40	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	<b>Hydrophytic Vegetation Present?</b> Yes _____ No <input checked="" type="checkbox"/>
_____ = Total Cover				
<b>Woody Vine Stratum (Plot size: _____)</b>				
1. <u>Blackberry (Rubus amereiacus)</u>	80	Y	FAC	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>5</u>		% Cover of Biotic Crust <u>0</u>		
Remarks: To steep to safely get down the slope past the blackberry.				



## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lower San Joaquin River City/County: San Joaquin County Sampling Date: March 9, 2021  
 Applicant/Owner: \_\_\_\_\_ State: CA Sampling Point: 01/10:27am  
 Investigator(s): Nicole Schleeeter, Bert Skillen Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): \_\_\_\_\_  
 Subregion (LRR): \_\_\_\_\_ Lat: 37.98211 Long: -121.36923 Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No _____ Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b> Yes _____ No <input checked="" type="checkbox"/>
Remarks: Could not safely get down to the OHWM. Data Point taken upland of wetland.	

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)  Total Number of Dominant Species Across All Strata: _____ (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B)  Prevalence Index = B/A = _____
<b>Sapling/Shrub Stratum (Plot size: _____)</b>				
1. <u>Salix</u>	10	N	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	<b>Hydrophytic Vegetation Indicators:</b> ___ Dominance Test is >50% ___ Prevalence Index is ≤3.0 <sup>1</sup> ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
_____ = Total Cover				
<b>Herb Stratum (Plot size: _____)</b>				
1. <u>Italian Thistle (Carduus pycnocephalus)</u>	65	Y	none	
2. <u>Unidentified grasses</u>	40	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	<b>Hydrophytic Vegetation Present?</b> Yes _____ No <input checked="" type="checkbox"/>
_____ = Total Cover				
<b>Woody Vine Stratum (Plot size: _____)</b>				
1. <u>Blackberry (Rubus amereiacus)</u>	80	Y	FAC	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>5</u> % Cover of Biotic Crust <u>0</u>				

Remarks:  
 To steep to safely get down the slope past the blackberry.



LSJR, Tenmile Slough  
Wetland Delineation  
Photo Log

Data Point: DP\_15

Date / Time: March 9, 2021 / 1:56 PM

Location: 37.9846264, -121.3693513

Notes: End of large wetland area. Image taken facing east, looking north.

Photos:



Data Point: DP\_14

Date / Time: March 9, 2021 / 1:54 PM

Location: 37.9854327, -121.3692776

Notes: Middle of large wetland area.

Photos:



Data Point: DP\_13

Date / Time: March 9, 2021 / 1:50 PM

Location: 37.9859333, -121.3692004

Notes: Reeds pushed over toward levee, on ag side of blackberry starts here. irrigation ditch less channelized, wider basin. Starting point of larger wetland area.

Photos:



Image taken facing East.



Image taken facing East.

Data Point: DP\_12

Date / Time: March 9, 2021 / 1:30 PM

Location: 37.9889544, -121.3691967

Notes: Small patch of rush between irrigation ditch and blackberry

Photos:



Image taken facing East.

Data Point: DP\_11

Date / Time: March 9, 2021 / 1:24 PM

Location: 37.9910184, -121.3690427

Notes: Reed marsh goes from irrigation ditch towards levee. cannot tell how far

Photos:



Image taken facing East, shows area of ag ditch with poorly defined banks, and wetland features.



Image taken facing East, shows area of ag ditch with poorly defined banks, and wetland features.

Data Point: DP\_10

Date / Time: March 9, 2021 / 1:19 PM

Location: 37.9920662, -121.3690803

Notes: Looking across irrigation ditch, reeds along levee side appear to stop at the willow. and stop where i am standing as irrigation ditch goes back to defined edge

Photos:



Data Point: DP\_09

Date / Time: March 9, 2021 / 1:17 PM

Location: 37.9924171, -121.3691615

Notes: Reeds on levee side of irrigation ditch

Photos:



Image taken facing East.

Data Point: DP\_08

Date / Time: March 9, 2021 / 1:13 PM

Location:

Notes: Looking across the ditch to levee

Photos:



Image taken from the Ag Field, looking East. Shows the maintained bank of the ag ditch, and the levee in the background.

Data Point: DP\_07

Date / Time: March 9, 2021 / 1:10 PM

Location: 37.9951498, -121.369634

Notes: Looking towards the levee.

Photos:

