MOSSDALE TRACT AREA URBAN FLOOD RISK REDUCTION PROJECT

Addendum to the Environmental Impact Report
State Clearinghouse No. 2022040471

Prepared By
Environmental Science Associates
for
San Joaquin Area Flood Control Agency

November 2026

MOSSDALE TRACT AREA URBAN FLOOD RISK REDUCTION PROJECT

Addendum to the Environmental Impact Report
State Clearinghouse No. 2022040471

Prepared By
Environmental Science Associates
for
San Joaquin Area Flood Control Agency

November 2026

2600 Capitol Avenue
Suite 200
Sacramento, CA 95816
916.564.4500
esassoc.com

Atlanta
Bend
Irvine
Los Angeles
Mobile
Oakland
Orlando
Palm Beach County
Pasadena
Pensacola
Petaluma
Portland
Rancho Cucamonga
Sacramento
San Diego
San Francisco
San Jose
Santa Barbara
Sarasota
Seattle
Tampa
Thousand Oaks

CONTENTS

Mossdale Tract Area Urban Flood Risk Reduction Project Environmental Impact Report Addendum

Page

Acronyms and Other Abbreviations ..... **ii**

Section 1. Background and Purpose of Addendum **1**
1.1 Background 1
1.2 Purpose of the Addendum 2

Section 2. Description of Project Changes **3**
2.1 Project Overview 3
2.2 Project Changes 3
2.2.1 Change to Fix-in-Place Levee Improvements Along Existing Dryland Levee 4
2.2.2 Alternate Dryland Levee Extension Alignment 4

Section 3. Analysis of Potential Environmental Effects **9**
3.1 Introduction 9
3.2 Environmental Issues Not Requiring Further Analysis 9
3.2.1 Project Components Not Requiring Further Analysis 9
3.2.2 Operation and Maintenance Activities Not Requiring Further Analysis 10
3.2.3 Project Changes Not Requiring Further Analysis 10
3.2.4 Resource Topics Not Requiring Further Analysis 10
3.3 Effects Related to the Proposed Changes to the Approved Project 12
3.3.1 Air Quality 12
3.3.2 Biological Resources–Terrestrial 13
3.3.3 Cultural Resources 15
3.3.4 Greenhouse Gas Emissions 17
3.3.5 Hydrology and Water Quality 18
3.3.6 Noise 20
3.3.7 Tribal Cultural Resources 24
3.4 Conclusion 25
3.5 References 25

Figures

Figure 1 Proposed Dryland Levee Components Overview 5

Appendices

A. Biological Resources Memorandum
B. Cultural Resources Assessment
C. Hydraulic Impact Analysis

Acronyms and Other Abbreviations

Acronym or Abbreviation	Definition
approved project	Mossdale Tract Area Urban Flood Risk Reduction Project as approved by the SJAFCA Board of Directors on July 9, 2026
BMP	best management practices
CalEEMod	California Emissions Estimator Model
CEQA	California Environmental Quality Act
certified EIR	*2026 Mossdale Tract Area Urban Flood Risk Reduction Project Environmental Impact Report*
CGP	Construction General Permit
dBA	A-weighted decibels
EIR	environmental impact report
ESA	Environmental Science Associates
FTA	Federal Transit Administration
GHG	greenhouse gas
HRA	health risk assessment
MEIR	maximally exposed individual receptor
Mossdale Tract EIR	*2026 Mossdale Tract Area Urban Flood Risk Reduction Project Environmental Impact Report*
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
O&M	operation and maintenance
PPV	peak particle velocity
RD 17	Reclamation District 17
SCH	State Clearinghouse
SJAFCA	San Joaquin Area Flood Control Agency
SJVAPCD	San Joaquin Valley Air Pollution Control District
SWPPP	Stormwater Pollution Prevention Plan
UFRR	Urban Flood Risk Reduction
VdB	vibration decibels

SECTION 1
Background and Purpose of Addendum

1.1 Background

On March 9, 2015, the City of Lathrop authored a Concept Proposal for a state Urban Flood Risk Reduction (UFRR) grant to design fix-in-place improvements to the Reclamation District 17 (RD 17) levees to achieve an urban level of flood protection equivalent to a 200-year level of protection. On May 15, 2015, the California Department of Water Resources (DWR) responded with a grant to prepare a UFRR study of alternatives and preliminary design of the preferred flood risk reduction project for the Mossdale Tract area, which was identified as being at risk of flooding from a 200-year flood event, with this risk being significantly increased under future climate conditions. In November 2017, the San Joaquin Area Flood Control Agency (SJAFCA), consisting of the city of Stockton, San Joaquin County, and the San Joaquin County Flood Control and Water Conservation District, modified its joint-powers authority structure to add the cities of Lathrop and Manteca. The UFRR grant agreement and lead agency status were then transferred to SJAFCA in March 2020. The final selected alternative in the UFRR study was Alternative 4a, which would provide increased public safety benefits by rehabilitating and improving flood management infrastructure for the 22,400-acre Mossdale Tract area, which includes RD 17 and portions of the incorporated cities of Stockton, Lathrop, and Manteca, as well as unincorporated San Joaquin County.

Alternative 4a was evaluated as the Mossdale Tract Area Urban Flood Risk Reduction Project (project) in the *2026 Mossdale Tract Area Urban Flood Risk Reduction Project Environmental Impact Report* (Mossdale Tract EIR, State Clearinghouse [SCH] Number 2022040471). The Mossdale Tract EIR was certified, and the project was approved, by the SJAFCA Board of Directors on July 9, 2026, and a Notice of Determination was filed with the SCH on July 9, 2026. The Mossdale Tract EIR (or "certified EIR") evaluated various fix-in-place levee improvements along the existing RD 17 levee system, including installation of floodwalls, seepage berms, cutoff walls, levee raises, and waterside erosion repairs; development of a dryland levee extension to Tinnin Road; ecosystem restoration at multiple sites in the project area; development of recreational features along the levee system; as well as development of various potential staging areas and haul routes (approved project).

Since certification of the Mossdale Tract EIR and project approval, SJAFCA has proposed the following changes to the approved project: (1) construction of a cutoff wall within the existing dryland levee; (2) construction of an approximately 3.5-mile alternative dryland levee extension alignment; and (3) additional construction details for portions of existing roadways where they intersect the alternative dryland levee alignment. All other components of the approved project remain unchanged.

1.2 Purpose of the Addendum

Section 15160 of the California Environmental Quality Act (CEQA) Guidelines explains that CEQA allows a lead agency to tailor an environmental document to different situations and intended uses. Specifically, Section 15160 allows lead agencies to tailor the use of CEQA mechanisms (such as this Addendum) to fit the circumstances presented to the lead agency by a project or changes to a project. SJAFCA has prepared this addendum to assess the minor changes to the approved project that are necessary since preparation of the certified EIR, in accordance with Section 15164. According to Section 15164(a) of the CEQA Guidelines, the lead agency or a responsible agency shall prepare an addendum to a previously certified EIR if some changes or additions are necessary but none of the conditions described in Section 15162 requiring preparation of a subsequent EIR have occurred. Section 15162 of the CEQA Guidelines lists the conditions that would require the preparation of a subsequent EIR rather than an addendum. These include the following:

1. Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
2. Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or
3. New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time of the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:
    a. The project will have one or more significant effects not discussed in the previous EIR or negative declaration;
    b. Significant effects previously examined will be substantially more severe than shown in the previous EIR;
    c. Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the Project, but the project proponents decline to adopt the mitigation measure or alternative; or
    d. Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

The purpose of this addendum to the certified EIR is to evaluate minor changes to the approved project (including an alternate fix-in-place levee improvement for the existing dryland levee, an alternate dryland levee extension alignment, and additional construction details for a portion of existing roadways) as compared to those previously evaluated in the certified EIR. This addendum provides documentation to support the conclusion that the minor changes to the approved project would not result in effects that meet the criteria described in CEQA Guidelines Sections 15162, and that the preparation of an addendum is appropriate.

SECTION 2
Description of Project Changes

2.1 Project Overview

The approved project evaluated in the certified EIR included the construction and operation and maintenance (O&M) of flood risk reduction components, ecosystem restoration sites, and multi-benefit components in and adjacent to the project area as well as the development of various staging areas and haul routes throughout the project area. Flood risk reduction components would include fix-in-place levee improvements that would be constructed and operated within the levee rights-of-way and easements. Fix-in-place levee improvements would include existing dryland levee reconstruction and construction of an associated seepage berm, as well as construction of cutoff walls and seepage berms, erosion repairs, encroachment remediation, pipe penetrations rehabilitation, and levee raising along various segments of the project alignment. Flood risk reduction components would also include construction of a dryland levee extension and an associated seepage berm that would extend the existing dryland levee along Woodward Avenue east to Tinnin Road to prevent flanking during flood events.

Ecosystem restoration would occur at various sites identified in the certified EIR on undeveloped land located on the waterside of the levee system. Restoration activities would include the construction of excavated floodplains, side channels, brush mats, habitat wood structures, willow baffles, and upland brush piles. Other multi-benefit components along the levee system would include recreational features such as paths along the top of levee and landside toe.

2.2 Project Changes

Since certification of the Mossdale Tract EIR and project approval, SJAFCA proposed the following changes to the approved project:

- Construction of a cutoff wall within the existing dryland levee that runs east from Woodward Avenue. As described in Section 2.1, *Project Overview*, the approved project evaluated in the certified EIR included construction of a drained seepage berm along the existing dryland levee at this location.
- Construction of an approximately 3.5-mile-long alternate dryland levee extension alignment, running from the terminus of the existing dryland levee east to Tinnin Road, which varies from the approved alignment evaluated in the certified EIR (see **Figure 1**). The alternate dryland levee extension alignment would be constructed with a seepage berm, consistent with the approved project.
- Additional details related to the reconstruction of portions of existing roadways where they intersect the alternate dryland levee extension alignment, including raising the grade of the existing road (raised vertical alignment) to form a ramp crossing over the levee crest, with approach embankments on both sides that tie into the existing roadway grade.

Each of the proposed changes to the approved project are described in more detail below.

2.2.1 Change to Fix-in-Place Levee Improvements Along Existing Dryland Levee

The certified EIR anticipated a seepage berm would be constructed along the existing dryland levee. However, under the proposed changes to the approved project, a cutoff wall would be constructed within the existing dryland levee instead. Overall, the proposed dryland levee cutoff wall (see Figure 1) would use similar construction methods, materials, and equipment as those described for cutoff wall construction in the certified EIR. The cutoff wall would be constructed at the levee centerline to depths that would be sufficient to minimize seepage both through the levee and beneath it to meet or exceed U.S. Army Corps of Engineers and State of California Central Valley Flood Protection Board levee design criteria.

The cutoff wall would be constructed using an excavator capable of digging a trench in the centerline of the levee. A working platform would be established by partially degrading the top of the existing dryland levee to provide adequate working width, and excavated soil would be mixed on-site with bentonite on the working platform and reintroduced in the trench. At the conclusion of construction, the levee crown would be rebuilt to its design height using appropriately conditioned soil fill and compacted to the specified density using a suitable compactor, such as a tamping-foot or smooth-drum roller. Levee reconstruction would also include a homogeneous section of imported low-permeability material. After the levee is reconstructed, aggregate base or asphalt concrete would be placed on the levee crown patrol road, and the disturbed slopes would be planted with native vegetation that meets federal and state levee safety criteria.

2.2.2 Alternate Dryland Levee Extension Alignment

The alternate dryland levee extension alignment is approximately 3.5 miles long and would roughly follow the approved dryland levee extension alignment described in the certified EIR before diverging near Oleander Avenue and Fig Road and continuing to Tinnin Road. The alternate dryland levee extension alignment would begin at the eastern end of the existing dryland levee and traverse east to Airport Way, approximately 200 feet south of the approved dryland levee extension alignment described in the certified EIR. At this point, the route follows the same path as the approved dryland levee alignment, continuing east from Airport Road and crossing Oleander Avenue. Approximately 650 feet east of the crossing at Oleander Way, the alternate dryland levee extension alignment diverges and traverses around an orchard before continuing east and crossing Union Road, traveling south along Union Road for 0.5 mile, traversing around two rural residential properties, then turning east and terminating at Tinnin Road.

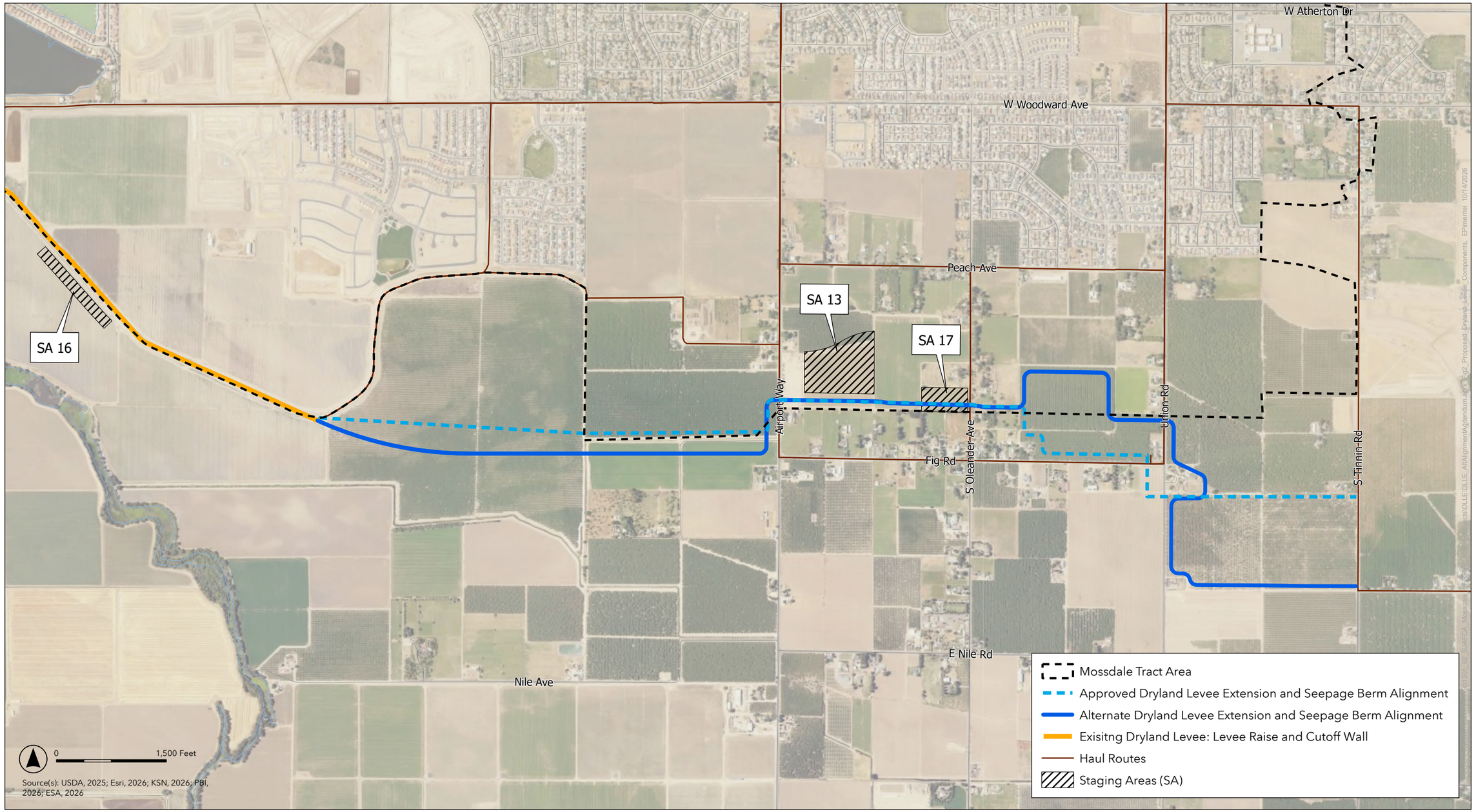


Figure 1
Proposed Dryland Levee Components Overview

This page intentionally left blank

The alternate dryland levee extension alignment would include installation of a seepage berm and acquisition of O&M corridors consistent with those described in the certified EIR. Development of the alternate dryland levee extension alignment would require demolition and reconstruction of portions of roadways, as well as the relocation and/or reconstruction of existing utilities, consistent with the descriptions of work in the certified EIR. This would include the reconstruction of portions of existing roadways where they intersect the alternate dryland levee extension alignment, including raising the grade of the existing road (raised vertical alignment) to form a ramp crossing over the levee crest, with approach embankments on both sides that tie into the existing roadway grade. On each side of the roadway approaching the alternate dryland levee extension alignment, retaining walls would be constructed along the approach embankment, as needed. Roadway reconstruction activities would also require the relocation of existing unpaved driveways along Airport Way and Oleander Avenue that overlap with roadway approach embankment work areas.

