ADMINISTRATIVE DRAFT ◦ FEBRUARY 2022

Initial Study/Mitigated Negative Declaration Bacon Island Levee Rehabilitation Project, Connection Slough and Santa Fe Cut Corridor

PREPARED FOR

Reclamation District No. 2028
(Bacon Island)
343 East Main Street, Suite 815
Stockton, CA 95202

PREPARED BY

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Suggested citation:
Reclamation District No. 2028. 2022. Initial Study/Mitigated Negative Declaration: Bacon Island Levee Rehabilitation Project, Connection Slough and Santa Fe Cut Corridor. Administrative Draft. Prepared by Stillwater Sciences, Davis, California for Reclamation District No. 2028 (Bacon Island), Stockton, California.

Cover photo: View of Bacon Island's southwestern levee corner and surrounding interior lands.

PROJECT SUMMARY

Project title	Bacon Island Levee Rehabilitation Project
CEQA lead agency name and address	Reclamation District No. 2028 (Bacon Island) 343 East Main Street, Suite 815 Stockton, California 95202
CEQA responsible agencies	• California Department of Water Resources (funding) • The Metropolitan Water District of Southern California (landowner) • California Department of Fish and Wildlife (Lake and Streambed Alteration Agreement)
Contact person and phone number	Nate Hershey, P.E. District Engineer and Brian Janowiak, P.E. Project Engineer MBK Engineers 455 University Avenue, Suite 100 Sacramento, CA 95825 Office: (916) 456-4400 Email: janowiak@mbkengineers.com
Project location	Bacon Island levee stations 200+00 to 300+00 (Connection Slough) and 625+00 to 707+00 (Santa Fe Cut), Sacramento-San Joaquin Delta, San Joaquin County
Project sponsor's name and address	Reclamation District No. 2028 (Bacon Island) 343 East Main Street, Suite 815 Stockton, California 95202
Zoning	Agriculture
Description of Project	Rehabilitate a portion of the north and south side (3.5 miles) of Bacon Island's levee system
Surrounding land uses and setting	Project is surrounded by Connection Slough (north) and Santa Fe Cut Corridor (south) and farmed lands on the interior of the island

PROPOSED MITIGATED NEGATIVE DECLARATION

Project: Bacon Island Levee Rehabilitation Project

Lead Agency: Reclamation District No. 2028

Project Location: Bacon Island is located in the central Sacramento-San Joaquin River Delta, approximately halfway between the city of Antioch to the west and Stockton to the east, in San Joaquin County, California. It is situated south of Mandeville Island, west of Mildred Island and Lower Jones Tract, north of Woodward Island, and east of Holland Tract.

Project Description: Reclamation District No. 2028 plans to rehabilitate the north and south sides of Bacon Island's levee system (Connection Slough and Santa Fe Cut), approximately 3.5 miles in length total, to sustainably achieve the minimum requirements of Bulletin 192-82 standard. Levee rehabilitation consists of widening and raising the levee crest, armoring the raised portion of the levee crest, flattening the landside levee slope, and placing an all-weather surface on the finished levee crest. Soil fill material may be sourced from within Bacon Island (on-site borrow) or as import from regional off-site commercial locations. Existing levee encroachments or penetrations such as siphon pipes, drain pipes, and unused structures or remnants of structures may be removed or relocated to facilitate the levee rehabilitation.

Findings: An Initial Study has been prepared to assess the Project's potential effects on the environment and the significance of those effects. Based on the Initial Study, Reclamation District No. 2028 has determined that the Project will not have any significant effects on the environment with implementation of mitigation measures. This conclusion is supported by the following findings:

- The Project will result in no impacts on mineral resources, population and housing, public services, recreation, transportation, utilities and service systems, and wildfire.
- The Project will result in less than significant impacts on aesthetics, agricultural and forest resources, air quality, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, and noise.
- Mitigation would reduce potentially significant impacts to less than significant levels for biological resources, cultural resources, and tribal cultural resources.

Mandatory Findings of Significance:

- The Project will not substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory.
- The Project will not have environmental effects that are individually limited, but cumulatively considerable.
- The Project will not have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly.
- The Project will not achieve short-term environmental goals to the disadvantage of long-term environmental goals.

- No substantial evidence exists that the Project will have a negative or adverse effect on the environment.

Proposed Mitigation Measures: Mitigation measures included in the Project to avoid or minimize potential environmental impacts are included in the attached Initial Study, which is hereby incorporated and fully made part of this Mitigated Negative Declaration. Implementation of these mitigation measures will reduce the potential environmental impacts of the Project to a less than significant level. Reclamation District No. 2028 has agreed to implement each of the identified mitigation measures, which will be adopted as part of the Mitigation Monitoring and Reporting Program.

Determination
In accordance with Section 21082.1 of the California Environmental Quality Act (CEQA), Reclamation District No. 2028 has independently reviewed and analyzed the Initial Study and proposed Mitigated Negative Declaration for the Project and finds that the Initial Study and proposed Mitigated Negative Declaration reflects the independent judgment of Reclamation District No. 2028. The lead agency further finds that the Project mitigation measures will be implemented as stated in the Initial Study and Mitigated Negative Declaration. This Mitigated Negative Declaration is filed in accordance with CEQA and the State CEQA guidelines.

I hereby approve this Project:

_____ _____
Reclamation District No. 2028 Date

ACRONYMS AND ABBRVIATIONS

Acronym	Definition
µg/m^3	micrograms per cubic meter of air
AB	Assembly Bill
ac	acre
BERD	Built Environment Resources Directory
BMP	best management practice
Btu	British thermal units
cal	calibrated
CalFire	Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCIC	Central California Information Center
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDTSC	California Department of Toxic Substances Control
CEC	California Energy Commission
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CGS	California Geological Survey
CH_4	methane
CHRIS	California Historical Resources Information System
CNDDB	California Natural Diversity Database
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
dB	decibels
DBH	Diameters at breast height
DDT	Dichlorodiphenyltrichloroethane
District	Reclamation District No. 2028
DWR	Department of Water Resources
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FMMP	Farmland Mapping and Monitoring Program
FNU	Formazin Nephelometric Unit
ft	feet
GHG	greenhouse gas
HTL	High Tide Line
IPaC	Information for Planning and Conservation
IS/MND	Initial Study/Mitigated Negative Declaration
LSAA	Lake and Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
MHW	Mean High Water
mi	mile
MLD	Most Likely Descendent
mm	millimeter
MRDS	Mineral Resource Data System

Acronym	Definition
MSDS	Material Safety Data Sheet
N_2O	Nitrous Oxide
n/a	Not Applicable
NAHC	Native American Heritage Commission
NO_x	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOC	Notice of Completion
NPPA	Native Plant Protection Act
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Units
PG&E	Pacific Gas and Electric Company
PM_{10}	Respirable Particulate Matter (less than 10 microns in diameter)
$PM_{2.5}$	Respirable Particulate Matter (less than 2.5 microns in diameter)
POW	Prisoner of War
PPIC	Public Policy Institute of California
Ppm	Parts Per Million
ROG	Reactive Organic Gases
RWQCB	Regional Water Quality Control Board
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMAQMD	Sacramento Metro Area Air Quality Management District
SMARA	Surface Mining and Reclamation Act
SO_2	Sulfur Dioxide
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
vdB	Vibration Decibels

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1 INTRODUCTION

Bacon Island is owned by the Metropolitan Water District of Southern California, and its levees are maintained by Reclamation District No. 2028 (District). The District was formed in March 1918 to maintain the District's levee system that protects approximately 5,625 acres of agricultural land, habitat, local infrastructure, and on-island assets. The District plans to rehabilitate the north and south sides of Bacon Island's levee system, approximately 3.5 miles (mi) in length, to sustainably achieve the minimum requirements of Bulletin 192-82[1] (Project). This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared in compliance with the California Environmental Quality Act (CEQA) to address the potential environmental effects of levee rehabilitation on Bacon Island.

1.1 Project Location

Bacon Island is located in the central Sacramento-San Joaquin River Delta, approximately halfway between the city of Antioch to the west and Stockton to the east, in San Joaquin County, California (Figure 1-1). The total size of the island is 5,625 acres (ac). It is situated south of Mandeville Island, west of Mildred Island and Lower Jones Tract, north of Woodward Island, and east of Holland Tract (Figure 1-2). Waterways surrounding the island include Connection Slough to the north, Middle River to the east, Santa Fe Cut to the south, and Old River to the west. Project activities are to take place along Connection Slough and Santa Fe Cut. The island is accessible from Bacon Island Road on Lower Jones Tract. Bacon Island Road runs along the levee of Bacon Island and provides the only road access to Mandeville Island via a bridge to the north. Although there is boat traffic in the rivers and sloughs around the island, there are no boat docks on Bacon Island. There are a few occupied and unoccupied residences and outbuildings on the island, including several abandoned structures associated with a historical Japanese day-labor camp. The island is, however, predominantly used for agricultural crop production, specifically corn, rice, wheat, sunflower, and alfalfa (RD2028 2012). Vegetation on the crown and slopes of levees on Bacon Island is regularly controlled by mechanical mowing and herbicides.

1.2 Project Area

The Project Area includes: (1) the levee crown and the area extending landside to varying distances up to 150 feet (ft) from the landside levee crest hinge point, from levee stations 200+00 to 300+00 (Connection Slough) along the north side of the island, and stations 625+00 to 707+00 (Santa Fe Cut) along the south side of the island; (2) the associated top of the bank along the waterside perimeter of the levee above the High Tide Line (HTL) and Mean High Water (MHW); and (3) two borrow sites. The Project Area and levee stationing are depicted in Figure 1-2.

[1] Bulletin 192-82 standards are levee standards established by Bulletin 192 published by the Department of Water Resources (DWR) in December 1982. Minimum standards include: (1) levees shall have a 1.5 ft of freeboard above the 300-year flood frequency elevation, as provided by the U.S. Army Corps of Engineers (USACE); (2) the minimum crown width shall be at least 16 ft; (3) waterside slopes shall be at least 2 horizontal to 1 vertical with revetment in areas where erosion has been a problem; (4) landside slope shall be at least 3 horizontal to 1 vertical, with flatter slopes in the lower portion of the levee in areas where soil stability and seepage have been problems; and (5) the levees shall have all-weather access roads.