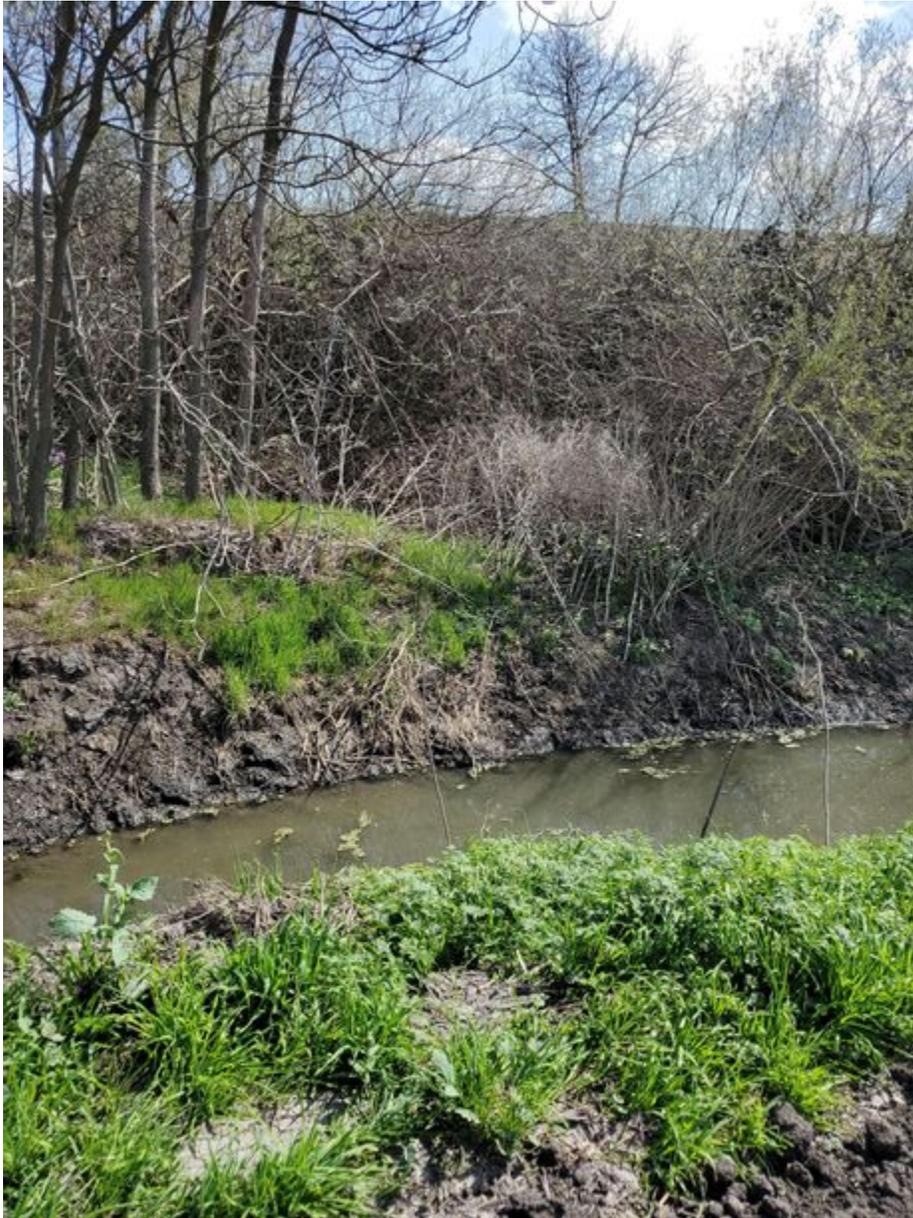


Image taken from the Ag Field, facing the South.

Data Point: DP\_06

Date / Time: March 9, 2021 / 1:03 PM

Location: 37.9941767, -121.3696157

Notes: Flat grassy terrace not wetlands

Photos:



Standing on the levee slope, facing south west.



Image taken facing West.

Data Point: DP\_05

Date / Time: March 9, 2021 / 12:53 PM

Location: 37.9907589, -121.3689836

Notes: No wetland on levee side of irrigation ditch

Photos:



Image taken facing South, standing on berm between bench and agricultural ditch.



Image taken facing North, standing on berm between bench and agricultural ditch.



Image taken facing East, standing on the bench between the ag ditch and the levee toe.

Data Point: DP\_04

Date / Time: March 9, 2021 / 12:42 PM

Location: 37.98877, -121.3688625

Notes: Image taken facing West

Photos:



Data Point: DP\_03

Date / Time: March 9, 2021 / 12:02 PM

Location: 37.9847913, -121.3690271

Notes: Reeds wider here, above the OHWM still

Photos:



Image taken facing South



Image taken facing North

Data Point: DP\_02

Date / Time: March 9, 2021 / 11:28 AM

Location: 37.9827166, -121.3691435

Notes: Clear bank to slope line, veg change still not safe to get down through blackberry  
Photos



Image taken facing West



Image taken facing North



Image taken facing South



Ground Cover

Data Point: DP\_01

Date / Time: March 9, 2021 / 11:23 AM

Location: 37.9821125, -121.3692292

Notes: To steep to det past the blackberries. Image taken facing the west.

Photos:





Appendix F  
**Special-Status Species Lists**

F-1 2021 Special-Status  
Species Lists



**Selected Elements by Scientific Name**  
**California Department of Fish and Wildlife**  
**California Natural Diversity Database**



**Query Criteria:** Quad IS (Stockton East (3712182))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S1S2	SSC
<i>Athene cunicularia</i> burrowing owl	ABNSB10010	None	None	G4	S3	SSC
<i>Buteo swainsoni</i> Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
<i>Delphinium recurvatum</i> recurved larkspur	PDRAN0B1J0	None	None	G2?	S2?	1B.2
<i>Oncorhynchus mykiss irideus pop. 11</i> steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
<i>Thamnophis gigas</i> giant gartersnake	ARADB36150	Threatened	Threatened	G2	S2	

**Record Count: 6**



Selected Elements by Scientific Name  
 California Department of Fish and Wildlife  
 California Natural Diversity Database



Query Criteria: Quad> IS >(Stockton West (3712183))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S1S2	SSC
<i>Ambystoma californiense pop. 1</i> California tiger salamander - central California DPS	AAAAA01181	Threatened	Threatened	G2G3	S3	WL
<i>Astragalus tener var. tener</i> alkali milk-vetch	PDFAB0F8R1	None	None	G2T1	S1	1B.2
<i>Athene cunicularia</i> burrowing owl	ABNSB10010	None	None	G4	S3	SSC
<i>Atriplex cordulata var. cordulata</i> heartscale	PDCHE040B0	None	None	G3T2	S2	1B.2
<i>Blepharizonia plumosa</i> big tarplant	PDAST1C011	None	None	G1G2	S1S2	1B.1
<i>Brasenia schreberi</i> watershield	PDCAB01010	None	None	G5	S3	2B.3
<i>Buteo swainsoni</i> Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
<i>Chloropyron palmatum</i> palmate-bracted bird's-beak	PDSCR0J0J0	Endangered	Endangered	G1	S1	1B.1
<i>Elanus leucurus</i> white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
<i>Extriplex joaquinana</i> San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
<i>Gonidea angulata</i> western ridged mussel	IMBIV19010	None	None	G3	S1S2	
<i>Hibiscus lasiocarpus var. occidentalis</i> woolly rose-mallow	PDMAL0H0R3	None	None	G5T3	S3	1B.2
<i>Hypomesus transpacificus</i> Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
<i>Lathyrus jepsonii var. jepsonii</i> Delta tule pea	PDFAB250D2	None	None	G5T2	S2	1B.2
<i>Oncorhynchus mykiss irideus pop. 11</i> steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
<i>Sagittaria sanfordii</i> Sanford's arrowhead	PMALI040Q0	None	None	G3	S3	1B.2
<i>Spea hammondi</i> western spadefoot	AAABF02020	None	None	G2G3	S3	SSC
<i>Spirinchus thaleichthys</i> longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
<i>Symphotrichum lentum</i> Suisun Marsh aster	PDASTE8470	None	None	G2	S2	1B.2