The alternate dryland levee extension alignment would be approximately 0.6 mile longer than the approved dryland levee extension alignment. However, the overall construction methods and equipment, material use, staging areas, and haul routes would be the same or similar to those previously analyzed in the certified EIR.

This page intentionally left blank

SECTION 3
Analysis of Potential Environmental Effects

3.1 Introduction

The certified EIR evaluated potential environmental impacts on the following resource categories: aesthetics; agricultural and forestry resources; air quality; biological resources–aquatic; biological resources–terrestrial; cultural resources; energy; geology and soils; greenhouse gas (GHG) emissions; hazards and hazardous materials; hydrology and water quality; land use and planning; mineral resources; noise; population and housing; public services; recreation; transportation; tribal cultural resources; utilities and service systems; and wildfire.

The analysis contained in this addendum is focused only on the proposed changes to the approved project, including: construction of a cutoff wall within the existing dryland levee that runs east from Woodward Avenue (as opposed to a drained seepage berm along the existing dryland levee at this location; construction of a 3.5-mile-long alternate dryland levee extension alignment and seepage berm; and additional details related to the reconstruction of existing roadways where they intersect the alternate dryland levee extension alignment. According to CEQA Guidelines Section 15164, this addendum needs to contain only the information needed to analyze the proposed changes to the approved project, including changed circumstances and new information requiring additional environmental review. Where existing information and analysis in the certified EIR are sufficient to evaluate the impacts of the proposed changes to the approved project, no additional environmental review is warranted.

Chapter 4 of the certified EIR discusses potential cumulative impacts from the approved project. As further discussed in Section 3.3, *Effects Related to the Proposed Changes to the Approved Project*, of this addendum, direct impacts of the proposed changes to the approved project would be limited, mitigable, or very localized, and would not cause or contribute to additional cumulative impacts beyond those described in the certified EIR. Therefore, the proposed changes to the approved project would not result in additional cumulatively considerable impacts, and the analysis in the certified EIR adequately addresses potential cumulative impacts.

3.2 Environmental Issues Not Requiring Further Analysis

3.2.1 Project Components Not Requiring Further Analysis

The proposed changes to the approved project evaluated in this addendum are limited to minor modifications to the flood risk reduction components analyzed in the certified EIR, as discussed in Section 2.2, *Project Changes*. The proposed changes to the approved project would not result in the modification of ecosystem restoration at sites 13, 14, and 16 or any other multi-benefit components evaluated in the certified EIR. Therefore, the impact determinations and mitigation measures required in the certified EIR related to ecosystem restoration sites 13, 14, and 16 and other multi-benefit components

would not be affected by the proposed changes to the approved project, and these project components are not discussed further in this addendum.

3.2.2 Operation and Maintenance Activities Not Requiring Further Analysis

The proposed changes to the approved project would include O&M activities along the additional approximately 0.6 mile of the alternate dryland levee extension alignment compared to the approved alignment. However, these activities would be similar in nature to those previously evaluated in the certified EIR and would not result in new types of O&M activities. Additionally, O&M activities along the existing dryland levee would be consistent with those analyzed in the certified EIR. Therefore, the impact determinations and mitigation measures provided in the certified EIR related to O&M activities are not discussed further in this addendum.

3.2.3 Project Changes Not Requiring Further Analysis

Roadway reconstruction was evaluated in the certified EIR; however, the exact details of roadway reconstruction activities were not known at the time. The certified EIR assumed dryland levee construction activities would require demolition and reconstruction of portions of these roadways where they intersect with the alignment. The certified EIR analyzed potential impacts resulting from roadway reconstruction along Airport Way, Oleander Avenue, Fig Road, and Union Road. As discussed in Section 2.2, *Project Changes*, this addendum provides additional details related to the reconstruction of portions of existing roadways where they intersect the alternate dryland levee extension alignment, including raising the grade of the existing road (raised vertical alignment) to form a ramp crossing over the levee crest, with approach embankments on both sides that tie into the existing roadway grade.

Although this addendum provides additional details related to roadway reconstruction activities, the potential impacts resulting from roadway reconstruction would not substantively differ from those evaluated in the certified EIR. Roadway reconstruction would occur in previously disturbed areas along existing roadways where they intersect with the alternate dryland levee extension alignment. The additional details related to roadway reconstruction provided in this addendum would not introduce new construction activities or increase the overall intensity of construction activities associated with the approved project. As shown in Figure 1, the alternate dryland levee extension alignment would result in fewer roadway crossings compared to the approved dryland levee extension alignment evaluated in the certified EIR (i.e., the alternate alignment would not require crossing Fig Road). Therefore, the impact determinations and mitigation measures provided in the certified EIR related to roadway reconstruction activities are not discussed further in this addendum.

3.2.4 Resource Topics Not Requiring Further Analysis

Based on the analysis provided previously related to roadway reconstruction activities, impact evaluations in the remainder of this addendum focus solely on the other proposed changes to the approved project described in Section 2, *Project Changes*. Specifically, these modifications include construction of a cutoff wall within the existing dryland levee alignment (in place of a seepage berm along the existing dryland levee) and construction of an alternative dryland levee extension alignment and seepage berm. For

purposes of this addendum, these modifications are collectively referred to as "modification of the existing dryland levee improvements and the alternative dryland levee extension alignment."

Construction methods, equipment, and intensity associated with modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would be generally consistent with those evaluated in the certified EIR. In addition, the alternate dryland levee extension alignment would not require new or modified haul routes or staging areas compared to those previously analyzed in the certified EIR. Therefore, modification of the existing dryland levee improvements and the alternate dryland levee extension alignment would not lead to substantive changes to impacts related to hazardous materials; geology, soils, and paleontological resources; or energy use, and these resource topics are not discussed further in this addendum.

As discussed in the certified EIR, the approved project would not include the construction of new housing or new or expanded utilities infrastructure, and while the approved project may facilitate growth by removing a development constraint, it would not induce growth beyond what has already been anticipated and evaluated in existing land use plans. These conditions would not change with modification of the existing dryland levee improvements and the alternative dryland levee extension alignment assessed in this addendum. Therefore, the proposed changes would not result in new or potentially more significant impacts on public services, population and housing, or utilities and service systems. Additionally, although portions of the alternate dryland levee extension alignment would occur in areas not previously included within the approved project footprint analyzed in the certified EIR, these areas have similar aesthetic qualities, environmental background conditions, and land uses as those previously evaluated, which generally consist of mixed agricultural and rural uses. Therefore, it is not anticipated that modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would result in new or more significant impacts related to aesthetics, agricultural and forestry resources, land use and planning, mineral resources, recreation, or wildfire, and these resource topics are not discussed further in this addendum.

In addition, implementation of certified EIR Mitigation Measure 3.17-1, which requires implementation of a construction traffic management plan would still be required, and SJAFCA would continue to coordinate with local transportation planning officials to ensure roadway design meet state and local standards. Therefore, it is not anticipated that modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would result in a new or potentially more significant impact related to transportation, and this resource topic is not discussed further in this addendum.

Related to aquatic biological resources, the existing dryland levee and alternate dryland levee extension alignment do not occur along or buffer aquatic habitat; adjacent habitat types consist of agricultural and developed lands and irrigation/drainage ditches (**Appendix A** to this addendum). Consistent with the certified EIR, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would be subject to mandatory water quality best management practices (BMPs) that would minimize erosion and avoid hazardous materials from entering adjacent waterways, and any potential indirect effects of construction activities on aquatic biological resources would be temporary. As a result, this resource topic is not discussed further in this addendum.

Accordingly, the only direct or indirect environmental effects that could potentially result from modification of the existing dryland levee improvements and the alternative dryland levee extension alignment that may differ from those evaluated in the certified EIR would include those related to air quality, biological resources–terrestrial, cultural resources, GHG emissions, hydrology and water quality, noise, and tribal cultural resources. These topics are therefore further analyzed in Section 3.3, *Effects Related to the Proposed Changes to the Approved Project,* of this addendum.

3.3 Effects Related to the Proposed Changes to the Approved Project

The following resource topics have been re-evaluated to determine whether modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would result in any new significant impacts or substantially more severe impacts than those described in the certified EIR.

3.3.1 Air Quality

Impacts related to air quality were discussed in Section 3.4, *Air Quality*, of the certified EIR. The analysis found that impacts related to the construction of flood risk reduction components would be less than significant with the implementation of mitigation.

Criteria air pollutants were modeled for the analysis in the certified EIR using the California Emissions Estimator Model (CalEEMod; version 2022.1.1.29). This model is used to estimate air pollutant emissions from both equipment and on-road vehicle exhaust.

Table 3.4-9 in Section 3.4.4 of the certified EIR displays the quantitative results of this evaluation and shows that emissions from project construction would be below significance thresholds for all pollutants except nitrogen oxides (NO_X), which would exceed the San Joaquin Valley Air Pollution Control District's (SJVAPCD's) significance thresholds in certain years. This impact was found to be potentially significant. The certified EIR concluded that implementation of Mitigation Measure 3.4-1, including requiring construction contractors to submit a Construction Emissions Minimization Plan to the SJAFCA detailing how the contractor will achieve a reduction of 20 percent in NO_x emissions through various measures, including the use of Tier 4 final engines for off-road equipment, would reduce these impacts to a less-than-significant level.

In addition to criteria pollutant modeling, a health risk assessment (HRA) for the analysis in the certified EIR was conducted using guidelines from SJVAPCD and the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment. The HRA estimated cancer risks and chronic health hazards from project-related diesel particulate matter emissions at nearby off-site residences located within 1,000 feet of the project area. The U.S. Environmental Protection Agency's AERMOD dispersion model (version 21112) was used to predict concentrations at receptor locations.

Table 3.4-10 in Section 3.4.4 of the certified EIR displays the quantitative results of the HRA for the flood risk reduction components of the approved project and shows that cancer risks and chronic health hazards would be less than the respective SJVAPCD thresholds, and the impact would be less than significant.

The proposed cutoff wall segment within the existing dryland levee would be located where it was previously assumed a seepage berm would be constructed under the approved project. However, the construction methods, materials, intensity, and equipment used to construct the cutoff wall within the existing dryland levee would be similar to those that were identified and modeled in the certified EIR for construction of a seepage berm at this same location (and similar to those for the construction of other cutoff walls along the existing RD 17 levee alignment). Therefore, construction emissions would be similar to the emissions previously modeled for the certified EIR. No new impacts would occur, and no additional mitigation measures would be required.

Portions of the alternate dryland levee extension alignment would be located in a different area than the approved dryland levee extension alignment modeled in the certified EIR. The maximally exposed individual receptor (MEIR) along the approved dryland levee extension alignment that was identified in the certified EIR was located approximately 100 feet away at a residence along Fig Road, near the intersection of Fig Road and Oleander Avenue. Due to the divergent path of the alternate dryland levee extension alignment and seepage berm, it would be located closer to a residence along Airport Way, several residences along Union Road (including one within 100 feet), and one residence near the intersection of Sedan Avenue and Tinnin Road as compared to the approved dryland levee extension alignment evaluated in the certified EIR. However, the proximity to the MEIR would not change from that evaluated in the certified EIR and would remain 100 feet. Construction of the additional 0.6 mile length of the alternate dryland levee extension alignment would require approximately 18 more one-way haul trips per day compared to what was previously analyzed for construction of the dryland levee in the certified EIR (maximum of 466 one-way trips per day). The additional trips would increase hauling emissions by approximately 2% over that construction period which would not change the impact conclusion for construction emissions in the certified EIR. Construction methods and equipment would also remain consistent with that evaluated in the certified EIR. Therefore, emissions associated with construction would be similar to the emissions previously modeled for the approved dryland levee extension alignment. Furthermore, there would be no change in the haul routes or equipment staging areas that were previously identified in the certified EIR would occur.

As a result, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would result in similar impacts as those identified for the approved project as described in the certified EIR, and implementation of Mitigation Measure 3.4-1 would reduce impacts associated with construction emissions to a less-than-significant level. In addition, there are no changes in the environmental setting, regulatory setting, or project characteristics that would result in new or substantially more severe air quality impacts.

Changes to the approved project would not result in any new significant impacts or substantially increase the severity of the previously identified air quality impacts. The previously adopted mitigation measures remain applicable and adequate, and the impact conclusions of the certified EIR related to air quality remain valid.

3.3.2 Biological Resources–Terrestrial

Impacts related to terrestrial biological resources were discussed in Section 3.6, *Biological Resources–Terrestrial*, of the certified EIR. The analysis found that impacts related to the construction of flood risk reduction components would be less than significant with the implementation of mitigation.

The certified EIR evaluated impacts on terrestrial biological resources resulting from the construction of flood risk reduction components including impacts on special-status species. The certified EIR determined the construction of flood risk reduction components would result in ground disturbance (e.g., excavation, grading, staging), vegetation removal, as well as tree trimming and removal and therefore could result in adverse direct and indirect effects, including the direct take of species, removal of suitable habitats, and disrupting breeding and foraging behaviors.

The certified EIR determined that the implementation of mandatory water quality BMPs would minimize erosion and avoid hazardous materials from entering adjacent waterways, which would reduce the potential for impacts on special-status species that may occur in these areas. However, potential impacts on special-status wildlife species, specifically, Crotch's bumble bee (*Bombus crotchii*), valley elderberry longhorn beetle (*Desmocersu californicus dimorphus*), Swainson's hawk (*Buteo swainsoni*), riparian brush rabbit (*Sylvilagus bachmani riparius*), northwestern pond turtle (*Actinemys marmorata*), burrowing owl (*Athene cunicularia*), northern harrier (*Circus hudsonius*), white-tailed kites (*Elanus leucurus*), loggerhead shrike (*Lanius ludovicianus*), breeding and migratory birds, and pallid bats (*Antrozous pallidus*) could still occur. The certified EIR also determined that construction activities could result in the trimming and removal of riparian habitat, the removal of approximately 1 acre of irrigation ditches that may qualify as wetlands, temporary interference with wildlife movement corridors, and the removal of trees protected under local ordinances.

The certified EIR concluded that implementation of Mitigation Measure 3.6-1a through 3.6-1j, which require worker environmental awareness training and species-specific measures, including pre-construction surveys, avoidance and minimization measures, relocation and exclusion measures, nest and roost buffers, and compensatory mitigation, would reduce impacts on special-status species to a less-than-significant level. Implementation of Mitigation Measure 3.6-2, which requires an aquatic resources delineation to identify potential wetlands and other waters that fall under state or federal jurisdiction, as well as implementation of avoidance, minimization, and compensation measures for any potential impacts, would reduce impacts on wetlands and other sensitive habitats. In addition, the certified EIR concluded that implementation of Mitigation Measure 3.6-5, which requires replacing heritage oaks removed on a 3:1 basis, would reduce impacts on protected tree species removed in the city of Stockton to a less-than-significant level. The modification of the existing dryland levee improvements and the alternative dryland levee extension alignment are not located in the city of Stockton; therefore, Mitigation Measure 3.6-5 is not relevant to the analysis in this addendum.

The proposed cutoff wall within the existing dryland levee would be in a previously disturbed area evaluated in the certified EIR for seepage berm construction. Construction methods, materials, and equipment used to construct the cutoff wall would be consistent with those identified in the certified EIR for the construction of other cutoff walls along the existing RD 17 levee alignment. Similarly, construction methods, materials, and equipment used to construct the alternate dryland levee extension alignment and seepage berm would be consistent with those identified in the certified EIR for dryland levee construction.

A reconnaissance biological resources survey of the alternate dryland levee extension alignment was performed by Environmental Science Associates (ESA) on September 30, 2026, to assess areas that were not surveyed in the certified EIR and identify habitat types along the alternate alignment. See the

Biological Resources Memorandum included as Appendix A to this addendum. The survey did not identify any potential habitat for special-status species. Much of the alternate dryland levee extension alignment surveyed consists of agricultural and ruderal land uses that provide poor habitat for most special-status wildlife. Although there were suitable areas where burrowing owls might occupy, there were no burrows. Incidental observations included several red-tailed hawks (*Buteo jamaicensis*) and turkey vultures (*Cathartes aura*) foraging and soaring across the surveyed parcels; however, no nests or active nesting behaviors were observed. An elderberry shrub was observed; however, this bush was located outside of the alternate dryland levee extension alignment, and no sign of valley elderberry longhorn beetles (*Desmocerus californicus dimorphus*) were observed (Appendix A to this addendum). Consistent with the 2026 Mossdale Tract Final EIR, any potential impacts on special-status species would be reduced through implementation of Mitigation Measures 3.6-1a through 3.6-1j. In addition, various irrigation/drainage ditches are present along the alternative dryland levee extension alignment (Appendix A to this addendum). As discussed in the certified EIR, although generally not considered a sensitive natural community, irrigation and drainage facilities in the project area may qualify as waters of the United States or state, thereby qualifying as a sensitive natural community. Therefore, Mitigation Measures 3.6-2 would be implemented consistent with the certified EIR.