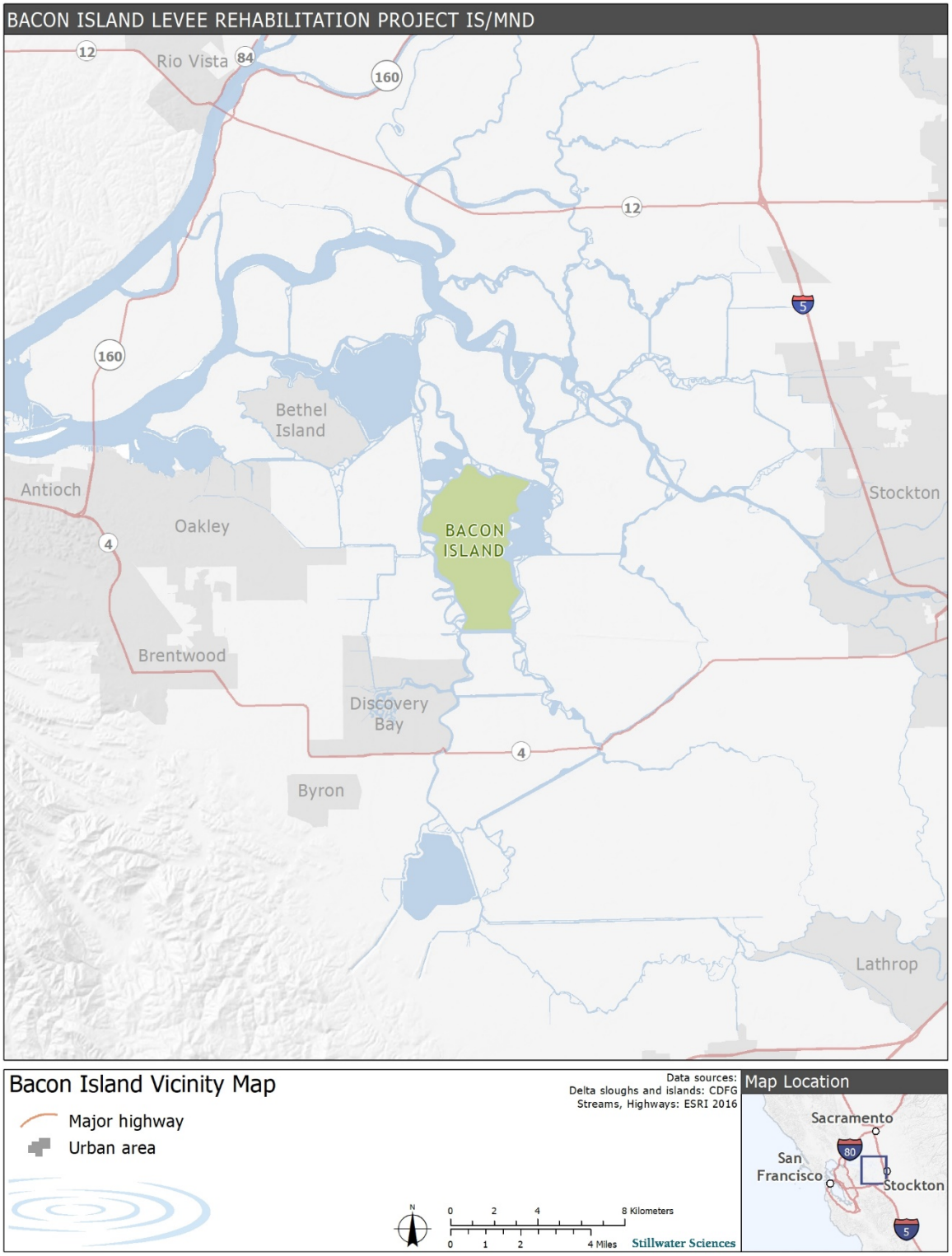

Figure 1-1. Bacon Island location and surrounding vicinity.

Figure 1-2. Bacon Island Levee Rehabilitation Project Area.

1.3 Project Purpose and Benefits

The sections of levee along Connection Slough and Santa Fe Cut on Bacon Island are generally narrow with over-steepened slopes, susceptible to erosion, seepage, and slope instability. Additionally, the levee proposed for rehabilitation sustained heavy damage during the 2017 flood, requiring several emergency flood fighting actions such as backfilling. The emergency flood response and temporary efforts saved the island, but the levee's geometry remains deficient and requires rehabilitation to meet the minimum requirements of Bulletin 192-82. To meet these minimum levee design standards and to improve emergency access and levee performance, the levees will be widened and raised, a toe berm constructed, revetments installed on waterside slopes, and a landside stability berm installed.

The District has concluded that rehabilitating the levees along Connection Slough and Santa Fe Cut is a high priority and will lower the overall flood risk for the island. This Project is funded by the Department of Water Resources' (DWR's) Delta Levees Special Projects Program (Project Funding Agreement BN-19-1.0-SP). Authorized under the California Water Code, this program provides funding to safeguard public benefits—including roads, utilities, water quality, recreation, navigation, and fish and wildlife—from flood hazards.

Project benefits include improving the reliability of local and regional water supply and conveyance. The Project levee protects channel integrity along Old and Middle Rivers,[2] which convey water to California State Water Project and federal Central Valley Project pumping facilities in the south Delta. The Project will reduce the risk of levee failure, thus reducing associated risks to the water supply, (e.g., the potential for salinity intrusion) for local and export interests.

This Project will also increase the protection of emergency infrastructure. The District's levee system protects local public utilities and vehicular access corridors. The island has 37,654 ft of minor roads, 28,288 ft of natural gas pipelines, eight gas wells, and residential buildings (RD 2028 2019). These assets are estimated to be worth $43,916,000. This does not include the land value, which was estimated as $16,248,424 by the Public Policy Institute of California (PPIC) in 2008 (RD 2028 2019). The District also provides the only road access to Mandeville Island, along Bacon Island Road. Utility providers include Pacific Gas and Electric Company (PG&E) and AT&T. PG&E maintains two large gas transmission lines from the McDonald Island Gas Storage Facility, as well as electrical lines servicing Bacon Island and adjacent islands. AT&T maintains the communication lines located on the island. The levee along the Old River corridor could provide secondary emergency access to Mandeville Island in the event there is a disruption of service on the county road providing primary access.

Project levees protect active agricultural operations on Bacon Island, including 4,752 ac of corn, wheat, sunflower, and alfalfa (RD2028 2019). Agricultural operations are supported by an on-island farming enterprise with warehouses, facilities, and farming equipment. In addition to agriculture, the Project levee protects an important variety of habitat, as quantified in a wetland delineation for the Delta Wetlands Project conducted in 2013 (ESA 2015); on-island habitat includes 116.9 ac of freshwater marsh, 8.8 ac of cottonwood-willow, 9.2 ac of Great Valley willow scrub, 27.4 ac of open water (e.g., canals, ditches, and permanent ponds), and 406.5 ac of

[2] A breach of the levee in the Project areas would flood the island, which would threaten the integrity of the Old and Middle River levees; the landside of the Old and Middle River levees would quickly erode, jeopardizing the reliability of the Old and Middle River corridors for water supply.

farmed wetlands (ESA 2015). Much of this agricultural land is seasonally flooded, adding to the available habitat for migratory waterfowl within the Pacific Flyway during the fall and winter.

1.4 Project Description

1.4.1 Levee configuration

Project implementation will result in a new levee configuration that will increase stability and thereby decrease the potential for failure. The typical resulting levee configuration and habitat enhancement details are depicted in Figures 1-3 and 1-4. The Project includes the placement of fill material on the levee toe, landside slope, and crown. The levee crown will be widened to a minimum width of 21 ft, and Class 2 aggregate base will be placed along its surface to create an all-weather roadway. Fill material will be placed along the landside levee slope to a minimum slope of 3:1 (horizontal to vertical) and on the waterside to a minimum slope of 2:1 (horizontal to vertical). Waterside work involves armoring newly placed clean quarry stone (i.e., riprap) along the upper waterside of the levee entirely above the HTL and MHW. Additional quarry stone will be used to supplement areas already armored to avoid any backfill or discontinuities.

Fill material obtained from two on-site borrow locations will be placed along the landside levee toe and work up toward the levee crown to construct the embankment and rehabilitate the levee slope. Once fill has been placed and the subgrade has been achieved, a county-maintained road from Stations 200+00 to 227+00 will be replaced in-kind as the levee is raised and rehabilitated. To maintain emergency vehicle access to Mandeville Island, one lane will remain open during construction. In compliance with California Water Code Section 12316(g), the construction of a stability berm along the landslide toe of the levee will raise the elevation of the land immediately adjacent to the levee, providing a cap over exposed peat that could otherwise oxidize over time. Construction activities will include excavating an exploratory trench (approximately 7 ft deep, 2.5 ft wide) along the levee crown over the length of the Project Area. The levee slopes will be stripped of vegetation but will not require excavating existing soil on the levee slope.

Project activities will total approximately 3.5 mi or 18,200 linear ft. The width of the repair footprint will vary along the length of the Project levee based on site-specific conditions such as the height, width, slope, and elevation of the existing levee. Project activities will be limited to the levee crown, landside levee slope extending landside to varying distances up to 150 ft from the landside levee crest hinge point, and the waterside levee slope above HTL and HHW, which are encompassed within the Project Area.

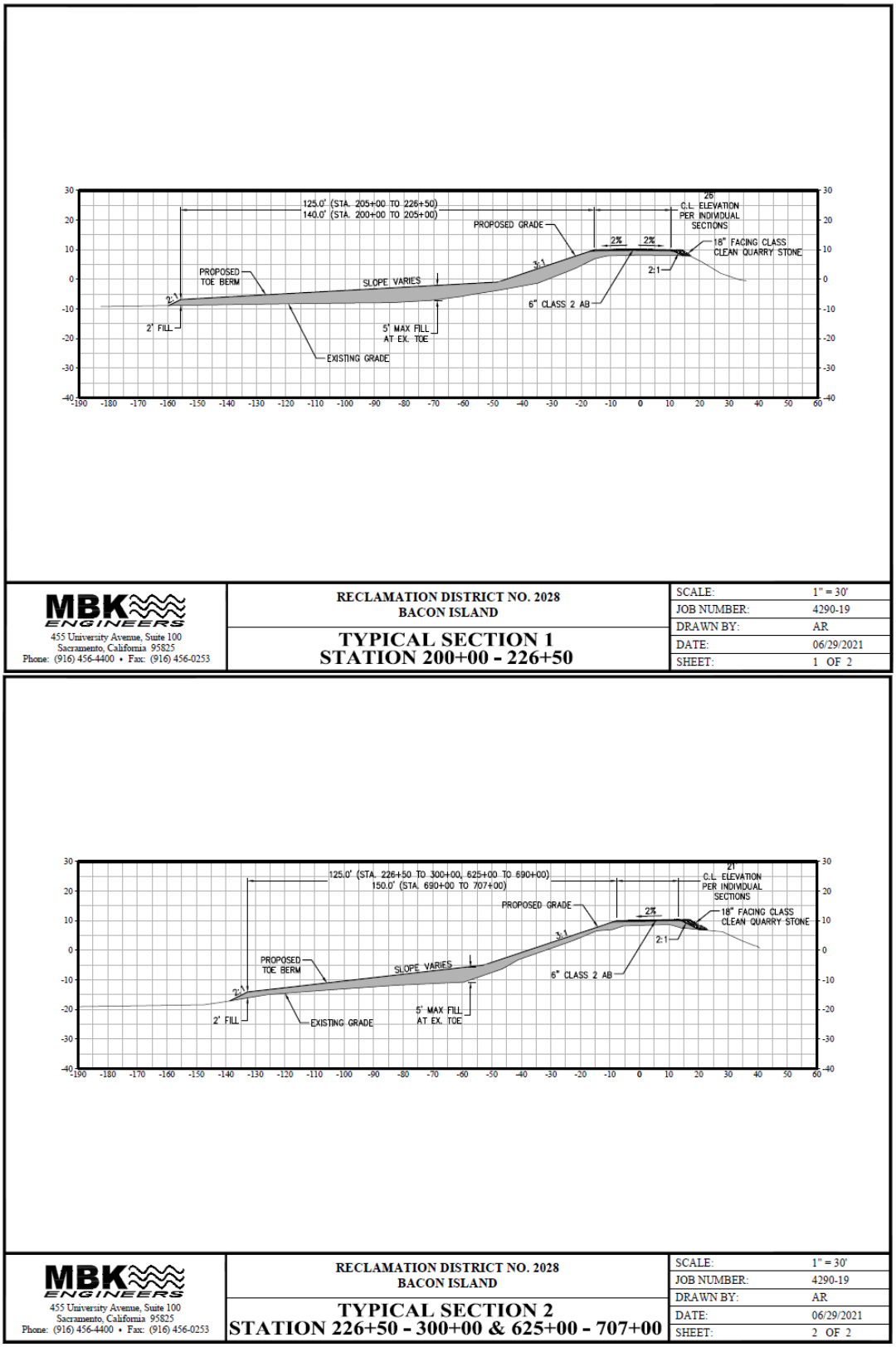

Figure 1-3. Typical levee configurations for Bacon Island Levee Rehabilitation Project, Stations 200 to 226+50 (top) and 226+50 to 300 & 625 to 707 (bottom).