**Selected Elements by Scientific Name**  
**California Department of Fish and Wildlife**  
**California Natural Diversity Database**



<b>Species</b>	<b>Element Code</b>	<b>Federal Status</b>	<b>State Status</b>	<b>Global Rank</b>	<b>State Rank</b>	<b>Rare Plant Rank/CDFW SSC or FP</b>
<i>Thamnophis gigas</i> giant gartersnake	ARADB36150	Threatened	Threatened	G2	S2	
<i>Trifolium hydrophilum</i> saline clover	PDFAB400R5	None	None	G2	S2	1B.2
<i>Vireo bellii pusillus</i> least Bell's vireo	ABPBW01114	Endangered	Endangered	G5T2	S2	

**Record Count: 23**

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Search:

**Search Results**

1 matches found. Click on scientific name for details

Search Criteria: CRPR is one of [1A,1B,2A,2B], Quad is one of [3712182]

Search:

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	PHOTO
<a href="#"><i>Delphinium recurvatum</i></a>	recurved larkspur	Ranunculaceae	perennial herb	Mar-Jun	None	None	G2?	S2?	1B.2	No Photo Available

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Search:

Search Results

11 matches found. Click on scientific name for details

Search Criteria: CRPR is one of [1A,1B,2A,2B], Quad is one of [3712183]

Search:

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	PHOTO
<a href="#"><i>Astragalus tener</i> var. <i>tener</i></a>	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	None	None	G2T1	S1	1B.2	No Photo Available
<a href="#"><i>Atriplex cordulata</i> var. <i>cordulata</i></a>	heartscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G3T2	S2	1B.2	No Photo Available
<a href="#"><i>Blepharizonia plumosa</i></a>	big tarplant	Asteraceae	annual herb	Jul-Oct	None	None	G1G2	S1S2	1B.1	No Photo Available
<a href="#"><i>Brasenia schreberi</i></a>	watershield	Cabombaceae	perennial rhizomatous herb (aquatic)	Jun-Sep	None	None	G5	S3	2B.3	No Photo Available
<a href="#"><i>Chloropyron palmatum</i></a>	palmate-bracted bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	May-Oct	FE	CE	G1	S1	1B.1	No Photo Available
<a href="#"><i>Extriplex joaquinana</i></a>	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	No Photo Available
<a href="#"><i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i></a>	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	None	None	G5T3	S3	1B.2	No Photo Available
<a href="#"><i>Lathyrus jepsonii</i> var. <i>jepsonii</i></a>	Delta tule pea	Fabaceae	perennial herb	May-Jul(Aug-Sep)	None	None	G5T2	S2	1B.2	No Photo Available
<a href="#"><i>Sagittaria sanfordii</i></a>	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	None	None	G3	S3	1B.2	No Photo Available
<a href="#"><i>Symphotrichum lentum</i></a>	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	None	None	G2	S2	1B.2	No Photo Available

<u><i>Trifolium</i></u>	saline clover	Fabaceae	annual herb	Apr-Jun	None	None	G2	S2	<del>C.B.</del> RARE		
<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>FAMILY</u>	<u>LIFEFORM</u>	<u>BLOOMING PERIOD</u>	<u>FED LIST</u>	<u>STATE LIST</u>	<u>GLOBAL RANK</u>	<u>STATE RANK</u>	<u>PLANT RANK</u>	<u>No Photo PHOTO Available</u>	

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## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
San Francisco Bay-Delta Fish And Wildlife  
650 Capitol Mall  
Suite 8-300  
Sacramento, CA 95814  
Phone: (916) 930-5603 Fax: (916) 930-5654  
[http://kim\\_squires@fws.gov](http://kim_squires@fws.gov)

In Reply Refer To:

September 15, 2021

Consultation Code: 08FBBDT00-2021-SLI-0266

Event Code: 08FBBDT00-2021-E-00660

Project Name: SJAFCAL Lower San Joaquin River Reach TS\_30\_L Levee Improvement

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at:

<http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>;

<http://www.towerkill.com>; and

<http://>

[www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html](http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html).

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**San Francisco Bay-Delta Fish And Wildlife**

650 Capitol Mall

Suite 8-300

Sacramento, CA 95814

(916) 930-5603

---

## Project Summary

Consultation Code: 08FBDT00-2021-SLI-0266

Event Code: Some(08FBDT00-2021-E-00660)

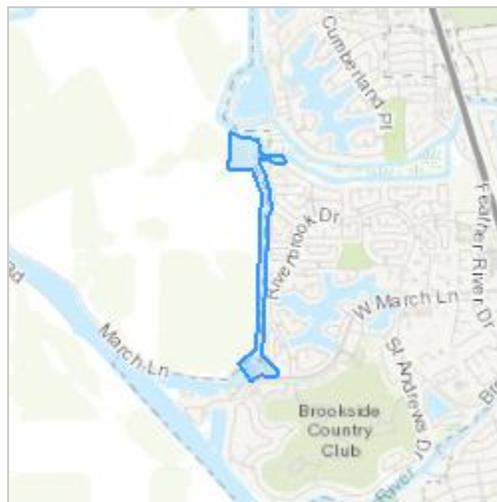
Project Name: SJAFCA Lower San Joaquin River Reach TS\_30\_L Levee Improvement