As a result, modification to the existing dryland levee and alternative alignment would result in similar impacts as those identified for the approved project as described in the certified EIR, and implementation of Mitigation Measures 3.6-1a–3.6-1j and 3.6-2 would reduce impacts associated with biological resources to a less-than-significant level. In addition, there are no changes in the environmental setting, regulatory setting, or project characteristics that would result in new or substantially more severe biological resource impacts.

Changes to the approved project would not result in any new significant impacts or substantially increase the severity of the previously identified terrestrial biological resources impacts. The previously adopted mitigation measures remain applicable and adequate, and the impact conclusions of the certified EIR related to terrestrial biological resources remain valid.

3.3.3 Cultural Resources

Impacts related to cultural resources were discussed in Section 3.7, *Cultural Resources*, of the certified EIR. The analysis found that impacts related to the construction of flood risk reduction components would be significant and unavoidable.

The certified EIR determined construction of the proposed flood risk reduction components of the project would involve ground disturbance, vibration, and the modification of architectural resources. Construction activities could physically damage or alter nearby architectural resources with the potential to qualify as historical resources, or physically damage or destroy known or previously undiscovered archaeological resources and human remains. However, the exact details, including precise locations, of any such construction activities were unknown at the time. Therefore, it was not known whether implementing the project would affect any historical or archaeological resources, or human remains. It was determined that construction activities associated with flood risk reduction components of the project could result in a potentially significant impact.

The certified EIR concluded that implementation of Mitigation Measures 3.7-1, 3.7-2b through f, and 3.7-3a and 3.7-3b would reduce impacts on historical and archaeological resources pursuant to CEQA Guidelines Section 15064.5. These measures require the development and implementation of a Cultural Resources Management Plan, which would require an inventory and significance evaluation for potential historical and archaeological resources in the project area; subsequent development and implementation of measures to avoid or reduce impacts on historical archaeological resources in the project area; development and implementation of a cultural resources awareness program; construction monitoring; and implementation of unanticipated discovery protocol for archaeological resources and human remains.

However, because portions of the project area were not surveyed due to lack of access, it was not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, the certified EIR determined impacts on cultural resources resulting from the construction of flood risk reduction components would be significant and unavoidable.

Construction methods, materials, and equipment for modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would be consistent with those identified in the certified EIR. Additionally, the proposed cutoff wall within the existing dryland levee would occur in a previously disturbed area already evaluated in the certified EIR for seepage berm construction. A reconnaissance cultural resource survey of the alternate dryland levee extension alignment was performed by ESA on September 30, 2026, to assess areas that were not surveyed in the certified EIR. See the Cultural Resources Assessment included as **Appendix B** to this addendum. The area surveyed included segments of the alternate dryland levee extension alignment that have not been surveyed for the certified EIR. However, some portions of the alternate dryland levee extension alignment remain unsurveyed due to access constraints. The areas surveyed were composed of previously disturbed agricultural areas with moderate to high ground visibility. No pre-contact Native American or historic-era cultural materials or other evidence of past human use was identified during the survey effort, and background research did not identify previously documented cultural resources along the alternate dryland levee extension alignment (Appendix B to this addendum).

As a result, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would result in similar impacts as those identified for the approved project as described in the certified EIR, and implementation of Mitigation Measures 3.7-1, 3.7-2b through f, 3.7-3a, and 3.7-3b would reduce impacts associated with cultural resources. However, as with the certified EIR, because portions of the alternate dryland levee extension alignment include areas that have not been surveyed due to lack of access, it is not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. This impact would remain significant and unavoidable with modification of the existing dryland levee improvements and the alternative dryland levee extension alignment, but these project changes would not increase the severity of this impact as compared to the approved project evaluated in the certified EIR. In addition, there are no changes in the environmental setting, regulatory setting, or project characteristics that would result in new or substantially more severe cultural resource impacts.

Changes to the approved project would not result in any new significant impacts or substantially increase the severity of the previously identified cultural resources impacts. The previously adopted mitigation

measures remain applicable and adequate, and the impact conclusions of the certified EIR related to cultural resources remain valid.

3.3.4 Greenhouse Gas Emissions

Impacts related to GHG emissions were discussed in Section 3.10, *Greenhouse Gas Emissions*, of the certified EIR. The analysis found that impacts related to the construction of flood risk reduction components would be less than significant.

Impacts from GHG emissions were evaluated qualitatively in relation to the statewide GHG reduction goals and local climate action plans as the SJVAPCD does not provide significance thresholds for construction-related GHG emissions. The certified EIR concluded that construction of the flood risk reduction components would be consistent with the GHG performance objectives in the California Air Resources Board's *2022 Scoping Plan for Achieving Carbon Neutrality* (CARB 2022) and local climate action plans and therefore would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Therefore, the certified EIR determined impacts related to GHG emissions resulting from the construction of flood risk reduction components would be less than significant. The certified EIR concluded that, although not required, implementation of Mitigation Measure 3.4-1, including requiring construction contractors to submit a Construction Emissions Minimization Plan to the SJAFCA detailing how the contractor will achieve a reduction of 20 percent in NO_x emissions through various measures, including the use of Tier 4 final engines for off-road equipment, would reduce NO_x emissions.

The proposed cutoff wall within the existing dryland levee would be located where it was previously assumed a seepage berm would be constructed. However, the construction methods, materials, and equipment used to construct the cutoff wall would be similar to those that were identified and modeled in the certified EIR for the seepage berm (and similar to those for the construction of other cutoff walls along the existing RD 17 levee alignment). Therefore, construction GHG emissions associated with cutoff wall construction would be similar to the GHG emissions previously modeled for the certified EIR. No new impacts would occur, and no additional mitigation measures would be required.

Construction of the additional 0.6 mile length of the alternate dryland levee extension alignment would require approximately 18 more one-way haul trips per day compared to what was previously analyzed for construction of the dryland levee in the certified EIR (maximum of 466 one-way trips per day). The additional trips would increase hauling emissions by approximately 2% over that construction period which would not change the impact conclusion for construction emissions in the certified EIR. Construction methods and equipment would also remain consistent with that evaluated in the certified EIR. Therefore, emissions associated with construction would be similar to the emissions previously modeled for the approved dryland levee extension alignment. Furthermore, there would be no change in the haul routes or equipment staging areas that were previously identified in the certified EIR.

Additionally, since the approval of the certified EIR, there have been no new plans or regulations adopted for the purpose of reducing GHG emissions that would be applicable to the project. Given that the proposed cutoff wall and alternate dryland levee extension alignment would require the same type of construction methods and restoration efforts as identified in the certified EIR, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would also not conflict

with the performance objectives outlined in the *2022 Scoping Plan for Achieving Carbon Neutrality* and local climate action plans.

As a result, modification to the existing dryland levee and alternative alignment would result in similar less-than-significant GHG impacts as those identified for the approved project as described in the certified EIR. Although not required, consistent with the approved project, implementation of Mitigation Measure 3.4-1 would reduce NOx emissions. In addition, there are no changes in the environmental setting, regulatory setting, or project characteristics that would result in new or substantially more severe GHG impacts.

Changes to the approved project would not result in any new significant impacts or substantially increase the severity of the previously identified GHG impacts. The previously adopted mitigation measures remain applicable and adequate, and the impact conclusions of the certified EIR related to GHG remain valid.

3.3.5 Hydrology and Water Quality

Impacts related to hydrology and water quality were discussed in Section 3.12, *Hydrology and Water Quality*, of the certified EIR. The analysis found that impacts related to the construction of flood risk reduction components would be less than significant with the implementation of mitigation.

The certified EIR evaluated hydrology and water quality impacts associated with construction of flood risk reduction components including potential effects related to surface and groundwater quality, groundwater supplies, the alteration of existing drainage patterns, flood hazards, and consistency with applicable water quality and groundwater management plans. Construction activities analyzed in the certified EIR included vegetation removal, demolition, clearing and grubbing, the construction of levee improvements, including seepage berms and cutoff walls, and the development of various staging areas and haul routes.

The certified EIR determined that earth-disturbing construction activities associated with flood risk reduction components have the potential to expose and disturb soils, potentially mobilizing and/or delivering eroded soil, sediment, and other pollutants to receiving waters. The eroded soils, sediment, and other pollutants could also be mobilized and transported off-site by stormwater runoff (nonpoint-source pollution), potentially degrading the water quality of receiving waters. In addition, fuels, lubricants, and other hazardous materials associated with construction equipment could also adversely affect water quality if spilled or stored improperly. However, the certified EIR concluded that compliance with National Pollutant Discharge Elimination System (NPDES) requirements, including coverage under the Construction General Permit (CGP), preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), and incorporation of BMPs, as well as compliance with federal, state, and local hazardous material handling requirements would reduce these potential impacts to a less-than-significant level.

The certified EIR also determined that construction of the proposed flood risk reduction components would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge. However, the certified EIR determined that construction of cutoff walls, which would require the use of bentonite materials, could adversely affect groundwater quality if accidental release were to

occur. As a result, the certified EIR implemented Mitigation Measure 3.12-1, which requires the development of a Bentonite Slurry Spill Contingency Plan or frac-out plan, 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.

With implementation of Mitigation Measure 3.12-1 as well as an SWPPP, BMPs, and consistency with relevant hazardous material regulations, the certified EIR determined that the project would not conflict with applicable water quality control or sustainable groundwater management plans. Therefore, the certified EIR concluded that hydrology and water quality impacts associated with construction of flood risk reduction components would be less than significant with mitigation.

The proposed cutoff wall within the existing dryland levee would be located where it was previously assumed a seepage berm would be constructed. Construction methods, materials, and equipment used to construct the cutoff wall would be similar to those that were identified in the certified EIR for the construction of other cutoff walls along the existing RD 17 levee alignment. Similarly, construction methods, materials, and equipment used to construct the alternate dryland levee extension alignment would be consistent with those identified in the certified EIR for dryland levee construction

Earth-disturbing construction activities (e.g., clearing, grubbing, excavation, grading) have the potential to expose and disturb soils, potentially mobilizing and/or delivering eroded soil, sediment, and other pollutants to receiving waters. In addition, discharges of construction-related hazards could result in impacts on surface and groundwater that could violate water quality standards and/or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. However, as more than 1 acre of land would be disturbed under the project, a CGP would be obtained in accordance with NPDES regulation. Compliance with the CGP would require implementation of an SWPPP and mandatory water quality BMPs that would minimize erosion and avoid hazardous materials from entering adjacent waterways. Additionally, all hazardous materials would be transported, handled, and disposed of consistent with applicable federal, state, and local regulations.

Construction of cutoff walls would require the use of bentonite materials; the construction of the soil-bentonite slurry cutoff walls and use of bentonite materials could result in impacts on groundwater quality that would be significant. However, consistent with the certified EIR, Mitigation Measure 3.12-1 would be implemented to reduce potential impacts resulting from the construction of soil-bentonite slurry cutoff walls to a less-than-significant level. Therefore, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would not violate any water quality standards or waste discharge requirements, substantially degrade surface or groundwater quality, or conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

The certified EIR concluded that all other impacts related to hydrology and water quality would be less than significant. Consistent with the approved project, modification of the existing dryland levee improvements and alternative dryland levee extension alignment would not involve the use of groundwater or require installation of groundwater wells and therefore would not decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin. Construction activities could temporarily alter the direction, rate, and amount of surface runoff within the project area. However, construction-related changes in the existing drainage

patterns would be temporary and have relatively localized effects on-site and immediately downstream of the project area. The project area evaluated in this addendum is located in Federal Emergency Management Agency Zone AE, an area designated as a high-risk flood zone with a 1 percent risk of flooding annually. However, compliance with existing regulations and the incorporation of BMPs would ensure that pollutants associated with construction equipment and activities are properly managed such that releases are avoided to the extent possible.

A hydraulic impact analysis was prepared by R&F Engineering on September 30, 2026 (**Appendix C** to this addendum**)**. The purpose of the hydraulic impact analysis was to assess how modification to the existing dryland levee and alternative alignment, primarily the alternate dryland levee extension alignment, would affect regional flood behavior under the current (2022) 200-year flood conditions, while considering resiliency to potential future climate change conditions. The hydraulic impact analysis determined the alternate dryland levee extension alignment would eliminate 200-year flooding within the Mossdale Tract by preventing flanking of the existing dryland levee. Although the alternate dryland levee extension alignment would redirect some floodwaters back into the San Joaquin River system, the resulting increases in flood extent are limited to shallow overland flooding in primarily agricultural areas west of the river and south of the alternate dryland levee extension alignment. These impacts are minor in both depth and extent and do not affect urbanized areas. The hydraulic impact analysis confirmed that, compared to the approved project, the modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would not cause any new flooding under more frequent events, including those at or below the 100-year level, and would provide protection to the project area under potential future climate change conditions. These findings are all consistent with the results of hydraulic modeling completed for the approved dryland levee extension alignment (included as Appendix G to the certified EIR).

As a result, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would result in similar impacts as those identified for the approved project as described in the certified EIR, and implementation of Mitigation Measure 3.12-1 would reduce impacts associated with water quality to a less-than-significant level. In addition, there are no changes in the environmental setting, regulatory setting, or project characteristics that would result in new or substantially more severe hydrology and water quality impacts.

Changes to the approved project would not result in any new significant impacts or substantially increase the severity of the previously identified hydrology and water quality impacts. The previously adopted mitigation measures remain applicable and adequate, and the impact conclusions of the certified EIR related to hydrology and water quality remain valid.

3.3.6 Noise

Impacts related to noise were discussed in Section 3.14, *Noise*, of the certified EIR. The analysis found that noise impacts related to the construction of flood risk reduction components would be significant and unavoidable. The analysis also found that vibration impacts related to construction of flood risk reduction components would be less than significant with the implementation of mitigation. The certified EIR also determined no impacts related to exposing people near an airport or private airstrip to excessive noise levels would occur.

The certified EIR evaluated noise from the construction of flood risk reduction components primarily generated from heavy duty equipment, which includes equipment such as excavators, cranes, dozers, and rollers. Construction of the flood risk reduction components would include site preparation (e.g., vegetation clearing, demolition, utilities relocation), grading, excavation, compaction, hauling and placement of materials, and site cleanup and demobilization. The certified EIR assumed construction activities would generally comply with local noise ordinances. However, depending on the allowable duration/schedule for the project and/or each phase, night work could be necessary.

As shown in Table 3.14-7 of the certified EIR, construction noise levels would generally be below the Federal Transit Administration's (FTA's) daytime construction noise impact criteria of 90 A-weighted decibels (dBA) (FTA 2018)[1]. However, construction could occur during nighttime hours. As a result, the certified EIR determined construction noise levels for some project components would be above the FTA's nighttime construction noise impact criteria of 80 dBA (FTA 2018). The certified EIR also determined construction-related hauling would represent substantial increases compared to existing traffic noise levels.

The certified EIR implemented Mitigation Measure 3.14-1, which would reduce the impacts of construction noise generated from construction equipment and hauling. However, it was determined Mitigation Measure 3.14-1 may not reduce noise levels at all times and locations to a less-than-significant level because of the close proximity of noise-sensitive receptors to construction activities along all elements of the project, and the limited feasibility of mitigating construction noise and haul truck noise to acceptable levels. Therefore, the certified EIR concluded that noise impacts related to the construction of flood risk reduction components would be significant and unavoidable.

Related to construction vibration, the certified EIR evaluated construction activities associated with the flood risk reduction components including the use of off-road equipment known to generate vibration. Specifically, the operation of pile drivers, compactors, and bulldozers, which are generally associated with groundborne vibration.

The certified EIR determined the highest vibration levels related to pile-driving activities would be generated at Mossdale Crossing County Park and at Interstate 5, which are located approximately 500 feet from residences across the San Joaquin River. At this distance, vibration generated from pile driving was determined to be below FTA's 80 vibration decibels (VdB)[2] criterion for infrequent (construction-related) events at residential receptors and the FTA's 0.5 inches/second peak particle velocity (PPV) criterion for building damage to modern construction. However, related to all non-pile-driving work activity, the certified EIR determined that while vibration levels would be below FTA's 0.5 inches/second PPV criterion for building damage to modern construction, vibration levels could exceed FTA's 80 VdB criterion for infrequent (construction-related) events at residential receptors (the closest of which would be approximately 40 feet from the nearest project work area). Additionally, as discussed previously, while construction activities would generally be consistent with local noise ordinances and would avoid

[1] A-weighted decibels are a sound level measurement that adjusts frequencies to match human hearing sensitivity, reducing low and very high frequencies and emphasizing mid-range sounds.

[2] The PPV is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe physical vibration impacts on buildings and structures. Another useful vibration descriptor is known as VdB. VdB is generally used when evaluating human response to vibration, as opposed to damage to structures (for which PPV is the more commonly used descriptor).

nighttime hours, in some cases, nighttime work may occur. The certified EIR also determined receptors located within 75 feet of construction activity would experience vibration levels that exceed the FTA's 80 VdB criterion for infrequent (construction-related) events at residential receptors.