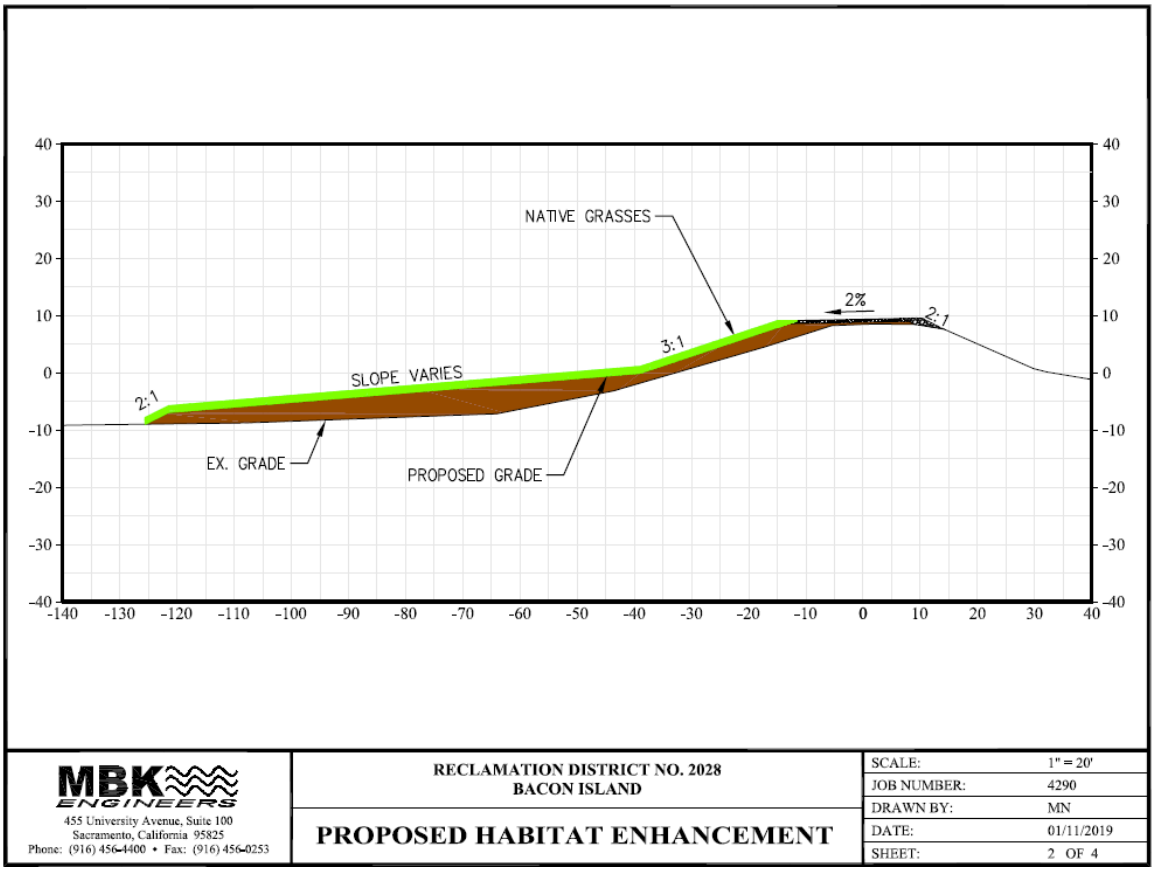

Figure 1-4. Proposed levee habitat enhancement details for Bacon Island Levee Rehabilitation Project.

1.4.2 Borrow sites

Fill material will be obtained from two on-site borrow locations. An estimated 501,800 cubic yards of on-island borrow material will be used as fill for placement on the levee toe, landside slope, and crown. The final amount of fill required will depend upon final design recommendations and grading plans. Borrow material will be removed and transported using excavators, bulldozers, and dump trucks.

The two borrow site locations are depicted in Figure 1-2. Borrow Site 1 is approximately 31.6 ac and located in the northwest portion of the island, west of Bacon Island Road (Figure 1-2). Approximately one-third of Borrow Site 1 was inundated during a March 2021 reconnaissance site visit, which was the result of surface mining for borrow material associated with a prior levee project; any excavation in submerged areas will require pumping to control the water levels. The remaining portion of Borrow Site 1 was fallow. Borrow Site 2 is approximately 31.2 ac and located in the southern portion of the island, also west of Bacon Island Road. Borrow Site 2 is used for agricultural production, currently alfalfa. Excavation at the borrow sites is expected to be between approximately 15 ft and 20 ft deep (elevation -35 ft NGVD29 to -40 ft NGVD29). Borrow excavation is expected to avoid nearby pipes and ditches.

1.4.3 Imported materials

The Project will require an estimated 44,300 tons of material (i.e., aggregate base, quarry stone) imported from off-site locations. Approximately 17,200 tons of Class 2 aggregate base on the levee crown is estimated to construct the all-weather roadway. Approximately 27,100 tons of quarry stone will be required to armor the newly placed fill on the upper waterside slope. These materials will come from the surrounding areas (e.g., Lodi, Stockton, Manteca, Tracy, etc.). The source(s) for imported materials will be determined upon award of bid. Materials sourced off-island will be imported using existing public roads (e.g., Bacon Island Road). On-island haul routes for all material, including fill from the borrow sites, will utilize existing dirt roads currently used for agricultural equipment.

1.4.4 Emergency stockpiles

The Project will also incorporate stockpiled material located strategically along the length of the levee. Stockpiles will include pre-deployed caches of rock slope protection (riprap) material for use during a flood fight, located outside of the levee design section. The stockpiles will be designed in accordance with the geotechnical engineer's recommendations. Typically, stockpiles are no more than 4 to 6 feet in height.

1.4.5 Site preparation

Site preparation activities include clearing vegetation on the landside slope, the vast majority of which is ruderal grasses/weeds anticipated to return following construction. There are eucalyptus/blue gum trees (*Eucalyptus globulus*) and shrubs designated for removal on the landside only. Anticipated impacts to vegetation on the waterside will be to ruderal grasses and weeds; all trees and shrubs on the waterside slope with diameters at breast height (DBH) equal to or greater than 2 inches will remain protected in place.

Any loss of riparian forest, scrub-shrub, or freshwater marsh habitat as a result of levee maintenance and improvement is pre-mitigated out to 150 ft from the levee centerline by provision of such habitat at nearby Medford Island, as described in the mitigation agreement between the District and California Department of Fish and Game (CDFG) (now California Department of Fish and Wildlife, CDFW) (CDFG 1993).

There are multiple existing siphons and pipes in the Project Area that will be raised above the floodplain to facilitate the Project. Project activities will avoid both occupied residences and abandoned buildings; any standing historical structures near the Project will be completely avoided by construction activities and left intact in their current locations.

1.4.6 Erosion control and planting

Appropriate best management practices (BMPs) (e.g., working only during dry periods) and a Stormwater Pollution Prevention Plan (SWPPP) will be implemented during construction in order to prevent and control potential impacts on waters from erosion during Project construction (Section 1.5). Erosion control measures will be implemented in accordance with the California Department of Transportation (Caltrans) Construction Site BMP Manual (Caltrans 2017a). A temporary berm comprised of the removed levee vegetation will be placed along the landside toe of work areas to act as an erosion control barrier. When placing quarry stone on the waterside slope, the existing rock will be compacted to create a bench that will catch and support the new rock.

All landside slopes will be constructed with 3:1 (horizontal:vertical) smooth, uniform slope to minimize erosion, and a 2:1 minimum waterside slope armored with riprap. The levee crown roadway will have a 2% slope to the landside to minimize runoff into the adjacent waterway. From Stations 200+00 to 227+00, the levee will be crowned along the centerline with 2% slopes landward and waterward to accommodate the county road per the San Joaquin County Standard Specifications.

Following Project levee construction, the landside slope will be hydroseeded with a CDFW-approved native grass seed mix for erosion protection as well as ecosystem enhancement. Hydroseeding at the end of construction and prior to the rainy season will help minimize erosion during the wet months. Rain during the wet months will naturally provide irrigation to support seed germination.

1.4.7 Equipment and materials

Table 1-1 provides a list of equipment that is anticipated to be used for the Project. All construction equipment is compliant with San Joaquin Valley Air Pollution Control District (SJVAPCD) requirements.

Table 1-1. Equipment anticipated to be used for the Bacon Island Levee Rehabilitation Project.

Equipment type	Number of rigs (or loads, if specified)
Excavators	1–3
Bulldozers	2–3
Blades	1–2
Compactors	2
Water trucks	2–3
Semi-bottom dump trucks, on site	10–30 looping trucks
Semi-bottom dump trucks, import aggregate base	50–150 loads per day
Side dump trucks, import quarry stone	~50 loads per day
Pumps (water truck)	2
Pumps (borrow sites)	2
Planting equipment	To be determined

Construction equipment and materials (e.g., rock revetment, aggregate base rock, any required planting materials) will be transported to Bacon Island via truck. Dump trucks will move fill material to levee sections. Aggregate base will be transported to the site via semi-bottom dump trucks. Equipment to place and compact fill material will likely include excavators, blades, bulldozers, water trucks, and compactors. Semi-bottom dump trucks will remain on site and deliver fill from the borrow sites to the Project Area in a looping pattern. Haul routes will be restricted to existing roads (i.e., no new roads will be created).

Pumps will be used as needed at the borrow sites to control water levels until excavation is complete, and sporadically throughout the workday to fill water trucks; water trucks will be used to control dust throughout Project construction.

1.4.8 Construction schedule and timing

Project construction is planned to occur in two phases over the course of two years, estimated from May 2022 through October 2022 (toe berm construction) and from as early as May 2023 through October 2023 (slope construction). Work is planned for potential completion in 2023. A typical workday is assumed to be 8 to 10 hours per day, during daylight hours, 5 to 6 days per week. Construction work will not occur prior to 6:00 a.m. or after 6:00 p.m. An estimated 180 working days will be necessary to complete the Project.

1.4.9 Conservation measures

The conservation measures described below will be implemented as part of the Project. The measures are based on standard practices to avoid, minimize, or reduce potential impacts on environmental resources and comply with existing regulations and/or requirements pertaining to air quality, hazards/hazardous materials, and hydrology/water quality.

AIR-1: Air Quality Protection

The following are measures to prevent, control, and minimize emissions during Project construction:

a) All construction vehicles will be model year 2010 or newer.
b) All construction equipment will be properly tuned and maintained prior to and for the duration of on-site operation.
c) Diesel-powered construction equipment idling time will be limited to less than five minutes.
d) A traffic plan will be developed to minimize traffic flow interference from construction activities.
e) An operational water truck will be available at all times. Water will be applied as needed to control dust and to prevent visible emissions violations and off-site dust impacts.
f) On-site dirt piles or stockpiled materials will be covered, and water or soil stabilizers will be employed to reduce wind-blown dust emissions.
g) Traffic speeds on all unpaved surfaces will be reduced to 20 miles per hour or less. Appropriate training, enforcement, and signage will be provided.
h) Ground cover will be re-established in the Project Area as soon as possible after construction.

HAZ-1: Hazardous Material Storage and Handling

Prior to Project construction, a SWPPP will be developed that will include, but not be limited to, the following list of BMPs to avoid and minimize potential effects from hazards and hazardous materials:

a) No potentially hazardous materials will be stored in a location where there is potential to enter any waterway and/or contaminate aquatic resources.
b) All construction materials with the potential to pollute runoff will be handled with care and stored under cover and/or surrounded by berms during wet weather or when rain is forecast.
c) An effort will be made to store only the amount of a potentially hazardous product necessary to complete the job.

d) Materials, fuels, liquids and lubricants, and equipment supplies stored on site will be stored in a neat, orderly manner, in their appropriate containers, with the original manufacturer's label, and, if possible, in an enclosure.
e) Any hazardous materials will be stored and labeled according to local, state, and federal regulations.
f) If drums must be stored without overhead cover, they will be stored at a slight angle to reduce corrosion and ponding of rainwater on the lids.
g) Substances will not be mixed with one another unless recommended by the manufacturer.
h) Manufacturer's recommendations for proper use and disposal of a product will be followed.
i) Whenever possible, all of a product will be used before disposal of its container.
j) If surplus product must be disposed of, the manufacturer's or the local and state recommended methods for proper disposal will be followed.