Project Type: STREAM / WATERBODY / CANALS / LEVEES / DIKES

Project Description: The City of Stockton and surrounding areas rely upon the Lower San Joaquin River (LSJR) levee system to prevent flooding during high water events. The SJAFCA Lower San Joaquin River Reach TS\_30\_L Levee Improvement will improve flood risk management in the Stockton area by repairing and enhancing this levee segment. The proposed Project is approximately 5,900 feet (or 1.1 miles) long and separates the Brookside residential development, also known as the Sargent Barnhart Tract, (landside) on the east and the Wright Elmwood Tract (waterside) on the west. The project will construct a 5,850 linear foot soil bentonite (SB) slurry cutoff wall to mitigate under-seepage and landside instability; reshape the levee to mitigate landside instability; install runoff erosion protection through placement of crushed rock or gravel; develop a co-located stockpile and staging area immediately adjacent to the north side of the Project site; develop an approximately 124-acre borrow site at Stockton East Water District nine miles east of the TS\_30\_L site; and use haul routes to/from the staging and borrow site.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@37.987013250000004,-121.36895902772129,14z>



Counties: San Joaquin County, California

## Endangered Species Act Species

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

### Mammals

NAME	STATUS
Riparian Brush Rabbit <i>Sylvilagus bachmani riparius</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/6189">https://ecos.fws.gov/ecp/species/6189</a>	Endangered

### Reptiles

NAME	STATUS
Giant Garter Snake <i>Thamnophis gigas</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/4482">https://ecos.fws.gov/ecp/species/4482</a>	Threatened

### Amphibians

NAME	STATUS
California Red-legged Frog <i>Rana draytonii</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/2891">https://ecos.fws.gov/ecp/species/2891</a>	Threatened
California Tiger Salamander <i>Ambystoma californiense</i> Population: U.S.A. (Central CA DPS) There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/2076">https://ecos.fws.gov/ecp/species/2076</a>	Threatened

## Fishes

NAME	STATUS
Delta Smelt <i>Hypomesus transpacificus</i> There is <b>final</b> critical habitat for this species. Your location overlaps the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/321">https://ecos.fws.gov/ecp/species/321</a>	Threatened

## Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate
Valley Elderberry Longhorn Beetle <i>Desmocerus californicus dimorphus</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/7850">https://ecos.fws.gov/ecp/species/7850</a>	Threatened

## Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp <i>Branchinecta lynchi</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/498">https://ecos.fws.gov/ecp/species/498</a>	Threatened
Vernal Pool Tadpole Shrimp <i>Lepidurus packardii</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/2246">https://ecos.fws.gov/ecp/species/2246</a>	Endangered

## Flowering Plants

NAME	STATUS
Large-flowered Fiddleneck <i>Amsinckia grandiflora</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/5558">https://ecos.fws.gov/ecp/species/5558</a>	Endangered
Palmate-bracted Bird's Beak <i>Cordylanthus palmatus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1616">https://ecos.fws.gov/ecp/species/1616</a>	Endangered

## Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Delta Smelt <i>Hypomesus transpacificus</i> <a href="https://ecos.fws.gov/ecp/species/321#crithab">https://ecos.fws.gov/ecp/species/321#crithab</a>	Final

F-2 2022 Special-Status  
Species Lists

CALIFORNIA DEPARTMENT OF  
**FISH and WILDLIFE** *RareFind*

**Query Summary:**

Quad IS (Bouldin Island (3812115) OR Woodward Island (3712185) OR Clifton Court Forebay (3712175) OR Terminous (3812114) OR Holt (3712184) OR Union Island (3712174) OR Lodi South (3812113) OR Stockton West (3712183) OR Lathrop (3712173))

Print

Close

**CNDDDB Element Query Results**

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Acipenser medirostris pop. 1	green sturgeon - southern DPS	Fish	AFCAA01031	14	2	Threatened	None	G2T1	S1	null	AFS_VU-Vulnerable, IUCN_EN-Endangered	Aquatic, Estuary, Marine bay, Sacramento/San Joaquin flowing waters
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	9	None	Threatened	G1G2	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Wetland
Alkali Meadow	Alkali Meadow	Herbaceous	CTT45310CA	8	1	None	None	G3	S2.1	null	null	Meadow & seep, Wetland
Ambystoma californiense pop. 1	California tiger salamander - central California DPS	Amphibians	AAAAA01181	1265	15	Threatened	Threatened	G2G3T3	S3	null	CDFW_WL-Watch List, IUCN_VU-Vulnerable	Cismontane woodland, Meadow & seep, Riparian woodland, Valley & foothill grassland, Vernal pool, Wetland
Ardea herodias	great blue heron	Birds	ABNGA04010	156	2	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Astragalus tener var. tener	alkali milk-vetch	Dicots	PDFAB0F8R1	65	4	None	None	G2T1	S1	1B.2	SB_UCSC-UC Santa Cruz	Alkali playa, Valley & foothill grassland, Vernal pool, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	2011	47	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex cordulata var. cordulata	heartscale	Dicots	PDCHE040B0	66	2	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub, Meadow & seep, Valley & foothill grassland
Blepharizonia plumosa	big tarplant	Dicots	PDAST1C011	53	2	None	None	G1G2	S1S2	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	437	1	None	Candidate Endangered	G2	S1S2	null	IUCN_EN-Endangered	null
Bombus occidentalis	western bumble bee	Insects	IIHYM24252	306	1	None	Candidate Endangered	G3	S1	null	IUCN_VU-Vulnerable, USFS_S-Sensitive	null
Branchinecta lynchi	vernal pool fairy shrimp	Crustaceans	ICBRA03030	796	6	Threatened	None	G3	S3	null	IUCN_VU-Vulnerable	Valley & foothill grassland, Vernal pool, Wetland