The certified EIR implemented Mitigation Measure 3.14-2, which would reduce the impacts of construction noise generated from construction equipment and ensure that the most substantial vibration-generating activities would avoid hours when nearby residents would reasonably be expected to sleep, which is the basis for the FTA's vibration criterion for human annoyance. As a result, the certified EIR concluded vibration impacts resulting from the construction of flood risk reduction components would be less than significant with mitigation.

The closest airport to the approved project is the Stockton Metropolitan Airport, approximately 1.5 miles east of the project area. The certified EIR determined the project would not introduce a new noise-sensitive land use or a new place of employment and, therefore, would not result in exposure of people residing or working in the project area to excessive noise levels. As a result, the certified EIR determined there would be no impact associated with exposing people near an airport or private airstrip to excessive noise levels.

As shown in Table 3.14-7 of the certified EIR, a levee raise and seepage berm along the existing dryland levee, identified as "Project Component 12," would result in a reference noise level of 85 dBA during daytime hours and 88.9 dBA during nighttime hours. For comparison, as identified for "Project Component 8d" in Table 3.14-7, levee raise and cutoff wall construction would similarly result in a reference noise level of 85 dBA during daytime hours and 88.9 dBA during nighttime hours. Therefore, noise levels experienced by the nearest sensitive noise receptor due to cutoff wall construction within the existing dryland levee (a residence across the San Joaquin River approximately 230 feet away) would be below the FTA's 90 dBA daytime criteria (FTA 2018), consistent with those evaluated in the certified EIR. However, also consistent with the analysis in the certified EIR, construction noise levels for this component would exceed the FTA's construction noise criteria of 80 dBA during nighttime hours (FTA 2018).

The alternate dryland levee extension alignment and seepage berm would be located approximately 100 feet away from the nearest sensitive receptor (a residence along Union Road) which is closer than the nearest receptor evaluated in the certified EIR (a residence along Airport Way located approximately 200 feet away). However, although the nearest sensitive receptor along the alternate dryland levee extension alignment would be closer than previously evaluated in the certified EIR, it should be noted that the closest sensitive receptor overall for flood risk reduction components evaluated in the certified EIR would be approximately 40 feet away (see Table 3.14-7 of the certified EIR). As shown in Table 3.14-7 of the certified EIR, construction noise levels for dryland levee and seepage berm construction at 200 feet (see "Project Component 15") would be 77.2 dBA during daytime hours and 85 dBA during nighttime hours. At a distance of 100 feet, the distance to the nearest sensitive receptor along the alternate dryland levee extension alignment would be 83 dBA during daytime hours and 91 dBA during nighttime hours. As a result, construction noise levels associated with construction activities along the alternate dryland levee extension alignment would be below the FTA's 90 dBA daytime criteria (FTA 2018). However, consistent with the analysis in the certified EIR, construction noise levels for this component would exceed the FTA's construction noise criteria of 80 dBA during nighttime hours (FTA 2018).

Additionally, as the alternate dryland levee extension alignment would be approximately 0.6 mile longer than the approved dryland levee extension alignment evaluated in the certified EIR approximately 18 more one-way haul trips per day would be required to deliver fill material. As discussed in Section 3.2, *Environmental Issues Not Requiring Further Analysis*, these trips would use the same haul routes previously analyzed in the certified EIR and would therefore pass the same noise-sensitive receptors. Consistent with the certified EIR, construction-related hauling would represent a substantial increase compared to existing traffic noise levels along these routes. However, as the certified EIR analyzed a maximum of 466 one-way trips per day for the levee alignment, an additional 18 trips per day would result in a nominal increase in the total hauling evaluated for the project and would not result in a perceptible increase in traffic noise levels compared to those disclosed in the certified EIR.

Related to generation of vibration during construction, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment does not include floodwall construction; therefore, no pile-driving activities would be required. As mentioned previously, the nearest sensitive receptor to the alternate dryland levee extension alignment would be approximately 100 feet away (a residence located along Union Road). This receptor would be located outside of the 75-foot buffer identified in the certified EIR for vibration levels that can be expected to exceed the FTA's 80 VdB criterion for infrequent (construction-related) events at residential receptors and would experience PPV levels far below the FTA's 0.5 inches/second PPV criterion for building damage to modern construction. As a result, vibration levels associated with modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would be below the FTA's vibration criteria for building damage and residential uses.

Consistent with the certified EIR, the closest airport to the modification of the existing dryland levee improvements and the alternative dryland levee extension alignment is the Stockton Metropolitan Airport, approximately 1.5 miles east of the project area. Therefore, the analysis and conclusions presented in the certified EIR remain relevant to the project changes, and the modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would not result in exposure of people residing or working in the project area to excessive noise levels related to proximity of a public or private airport.

As a result, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would result in similar impacts as those identified for the approved project as described in the certified EIR, and implementation of Mitigation Measure 3.14-1 would reduce impacts associated with construction-related noise. However, as concluded in the certified EIR, Mitigation Measure 3.14-1 may not reduce noise levels to a less-than-significant level in all locations and at all times because of the proximity of noise-sensitive receptors to construction activities and the limited feasibility of mitigating construction noise and haul truck noise to acceptable levels. These temporary and short-term impacts would remain significant and unavoidable with modification of the existing dryland levee improvements and the alternative dryland levee extension alignment. However, these project changes would not increase the severity of this impact as compared to the approved project evaluated in the certified EIR. As vibration levels would not exceed relevant FTA construction-related vibration thresholds, implementation of Mitigation Measure 3.14-2 would not be required. In addition, there are no changes in the environmental setting, regulatory setting, or project characteristics that would result in new or substantially more severe noise impacts.

Changes to the approved project would not result in any new significant impacts or substantially increase the severity of the previously identified noise impacts. The previously adopted mitigation measures remain applicable and adequate, and the impact conclusions of the certified EIR related to noise remain valid.

3.3.7 Tribal Cultural Resources

Impacts related to tribal cultural resources were discussed in Section 3.18, *Tribal Cultural Resources*, of the certified EIR. The analysis found that impacts related to the construction of flood risk reduction components would be significant and unavoidable.

The certified EIR determined construction of the flood risk reduction components of the project would involve ground disturbance (e.g., excavation, grading, grubbing, staging) and may also affect the biological resources community (e.g., fishes, riparian vegetation), visual setting, noise levels, and air quality, among other resources. Such activities are the type that have the potential to affect tribal cultural resources through their partial or complete destruction, introduction of new visual elements to landscapes associated with or comprising tribal cultural resources, and impacts on biological resources associated with or comprising tribal cultural resources. If any archaeological resources present are found to qualify as a tribal cultural resource, pursuant to Public Resources Code Section 21074, any impact of these resources could be potentially significant.

The certified EIR concluded that implementation of Mitigation Measures 3.7-1, 3.7-2b through f, and 3.7-3b would reduce the impacts of the project on tribal cultural resources, as defined in Public Resources Code Section 21074. These measures require the development and implementation of a Cultural Resources Management Plan, which would require an inventory and significance evaluation for potential archaeological resources in the project area; subsequent development and implementation of measures to avoid or reduce impacts on archaeological resources in the project area; development and implementation of a cultural resources awareness program; construction monitoring; and implementation of unanticipated discovery protocol for archaeological resources and human remains.

However, because the specific characteristics of any archaeological resources that may be in portions of the project area were unknown, it was not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. Therefore, the certified EIR concluded this impact would be significant and unavoidable.

Construction methods, materials, and equipment for modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would be consistent with those identified in the certified EIR. Additionally, the proposed cutoff wall within the existing dryland levee would occur in a previously disturbed area already evaluated in the certified EIR for seepage berm construction. A reconnaissance cultural resources survey of the alternate dryland levee extension alignment was performed by ESA on September 30, 2026, to assess areas that were not surveyed in the certified EIR. See Cultural Resources Assessment included as Appendix B to this addendum. The area surveyed included segments of the alternate dryland levee extension alignment that have not been surveyed for the certified EIR. However, some portions of the alternate dryland levee extension alignment remain unsurveyed due to access constraints. The areas surveyed were composed of previously disturbed agricultural areas with moderate to high ground visibility. No pre-contact Native American or historic-era

cultural materials or other evidence of past human use was identified during the survey effort, and background research did not identify previously documented cultural resources along the alternate dryland levee extension alignment (Appendix B to this addendum).

As a result, modification of the existing dryland levee improvements and the alternative dryland levee extension alignment would result in similar impacts as those identified for the approved project as described in the certified EIR, and implementation of Mitigation Measures 3.7-1, 3.7-2b through f, and 3.7-3b would reduce impacts associated with tribal cultural resources. However, as with the certified EIR, because portions of the alternate dryland levee extension alignment include areas that have not been surveyed due to lack of access, it is not possible to conclude that the mitigation measures, or equally effective mitigation measures, would reduce significant impacts to a less-than-significant level in all cases. This impact would remain significant and unavoidable with modification of the existing dryland levee improvements and alternative dryland levee extension alignment, but these project changes would not increase the severity of this impact. In addition, there are no changes in the environmental setting, regulatory setting, or project characteristics that would result in new or substantially more severe tribal cultural resource impacts.

Changes to the approved project would not result in any new significant impacts or substantially increase the severity of the previously identified tribal cultural resources impacts. The previously adopted mitigation measures remain applicable and adequate, and the impact conclusions of the certified EIR related to tribal cultural resources remain valid.

3.4 Conclusion

Based on this information, the proposed changes to the approved project would not result in effects that meet the criteria described in CEQA Guidelines Section 15162. In addition, no substantial changes have occurred with respect to the circumstances under which the project would be undertaken, and no new information of substantial importance has been identified that would require major revisions to the certified EIR. This addendum concludes that the proposed changes to the approved project do not trigger any of the CEQA Guidelines Section 15162 conditions described previously, and that the preparation of an addendum (per CEQA Guidelines Section 15164) is therefore appropriate.

3.5 References

CARB (California Air Resources Board). 2022. *2022 Scoping Plan for Achieving Carbon Neutrality*. November 2022. Accessed October 14, 2026. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf.

FTA (Federal Transit Administration). 2018. *Transit Noise and Vibration Impact Assessment Manual*. September 2018. Accessed October 14, 2026. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

This page intentionally left blank

Appendix A
Biological Resources Memorandum

ESA

2600 Capitol Avenue
Suite 200
Sacramento, CA 95816
916.564.4500 phone
916.564.4501 fax

esassoc.com

memorandum

date	October 16, 2026
to	Ruth Darling, LWA
cc	Cathy McEfee, ESA
from	Chuck Hughes, ESA
subject	Results of Additional Biological Resource Surveys for Added Areas for the Mossdale Tract Area Urban Flood Risk Reduction Project

This memo provides the results of additional biological resource surveys conducted for the Mossdale Tract Area (study area) that were completed after the Mossdale Tract Area Urban Flood Risk Reduction Project Draft Biological Resource Assessment (February 2023) was prepared. The additional assessments were conducted on privately owned areas included in the dryland levee component of the study area and restoration sites (RS) 13, 14, and 16. These areas were not included in the 2023 Draft Biological Resource Assessment due to access constraints. Small portions of the study area remain unsurveyed due to access constraints, however these portions consist of agricultural areas and private residences where the presence of special-status biological resources is much less likely.

The entire study area is comprised of approximately 1,313 acres including an existing levee in San Joaquin County, California. The area covered in this memo includes parcels in the dryland levee area and in RS 13, 14, and 16 portions of the study area. The additional parcels surveyed for this memo and the survey dates and staff are in **Table 1**. The added areas are mainly used for agriculture, including field crops and orchards.

TABLE 1
ADDITIONAL AREAS SURVEYED AFTER 2023 DRAFT REPORT

Assessor's Parcel Number (APN) [a]	Survey Date	Staff
241-330-320 241-330-330 241-330-340	November 8, 2024	Zach Leisz, Amanda Segura-Moon
268-320-080 268-320-120 268-320-130 268-320-140 268-320-180 268-320-190 226-030-220	December 18, 2024	Zach Leisz, Amanda Segura-Moon
239-030-090 239-030-140	December 20, 2024	Zach Leisz, Amanda Segura-Moon
226-020-320 241-330-050	January 24, 2025	Zach Leisz, Amanda Segura-Moon
226-050-180 226-100-100 226-100-130	May 5, 2025	Zach Leisz, Amanda Segura-Moon
226-100-100 226-100-130	May 20, 2026	Morgan Henry, Matthew Falcon
241-330-320 241-330-330 241-330-340 236-030-180 236-030-190 226-100-010	September 30, 2026	Matthew Falcon

Notes:
[a] Only those portions of each APN overlapping with the study area were surveyed.

Biological Communities and Special-Status Plants

The biological communities described in the 2023 Biological Resource Assessment Report remain accurate for the study area (see Chapter 3 for the community descriptions).

Portions of the study area in the dryland levee extension consist entirely of land used for agriculture, residential, and roads (see enclosed updated **Figure 3-1, Sheets 3-1p through 3-1t).** There are also multiple areas of ruderal vegetation, mostly along roadsides, which is a highly disturbed community where mostly nonnative annual vegetation or bare ground is present. The dryland levee extension portions of the study area do not contain any areas of sensitive natural communities nor any potential habitat for special-status plants.

The portions of the study area on RS 13, 14, and 16 contain areas of riparian forest, forested wetland, emergent wetland, the San Joaquin River, and drainage ditch.

Based on the communities mapped and new areas surveyed, there is no change in the Potential to Occur determinations of any of the special status plant species listed in Table 3-2 of the 2023 Biological Resource Assessment Report.

Special-Status Wildlife

ESA biologists evaluated the study area for the potential to occur of special-status wildlife using the same methods as described in Chapter 4 of the Biological Resource Assessment Report. The survey of the study area does not change any of the original Potential to Occur descriptions listed in Table 4-1. Much of the study area surveyed consist of agricultural and ruderal land uses that provide poor habitat for most special-status wildlife.

While there were suitable areas where burrowing owls might occupy, there were no burrows. Incidental observations included several red-tailed hawks (*Buteo jamaicensis*) and turkey vultures (*Cathartes aura*) foraging and soaring across the surveyed parcels; however, no nests or active nesting behaviors were observed.

Valley Elderberry Longhorn Beetle Habitat

ESA Biologists surveyed for any suitable valley elderberry longhorn beetle (VELB) habitat, following the same methodology detailed in Chapter 5 of the 2023 Biological Resource Assessment Report. During the additional surveys, one elderberry shrub was identified (see enclosed additional map sheet for **Figure 5-3)**. The shrub was located on RS-13, with multiple stems over an inch in diameter, but no VELB exit holes were observed. No other elderberry shrubs were observed during the survey.

Enclosures: Updated Biological Communities Map, Figure 3-1a through Figure 3-1t.
Updated Elderberry Shrub Map Sheet, Figure 5-3.