HAZ-2: Hazardous Spill Prevention and Response

The SWPPP developed for the Project will include, but not be limited to, the following measures to prevent, control, and minimize impacts from a spill of a hazardous, toxic, or petroleum substance during construction of the Project:

a) Minor spills are those that can be controlled by on-site personnel. The following actions will occur upon discovery of a minor spill:
    - The spread of the spill will be contained.
    - If the spill occurs on impermeable surfaces, such as any temporary surfaces installed for pollution prevention during construction, it will be cleaned up using "dry" methods (e.g., absorbent materials, cat litter, and/or rags).
    - If the spill occurs in permeable substrate areas, it will be immediately contained by constructing an earthen dike. The contaminated soil will be excavated and properly disposed of.
    - If the spill occurs during rain, the impacted area will be covered to avoid runoff, and appropriate cleanup steps will be taken after precipitation has ceased.
    - All steps taken to report and contain the spill will be recorded.
b) On-site personnel should not attempt to control major spills until the appropriate and qualified emergency response staff has arrived at the site. Failure to report major spills can result in significant fines and penalties.
    - If a major spill occurs, the Governor's Office of Emergency Services Warning Center will be notified at (800) 852-7550 in addition to local authorities.
    - For spills of federal reportable quantities, the National Response Center will also be notified at (800) 424-8802. The federal reportable spill quantity for petroleum products is any oil spill that (1) violates applicable water quality standards, (2) causes a film or sheen upon or discoloration of the water surface or adjoining shoreline, or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.
    - A written report will be sent to all notified authorities.
c) Diesel fuel, oil, gasoline, and lubricants are considered petroleum products. These materials will be handled carefully to minimize their exposure to storm water. The risks in using petroleum products will be reduced by following these steps:

- Waste oil and other petroleum products will not be discharged into the ground or other water bodies.
- Petroleum products will be stored in tightly sealed containers that are clearly labeled, in a covered area, and within prefabricated spill containment devices, earthen berms, or similar secondary containment features.
- On-site vehicles will be monitored for fluid leaks and receive regular preventative maintenance to reduce the chance of leakage (e.g., check for and fix fuel oil leaks in construction vehicles on a regular basis).
- Bulk storage tanks having a capacity of more than 55 gallons will be provided with a secondary containment measure. Containment can be provided by a prefabricated temporary containment mat, a temporary earthen berm, or other, equally effective containment measure.
- Bulk fuel or lubricating oil dispensers will have a valve that must be held open to allow the flow of fuel into construction vehicles. During fueling operations, the contractor will have personnel present to detect and contain spills.

d) The following additional spill control and cleanup practices will be followed:
   - Spills will be contained and cleaned up immediately after discovery.
   - Manufacturer's methods for spill cleanup of a material will be followed as described on the material safety data sheets (MSDS) (kept with product containers).
   - Materials and equipment needed for cleanup procedures will be kept readily available on site, either at an equipment storage facility or on the contractor's trucks. Equipment to be kept on site will include, but not be limited to, brooms, dust pans, shovels, granular absorbents, sand, sawdust, absorbent pads and booms, plastic and metal trash containers, gloves, and goggles.
   - On-site personnel will be made aware of cleanup procedures, the location of spill cleanup equipment, and proper disposal procedures.
   - Toxic, hazardous, or petroleum product spills required to be reported by regulations will be documented and a record of the spills will be kept with Project documents.
   - If a spill occurs that is reportable to the federal, state, or local agencies, the contractor is responsible for making and recording the reports.

HAZ-3: Fire Prevention

The following are measures to reduce the potential for fire:

a) Smoking will be permitted only in designated smoking areas.
b) Every fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all flammable materials will be removed from equipment parking and storage areas.

HYD-1: Erosion Control

The SWPPP developed for the Project will include, but not be limited to, the following BMPs to avoid and minimize potential impacts on waters from erosion:

a) Construction will occur only during dry periods.
b) Prior to storm events, all construction activities shall cease, and appropriate erosion control measures will be implemented.

c) Soil, silt, or other organic materials will not be placed, stockpiled, or stored where such materials could pass into surface water or surface water drainage courses during unexpected rain events.

d) All areas disturbed by Project activities will be protected from washout or erosion prior to the onset of the rainy season.

e) All temporarily affected areas will be restored to pre-construction contours and conditions upon completion of construction activities.

f) Prior to initiation of any waterside work, erosion control measures will be utilized throughout all phases of operation where silt and/or earthen fill threaten to enter waters of the U.S. and/or state.

1.4.10 Mitigation Measures

Mitigation measures have been added to the Project to reduce potential effects on biological, cultural, and tribal cultural resources to a less-than-significant level. Pre-construction surveys will be conducted for each year of Project implementation, if applicable. Borrow sites and any ditches and ponds within 100 feet of the Project Area will be surveyed for special-status species, including giant garter snakes (*Thamnophis gigas*) prior to dewatering, and within the appropriate time frames for each survey. Results from all pre-construction surveys described in the following mitigation measures will be provided to Delta Levee Program CDFW staff for review prior to the initiation of construction.

BIO-1: Rare Plants

The following measures will ensure that adverse effects on special-status plants are avoided or minimized:

a) Surveys for special-status plants will be conducted in accordance with the Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 2000) and Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2018) and will be comprehensive for vascular plants.

b) Areas with special-status plants will be flagged or otherwise marked (e.g., staked, fenced) for avoidance prior to construction, including the incorporation of a clearly marked 10-ft buffer, and all employees will be notified of the plant locations. If work must be conducted within the 10-ft buffer area, CDFW will be consulted to determine appropriate methods to avoid impacts to rare plants.

c) If avoidance is not possible, the need for mitigation shall be determined on a case-by-case basis in consultation with CDFW, prior to construction. For impacts that are determined by CDFW to be potentially significant, mitigation shall be provided in a manner and at a location that is acceptable to CDFW. If impacts are mitigated at a location other than a mitigation bank, the new plantings shall be documented using a California Natural Diversity Database (CNDDB) form and completed forms shall be submitted to CNDDB following establishment.

BIO-2: Worker Environmental Training

- All contractors and equipment operators will be provided Worker Environmental Awareness Training to educate them on the environmental resources of the Project Area, including the potential for special-status species to be present, and the required protection

measures (including all the biological avoidance and minimization measures outlined in the Conservation Measures section [Section 1.5] of this IS/MND). Training will include information about the federal and California Endangered Species Acts (ESA and CESA, respectively), and the consequences of noncompliance with these acts. Workers will be informed about the presence, life history, and habitat requirements of all special-status species that may be affected in the Project Area. Training also will include information on state and federal laws protecting water resources and migratory birds as well as their nests and eggs. This training will be conducted prior to construction for each year of Project implementation and will be provided to any new staff/contractors added during Project construction.

BIO-3: Northwestern Pond Turtle

- A survey for western pond turtles (*Actinemys marmorata*) and any active pond turtle nests (during the nesting and emergence of hatchling season, April 1 through November 30) will be conducted in suitable habitat located within a 100-ft buffer of the Project Area by a qualified biologist within seven days prior to onset of staging or construction activities. If a Northwestern Pond Turtle nest is found, a 100-ft no-disturbance buffer zone will be established around the nest using flagging, fencing, and/or signage as appropriate. No construction activities will occur within the buffer zone until a qualified biologist has determined that the nest in not in use. If a Northwestern Pond Turtle is observed at any time before or during construction, it will be left alone to move out of the area on its own.

BIO-4: Giant Garter Snake

- The following measures will be implemented to minimize effects on giant garter snake or their habitat. They are based on the U.S. Fish and Wildlife Service's (USFWS) *Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat, from Programmatic Formal Consultation for U.S. Army Corps of Engineers (USACE) 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California* (USFWS 1997).
    a) If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Any sightings and/or any incidental take will be reported to CDFW and USFWS.
    b) Construction activity within giant garter snake habitat (e.g., aquatic habitat and upland habitat within 200 ft of aquatic margins) will be conducted between May 1 and October 1. This is the active period for the snake; direct mortality is lessened because snakes are expected to actively move and avoid danger. Initiation of construction activities within 200 ft of the banks of snake aquatic habitat will be avoided during the snake's inactive season (October 2 through April 30). With permission from relevant agencies (i.e., USFWS and CDFW), ground-disturbing activities that were initiated prior to October 1 may continue into the snake's inactive season.
    c) Any irrigation or drainage ditches and borrow sites that will be disturbed or removed will be dewatered prior to the initiation of construction activities. Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.

d) All Project areas will be surveyed for giant garter snake by a qualified biologist, 24 hours prior to the start of construction activities, and again if there is a lapse in construction activity of two weeks or more.

e) The Project will prohibit use of erosion control materials potentially harmful to giant garter snake and other species, such as mono-filament netting (erosion control matting) or similar material, in potential giant garter snake habitat. Tightly woven fiber netting or similar material will be used for erosion control to ensure that giant garter snakes do not get trapped and become entangled.

f) During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed Project activity will be limited to the minimum necessary.

g) Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the Project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles will observe a 20-mile-per-hour speed limit within the construction areas, except for county roads and on state and federal highways.

h) Confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas.

BIO-5: Breeding Birds and Raptors

- For Project activities conducted during the bird breeding season (February 1–August 15), a pre-construction nest survey will be conducted. Surveys will include ground nesting birds and raptors (e.g., northern harriers and short-eared owls), as well as suitable trees, shrubs, buildings, etc., within 500 ft of the Project Area. Species-specific surveys will be conducted as described below in measures **BIO-7** through **BIO-8**. If active nests (nests containing eggs or young) are identified, a no-disturbance buffer zone will be established around the nest using flagging, fencing, and/or signage as appropriate. No construction activities will occur within the buffer zone until a qualified biologist has determined that the young have fledged or that construction activities within the buffer zone are not disturbing the nesting birds. The width of the buffer zone will be determined by a qualified biologist; recommended buffers are 500 ft for raptors and 100 ft for other birds. If the project is delayed longer than 2 weeks during breeding season, an additional survey will be necessary.

BIO-6: Swainson's Hawk

- The following measures will be implemented between March 1 and August 15 to minimize effects on Swainson's hawk (*Buteo swainsoni*) and other protected raptors:

  a) In order to avoid take (Fish and Game Code Section 86) of protected raptors (Fish and Game Code Section 3503.5), a pre-construction raptor nest survey will be conducted within a quarter mile (1,320 ft) of the Project site, and within 15 days prior to the beginning of construction activities by a CDFW-approved biologist in order to identify active nests in the Project vicinity. The results of the survey will be submitted to the District.

  b) If active nests are found, a quarter-mile initial temporary nest disturbance buffer will be established. If Project-related activities within the temporary nest disturbance buffer are determined to be necessary during the nesting season, then an on-site

biologist/monitor experienced with raptor behavior will be retained to monitor the nest, and will, along with the project proponent, consult with CDFW to determine the best course of action necessary to avoid nest abandonment or take of individuals.

c) Work may be only allowed to proceed within the temporary nest disturbance buffer if raptors are not exhibiting agitated behavior such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, and only with the agreement of CDFW. Based on the behavior observed, the buffer may be reduced if the birds are tolerant of construction activities. The designated on-site biologist/monitor shall be on site daily while construction-related activities are taking place within the quarter-mile buffer and shall have the authority to stop work if raptors are exhibiting agitated behavior.

d) If the project is delayed longer than 2 weeks during breeding season, an additional survey will be necessary.

BIO-7: California Black Rail

- The following measures will be implemented to avoid or minimize effects on California black rail (*Laterallus jamaicensis coturniculus*):

  a) If black rail nests are identified during the pre-construction nesting bird surveys, a 700-ft no-work buffer will be established around active nests. No Project-related activities will be allowed to occur within this buffer until young have fledged or the species is no longer attempting to nest. The buffer can be removed prior to the end of their breeding season (July 31) if a qualified biologist determines that all young have fledged or the nest did not end up being occupied.

  b) If the 700-ft no-disturbance buffer cannot be avoided, construction will be postponed in that area until after the breeding season or as approved by USFWS and CDFW.

BIO-8: Western Burrowing Owl

- Western burrowing owl (*Athene cunicularia*) may be present in the work area. Avoidance of take of individual burrowing owls, their nests, and eggs is currently mandated under Fish and Game Code Sections 86, 3503, 3503.5 and 3513. CDFW recommends the District follow the 2012 Staff Report on Burrowing Owl Mitigation to reduce the chance of adversely impacting burrowing owls if they are thought to be present at the site. Occupied habitat includes areas burrowing owls may use for breeding/nesting (February 1 to August 31), wintering (September 1 to January 31), foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can typically be verified by an observation of at least one burrowing owl, or alternatively, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement, and/or loose soil near the burrow entrance.