Branchinecta mesovallensis	midvalley fairy shrimp	Crustaceans	ICBRA03150	144	2	None	None	G2	S2S3	null	null	Vernal pool, Wetland
Brasenia schreberi	watershield	Dicots	PDCAB01010	43	2	None	None	G5	S3	2B.3	IUCN_LC-Least Concern	Marsh & swamp, Wetland
Buteo regalis	ferruginous hawk	Birds	ABNKC19120	107	1	None	None	G4	S3S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Great Basin grassland, Great Basin scrub, Pinon & juniper woodlands, Valley & foothill grassland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2548	232	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
Carex comosa	bristly sedge	Monocots	PMCYP032Y0	31	2	None	None	G5	S2	2B.1	IUCN_LC-Least Concern	Coastal prairie, Freshwater marsh, Marsh & swamp, Valley & foothill grassland, Wetland
Chloropyron palmatum	palmate-bracted bird's-beak	Dicots	PDSCR0J0J0	25	1	Endangered	Endangered	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Chenopod scrub, Meadow & seep, Valley & foothill grassland, Wetland
Circus hudsonius	northern harrier	Birds	ABNKC11011	54	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal scrub, Great Basin grassland, Marsh & swamp, Riparian scrub, Valley & foothill grassland, Wetland
Cirsium crassicaule	slough thistle	Dicots	PDAST2E0U0	18	1	None	None	G1	S1	1B.1	null	Chenopod scrub, Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	10	None	None	G3	S2.1	null	null	Marsh & swamp, Wetland
Delphinium recurvatum	recurved larkspur	Dicots	PDRAN0B1J0	119	4	None	None	G2?	S2?	1B.2	BLM_S-Sensitive, SB_SBBG-Santa Barbara Botanic Garden	Chenopod scrub, Cismontane woodland, Valley & foothill grassland
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	Insects	IICOL48011	271	1	Threatened	None	G3T2T3	S3	null	null	Riparian scrub
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	184	3	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1421	33	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast

												standing waters, Wetland
<i>Eremophila alpestris actia</i>	California horned lark	Birds	ABPAT02011	94	3	None	None	G5T4Q	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Marine intertidal & splash zone communities, Meadow & seep
<i>Eryngium racemosum</i>	Delta button-celery	Dicots	PDAP10Z0S0	26	2	None	Endangered	G1	S1	1B.1	null	Riparian scrub, Wetland
<i>Eryngium spinosepalum</i>	spiny-sealed button-celery	Dicots	PDAP10Z0Y0	108	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_SBBG-Santa Barbara Botanic Garden	Valley & foothill grassland, Vernal pool, Wetland
<i>Eschscholzia rhombipetala</i>	diamond-petaled California poppy	Dicots	PDPAP0A0D0	12	2	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Valley & foothill grassland
<i>Eucerceris ruficeps</i>	redheaded sphecid wasp	Insects	IIHYM18010	4	1	None	None	G1G3	S1S2	null	null	Interior dunes
<i>Extriplex joaquinana</i>	San Joaquin spearscale	Dicots	PDCHE041F3	127	12	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Valley & foothill grassland
<i>Gonidea angulata</i>	western ridged mussel	Mollusks	IMBIV19010	157	3	None	None	G3	S1S2	null	IUCN_VU-Vulnerable	Aquatic
Great Valley Valley Oak Riparian Forest	Great Valley Valley Oak Riparian Forest	Riparian	CTT61430CA	33	2	None	None	G1	S1.1	null	null	Riparian forest
<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	woolly rose-mallow	Dicots	PDMAL0H0R3	173	80	None	None	G5T3	S3	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_UCBG-UC Botanical Garden at Berkeley	Freshwater marsh, Marsh & swamp, Wetland
<i>Hygrotus curvipes</i>	curved-foot hygrotus diving beetle	Insects	IICOL38030	21	4	None	None	G1	S2	null	null	Aquatic
<i>Hypomesus transpacificus</i>	Delta smelt	Fish	AFCHB01040	29	12	Threatened	Endangered	G1	S1	null	AFS_TH-Threatened, IUCN_CR-Critically Endangered	Aquatic, Estuary
<i>Lanius ludovicianus</i>	loggerhead shrike	Birds	ABPBR01030	110	2	None	None	G4	S4	null	CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Broadleaved upland forest, Desert wash, Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands, Riparian woodland, Sonoran desert scrub
<i>Laterallus jamaicensis coturniculus</i>	California black rail	Birds	ABNME03041	303	23	None	Threatened	G3T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_EN-Endangered, NABCI_RWL-Red Watch List	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland
<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	Delta tule pea	Dicots	PDFAB250D2	133	22	None	None	G5T2	S2	1B.2	SB_BerrySB-Berry Seed Bank, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Freshwater marsh, Marsh & swamp, Wetland
<i>Lepidurus packardii</i>	vernal pool tadpole shrimp	Crustaceans	ICBRA10010	329	1	Endangered	None	G4	S3	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
<i>Lilaeopsis masonii</i>	Mason's lilaeopsis	Dicots	PDAP119030	198	80	None	Rare	G2	S2	1B.1	null	Freshwater marsh, Marsh & swamp, Riparian scrub, Wetland
<i>Limosella australis</i>	Delta mudwort	Dicots	PDSCR10030	59	26	None	None	G4G5	S2	2B.1	null	Brackish marsh, Freshwater marsh, Marsh &

													swamp, Riparian scrub, Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	508	3	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened		Vernal pool
Melospiza melodia pop. 1	song sparrow ("Modesto" population)	Birds	ABPBXA3013	92	34	None	None	G5T3?Q	S3?	null	CDFW_SSC-Species of Special Concern		Artificial flowing waters, Freshwater marsh, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters
Navarretia nigelliformis ssp. radians	shining navarretia	Dicots	PDPLM0C0J2	102	1	None	None	G4T2	S2	1B.2	BLM_S-Sensitive		Cismontane woodland, Valley & foothill grassland, Vernal pool, Wetland
Northern Claypan Vernal Pool	Northern Claypan Vernal Pool	Herbaceous	CTT44120CA	21	1	None	None	G1	S1.1	null	null		Vernal pool, Wetland
Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	4	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened		Aquatic, Sacramento/San Joaquin flowing waters
Perognathus inornatus	San Joaquin pocket mouse	Mammals	AMAFD01060	140	2	None	None	G2G3	S2S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern		Cismontane woodland, Mojavean desert scrub, Valley & foothill grassland
Potamogeton zosteriformis	eel-grass pondweed	Monocots	PMPOT03160	20	1	None	None	G5	S3	2B.2	null		Marsh & swamp, Wetland
Puccinellia simplex	California alkali grass	Monocots	PMPOA53110	80	2	None	None	G2	S2	1B.2	BLM_S-Sensitive		Chenopod scrub, Meadow & seep, Valley & foothill grassland, Vernal pool
Rana draytonii	California red-legged frog	Amphibians	AAABH01022	1682	24	Threatened	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable		Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh & swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	143	1	None	None	G3	S3	1B.2	BLM_S-Sensitive		Marsh & swamp, Wetland
Scutellaria galericulata	marsh skullcap	Dicots	PDLAM1U0J0	39	3	None	None	G5	S2	2B.2	null		Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Wetland
Scutellaria lateriflora	side-flowering skullcap	Dicots	PDLAM1U0Q0	13	2	None	None	G5	S2	2B.2	IUCN_LC-Least Concern		Marsh & swamp, Meadow & seep, Wetland
Spea hammondii	western spadefoot	Amphibians	AAABF02020	1425	1	None	None	G2G3	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened		Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland
Spergularia macrotheca var.	long-styled sand-spurrey	Dicots	PDCAR0W062	22	7	None	None	G5T2	S2	1B.2	null		Marsh & swamp, Meadow & seep