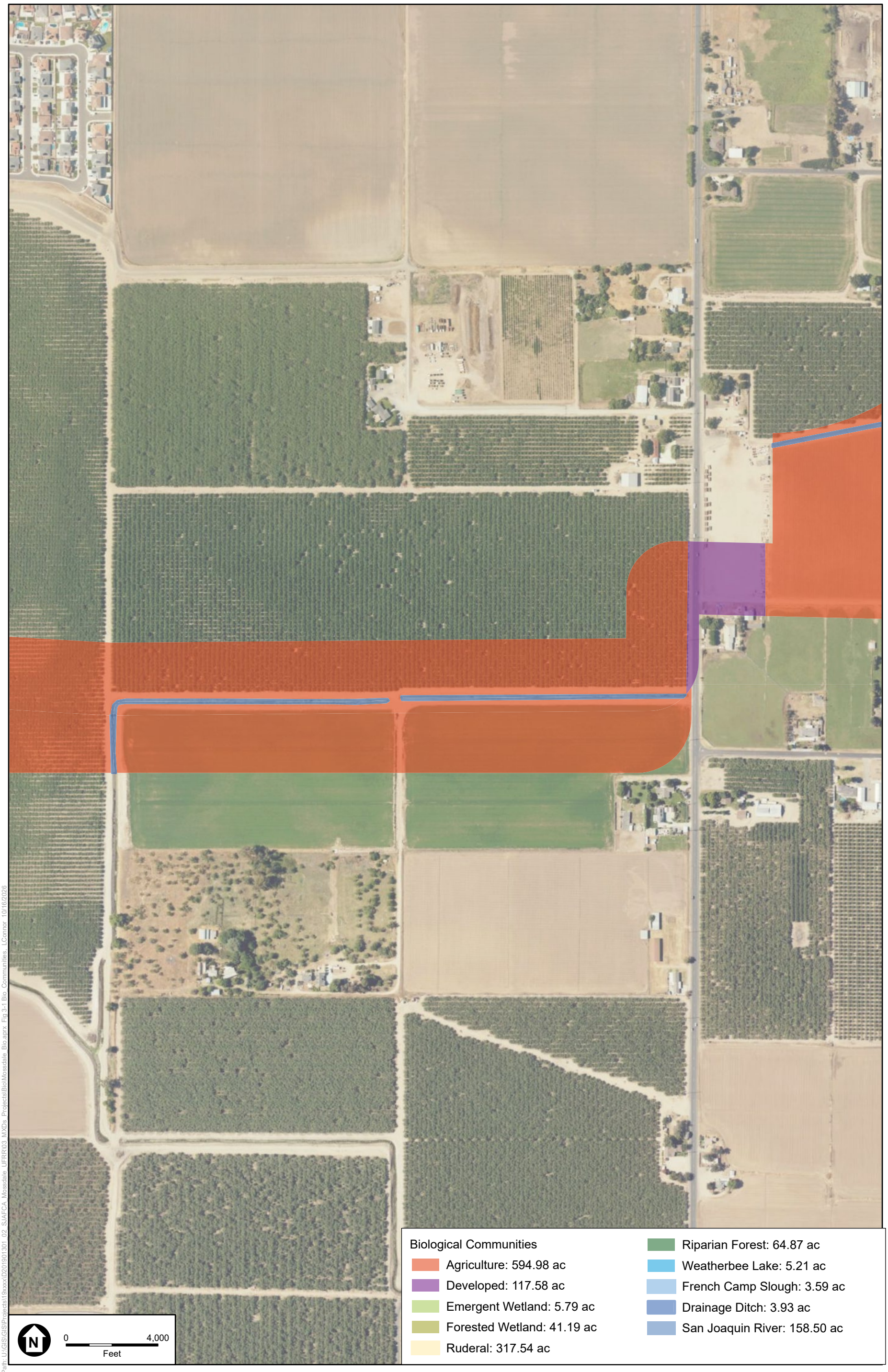


SOURCE: USDA, 2022; CPAD, 2021; KSN, 2025; PBI, 2022; ESA, 2025

SJAFCA Mossdale Tract Urban Flood Risk Reduction Project

Figure 3-1 p Biological Communities

ESA

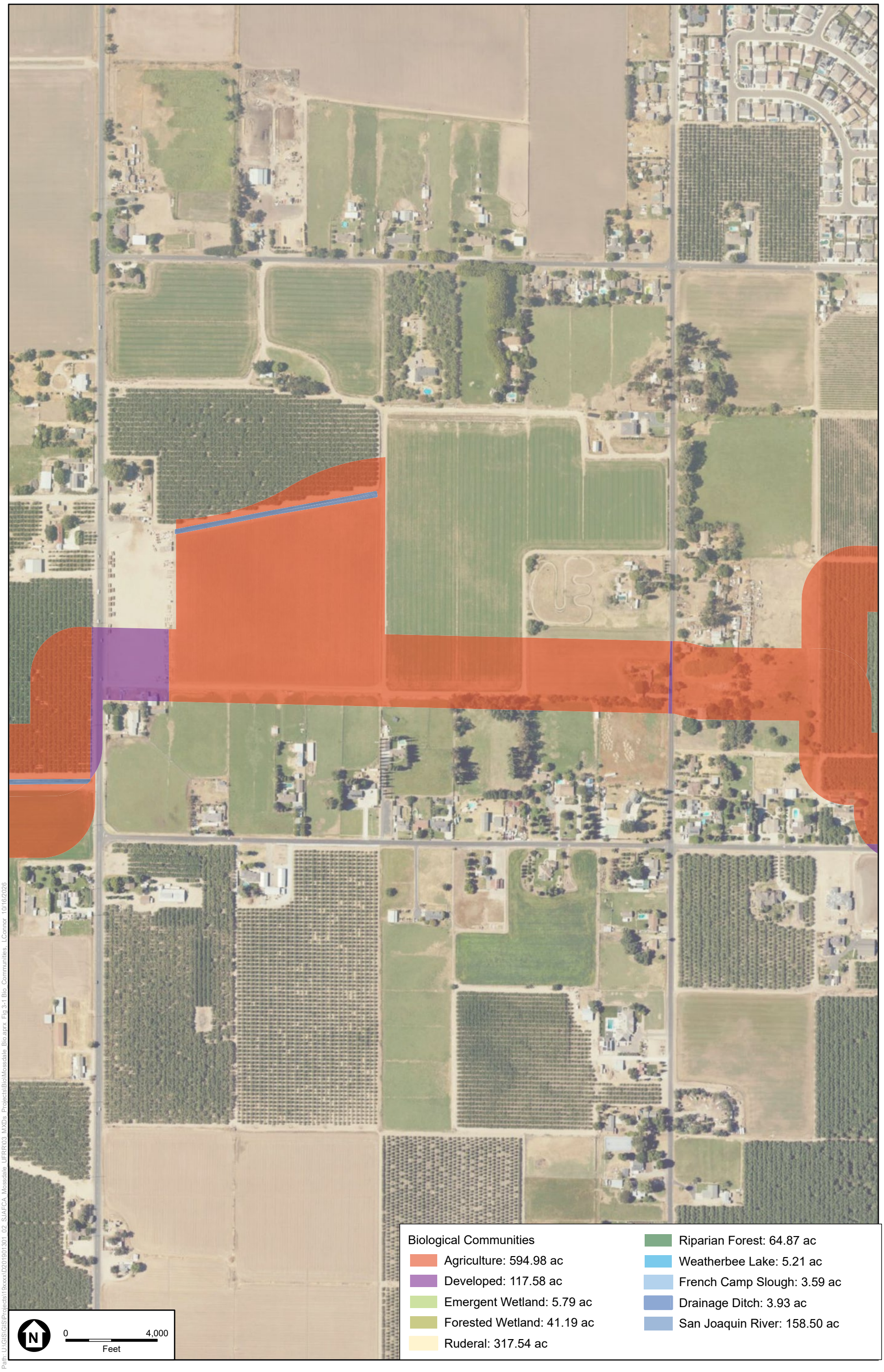


SOURCE: USDA, 2022; CPAD, 2021; KSN, 2025; PBI, 2022; ESA, 2025

SJAFCA Mossdale Tract Urban Flood Risk Reduction Project

Figure 3-1 q Biological Communities

ESA

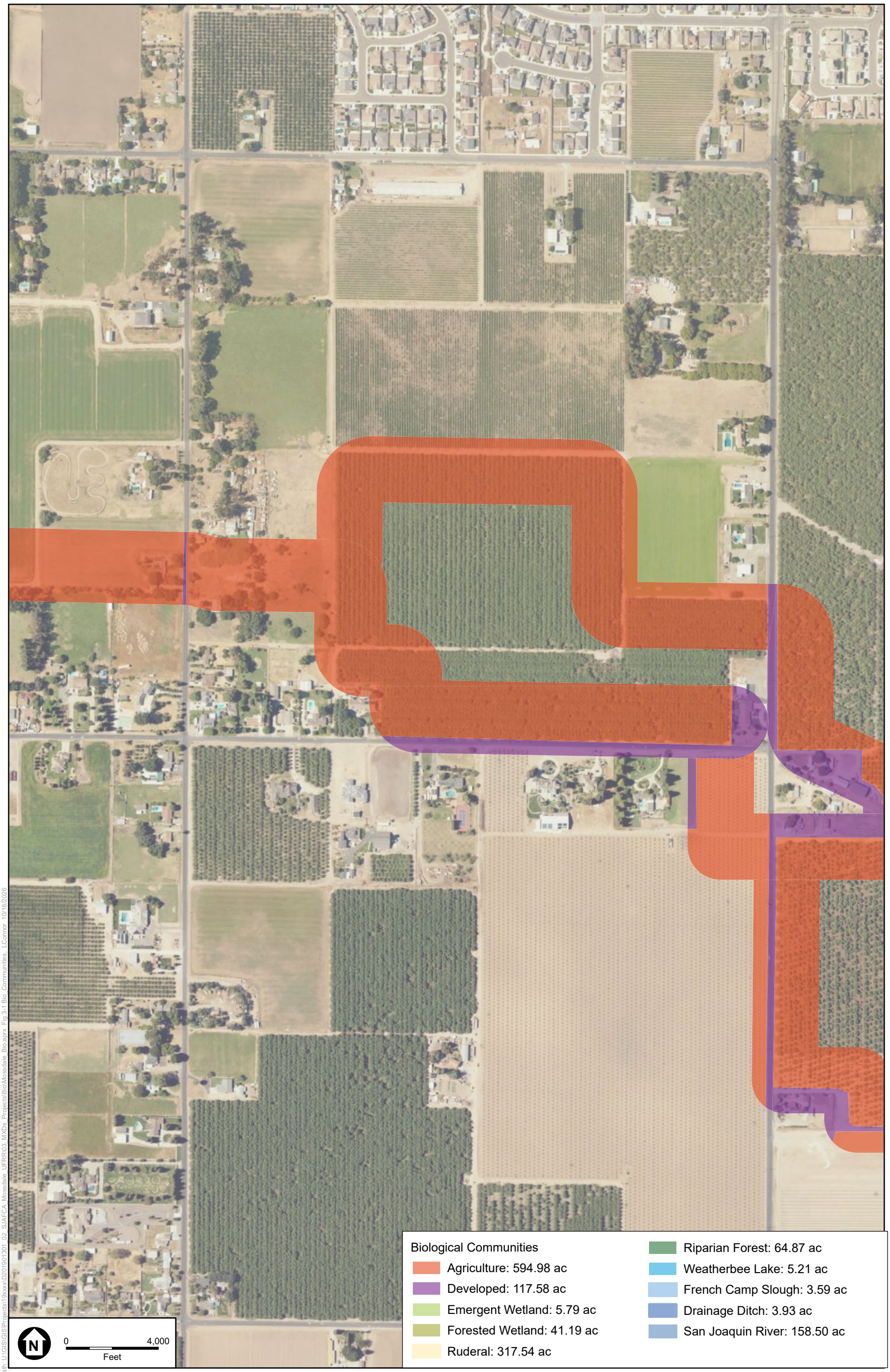


SOURCE: USDA, 2022; CPAD, 2021; KSN, 2025; PBI, 2022; ESA, 2025

SJAFCA Mossdale Tract Urban Flood Risk Reduction Project

Figure 3-1 r Biological Communities

ESA

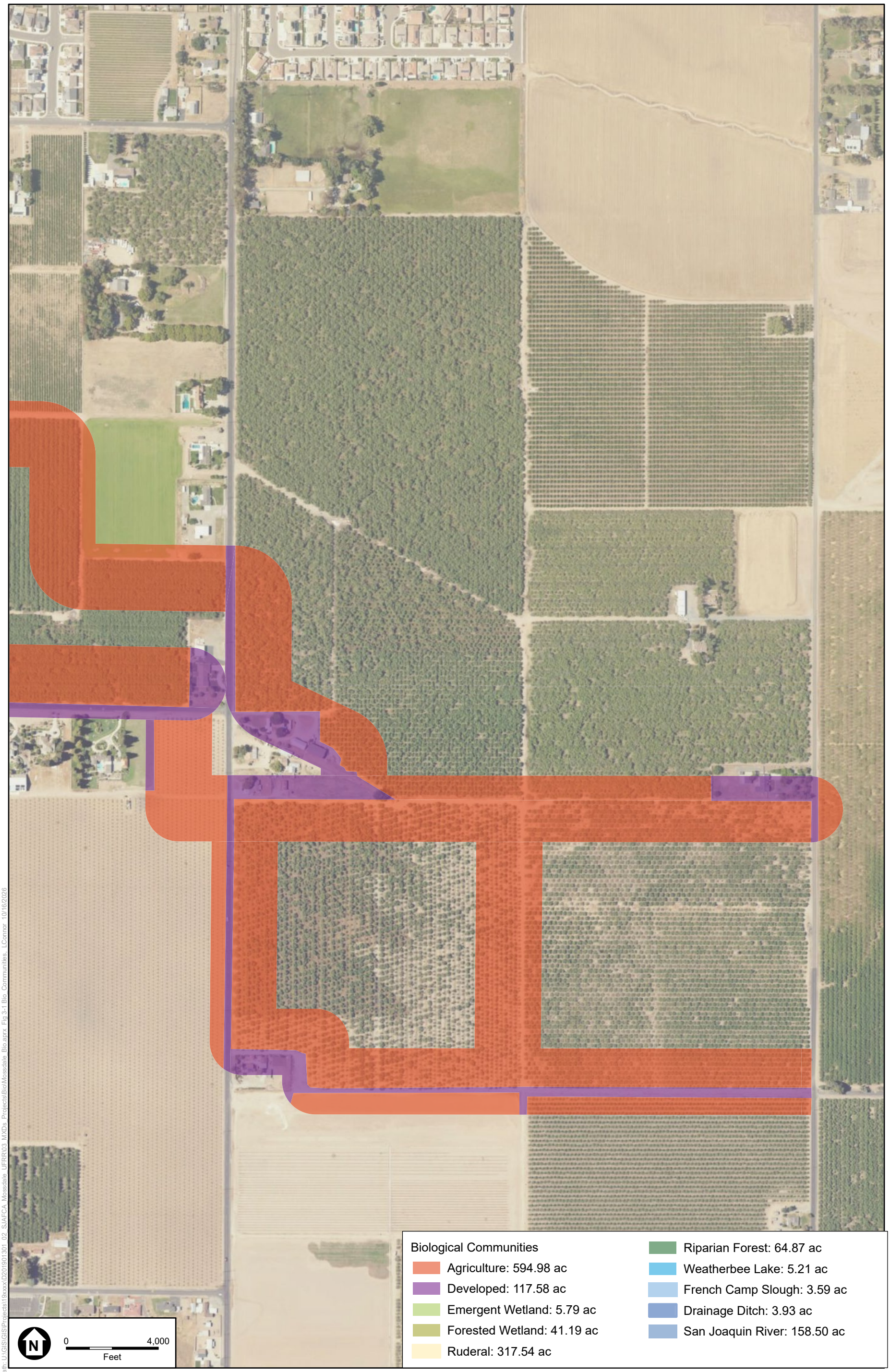


SOURCE: USDA, 2022; CPAD, 2021; KSN, 2025; PBI, 2022; ESA, 2025

SJAFCA Mossdale Tract Urban Flood Risk Reduction Project

Figure 3-1 s Biological Communities

ESA

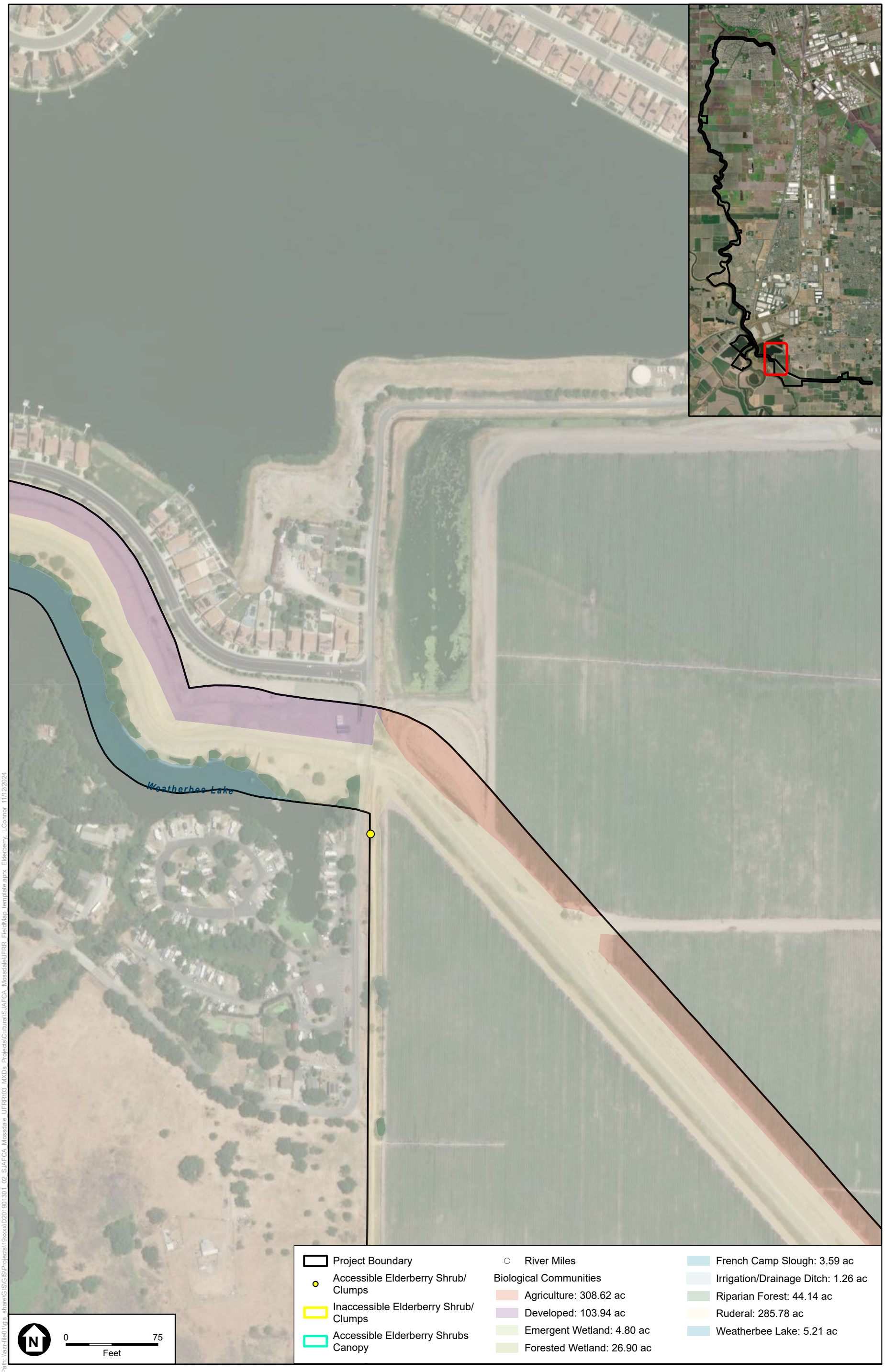


SOURCE: USDA, 2022; CPAD, 2021; KSN, 2025; PBI, 2022; ESA, 2025

SJAFCA Mossdale Tract Urban Flood Risk Reduction Project

Figure 3-1 t Biological Communities

ESA



SOURCE: MAXAR, 2021; CPAD, 2021; KSN, 2022; PBI, 2022; ESA, 2022

SJAFCA Mossdale Tract Urban Flood Risk Reduction Project

Figure 5-3 Elderberry Shrubs

Appendix B
Cultural Resources Assessment

ESA

2600 Capitol Avenue
Suite 200
Sacramento, CA 95816
916.564.4500 phone
916.564.4501 fax

esassoc.com

memorandum

date	October 7, 2026
to	Ruth Darling, LWA
cc	Cathy McEfee, ESA
from	Heidi Koenig, ESA
subject	Results of Cultural Resource Assessment for the Mossdale Project Dryland Levee Extension, Alternative Routes Segments 2.1, 2.2, 2.3, and 3