BIO-9: Delta Levees Program Identified Habitat

- Impacts on freshwater marsh, scrub-shrub, and riparian forest habitats due to levee rehabilitation and maintenance on Bacon Island have been pre-mitigated under the *Fish and Wildlife Habitat Mitigation Agreement by and Between Reclamation District 2041 and the California Department of Fish and Game* (CDFG 1993). This mitigation agreement, between CDFW and Reclamation District No. 2041 (Medford Island), provides mitigation lands on Medford Island for past and future long-term losses of freshwater marsh, scrub-shrub, and riparian forest habitats resulting from levee maintenance and rehabilitation on specified Delta islands. Reclamation District No. 2028 (Bacon Island) is one of the islands

covered by this agreement. The District is only pre-mitigated for impacts to the waterside levee and to 150 ft landward of the levee centerline. Any impacts to habitat beyond 150 ft will require mitigation. Shaded riverine aquatic habitat and special-status plant species are not pre-mitigated. If any impacts to habitat not covered by the Mitigation Agreement do occur, they will be mitigated in a manner and location acceptable to CDFW.

CUL-1: Cultural Resources

- The following measures will be implemented during the Project to avoid and minimize potential effects on cultural resources:
  a) Information about the potential for cultural resources in the Project Area and the measures in place to protect them will be provided to all contractors and equipment operators. Training will include information about the federal and state laws protecting cultural resources, identification of potential cultural resources, and procedures to follow (e.g., protective buffers, personnel to contact) in the event of an inadvertent find. This training will be conducted prior to construction for each year of Project implementation, and will be provided to any new staff/contractors added during the Project.
  b) During Project activities near the Bacon Island Ditch Network (Ditch Network [NIC-2021-Bacon-02]) a 15-ft avoidance buffer will be established around the resource and no ground disturbing activities will occur within the avoidance area.
  c) If a cultural resource is inadvertently discovered during Project activities, work must be halted within 30 ft of the find and a qualified archaeologist (36 CFR Part 61) notified immediately so that an assessment of its potential significance can be undertaken. Construction activities may continue in other areas but may not resume in the area of the find until the District provides written permission. If the discovery proves to be significant, additional work, such as data recovery excavation, may be warranted and would be discussed in consultation with the District, affiliated tribal organizations, and any other relevant regulatory agencies or invested parties, as appropriate.
  d) State of California Health and Safety Code Section 7050.5 covers the discoveries of human remains (including those outside of formal cemeteries), except on federal lands. This code section states that no further disturbance may occur, and Project activities in the immediate area will halt, until the County Coroner has made a determination of origin and disposition of the remains pursuant to PRC Section 5097.98. If human remains are found during Project activities, the County Coroner must be notified of the find immediately upon discovery. If the human remains are determined to be of Native American origin, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendent (MLD). The MLD must complete an inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

2 ENVIRONMENTAL IMPACTS

Each of the following resource sections includes a completed checklist (from Appendix G of the CEQA Guidelines) of environmental factors potentially affected and identifies potential Project impacts by significance level (i.e., no impact, less than significant impact, less than significant impact with mitigation incorporated, and potentially significant impact). The environmental factors checked in Table 2-1 would be potentially affected by this Project; mitigation measures will be implemented to reduce these potential impacts to less than significant levels.

Table 2-1. Summary of environmental factors potentially affected by the Project.

❑ Aesthetics	❑ Agriculture and Forest Resources	❑ Air Quality
✓ Biological Resources	✓ Cultural Resources	❑ Energy
❑ Geology and Soils	❑ Greenhouse Gas 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	❑ Wildfire	❑ Mandatory Findings of Significance

2.1 Aesthetics

Issues	Potentially significant impact	Less Than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Have a substantial adverse effect on a scenic vista?	❑	❑	❑	✓
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?	❑	❑	❑	✓
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the Project is in an urbanized area, would the Project conflict with applicable zoning and other regulations governing scenic quality?	❑	❑	✓	❑
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	❑	❑	❑	✓

2.1.1 Environmental setting

The term "aesthetics" typically refers to the perceived visual character of an area, such as of a scenic view, open space, or architectural facade. The aesthetic value of an area is a measure of its visual character and visual quality combined with viewer response (FHWA 1981). This combination may be affected by the components of a project (e.g., buildings constructed at heights that obstruct views, hillsides cut and graded, open space changed to an urban setting), as well as the length and frequency of viewer exposure to the setting. Aesthetic impacts are changes in viewer response as a result of Project construction and operation.

The Bacon Island levee provides scenic views of the Sacramento-San Joaquin Delta and marsh habitats. Views of the island interior are largely agricultural. These views include the maintained levee, ruderal vegetation, managed corn and rice fields, and small patches of riparian forest. While Bacon Island is accessible by vehicle, the levee road in the northern portion of the Project Area is behind a locked gate at Station 227+00 (at the Mandeville Island bridge) and is only used to access agricultural fields on the west side of the island and for levee patrol and maintenance.

People boating in waterways surrounding the island are not generally able to see the interior of the island because of the existing levee. Viewers include the people inhabiting the approximately 11 residences on the island, District employees who maintain the island, and farmers who manage the agricultural fields on the island.

2.1.2 Findings

a) Would the Project have a substantial adverse effect on a scenic vista?

The rehabilitation of the levee will not impact existing views of the Sacramento-San Joaquin Delta and marsh habitats from Bacon Island. Views of the island interior are not scenic as described above. There will be no impact.

b) Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?

Bacon Island is not located within a state scenic highway. The nearest state scenic highway is Route 4, over ten miles to the northwest of the Project Area (Caltrans 2017b). There will be no impact.

c) In non-urbanized areas, would the Project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the Project is in an urbanized area, would the Project conflict with applicable zoning and other regulations governing scenic quality?

The Project is in a non-urbanized area. Construction activities will temporarily disrupt the visual character of the Project Area. During Project construction, vegetation along the levee slopes will be removed and material will be excavated from the borrow sites, which will temporarily degrade the visual quality of the site. Construction equipment may be visible for a limited number of boaters using nearby waters in the Delta or a limited number of visitors to the island by vehicle. These impacts will occur for a short period of time (i.e., 12 total months in 2022 and 2023) and will be seen by very few viewers. After Project completion, the slopes will be revegetated with a native grass mix, and construction equipment will be removed. Additionally, visibility of the

surrounding waterways will be improved following removal of trees along the levee slopes, and the excavated borrow sites are anticipated to passively establish freshwater pond, marsh, and/or scrub-shrub habitat, which will add heterogeneity to the landscape. For these reasons, the rehabilitation of the levee will not permanently degrade the visual character or the aesthetic quality of the Project Area or surrounding areas. Therefore, effects will be less than significant.

d) Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

The Project will not involve nighttime construction or creation of a new source of substantial light or glare. There will be no impact.

2.2 Agricultural and Forest Resources

Issues	Potentially significant impact	Less Than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	❑	❑	✓	❑
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	❑	❑	✓	❑
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	❑	❑	❑	✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?	❑	❑	❑	✓
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	❑	❑	❑	✓

2.2.1 Environmental setting

2.2.1.1 Farmland

The California Farmland Mapping and Monitoring Program (FMMP), administered by the State Division of Land Resource Protection, is responsible for producing agricultural resource maps based on soil quality and land use. The purpose of the FMMP is to provide information to be used in planning for current and future use of the State's agricultural lands. The FMMP designates land into the following categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban or Built-up Land, Other Land,

and Water. Other Land is documented in greater detail and includes the following Rural Land categories: Rural Residential Land, Semi-Agricultural Land and Rural Commercial Land, Vacant or Disturbed Land, Confined Animal Agriculture, Nonagricultural or Natural Vegetation, and Water.

The majority of Bacon Island (5,141 ac) is designated as Prime Farmland (FMMP 2021). Along the outer edge of the island, there are small areas of Non-agricultural and Natural Vegetation (FMMP 2021). Borrow sites 1 and 2, totaling 62.8 ac, are located on Prime Farmland (FMMP 2021). Borrow Site 2 comprises 31.2 ac of active farmland (alfalfa). Borrow Site 1 comprises 17.3 ac of fallow farmland, as well as 14.3 ac of combined barren, ruderal herbaceous, scrub-shrub, and open water (Section 2.4.2.1).

2.2.2 Findings

a) Would the Project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural land?

Borrow sites 1 and 2 may be excavated between approximately 15 and 20 ft deep, which could reach the existing water table, in which case water from the existing water table may seep into the bottom of the pits and form ponds. These two borrow sites, overlapping approximately 62.8 ac of land designated as Prime Farmland, will be converted to non-agricultural uses, namely wildlife habitat in the form of freshwater ponds, freshwater marsh, and scrub-shrub (presumed to become naturally established as a result of rainwater, and possibly groundwater, filling the depressions created from borrow material removal). The conversion will represent approximately 0.0084% of the total agricultural land and 0.0164% of the total Prime Farmland in San Joaquin County according to the 2016 FMMP acreages. This conversion will not substantially affect overall farmland acreage or agricultural productivity in San Joaquin County. In contrast to this small area of farmland conversion, the rehabilitated levee will provide substantial protection from future flood damage to 5,141 ac of Prime Farmland on Bacon Island; therefore, the Project will have a cumulative benefit to agricultural resources via flood protection. Furthermore, the Project will convert the Prime Farmland to habitat rather than to paved or developed land uses. Therefore, the Project will have a cumulative benefit to agricultural resources.

For the abovementioned reasons, conversion of Prime Farmland in the Project is considered less than significant.

b) Would the Project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The Project will not conflict with goals or policies in the San Joaquin County General Plan (San Joaquin County 2014) or the Land Use and Resource Management Plan for the Primary Zone of the Delta (DPC 2010). The San Joaquin County Wide General Plan establishes General Agriculture (A/G) Zones to preserve agricultural lands for the continuation of commercial agricultural enterprises (San Joaquin County 2014). The two borrow sites are the only parts of the Project where a change in land use will occur. Borrow sites 1 and 2, which are 31.6 ac and 31.2 ac (respectively), are located in a parcel zoned AG-80 (“80” means parcel sizes must be a minimum of 80 ac). After the Project, the borrow site areas are anticipated to provide freshwater pond, freshwater marsh, and/or scrub-shrub habitat. These habitats will create small pockets of open space that do not substantially conflict with existing zoning for agricultural use on the

island. One of the goals of the Land Use and Resource Management Plan for the Primary Zone of the Delta (DPC 2010) is to "encourage compatibility between agricultural practices and wildlife habitat." Agriculture will continue to be the primary land use on Bacon Island, and the levee rehabilitation will add protection to this resource.

Bacon Island is not under a Williamson Act contract (San Joaquin County Assessor 2015).

The Project will have a less than significant impact.

c) Would the Project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No portion of Bacon Island is zoned for forest land, timberland, or Timberland Production. There will be no impact.

d) Would the Project result in the loss of forest land or conversion of forest land to non-forest use?

No portion of Bacon Island contains forest land, the Project will not result in the loss or conversion of forest land. There will be no impact.

e) Would the Project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

The Project will not involve other changes to the existing environment, beyond those discussed in (a) and (b) above, that could result in additional conversion of Farmland to non-agricultural use or any conversion of forest land to non-forest use. Conversion of Project borrow sites to non-agricultural use will not interrupt or preclude ongoing agricultural operations elsewhere on Bacon Island or result in additional conversion of farmed or forested land beyond the borrow sites themselves. Agriculture will continue to be the primary land use on Bacon Island, and the levee rehabilitation will add protection to this resource. There will be no impact.

2.3 Air Quality

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	❑	❑	✓	❑
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?	❑	❑	✓	❑
c) Expose sensitive receptors to substantial pollutant concentrations?	❑	❑	✓	❑
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	❑	❑	❑	✓

2.3.1 Environmental setting

Bacon Island is located in the northern region of the San Joaquin Valley Air Basin (SJVAB), which includes Fresno, Kern (western and central), Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties, and is administered by the SJVAPCD. The SJVAB is bounded by mountainous areas to the east, west, and south, with an opening to the north into the Sacramento Valley. The region experiences relatively long summers with generally hot and dry conditions, and short winters with sparse rainfall. Subtropical high air pressure events can occur year-round and result in the formation of strong atmospheric inversion layers. The combination of these topographical and meteorological conditions acts to prevent the dispersion of pollutants and is particularly conducive to poor air quality.