longistyla													
Spirinchus thaleichthys	longfin smelt	Fish	AFCHB03010	46	10	Candidate	Threatened	G5	S1	null	IUCN_LC-Least Concern	Aquatic, Estuary	
Sylvilagus bachmani riparius	riparian brush rabbit	Mammals	AMAEB01021	20	12	Endangered	Endangered	G5T1	S1	null	null	Riparian forest	
Symphotrichum lentum	Suisun Marsh aster	Dicots	PDASTE8470	175	48	None	None	G2	S2	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture	Brackish marsh, Freshwater marsh, Marsh & swamp, Wetland	
Taxidea taxus	American badger	Mammals	AMAJF04010	594	4	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog & fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, lone formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland, Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley & foothill grassland	
Thaleichthys pacificus	eulachon	Fish	AFCHB04010	10	1	Threatened	None	G5	S1	null	IUCN_LC-Least Concern	Aquatic, Klamath/North coast flowing waters	
Thamnophis gigas	giant gartersnake	Reptiles	ARADB36150	373	10	Threatened	Threatened	G2	S2	null	IUCN_VU-Vulnerable	Marsh & swamp, Riparian scrub, Wetland	
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Dicots	PDAST9F031	12	1	None	None	G4T3	S1	2B.1	null	Marsh & swamp, Meadow & seep, Riparian forest, Vernal pool, Wetland	
Trifolium hydrophilum	saline clover	Dicots	PDFAB400R5	56	1	None	None	G2	S2	1B.2	null	Marsh & swamp, Valley & foothill grassland,	

												Vernal pool, Wetland
Tropidocarpum capparideum	caper-fruited tropidocarpum	Dicots	PDBRA2R010	20	8	None	None	G1	S1	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Valley & foothill grassland
Valley Oak Woodland	Valley Oak Woodland	Woodland	CTT71130CA	91	1	None	None	G3	S2.1	null	null	Cismontane woodland
Valley Sink Scrub	Valley Sink Scrub	Scrub	CTT36210CA	29	4	None	None	G1	S1.1	null	null	Chenopod scrub
Vireo bellii pusillus	least Bell's vireo	Birds	ABPBW01114	504	1	Endangered	Endangered	G5T2	S2	null	NABCI_YWL-Yellow Watch List	Riparian forest, Riparian scrub, Riparian woodland
Vulpes macrotis mutica	San Joaquin kit fox	Mammals	AMAJA03041	1020	12	Endangered	Threatened	G4T2	S2	null	null	Chenopod scrub, Valley & foothill grassland
Xanthocephalus xanthocephalus	yellow-headed blackbird	Birds	ABPBXB3010	13	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Marsh & swamp, Wetland

# IPaC resource list

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

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

## Project information

### NAME

Solari Property

### LOCATION

San Joaquin County, California



### DESCRIPTION

Some(Potential Restoration Site)

# Local office

San Francisco Bay-Delta Fish And Wildlife

 (916) 930-5603

 (916) 930-5654

650 Capitol Mall

Suite 8-300

Sacramento, CA 95814

NOT FOR CONSULTATION

# Endangered species

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

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

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

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

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  2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of

## Commerce.

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

## Mammals

NAME	STATUS
Riparian Brush Rabbit <i>Sylvilagus bachmani riparius</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/6189">https://ecos.fws.gov/ecp/species/6189</a>	Endangered

## Reptiles

NAME	STATUS
Giant Garter Snake <i>Thamnophis gigas</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/4482">https://ecos.fws.gov/ecp/species/4482</a>	Threatened

## Amphibians

NAME	STATUS
California Tiger Salamander <i>Ambystoma californiense</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/2076">https://ecos.fws.gov/ecp/species/2076</a>	Threatened

## Fishes

NAME	STATUS
Delta Smelt <i>Hypomesus transpacificus</i> Wherever found There is <b>final</b> critical habitat for this species. Your location overlaps the critical habitat. <a href="https://ecos.fws.gov/ecp/species/321">https://ecos.fws.gov/ecp/species/321</a>	Threatened

## Insects

NAME	STATUS
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<b>Monarch Butterfly</b> <i>Danaus plexippus</i>	<b>Candidate</b>
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Wherever found

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/9743>

<b>Valley Elderberry Longhorn Beetle</b> <i>Desmocerus californicus</i>	<b>Threatened</b>
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*dimorphus*

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/7850>

## Crustaceans

NAME

STATUS

<b>Vernal Pool Fairy Shrimp</b> <i>Branchinecta lynchi</i>	<b>Threatened</b>
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Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/498>

<b>Vernal Pool Tadpole Shrimp</b> <i>Lepidurus packardii</i>	<b>Endangered</b>
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Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/2246>

## Flowering Plants

NAME

STATUS

<b>Large-flowered Fiddleneck</b> <i>Amsinckia grandiflora</i>	<b>Endangered</b>
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Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/5558>

## Critical habitats

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

This location overlaps the critical habitat for the following species:

NAME	TYPE
Delta Smelt <i>Hypomesus transpacificus</i> <a href="https://ecos.fws.gov/ecp/species/321#crithab">https://ecos.fws.gov/ecp/species/321#crithab</a>	Final