This memorandum provides the results of a cultural resource assessment conducted for a proposed alternative route (Segments 2.1, 2.2, 2.3, and 3) for the dryland levee extension that was approved as part of the Mossdale Tract Area Urban Flood Risk Reduction Project (approved project). An Archaeological and Architectural Resources Inventory Report (ESA, 2025) was prepared for the approved project that covered the approved project area but did not include the proposed alternative routes of the dryland levee extension.

In February 2022, ESA requested a cultural resources records search for the project from staff at the Central California Information Center (CCIC), California State University, Stanislaus. The study area for the records search was the APE with a 0.25-mile buffer. The CCIC maintains the official CHRIS records of previous cultural resources studies and recorded cultural resources for the APE and vicinity. With modifications to the APE, ESA requested several records search updates from the CCIC for the APE and vicinity. There are no previously documented cultural resources in the proposed alternative routes of the dryland levee extension.

ESA archaeologist Eleni Carwin performed a site visit and survey for the proposed alternative route on September 30, 2026 (see **Photos 1-4**). The area surveyed included Reach Segment 2.1 and Reach Segment 2.3 specifically the areas which were not surveyed on previous pedestrian efforts. Reach 2.1 consisted of almond orchards with machine and agricultural disturbance. The soil was compacted silt with grassy vegetation between the orchard rows and a ground visibility of approximately 65-75%. There were unimproved dirt access roads between some of the orchard blocks with 100% visibility. Segment 2.3 was surveyed and is characterized by two distinct environments. The first is the almond orchard area, which was undergoing agricultural work during the survey and comprised of a dry compact silt. The area between the rows was being swept and as such there was very little vegetation and a greater ground visibility of 85-90% with 100% in the dirt access roads at the perimeter of the parcel. The second area is east of Union Road and is comprised of a bare field which has evidence of harrowing or another recent mechanical disturbance most likely for an agricultural purpose. The soil is silt and there is no vegetation with a ground visibility of 100%. No pre-contact Native American or historic-era cultural materials or other evidence of past human use was identified during the survey effort.

Photo 1. Overview of proposed alignment in Reach 2.1 facing west



Photo 2. Overview of proposed alignment in Reach 2.1 facing east



Photo 3. Overview of proposed alignment in Segment 2.3 orchard area, facing south



Photo 4. Overview of proposed alignment in Segment 2.3 field area, facing south



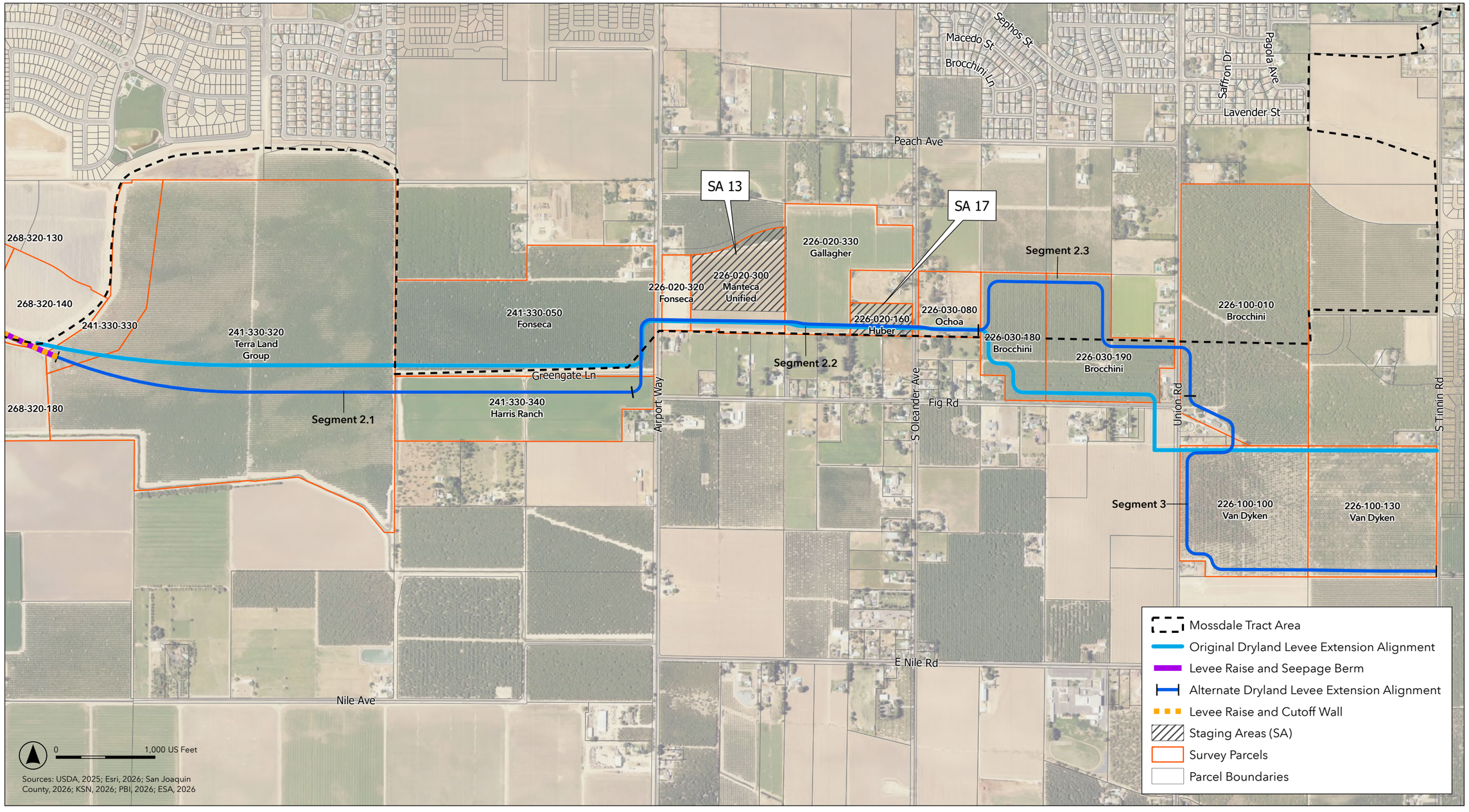


Figure 1
Dryland Levee Alternative Alignment
Survey Map - September 18, 2026

Appendix C
Hydraulic Impact Analysis

Mossdale Urban Flood Risk Reduction Project
Hydraulic Impact Analysis

Prepared for: San Joaquin Area Flood Control Agency (SJAFCA)

Date: September 30, 2026

Prepared by: Baron Creager, PE, CFM & Nick McGuire, PE

Reviewed by: Mike Rossiter, PE, CFM

INTRODUCTION

This technical memorandum (TM) was developed for the San Joaquin Area Flood Control Agency (SJAFCA) to support implementation of the Mossdale Tract Urban Flood Risk Reduction (UFRR) Project (Project). The purpose of the UFRR Project is to provide 200-year Urban Level of Protection (ULOP) to the Mossdale Tract Area in accordance with the requirements of Senate Bill (SB5). The Project includes fix-in-place levee improvements along the right bank of the lower San Joaquin River (LSJR) and a dryland levee extension south of Manteca, CA.

R&F Engineering, Inc. (R&F) conducted an analysis to assess potential hydraulic impacts associated with implementation of the Project, primarily focusing on the proposed dryland levee extension which is intended to prevent flanking floodwaters from entering the Mossdale Tract. This TM summarizes the methods and results of the hydraulic impact analysis.

BACKGROUND

The existing levees surrounding the Mossdale Tract are designed to provide protection against the 100-year flood event under current climate conditions. The “100-year flood event” refers to a flow event that has a 1-in-100 (or 1%) chance of occurring in any given year and serves as the standard level of protection used by the Federal Emergency Management Agency (FEMA) for levee accreditation.

As noted previously, California Senate Bill 5 (SB 5) requires a higher standard of protection—specifically, the 200-year (0.5% annual chance) flood event—for levees protecting urban and urbanizing areas within the Central Valley. In support of this requirement, the California Department of Water Resources (DWR) published the Urban Levee Design Criteria (ULDC) in 2012. The ULDC provides technical guidance for designing, evaluating, operating, and maintaining levees and floodwalls to meet 200-year protection standards, while also incorporating allowances for future climate change and associated hydrologic uncertainty.

The UFRR Project proposes to extend the existing dryland levee eastward and implement fix-in-place improvements along the right (east) bank of the Lower San Joaquin River (LSJR). These improvements are intended to enhance flood protection for the Mossdale Tract Area, to comply with ULOP requirements, and to provide resilience against future climate conditions.

Figure 1 presents the proposed UFRR Project elements, including the fix-in-place levee improvements and the dryland levee extension to Tinnin Road.

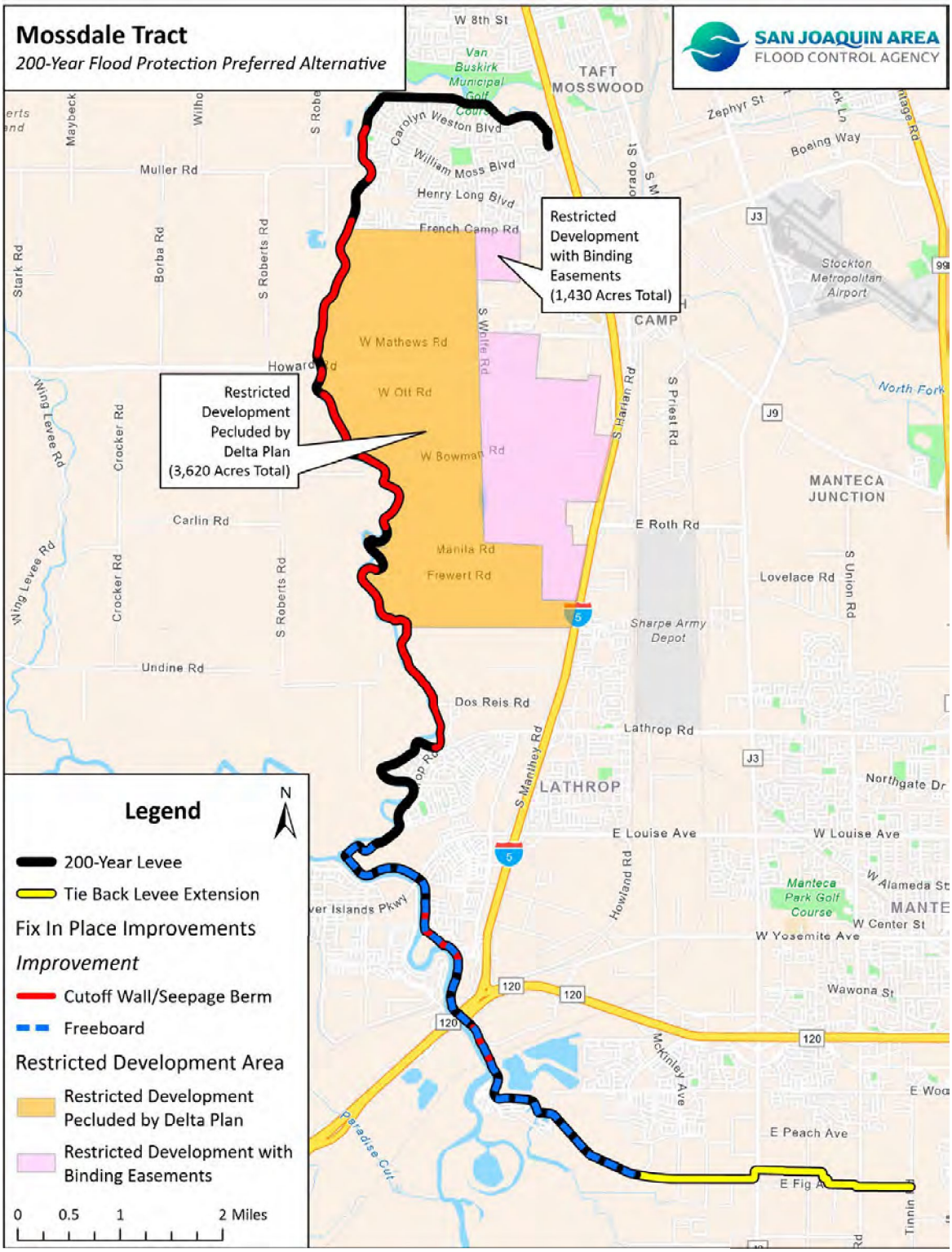


Figure 1. Proposed Mossdale UFRR Project Improvements.

HYDRAULIC MODEL DEVELOPMENT

The model used to evaluate hydraulic impacts of the UFRR project is a HEC-RAS v6.3.1 model that has been incrementally updated through various studies since its initial development by DWR as part of the Central Valley Flood Evaluation and Delineation (CVFED) program. The 2014 RD 17 Hydraulics Study[1] updated the CVFED model to v4.1 and recalibrated it. The 2021 UFRR Study[2] updated it to v5.0.3 which incorporated 2D floodplains into the model. In 2023, R&F up-versioned the model to v6.3.1, incorporated new 2017 terrain data flown by the United States Geological Survey (USGS), and further refined the model geometry[3]. A more detailed discussion of these updates to the HEC-RAS model can be found in the referenced reports.

To assess potential hydraulic impacts from implementing the UFRR project the existing (2022) hydrology was simulated under with- and without-project conditions. To assess the project's resilience to climate change the with- and without-project conditions are simulated under additional climate change hydrology scenarios. These scenarios and the associated assumptions are discussed in more detail below.

WITHOUT PROJECT CONDITIONS

The without-project condition represents the Lower San Joaquin River (LSJR) system without implementation of the proposed UFRR Project. The hydraulic model for this scenario is based primarily on 2017 LiDAR terrain data, which reflects existing topographic conditions and levee configurations at that time. Most notably, the Mossdale dryland levee is represented in its pre-project state, terminating at Tinnin Road.

Since 2017, the River Islands community of Lathrop has completed construction of a new ring levee system that surrounds the community. River Islands is located south and east of Old River, north of Paradise Cut, and west of the LSJR near the Interstate 5 (I-5) bridge, forming an "island" bounded by these three waterways. To reflect these improvements, R&F Engineering incorporated terrain data for the newly constructed ring levee into the model using as-built drawings and digital elevation models provided by MBK Engineers.