2.3.1.1 Criteria air pollutants

The Federal Clean Air Act of 1970 (Section 6.1) and California Air Resources Board (CARB) have established air quality standards for several common pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, sulfates, and hydrogen sulfide (CARB 2021a). Air quality data for the SJVAB from 2016 to 2020 are summarized in Table 2-2 and describe the existing conditions for some criteria air pollutants in the Project Area and vicinity.

Table 2-2. Summary statistics for air quality data in the SJVAB from 2016 to 2020.

Year	Pollutant (averaging time)	Maximum concentration	No. of days exceeding federal standards	No. of days exceeding state standards
2016	Ozone (1-hour)	0.131 ppm	n/a	51
	Ozone (8-hour)	0.101 ppm	112	113
	$PM_{2.5}$ (daily)	66.4 µg/m^3	26	n/a
	PM_{10} (daily)	132.5 µg/m^3	0	158
2017	Ozone (1-hour)	0.143 ppm	n/a	48
	Ozone (8-hour)	0.113 ppm	122	126
	$PM_{2.5}$ (daily)	113.4 µg/m^3	34	n/a
	PM_{10} (daily)	210.0 µg/m^3	8	146
2018	Ozone (1-hour)	0.129 ppm	n/a	42
	Ozone (8-hour)	0.102 ppm	111	112
	$PM_{2.5}$ (daily)	189.8 µg/m^3	42	n/a
	PM_{10} (daily)	250.4 µg/m^3	10	164
2019	Ozone (1-hour)	0.110 ppm	n/a	24
	Ozone (8-hour)	0.094 ppm	96	100
	$PM_{2.5}$ (daily)	83.7 µg/m^3	21	n/a
	PM_{10} (daily)	664.2 µg/m^3	16	130
2020	Ozone (1-hour)	0.142 ppm	n/a	50
	Ozone (8-hour)	0.114 ppm	119	121
	$PM_{2.5}$ (daily)	199.7 µg/m^3	52	n/a
	PM_{10} (daily)	359.0 µg/m^3	39	157

Source: CARB 2021b
$PM_{2.5}$ = respirable particulate matter (less than 2.5 microns in diameter)
PM_{10} = respirable particulate matter (less than 10 microns in diameter)
ppm = parts per million
µg/m^3 = micrograms per cubic meter of air
n/a = not applicable

The SJVAB does not consistently meet several applicable air quality standards (CARB 2021c). Between 2016 and 2020, measures of eight-hour ozone frequently exceeded both federal and state standards, whereas concentrations of suspended particulate matter ($PM_{2.5}$[3] and PM_{10}[4]) exceeded federal standards fewer times per year, but frequently exceeded state standards (Table 2-2). The SJVAB is currently designated as nonattainment for state ozone, $PM_{2.5,}$ and PM_{10} standards (CARB 2021c) and for federal ozone and $PM_{2.5}$ standards (USEPA 2021a). Otherwise, the Project Area is designated as attainment for carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) standards.

SJVAPCD criteria air pollutants and precursors of primary concern for construction activity in California include ozone precursors (e.g., nitrogen oxides [NO_X] and reactive organic gases [ROG]), CO, sulfur oxides (SO_X), and fugitive/exhaust dust particulate matter (PM_{10} and $PM_{2.5}$) (SJVAPCD 2015).

[3] Respirable particulate matter less than 2.5 microns in diameter
[4] Respirable particulate matter less than 10 microns in diameter

The SJVAPCD has established particulate matter (PM_{10} and $PM_{2.5}$), ozone, and CO plans to aid in the attainment of federal and state air quality standards largely through emissions reductions (SJVAPCD 2012). In accordance with these plans, the SJVAPCD has developed emissions thresholds for criteria pollutants developed by the SJVAPCD and the U.S. Environmental Protection Agency (EPA) were used in determining the significance of Project-related air quality effects. Since the SJVAPCD thresholds are more stringent than the EPA thresholds, emissions would be considered significant if they exceeded the local thresholds established by the SJVAPCD for construction activities. Thresholds established by the SJVAPCD for construction are:

- 10 tons per year of NO_X
- 10 tons per year of ROG
- 15 tons per year of PM_{10} (summed for dust and exhaust)
- 15 tons per year of $PM_{2.5}$ (summed for dust and exhaust)
- 100 tons per year of CO
- 27 tons per year of SO_X

2.3.1.2 Sensitive receptors

Some individuals have heightened health risks associated with exposure to air pollution, and for some air quality constituents, impacts are determined based on the distance to the closest sensitive receptor. Sensitive receptors include but are not limited to residential areas, schools, and hospitals. The nearest sensitive receptors to the Project are limited to the 11 residences on Bacon Island, five of which are located between 600 ft and 1,200 ft north of the Project Area near Santa Fe Cut (Section 2.14 Population and Housing). There are also residential homes and businesses on Bethel Island (estimated population of 2,161), which is approximately 2.7 miles northwest of Bacon Island.

2.3.2 Findings

This section describes the potential air quality effects of the Project, including exhaust emissions from construction equipment, fugitive dust generated by construction activities, and vehicle travel over unpaved roads. To complete the air quality analysis, information was collected on Project construction activities, duration, timing, and equipment use for the anticipated construction period and used to run the Road Construction Emission Model Version 9.0.0 developed for the Sacramento Metro Area Air Quality Management District (SMAQMD) to estimate Project emissions. Operational emissions were not analyzed because there will be no change in levee maintenance or agricultural activity following construction. This model is approved for use by the SJVAPCD for linear projects that include construction of a new roadway, road widening, or levee construction. The road construction emissions model data entry and emissions summary sheets are included as Appendix A.

The modeling was based on the material amounts and construction equipment assumptions described in Table 2-3 and: (1) a 64.6-ac Project area; (2) a 5.0-ac maximum daily disturbance; (3) a total of 2,788 cubic yards of on-site fill per day; (4) a total of 142 cubic yards of imported aggregate base and quarry stone per day; (5) a round-trip distance of 70 mi for imported material; and (6) an equipment operational estimate of 5-day work week with 8 hours per day, totaling 60 days between May 1 through October 31 in 2022, and 120 days between May 1 through October 31 in 2023.

Table 2-3. Project emission sources and assumptions used to determine air emissions.

Emission source	Project assumptions
Material on-site used for cut/fill	501,800 cubic yards
Imported aggregate base for all-weather roadway	8,600 cubic yards[1] (17,200 tons)
Imported quarry stone for armor	16,938 cubic yards[2] (27,100 tons)
Fuel-fired construction equipment	Excavator (3) Bulldozer (3) Scraper (2) Compactor (2) Water truck (3) Pumps (2) Planting equipment (1)
Employee commute trips	10 employee trips/day, 20 miles each way

[1] Based on a unit conversion for aggregate base of approximately 2.0 tons per cubic yard.
[2] Based on a unit conversion for quarry stone of approximately 1.6 tons per cubic yard.

Model results for the average annual emissions in tons per year for the Project construction period are shown in Table 2-4.

Table 2-4. Project construction emission estimates and SJVAPCD thresholds.

	NO_X	ROG	PM_{10}	$PM_{2.5}$	CO	SO_X
Project Construction (tons for the Project)	5.56	0.50	1.74	0.52	4.11	0.01
SJVAPCD Threshold (tons per year)	10	10	15	15	100	27

Model assumptions include application of BMPs such that all on-road heavy duty trucks will be limited to vehicles of model year 2010 or newer (**AIR-1**, Section 1.4.9).

a) Would the Project conflict with or obstruct implementation of the applicable air quality plan?

Based on the air quality modeling results (Table 2-2), construction of the Project is expected to result in temporary emissions that are well below SJVAPCD standards and therefore do not conflict with emissions reductions goals outlined in SJVAPCD air quality attainment plans for particulate matter (PM_{10} and $PM_{2.5}$), ozone, and CO (SJVAPCD 2012). BMPs will be implemented as part of conservation measure **AIR-1** (Section 1.4.9) to ensure emissions are minimized. There will be no change in long-term operational emissions. This impact will therefore be less than significant.

b) Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

The model results summarized in Table 2-2 show the construction of the Project is not expected to exceed the annual threshold criteria of pollutants for which the Project region is currently in non-attainment (including $PM_{2.5}$, PM_{10}, and ozone precursors [e.g., NO_x, ROG, CO]) , and

implementation of BMPs in **AIR-1** (Section 1.4.9) will ensure emissions are minimized. There will be no change in long-term operational emissions as a result of the Project. Although the Project will result in some emissions for which the SJVAB is not in attainment, the minimal amount and temporary nature of these emissions will not result in a cumulatively considerable net increase of these pollutants. Therefore, the impact would be less than significant.

c) Would the Project expose sensitive receptors to substantial pollutant concentrations?

The construction of the Project is not expected to expose sensitive receptors to substantial pollutant concentrations. The nearest sensitive receptors are limited to the 11 residences on Bacon Island, five of which are located between 600 ft and 1,200 ft north of the Project Area near Santa Fe Cut (Section 2.14 Population and Housing). There are also residential homes and businesses on Bethel Island (estimated population of 2,137), which is approximately 2.7 mi northwest of Bacon Island. The Project will not result in substantial diesel particulate emissions; maximum exhaust emissions are 0.24 pounds per day PM_{10} and 0.21 pounds per day $PM_{2.5}$ (Appendix A). Implementation of BMPs included in **AIR-1** (Section 1.4.9) will minimize diesel emissions, and Project construction will be temporary, only resulting in increased diesel exhaust for 12 months over the course of two years. Therefore, the Project's impact on exposing sensitive receptors to substantial pollutant concentrations will be less than significant.

d) Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The construction of the Project is not expected to result in other emissions adversely affecting a substantial number of people, such as those leading to objectionable odors, and the Project will not result in any change to current operations. Therefore, there will be no impact.

2.4 Biological Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	❑	✓	❑	❑
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	❑	✓	❑	❑

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
c) Have a substantial adverse effect on federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	❑	❑	❑	✓
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	❑	❑	❑	✓
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	❑	❑	❑	✓
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?	❑	❑	❑	✓

2.4.1 Environmental setting

Desktop and field evaluations were conducted to identify biological resources that may occur within or near the Project Area and to inform the development of appropriate avoidance, minimization, and mitigation measures. Methods and key findings from these evaluations were used to inform the impacts determinations in Section 2.4.2 and are detailed below in Section 2.4.1.

2.4.1.1 Methodology

Special-status species are defined as those that are:

- listed as endangered or threatened, or are proposed/candidates for listing, under the ESA (Section 6.1) and/or CESA (Section 6.2);
- designated by CDFW as a Species of Special Concern (Section 6.2);
- designated by CDFW as Fully Protected under the California Fish and Game Code (Sections 3511, 4700, 5050, and 5515) (Section 6.2);
- protected under the federal Bald and Golden Eagle Protection Act (Section 6.1);
- designated as rare under the California Native Plant Protection Act (NPPA, Section 6.2); and/or
- included on the CDFW's Special Vascular Plants, Bryophytes, and Lichens List with a California Rare Plant Rank (CRPR) of 1, 2, 3, or 4 (CDFW 2021a).

In addition, sensitive natural communities are defined as:

- vegetation communities identified as critically imperiled (S1), imperiled (S2), or vulnerable (S3) on the most recent *California Sensitive Natural Communities List* (CDFW 2020).

Desktop Review

Lists of special-status plant and wildlife species that may occur in the Project Area or vicinity were developed by querying the following agency databases:

- The USFWS Information for Planning and Conservation Portal (IPaC) (USFWS 2021);
- The California Native Plant Society's (CNPS) online Inventory of Rare and Endangered Vascular Plants of California (CNPS 2021); and
- CDFW's CNDDB (CDFW 2021b).

Database queries were based on a search of the U.S. Geological Survey (USGS) 7.5-minute quadrangles in which the Project is located (Woodward Island and Bouldin Island), and the surrounding ten quadrangles (Rio Vista, Isleton, Thornton, Terminous, Holt, Union Island, Clifton Court Forebay, Byron Hot Springs, Brentwood, and Jersey Island). These quadrangles are collectively referred to as the Project Region. The database query results are presented in Appendix B (for special-status plants and sensitive natural communities) and Appendix C (for special-status wildlife species). Fish species are not included, as there will be no work below HTL or MHW or work affecting Shaded Riverine Aquatic cover.