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

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

1. The [Migratory Birds Treaty Act](#) of 1918.
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Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds  
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds  
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

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

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

## present and breeding in your project area.

NAME	BREEDING SEASON
<p><b>Belding's Savannah Sparrow</b> <i>Passerculus sandwichensis beldingi</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA  <a href="https://ecos.fws.gov/ecp/species/8">https://ecos.fws.gov/ecp/species/8</a></p>	Breeds Apr 1 to Aug 15
<p><b>Bullock's Oriole</b> <i>Icterus bullockii</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA</p>	Breeds Mar 21 to Jul 25
<p><b>California Gull</b> <i>Larus californicus</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds Mar 1 to Jul 31
<p><b>Clark's Grebe</b> <i>Aechmophorus clarkii</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds Jun 1 to Aug 31
<p><b>Common Yellowthroat</b> <i>Geothlypis trichas sinuosa</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA  <a href="https://ecos.fws.gov/ecp/species/2084">https://ecos.fws.gov/ecp/species/2084</a></p>	Breeds May 20 to Jul 31
<p><b>Lawrence's Goldfinch</b> <i>Carduelis lawrencei</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.  <a href="https://ecos.fws.gov/ecp/species/9464">https://ecos.fws.gov/ecp/species/9464</a></p>	Breeds Mar 20 to Sep 20
<p><b>Nuttall's Woodpecker</b> <i>Picoides nuttallii</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA  <a href="https://ecos.fws.gov/ecp/species/9410">https://ecos.fws.gov/ecp/species/9410</a></p>	Breeds Apr 1 to Jul 20
<p><b>Oak Titmouse</b> <i>Baeolophus inornatus</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.  <a href="https://ecos.fws.gov/ecp/species/9656">https://ecos.fws.gov/ecp/species/9656</a></p>	Breeds Mar 15 to Jul 15

**Olive-sided Flycatcher** *Contopus cooperi*

Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3914>

**Tricolored Blackbird** *Agelaius tricolor*

Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3910>

**Western Grebe** *aechmophorus occidentalis*

Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/6743>

**Wrentit** *Chamaea fasciata*

Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

**Yellow-billed Magpie** *Pica nuttalli*

Breeds Apr 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9726>

# IPaC resource list

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

## Project information

### NAME

Solari Property

### LOCATION

San Joaquin County, California



### DESCRIPTION

Some(Potential Restoration Site)

# Local office

San Francisco Bay-Delta Fish And Wildlife

 (916) 930-5603

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650 Capitol Mall

Suite 8-300

Sacramento, CA 95814

NOT FOR CONSULTATION

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## Mammals

NAME	STATUS
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## Reptiles

NAME	STATUS
Giant Garter Snake <i>Thamnophis gigas</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/4482">https://ecos.fws.gov/ecp/species/4482</a>	Threatened

## Amphibians

NAME	STATUS
California Tiger Salamander <i>Ambystoma californiense</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/2076">https://ecos.fws.gov/ecp/species/2076</a>	Threatened

## Fishes

NAME	STATUS
Delta Smelt <i>Hypomesus transpacificus</i> Wherever found There is <b>final</b> critical habitat for this species. Your location overlaps the critical habitat. <a href="https://ecos.fws.gov/ecp/species/321">https://ecos.fws.gov/ecp/species/321</a>	Threatened

## Insects

NAME	STATUS
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<b>Monarch Butterfly</b> <i>Danaus plexippus</i>	<b>Candidate</b>
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Wherever found

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/9743>

<b>Valley Elderberry Longhorn Beetle</b> <i>Desmocerus californicus dimorphus</i>	<b>Threatened</b>
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Wherever found

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<https://ecos.fws.gov/ecp/species/7850>

## Crustaceans

NAME

STATUS

<b>Vernal Pool Fairy Shrimp</b> <i>Branchinecta lynchi</i>	<b>Threatened</b>
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Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/498>

<b>Vernal Pool Tadpole Shrimp</b> <i>Lepidurus packardii</i>	<b>Endangered</b>
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Wherever found

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<https://ecos.fws.gov/ecp/species/2246>

## Flowering Plants

NAME

STATUS

<b>Fleshy Owl's-clover</b> <i>Castilleja campestris</i> ssp. <i>succulenta</i>	<b>Threatened</b>
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Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/8095>

<b>Large-flowered Fiddleneck</b> <i>Amsinckia grandiflora</i>	<b>Endangered</b>
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Wherever found

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<https://ecos.fws.gov/ecp/species/5558>

## Critical habitats

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## Migratory birds

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<p><b>Bullock's Oriole</b> <i>Icterus bullockii</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA</p>	Breeds Mar 21 to Jul 25
<p><b>California Gull</b> <i>Larus californicus</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds Mar 1 to Jul 31
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<p><b>Common Yellowthroat</b> <i>Geothlypis trichas sinuosa</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA  <a href="https://ecos.fws.gov/ecp/species/2084">https://ecos.fws.gov/ecp/species/2084</a></p>	Breeds May 20 to Jul 31
<p><b>Lawrence's Goldfinch</b> <i>Carduelis lawrencei</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.  <a href="https://ecos.fws.gov/ecp/species/9464">https://ecos.fws.gov/ecp/species/9464</a></p>	Breeds Mar 20 to Sep 20
<p><b>Nuttall's Woodpecker</b> <i>Picoides nuttallii</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA  <a href="https://ecos.fws.gov/ecp/species/9410">https://ecos.fws.gov/ecp/species/9410</a></p>	Breeds Apr 1 to Jul 20