In addition, the Phase 1 Lower San Joaquin River Project (LSJRP)—led by the U.S. Army Corps of Engineers (USACE) in partnership with SJAFCA—is currently in design and will include levee improvements in North and Central Stockton. Planned improvements consist of fix-in-place levee upgrades and a new levee segment along the right bank of Duck Creek east of I-5. As this project is not yet constructed, the Phase 1 LSJRP improvements were not included in the current (2022) conditions model scenarios but were incorporated into the future climate change scenarios to reflect long-term implementation assumptions.

[1] PBI. 200-Year Freeboard Analysis & Floodplain Mapping within RD 17. May, 2014
[2] PBI. Mossdale Tract Area Urban Flood Risk Reduction: Hydraulic Modeling Technical Memorandum. June, 2021
[3] R&F Engineering. Mossdale Tract Urban Flood Risk Reduction: Hydraulic Model & Climate Change Update. 20 March 2023.

Figure 2 provides an overview of the key levee features under the without-project condition, including the existing extent of the Mossdale dryland levee, the River Islands ring levee, and planned Phase 1 LSJRP improvements.

WITH-PROJECT CONDITIONS

The with-project scenarios include the fix-in-place levee improvements and the dryland levee extension out to Tinnin Road that are associated with the Mossdale UFRR Project, as previously shown in Figure 1.

All levees, in both the without-project and with-project conditions, were assumed to hold and were not set to breach in any of the scenarios. If water surface elevations (WSELs) reached the top of the levees, the levees were modeled to act as weirs and overtop without failing.

HYDROLOGY

Model hydrology was derived from the 2022 Central Valley Flood Protection Plan (CVFPP) and accompanying hydraulic models. The CVFPP provides 200-year event at-latitude flows on the SJR at Vernalis, CA (Index Point SJ28) under existing (2022) conditions, as well as future (2072) conditions. The CVFPP provides low, median, and high projections for future conditions and the median projection was chosen for analysis and planning purposes on the Project.

The 200-year flow event under 2022 hydrologic conditions was used as the hydrology for current conditions scenarios. To represent future climate change conditions, the 200-year event under the CVFPP's median 2072 climate change hydrologic conditions were evaluated. In addition, the UFFR Project's design hydrology, which lies between current hydrologic conditions and CVFPP 2072 hydrologic conditions, were also evaluated.

The 2022 CVFPP sets the target at-latitude flows at Vernalis for the 200-year event under 2022 and 2072 (median) hydrologic conditions to be 101,300 cfs, and 320,900 cfs, respectively. To achieve these target flows, historic flood events were scaled up (e.g. 115% of the 1997 event) to meet the target peak flows. The UFRR Design Hydrology represents a climate change event between current hydrologic conditions and CVFPP 2072 hydrologic conditions and is set at 202,925 cfs. Further discussion of the UFRR Design Hydrology can be found in the Mossdale UFRR HBOD report[4]. At-latitude peak flows at Vernalis for the analyzed flow events are presented in Table 1 below.

Table 1. Flow Scenarios used for hydraulic impact analysis.

Flow Scenario	2022 CVFPP Vernalis At-Latitude Flow	1997 Scaled Event	Modeled Vernalis At-Latitude Flow
200-Year Current (2022) Condition	101,300 cfs	115%	104,520 cfs
200-Year UFRR Design Condition	202,925 cfs	160%	209,990 cfs
200-Year Future (2072) Condition	320,900 cfs	200%	315,047 cfs

[4] San Joaquin Area Flood Control Agency. Mossdale Tract Area Urban Flood Risk Reduction Project: Hydraulic Basis of Design Report. 17 February 2023.



R&F ENGINEERING
2270 Douglas Blvd, Suite 118
Roseville, CA 95661
(209)304-1739

San Joaquin Flood Control Agency

Without-Project Conditions for Hydraulic Impact Analysis

Figure 2

Date: 5/6/2025

Path: C:\Users\NickMcGuire\R&F Engineering, Inc\R&F Engineering - Documents\4.0 GIS\Project\SJAFCA\UFRR\MXD\Dryland Levee Hydraulic Impact Analysis\Hydraulic Impact Analysis.aprx

DOWNSTREAM BOUNDARY CONDITIONS

Downstream boundary conditions for the model were defined using variable stage hydrographs developed from historical Delta stage data. These hydrographs were scaled to align with peak water surface elevations (WSELs) currently being used for the design of the USACE Phase 1 LSJRP[5]. The 200-year Current (2022) Condition scenario followed a historical stage-frequency analysis at the locations of the model's downstream boundary conditions (Old River, Middle River, and the SJR). The 200-year UFRR Design and Future (2072) climate change conditions incorporate sea level rise of 0.66-feet and 1.66-feet respectively, consistent with what is being used for the Phase 1 LSJRP. The sea level rise estimate is based on the USACE Adopted Curve II published in EC 1165-2-212[6] which shows the sea level rise projections falling between the intermediate and high curves estimated by USACE. A breakdown of the peak water surface elevations for each of the downstream boundary conditions are shown in Table 2.

Table 2. Downstream Boundary Conditions (ft-NAVD88) used for hydraulic impact analysis.

Flow Scenario	Burns Cutoff	Grant Line Canal	Middle River	Old River	San Joaquin River
200-Year Current (2022) Conditions	11.34	12.69	11.85	12.69	11.34
200-Year UFRR Design Scenario	12.00	13.35	12.51	13.35	12.00
200-Year Future (2072) Conditions	13.00	14.35	13.51	14.35	13.00

MODEL SCENARIOS

To assess potential hydraulic impacts from implementing the UFRR project the existing (2022) hydrology was simulated under with- and without-project conditions. To assess the project's resilience to climate change the with- and without-project conditions are simulated under additional climate change hydrology scenarios. All scenarios were analyzed based on the assumptions and parameters detailed above. Table 3 below presents an overview of the four model scenarios and the associated conditions of each scenario.

Table 3. Overview of model scenarios used in hydraulic impact analysis.

UFRR Project Scenario	Index Year	Flow at Vernalis (cfs)	Sea Level Rise (feet)	UFRR Project (Fix-in-Place + Dryland Extension)	LSJRP – Phase 1	River Islands Levee
Without Project	**Current (2022) Conditions**	104,502	0.0	No	No	Yes
With Project				Yes	No	Yes
Without Project	**UFRR Design Conditions**	209,990	0.66	No	Yes	Yes
With Project				Yes	Yes	Yes
Without Project	**Future (2072) Conditions**	315,047	1.66	No	Yes	Yes
With Project				Yes	Yes	Yes

[5] USACE. Design Criteria and Assumptions for DWSPs and MTOLs. 3 April 2023.
[6] USACE. Sea-Level Change Considerations for Civil Works Programs. 1 October 2011.

RESULTS

The following section presents the results of the with- and without-project existing (2022) conditions scenarios developed to evaluate the potential hydraulic impacts of the proposed UFRR Project. A high-level evaluation of the project's resiliency to climate change is also provided.

CURRENT (2022) CONDITIONS

WITHOUT PROJECT

Figure 3 shows the modeled floodplain under the 200-year Current (2022) Condition event without implementation of the UFRR Project. Under this scenario, the existing dryland levee remains intact but is flanked along its eastern end. Floodwaters flank around the levee system, with up to 3,300 cfs of overland flow entering the Mossdale Tract from the south.

The result is extensive flooding within 3,680 acres of the Mossdale Tract. Approximately 20,000 acre-feet of floodwater inundates residential and industrial areas north of the dryland levee. The Oakwood Shores neighborhood and adjacent areas are among the most severely impacted, with flood depths exceeding 10 feet. Flooding depths generally decrease moving eastward across the floodplain, ranging from 2 to 5 feet in depth, while areas east of Airport Way experience more localized street-level flooding. Commercial and industrial parcels north of Highway 120 are inundated to depths between 0 and 5 feet.

Additional overland flooding occurs outside the Mossdale Tract area, particularly west of the San Joaquin River (SJR). Flooding is observed near River Islands (south of I-5), north of Tracy and Mountain House, in southern Roberts Island, and throughout portions of Stockton and French Camp. Many of the non-urban levees along the lower San Joaquin River system are geotechnically fragile and become unstable in as little as a 10-year flow event. Under a real-world 200-year flood, these levees would likely fail before being overtopped, further exacerbating regional flood risks.

WITH-PROJECT

Figure 4 illustrates the modeled floodplain for the same 200-year event, but with the Mossdale UFRR Project in place. With the proposed levee improvements, including the dryland levee extension, flanking at the eastern edge of the Mossdale Tract is prevented. As a result, flooding is completely eliminated within the Mossdale Tract under the 200-year event.

Localized flooding persists near French Camp and parts of Stockton, but these areas are also inundated under the without-project condition and are not considered to be impacted by project-induced changes. Minor increases in flood extent are observed west of the SJR, which are further discussed in the following comparison section.

COMPARISON OF WITH- AND WITHOUT PROJECT CONDITIONS

Figures 5 and 6 show the *changes* in flood extent and flood depth, respectively, resulting from implementation of the Mossdale UFRR Project. Overall, approximately 3,680 acres are removed

from the 200-year floodplain under 2022 conditions. This benefit is concentrated north of the extended dryland levee, where floodwaters are redirected away from the Mossdale Tract and back into the San Joaquin River system.

This redirection of flow slightly raises in-channel WSELs—by approximately 0.1 feet in Old River and 0.2 feet in the San Joaquin River. These increases are relatively small, but with many levees already being overtopped under the without-project scenario and with the surrounding topography being relatively flat, the increased WSELs lead to some additional shallow overland flooding, primarily west of the SJR. Approximately 2,970 acres of previously dry land experience new inundation, most of which is agricultural.

Flood depths in these newly flooded areas remain shallow—generally less than 3 feet. The most notable increase in depth occurs in an existing low-lying pond west of the SJR, between I-5 and the Union Pacific Railroad, where modeled depths reach approximately 6 feet. However, this location is undeveloped and already subject to ponding under current conditions.

Table 4 summarizes changes in flooded acreage by depth category. Under with-project conditions, there is a slight increase in areas experiencing shallow flooding (less than 3 feet), a minor reduction in moderate flooding (3 to 5 feet), and a notable reduction in deep flooding (greater than 5 feet). The net effect is a reduction in total inundated area of approximately 680 acres.

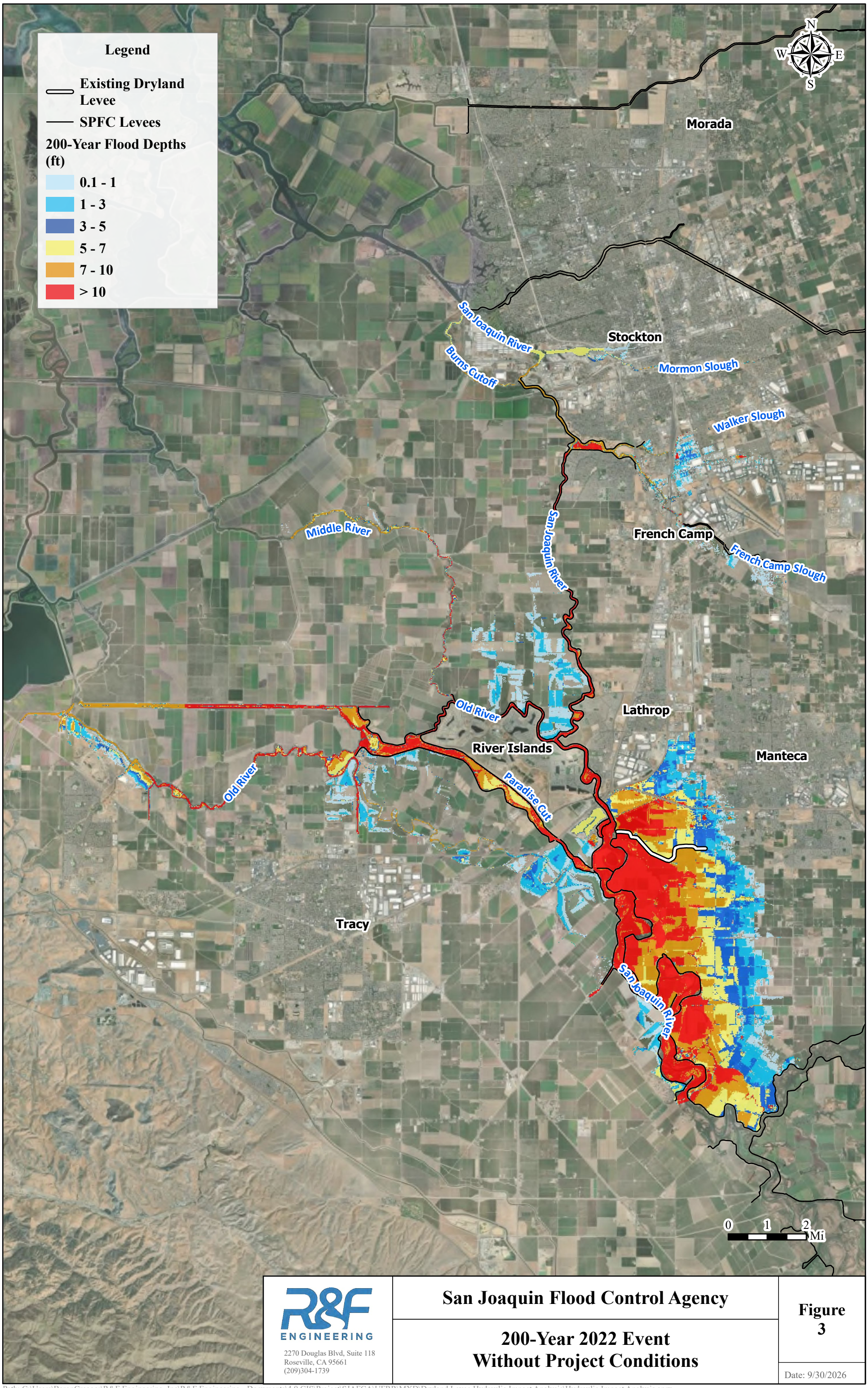
Table 5 confirms that the UFRR Project does not cause any new flooding under more frequent, lower-magnitude events. The 2-, 5-, 10-, 50-, and 100-year events remain unaffected, as the existing Mossdale levees already provide adequate protection for these flood scenarios.

Table 4. Area flooded in 2022 WOP and 2022 WP scenarios categorized by depth.

Flooding Depth (ft)	0.10 - 0.25	0.25 - 0.50	0.50 - 0.75	0.75 - 1	1 - 3	3 - 5	>5	TOTAL
WOP (acres)	830	1,230	990	820	4,080	2,590	10,250	**20,790**
WP (acres)	850	1,410	1,280	1,060	4,910	2,180	8,390	**20,080**
Difference (acres)	20	180	290	240	830	-410	-1,860	**-710**

Table 5. Newly flooded area and flooded area removed in Current (2022) Condition scenario due to UFRR Project implementation.