In addition to the database queries described above, the following information sources were reviewed:

- USFWS species profiles, species recovery plans, and 5-year species reviews,
- scientific research and/or peer-reviewed journal articles,
- unpublished technical reports, and
- citizen science databases including eBird (2019).

Habitat type assessment

On March 17, 2021, a site reconnaissance visit—including habitat mapping and a habitat assessment for special-status wildlife and plant species—was conducted by two Stillwater Sciences wildlife biologists (H. Burger and M. Montjoy) and an ecologist (E. Applequist) throughout the Project Area.

The habitat preferences and distributional range of each species identified from the database queries (Appendices B and C) were compared with existing information and the results of the site reconnaissance to determine the likelihood for each species to occur in the Project Area and to refine the list of species that may be impacted by the Project (Appendix B and Appendix C). If a species' required habitat was lacking from the Project Area or if the Project Area is outside the species' known distribution or elevation range, the species was considered not likely to occur. The habitat assessment applied one of the following categories of likelihood of occurrence for each special-status species: None (no potential to occur), Low (not expected to occur), Moderate (may occur), or High (previously documented and/or highly suitable habitat).

Botanical field surveys

Special-status plant surveys of the Project Area were conducted on April 15, 2021 for early-blooming species (by R. Thoms and C. Walton) and on July 6, 2021 for late-blooming species (by R. Thoms and Abra Schlotz) by two-person teams led by individuals with: (1) experience conducting floristic surveys; (2) knowledge of plant taxonomy and plant community ecology and classification; (3) familiarity with the plant species of the area; and (4) familiarity with appropriate state and federal statutes related to plants and plant collecting.

Surveys for special-status plant species were conducted in accordance with the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000) and *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (CDFW 2018). Specifically, surveys were comprehensive for vascular plants and bryophytes such that "every plant taxon that occurs on site [was] identified to the taxonomic level necessary to determine rarity and listing status" (CDFW 2018). If identification was not possible in the field, the plants were collected for identification in the laboratory in accordance with government collecting regulations (using the "1 in 20" rule, Wagner 1995) or, if potentially a special-status plant, according to the botanists' current CDFW plant voucher collection permit guidelines (e.g., not more than five individuals or two percent of the population, whichever is less, for one voucher sheet). Vascular plants were identified following the taxonomy of the *Jepson eFlora* (Jepson Flora Project 2021).

CNDDB forms were to be completed for any documented special-status plant populations and any sensitive natural communities were to be documented on CNPS/CDFW Combined Vegetation Rapid Assessment and Relevé Field Forms. Concurrent with the special-status plant surveys, surveys for blue elderberry (*Sambucus nigra*) were conducted following USFWS (2017) guidelines for assessing habitat for the federally listed valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

2.4.1.2 Land cover and vegetation types

Most of Bacon Island is in agricultural production, including Borrow sites 1 and 2. Land cover types) in the Project Area are depicted in Figures 2-1 through 2-8 and summarized in Table 2-5. The Project Area is primarily non-native ruderal herbaceous vegetation, which provides relatively low-value habitat. Vegetation on the crown and slopes of the levees is regularly mowed and sprayed with herbicide. There are occasional patches of Riparian Forest,[5] Scrub-shrub,[6] and non-native Himalayan blackberry (*Rubus armeniacus*) brambles along the levee slopes, as well as a patch of Scrub-shrub in Borrow Site 1. No Freshwater Marsh[7] is present. Shaded Riverine Aquatic habitat is present as a patch of blue gum on the waterside of the levee near the southeastern corner of Bacon Island but will not be removed as part of the Project. Small patches of native vegetation are sparsely distributed throughout the Project Area, providing minimal wildlife habitat value.

[5] Assembly Bill (AB) 360 Definition for Riparian Forest habitat includes woody vegetation (including isolated trees or shrubs) greater than 20 ft in height that may or may not overhang the water's edge. Often there is a dense, shrubby understory. The most common trees in the Delta include cottonwood, sycamore, alder, Oregon ash, willows, box elder, black walnut and various oaks.

[6] The AB 360 Definition for Scrub-shrub habitat includes stands of woody vegetation predominantly less than 20 ft in height. The various tree and shrub species that make up Scrub-shrub are generally the same as for Riparian Forest, although in most instances alders and or willows are the dominant plants.

[7] The AB 360 definition for Freshwater Marsh habitat includes tidal and non-tidal areas near levees, either on the waterside or landside where there are seeps or toe ditches. Common plant species include cattails and tules.

Figure 2-1. Land cover and vegetation types in the Project Area, page 1.

Figure 2-2. Land cover and vegetation types in the Project Area, page 2.

Figure 2-3. Land cover and vegetation types in the Project Area, page 3.

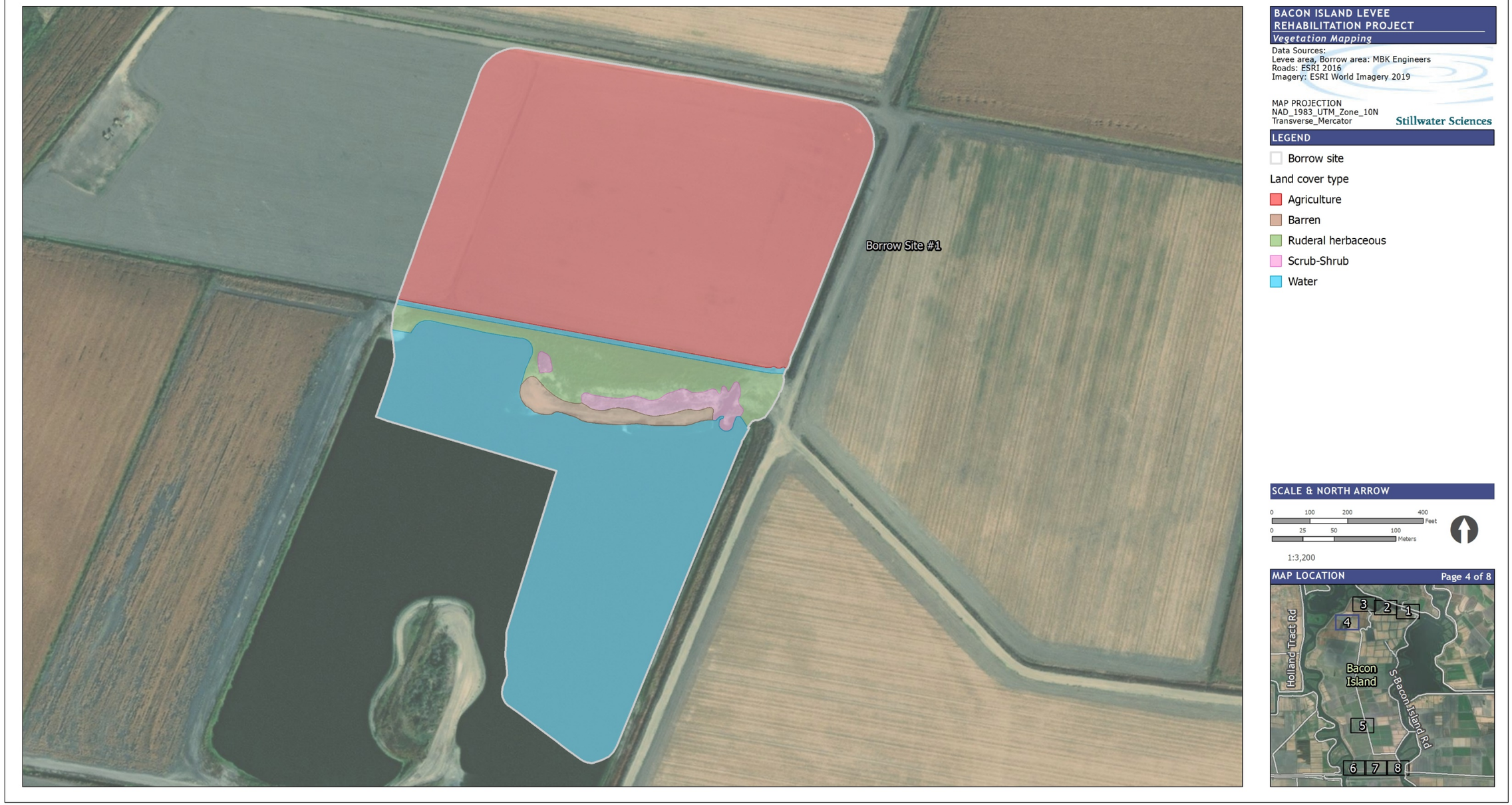

Figure 2-4. Land cover and vegetation types in the Project Area, page 4.

Figure 2-5. Land cover and vegetation types in the Project Area, page 5.

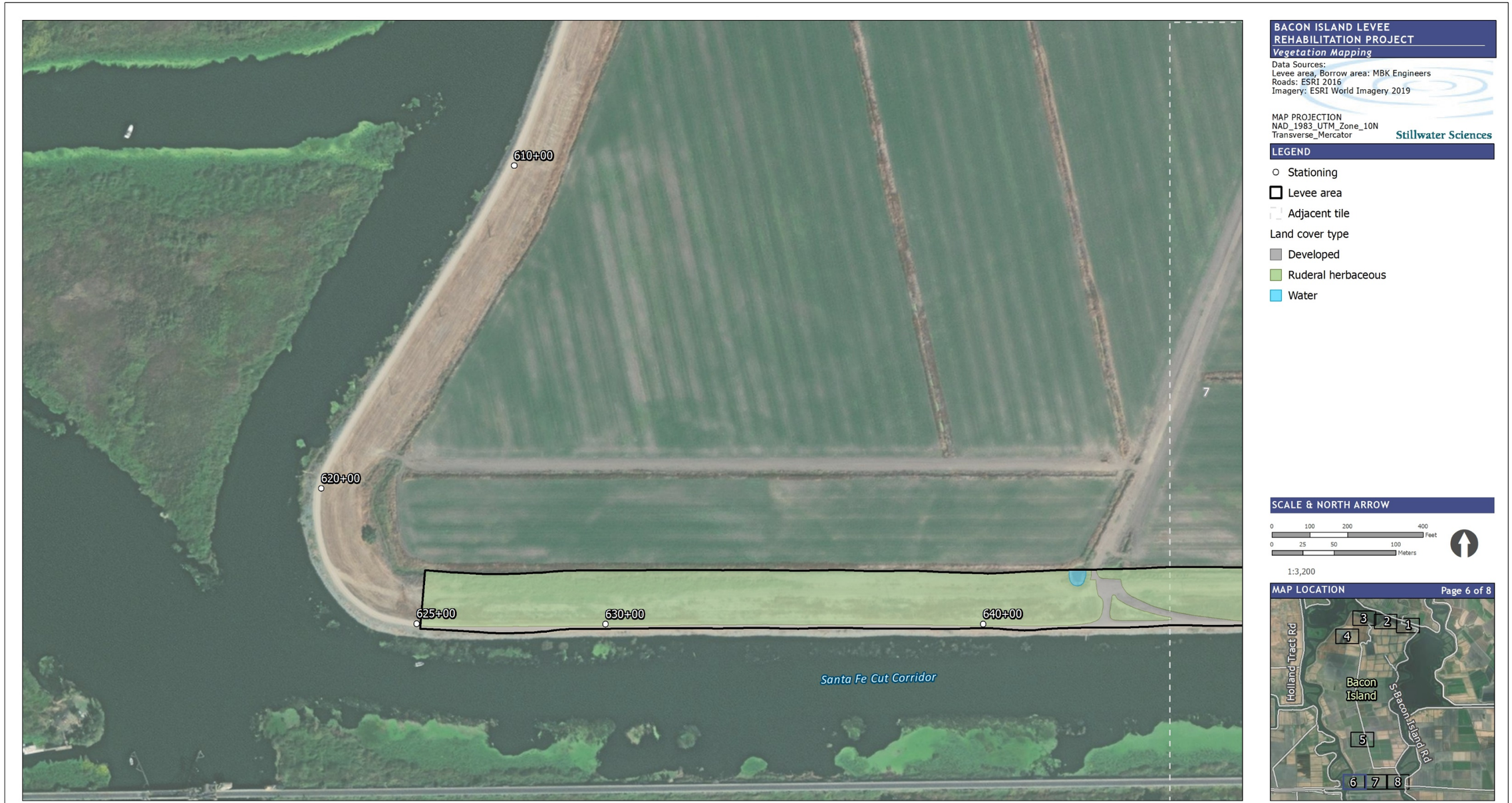

Figure 2-6. Land cover and vegetation types in the Project Area, page 6.