- Oak Titmouse** *Baeolophus inornatus* Breeds Mar 15 to Jul 15  
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.  
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- Olive-sided Flycatcher** *Contopus cooperi* Breeds May 20 to Aug 31  
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<https://ecos.fws.gov/ecp/species/3914>
- Tricolored Blackbird** *Agelaius tricolor* Breeds Mar 15 to Aug 10  
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.  
<https://ecos.fws.gov/ecp/species/3910>
- Western Grebe** *aechmophorus occidentalis* Breeds Jun 1 to Aug 31  
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.  
<https://ecos.fws.gov/ecp/species/6743>
- Wrentit** *Chamaea fasciata* Breeds Mar 15 to Aug 10  
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- Yellow-billed Magpie** *Pica nuttalli* Breeds Apr 1 to Jul 31  
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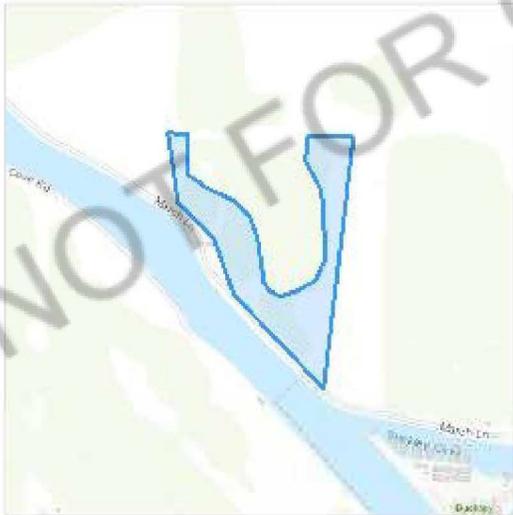
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## Location

San Joaquin County, California



## Local office

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1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
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4. Provide a name and description for your project.
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NAME	STATUS
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## Amphibians

NAME	STATUS
California Tiger Salamander <i>Ambystoma californiense</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/2076">https://ecos.fws.gov/ecp/species/2076</a>	Threatened

## Fishes

NAME	STATUS
Delta Smelt <i>Hypomesus transpacificus</i> Wherever found There is <b>final</b> critical habitat for this species. Your location overlaps the critical habitat. <a href="https://ecos.fws.gov/ecp/species/321">https://ecos.fws.gov/ecp/species/321</a>	Threatened

## Insects

NAME	STATUS
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## Monarch Butterfly *Danaus plexippus* Candidate

Wherever found

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/9743>

## Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* Threatened

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/7850>

## Crustaceans

NAME

STATUS

### Vernal Pool Fairy Shrimp *Branchinecta lynchi* Threatened

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/498>

### Vernal Pool Tadpole Shrimp *Lepidurus packardii* Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/2246>

## Flowering Plants

NAME

STATUS

### Large-flowered Fiddleneck *Amsinckia grandiflora* Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/5558>

## Critical habitats

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

This location overlaps the critical habitat for the following species:

NAME	TYPE
Delta Smelt <i>Hypomesus transpacificus</i> <a href="https://ecos.fws.gov/ecp/species/321#crithab">https://ecos.fws.gov/ecp/species/321#crithab</a>	Final

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

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

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds  
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds  
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

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

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

## present and breeding in your project area.

NAME	BREEDING SEASON
<p><b>Belding's Savannah Sparrow</b> <i>Passerculus sandwichensis beldingi</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA  <a href="https://ecos.fws.gov/ecp/species/8">https://ecos.fws.gov/ecp/species/8</a></p>	Breeds Apr 1 to Aug 15
<p><b>Bullock's Oriole</b> <i>Icterus bullockii</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA</p>	Breeds Mar 21 to Jul 25
<p><b>California Gull</b> <i>Larus californicus</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds Mar 1 to Jul 31
<p><b>Clark's Grebe</b> <i>Aechmophorus clarkii</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	Breeds Jun 1 to Aug 31
<p><b>Common Yellowthroat</b> <i>Geothlypis trichas sinuosa</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA  <a href="https://ecos.fws.gov/ecp/species/2084">https://ecos.fws.gov/ecp/species/2084</a></p>	Breeds May 20 to Jul 31
<p><b>Lawrence's Goldfinch</b> <i>Carduelis lawrencei</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.  <a href="https://ecos.fws.gov/ecp/species/9464">https://ecos.fws.gov/ecp/species/9464</a></p>	Breeds Mar 20 to Sep 20
<p><b>Nuttall's Woodpecker</b> <i>Picoides nuttallii</i></p> <p>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA  <a href="https://ecos.fws.gov/ecp/species/9410">https://ecos.fws.gov/ecp/species/9410</a></p>	Breeds Apr 1 to Jul 20
<p><b>Oak Titmouse</b> <i>Baeolophus inornatus</i></p> <p>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.  <a href="https://ecos.fws.gov/ecp/species/9656">https://ecos.fws.gov/ecp/species/9656</a></p>	Breeds Mar 15 to Jul 15

**Olive-sided Flycatcher** *Contopus cooperi*

Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3914>

**Tricolored Blackbird** *Agelaius tricolor*

Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3910>

**Western Grebe** *aechmophorus occidentalis*

Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/6743>

**Wrentit** *Chamaea fasciata*

Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

**Yellow-billed Magpie** *Pica nuttalli*

Breeds Apr 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9726>

## Search Results

6 matches found. Click on scientific name for details

Search Criteria: 9-Quad include [3712184]

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	PHOTO
<a href="#"><u>Carex comosa</u></a>	bristly sedge	Cyperaceae	perennial rhizomatous herb	May-Sep	None	None	G5	S2	2B.1	 Dean Wm. Taylor 1997
<a href="#"><u>Hibiscus lasiocarpus</u></a> <a href="#"><u>var. occidentalis</u></a>	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	None	None	G5T3	S3	1B.2	 © 2020 Steven Perry
<a href="#"><u>Lathyrus jepsonii</u></a> <a href="#"><u>var. jepsonii</u></a>	Delta tule pea	Fabaceae	perennial herb	May-Jul(Aug-Sep)	None	None	G5T2	S2	1B.2	 © 2003 Mark Fogiel
<a href="#"><u>Lilaeopsis masonii</u></a>	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	None	CR	G2	S2	1B.1	No Photo Available
<a href="#"><u>Limosella australis</u></a>	Delta mudwort	Scrophulariaceae	perennial stoloniferous herb	May-Aug	None	None	G4G5	S2	2B.1	 © 2020 Richard Sage
<a href="#"><u>Symphotrichum lentum</u></a>	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	None	None	G2	S2	1B.2	No Photo Available

Showing 1 to 6 of 6 entries

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