Return Period Event	2-year	5-year	10-year	50-year	100-year	200-year
Newly Flooded Area (acres)	No Change	No Change	No Change	No Change	No Change	2,970
Flooded Area Removed (acres)	No Change	No Change	No Change	No Change	No Change	-3,680



R&F ENGINEERING

2270 Douglas Blvd, Suite 118
Roseville, CA 95661
(209)304-1739

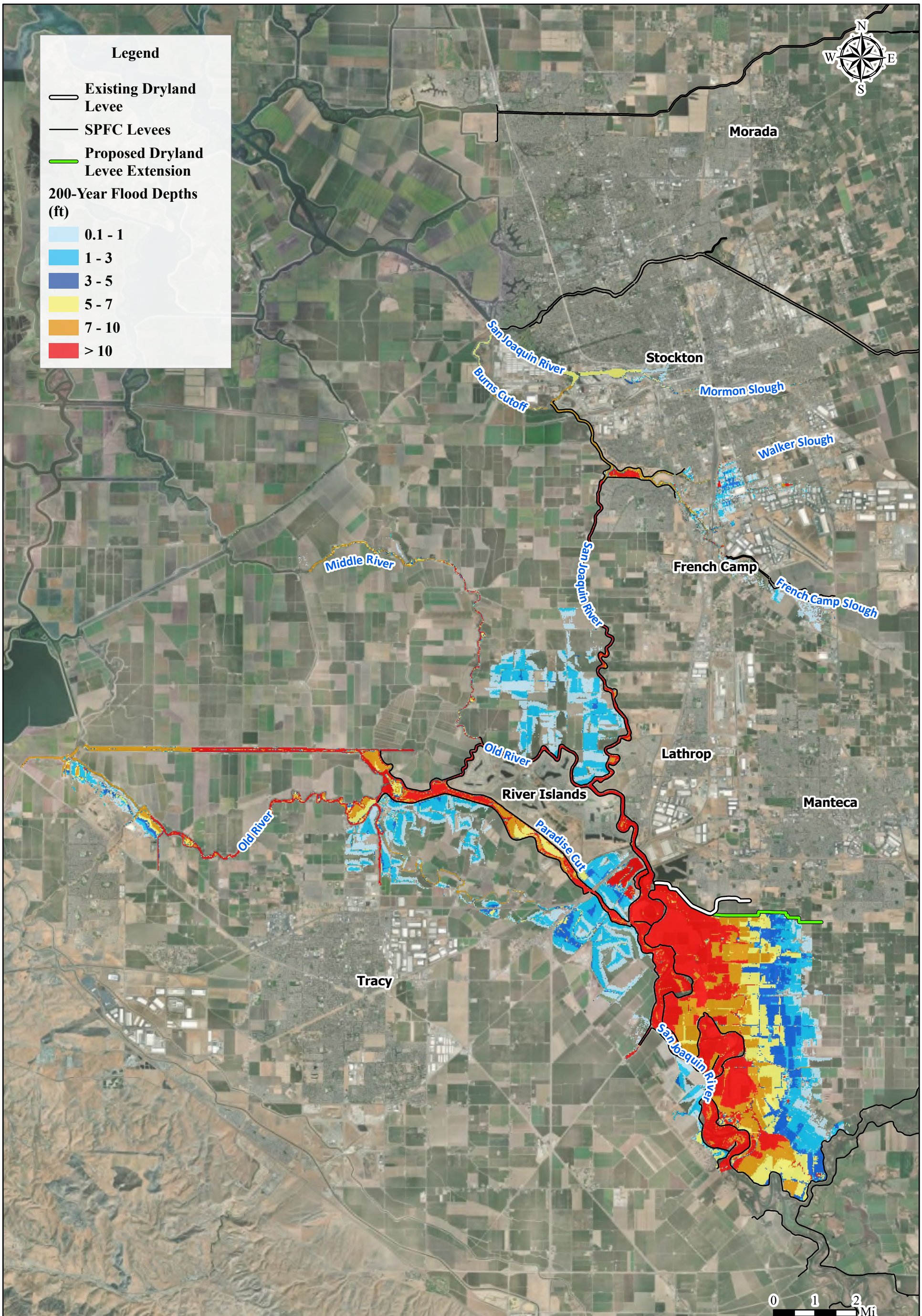
San Joaquin Flood Control Agency

200-Year 2022 Event
Without Project Conditions

Figure 3

Date: 9/30/2026

Path: C:\Users\BaronCreager\R&F Engineering, Inc\R&F Engineering - Documents\4.0 GIS\Project\SJAFCA\UFRR\MXD\Dryland Levee Hydraulic Impact Analysis\Hydraulic Impact Analysis.aprx



R&F ENGINEERING

2270 Douglas Blvd, Suite 118
Roseville, CA 95661
(209)304-1739

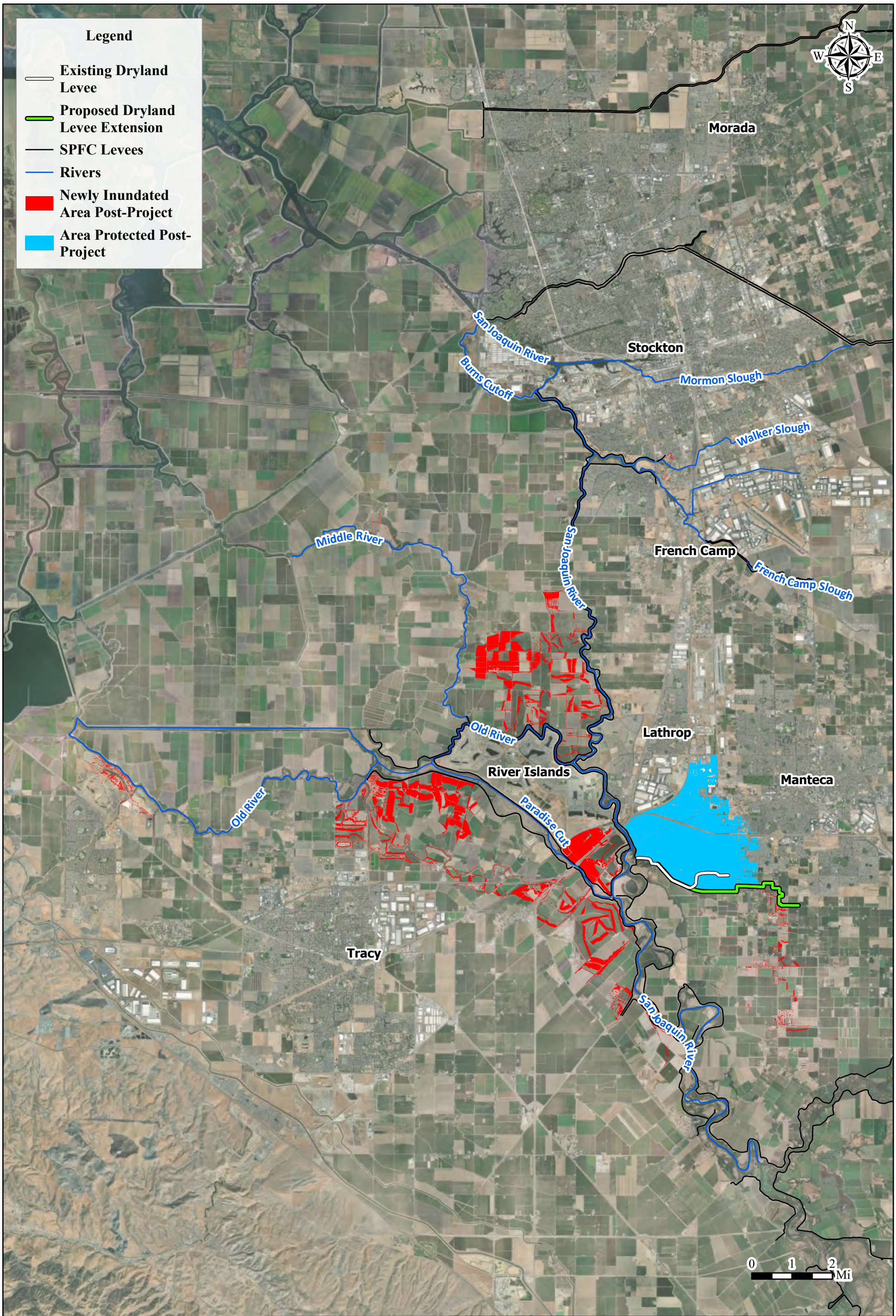
San Joaquin Flood Control Agency

200-Year 2022 Event With Project Conditions

Figure 4

Date: 9/30/2026

Path: C:\Users\BaronCreager\R&F Engineering, Inc\R&F Engineering - Documents\4.0 GIS\Project\SJAFCA\UFRR\MXD\Dryland Levee Hydraulic Impact Analysis\Hydraulic Impact Analysis.aprx



R&F ENGINEERING

2270 Douglas Blvd, Suite 118
Roseville, CA 95661
(209)304-1739

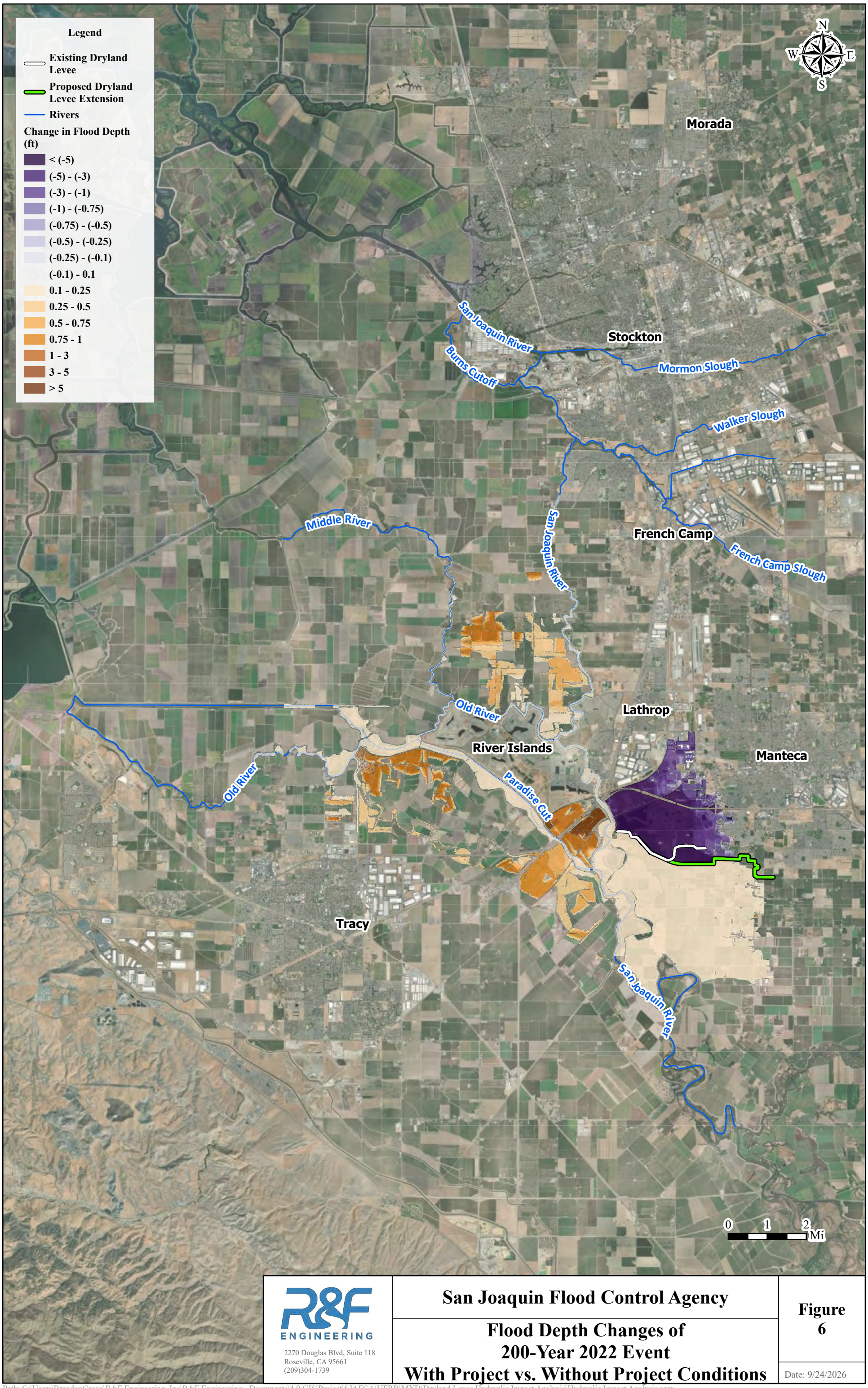
San Joaquin Flood Control Agency

Area Removed from the 2022 Floodplain and Newly Inundated Area due to Project Implementation

Figure 5

Date: 9/24/2026

Path: C:\Users\BrandonGreen\R&F Engineering, Inc\R&F Engineering - Documents\4.0 GIS\Project\SJAFCA\UFRR\MXD\Dryland Levee Hydraulic Impact Analysis\Hydraulic Impact Analysis.aprx



R&F ENGINEERING
2270 Douglas Blvd, Suite 118
Roseville, CA 95661
(209)304-1739

San Joaquin Flood Control Agency

Flood Depth Changes of 200-Year 2022 Event With Project vs. Without Project Conditions

Figure 6

Date: 9/24/2026

Path: C:\Users\BrandonGreen\R&F Engineering, Inc\R&F Engineering - Documents\4.0 GIS\Project\SJAFCA\UFRR\MXD\Dryland Levee Hydraulic Impact Analysis\Hydraulic Impact Analysis.aprx

CONCLUSIONS OF CURRENT (2022) CONDITIONS SCENARIOS

Under current (2022) conditions, the Mossdale UFRR Project is effective in eliminating 200-year flood risk within the Mossdale Tract and prevents flanking of the dryland levee. This results in significant flood risk reduction for the homes, businesses, and critical infrastructure in the area. While redirected floodwaters lead to minor increases in river stages and shallow flooding in adjacent areas—primarily south of the dryland levee and west of the San Joaquin River—these impacts are limited in both depth and extent and do not impact urbanized areas. No new flooding occurs under smaller, more frequent (100-year or less) flood events.

Impacts to agricultural areas under with-project conditions primarily consist of slightly deeper flood depths and potentially longer flood durations. The hydraulic modeling conducted for this analysis does not account for infiltration losses or percolation of floodwaters into the ground. Instead, it assumes that all floodwaters remain ponded in place. In reality, the predominant soil type in the affected area is Hydrologic Soil Group C, which has an average infiltration rate of approximately 0.1 inches per hour[7]. At this rate, one foot of standing water would take about five days to infiltrate into the soil. In addition, depending on ambient air temperatures, some reduction in ponded depth would also occur due to evaporation. Because the flooded areas are generally flat, both percolation and evaporation would help to shorten the overall duration of shallow flooding impacts in these agricultural areas.

Overall, the analysis demonstrates that the Project substantially reduces flood risk within the protected area, with only minor and manageable changes elsewhere in the system.

CLIMATE CHANGE RESILIENCY

The UFRR Design conditions and Future (2072) conditions were evaluated to determine the project's sensitivity and resiliency to climate change. Both conditions convey significantly more water through the San Joaquin River system, and both are subject to higher sea levels due to climate change.

The without-project scenarios inundate the entirety of Mossdale Tract and affected parts of downtown Stockton when floodwaters re-entered French Camp Slough, raising local water surface elevations. The interior of River Islands remains dry, but levees along Old River, Middle River, and San Joaquin River are overtopped, and thousands of acres of farmland are inundated. The northern extents of Tracy are affected by flooding, but the affected parcels are predominantly industrial and commercial, not residential.

The with-project scenarios remove Mossdale Tract from the 200-year floodplain and redirect floodwaters back in the San Joaquin River at the dryland levee. Since water does not travel overland to French Camp Slough, water levels do not rise high enough to inundate downtown Stockton to the same degree as the without-project scenario. Some residual flooding from Mormon Slough and Walker Slough is still observed. The water redirected from Mossdale Tract

[7] USACE. HEC-RAS 2D User's Manual – Infiltration Methods. 2025

minorly increases flood extents and flood depths in the rest of the project area, but over 10,000 net acres are removed from the floodplains with implementation of the proposed project, and Mossdale Tract is protected. Therefore, the project is resilient against potential future climate change and would further protect the project area should such an extreme event occur.

SUMMARY

This memorandum summarizes the results of a hydraulic impact analysis conducted to evaluate the effects of implementing the Mossdale Tract Urban Flood Risk Reduction (UFRR) Project. The purpose of the analysis is to assess how the proposed levee improvements—primarily the dryland levee extension—affect regional flood behavior under the current (2022) 200-year flood conditions, while considering resiliency to potential future climate change conditions.

Under current (2022) conditions, the Mossdale UFRR Project is shown to eliminate 200-year flooding within the Mossdale Tract by preventing flanking of the existing dryland levee. This provides meaningful flood risk reduction to homes, businesses, and infrastructure in the area. While the Project redirects some floodwaters back into the San Joaquin River system, the resulting increases in flood extent are limited to shallow overland flooding in primarily agricultural areas west of the river and south of the dryland levee. These impacts are minor in both depth and extent and do not affect urbanized areas. The analysis also confirms that the Project does not cause any new flooding under more frequent events, including those at or below the 100-year level. The project is also shown to provide protection to the project area under potential future climate change conditions.

MODELING ASSUMPTIONS AND LIMITATIONS

As with all hydraulic modeling, this analysis includes several simplifying assumptions and limitations that may affect how an extreme flood event would unfold in reality. Results from this analysis should be interpreted with these limitations in mind.

The model was run over a 27-day simulation window, which is sufficient to capture peak inundation depths and extents but does not simulate full drainage or drying of floodwaters. In an actual flood event, emergency response actions—such as relief cuts, pumping, or temporary flood barriers—could influence flood behavior and recession rates. Additionally, natural processes like evaporation and infiltration would begin to reduce ponded water volumes following peak inundation.

The complex network of tributaries and confluences within the Lower San Joaquin River system makes the model extremely susceptible to instability. Each river reach typically requires some flow to keep the computations stable. There are some waterways in the model (e.g. Mormon Slough and Walker Slough) that have minimum flows running through them that are not based on any flow event, but only present to maintain model stability. Some overtopping in downtown Stockton is observed from these channels that is unlikely to be observed in reality, but it exists in the modeling environment to ensure stability and solution convergence.

This analysis assumes that all levees remain intact throughout the simulated flood event, with no structural failures occurring. Overtopping is allowed in the model, but breach behavior—such as levee erosion or collapse—is not simulated. In reality, many non-urban levees in the lower San Joaquin River region are uncertified and may be vulnerable to failure during large events. If such breaches were to occur, the extent and depth of flooding could differ significantly from the modeled results. The same applies to upstream levees in the San Joaquin River watershed, where failure could alter the volume and timing of flows reaching Vernalis and, ultimately, the project area.