Figure 2-7. Land cover and vegetation types in the Project Area, page 7.

Figure 2-8. Land cover and vegetation types in the Project Area, page 8.

Table 2-5. Summary of land cover types in the Project Area (in acres).

Land cover/ Vegetation type	Levee area	Borrow Site 1	Borrow Site 2	Total acres	Percent of total
Agriculture	1.93	17.34	31.18	50.45	39.6%
Barren	–	0.49	–	0.49	0.4%
Developed	10.07	–	–	10.07	7.9%
Himalayan blackberry	0.07	–	–	0.07	0.1%
Riparian Forest	0.26	–	–	0.26	0.2%
Ruderal herbaceous	52.08	2.10	–	54.18	42.5%
Scrub-shrub	0.14	0.53	–	0.67	0.5%
Water	0.04	11.15	–	11.19	8.8%
Total				**127.38**	**100%**

Agriculture

Most of Bacon Island's interior is used for agriculture. Annual crops are typically grown within the agricultural portion of Borrow Site 1 (Figure 2-4), though it was fallow during 2021 site visits. Borrow Site 2 (Figure 2-5) is currently under cultivation for alfalfa (*Medicago sativa*). Agricultural lands have primarily replaced areas that were historically dominated by Delta wetlands. Depending on crop type, agricultural fields may provide some form of habitat for native birds (e.g., raptors and their rodent prey) for part of the year, though other types (e.g., vineyards, orchards) provide little habitat value (Ivey et al. 2003). A total of 50.45 ac (39.6%) of the Project Area is agriculture (Table 2-5).

Barren

The seasonally inundated edge of the pond in Borrow Site 1 is barren and unvegetated due to occasional inundation (Figure 2-4). A total of 0.49 ac (0.4%) of the Project Area is barren (Table 2-5).

Developed

Developed areas include improved and unimproved driving surfaces, primarily the gravel road along the levee crown. A total of 10.07 ac (7.9%) of the Project Area is developed.

Himalayan blackberry

Two patches of non-native Himalayan blackberry brambles are located along the landside levee near Levee Station 226 (Figure 2-1). These patches are dominated by a dense thicket of Himalayan blackberry. Although Himalayan blackberry fruits provide food for birds and mammals and the dense brambles may provide cover for wildlife, it is a non-native and highly invasive plant species and often outcompetes and replaces native habitat. A total of 0.07 ac (0.1%) of the Project Area is Himalayan blackberry (Table 2-5).

Riparian Forest

Riparian Forest vegetation in the Project Area occurs only as a patch of blue gum on the waterside of the levee near the southeastern corner of Bacon Island (Figure 2-8). The mature blue gum trees can provide cover, roosting, foraging, and nesting habitat to raptor, songbird, and migratory bird species, as well as Shaded Riverine Aquatic habitat for fish. A great blue heron (*Ardea herodias*) rookery and a roosting great horned owl (*Bubo virginianus*) were observed in

the blue gum trees during the site reconnaissance visit on March 17, 2021. A total of 0.26 ac (0.2%) of the Project Area is Riparian Forest (Table 2-5).

Ruderal herbaceous

Vegetation on the levee crown, the landside levee slope, the riprapped waterside slope, and the southwest portion of Borrow Site 1 is dominated by non-native ruderal herbaceous vegetation (Figure 2-1 through Figure **2-4** and Figure 2-6 through Figure **2-8**). Dominant plant species include a mix of non-native grasses such as Bermuda grass (*Cynodon dactylon*), Mediterranean barley (*Hordeum murinum*), ripgut grass (*Bromus diandrus*) and common reed (*Phragmites australis*), as well as herbaceous non-native species such as wild watermelon (*Citrullus lanatus* var. *citroides*), shortpod mustard (*Hirschfeldia incana*), radish (*Raphanus sativus*), and curly dock (*Rumex crispus*). Ruderal herbaceous areas can provide some wildlife species with food resources (for example, seeds from grasses and forbs), perching opportunities for common songbirds such as red-winged blackbird (*Agelaius phoeniceus*) and song sparrow (*Melospiza melodia*), and foraging opportunities for raptors. Raptors are frequently observed foraging for rodents on the landside of ruderal levee slopes (which are periodically mowed), including the levee on Bacon Island. However, in general, ruderal herbaceous vegetation does not provide high-quality wildlife habitat, particularly for special-status species. A total of 54.18 ac (42.5%) of the Project Area is ruderal herbaceous (Table 2-5).

Scrub-shrub

Scrub-shrub vegetation is distributed in small patches on the waterside of the levee (Figure 2-4) and at Borrow Site 1 (Figure 2-4). Dominant plant species include Goodding's willow (*Salix gooddingii*), narrow-leaved willow (*Salix exigua*), and California blackberry (*Rubus ursinus*). Scrub-shrub in the Project Area may provide cover and foraging habitat for wildlife including birds and mammals. A total of 0.67 ac (0.5%) of the Project Area is Scrub-shrub (Table 2-5).

Water

A small agricultural pond is present within the Project Area on the landside of the levee near Levee Station 643 (Figure 2-6). Additionally, much of the southern portion of Borrow Site 1 is inundated, and an irrigation ditch runs east-west across the center of Borrow Site 1 (Figure 2-4). Water may provide cover and foraging habitat for a variety of wildlife. A total of 11.19 ac (8.8%) of the Project Area is water (Table 2-5).

2.4.1.3 Waters and wetlands

Although a formal delineation of jurisdictional waters and wetlands has not been conducted for the Project Area, the boundaries of such features can be reasonably approximated based on the river stage formation, vegetation, and land cover type (Figures 2-1 through 2-13). On the waterside of the levee, all features below the HTL are subject to Sections 404 and 401 of the Clean Water Act and are considered jurisdictional waters/wetlands by the (USACE); features below MHW are also subject to Section 10 of the Rivers and Harbors Act (Section 6.1). The Sacramento District of the USACE (regulatory branch) does not typically take jurisdiction over wetlands on the landside of levees (e.g., Freshwater Marsh) associated with ditches and/or levee seepage for levee repair projects in the Delta (USACE 1995). Any work on the waterside of the levee, from the hinge point down, falls under the regulatory purview of CDFW under Section 1600 of the Fish and Game Code (Section 6.2). The inundated southern portion of Borrow Site 1 is subject to ongoing operations and maintenance and is an active surface mining site for borrow material; as such, it is not classified as a water of the state.

2.4.1.4 Special-status species and sensitive natural communities

Plant species and natural communities

Seventeen special-status plant species and one sensitive natural community were determined to have the potential to occur within or near the Project Area (Table 2-6). Forty-seven special-status plant species and eight sensitive natural communities were identified from the database queries as being previously documented in the Project Region (Appendix B). Thirty species had no potential to occur in or near the Project Area either because no suitable habitat is present and/or the Project Area is outside of the species' known elevation range. Seven sensitive natural communities had no potential to occur in or near the Project Area due to the lack of characteristic species as determined during the site reconnaissance visit.

Table 2-6. Summary of special-status plant species and sensitive natural communities with potential to occur in the Project Area.

Scientific name	Common name	Status[1] Federal/State/CRPR
Special-status plant species		
Atriplex minuscula	lesser saltscale	–/–/1B.1
Brasenia schreberi	watershield	–/–/2B.3
Calochortus pulchellus	Mt. Diablo fairy-lantern	–/–/1B.2
Carex comosa	bristly sedge	–/–/2B.1
Centromadia parryi subsp. *rudis*	Parry's rough tarplant	–/–/4.2
Cicuta maculata var. *bolanderi*	Bolander's water-hemlock	–/–/2B.1
Hibiscus lasiocarpos var. *occidentalis*	woolly rose-mallow	–/–/1B.2
Lathyrus jepsonii var. *jepsonii*	Delta tule pea	–/–/1B.2
Lilaeopsis masonii	Mason's lilaeopsis	–/CR/1B.1
Limosella australis	Delta mudwort	–/–/2B.1
Myosurus minimus subsp. *apus*	little mousetail	–/–/3.1
Potamogeton zosteriformis	eel-grass pondweed	–/–/2B.2
Sagittaria sanfordii	Sanford's arrowhead	–/–/1B.2
Scutellaria galericulata	marsh skullcap	–/–/2B.2
Scutellaria lateriflora	side-flowering skullcap	–/–/2B.2
Spergularia macrotheca var. *longistyla*	long-styled sand-spurrey	–/–/1B.2
Symphyotrichum lentum	Suisun Marsh aster	–/–/1B.2
Sensitive natural communities		
N/A	Coastal and valley freshwater marsh	S2.1

[1] Status:
Federal
– No federal status
State
CR California State listed as rare
– No State status

California Rare Plant Rank (CRPR)
1B Plants rare, threatened, or endangered in California and elsewhere
2B Plants rare, threatened, or endangered in California, but more common elsewhere
0.1 Seriously threatened in California (high degree/immediacy of threat)
0.2 Fairly threatened in California (moderate degree/immediacy of threat)
0.3 Not very threatened in California (low degree/immediacy of threats or no current threats known)
State Ranks for Sensitive Natural Communities
S2 6–20 viable occurrences Statewide
0.1 Very threatened

No special-status species or sensitive natural communities were documented within the Project Area. Appendix D provides a comprehensive list of plants documented in the Project Area during the botanical surveys.

Wildlife

Thirty-five special-status wildlife species were identified from the database queries and site visit as potentially occurring in the Project Region (Appendix C). Twenty-four species have no or low potential to occur in or near the Project Area because no or marginally suitable habitat is present or the Project Area is outside of the species' known range. The following 11 remaining species have moderate or high potential to occur within or near the Project Area:

- Western pond turtle (*Actinemys marmorata*)
- Giant garter snake (*Thamnophis gigas*)
- White-tailed kite (*Elanus leucurus*)
- Northern harrier (*Circus cyaneus*)
- Swainson's hawk (*Buteo swainsoni*)
- California black rail (*Laterallus jamaicensis coturniculus*)
- Greater/Lesser sandhill crane (*Antigone canadensis tabida/ Antigone canadensis canadensis*)
- Loggerhead shrike (*Lanius ludovicianus*)
- Song sparrow ("Modesto" population) (*Melospiza melodia*)
- Tricolored blackbird (*Agelaius tricolor*)
- Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)

These species are discussed in detail below, including listing status, habitat associations, and notable life history requirements. Unless otherwise noted in the discussions below, these species were not observed during the habitat assessments conducted in 2021. In addition to the species described below, other common and special-status amphibians, reptiles, birds, and mammals may use the Project Area for foraging, cover, dispersal, and breeding.

Western pond turtle. Western pond turtle, a CDFW Species of Special Concern, inhabits fresh or brackish water characterized by areas of deep water, low flow velocities, moderate amounts of riparian vegetation, warm water and/or ample basking sites, and underwater cover elements, such as large woody debris and rocks (Jennings and Hayes 1994). Along major rivers, western pond turtles are often concentrated in side-channels and backwater areas. Turtles may move to off-channel habitats, such as oxbows, during periods of high flows (Holland 1994). Although adults are habitat generalists, hatchlings and juveniles require specialized habitat for survival through their first few years. Hatchlings spend much of their time feeding in shallow water with dense submerged or short emergent vegetation (Jennings and Hayes 1994). Although an aquatic reptile, western pond turtles require upland habitats for basking, overwintering, and nesting, typically within 0.6 mi from aquatic habitats (Holland 1994).

Western pond turtles are likely present in or near the Project Area; they may also migrate overland through the Project Area. Stillwater biologists observed six western pond turtles using aquatic habitat on Bacon Island along the waterside of the eastern Bacon Island levee in spring of 2016 (Stillwater Sciences 2016). There are four additional CNDDB records along Old River to the west and Connection Slough to the north (CDFW 2021b). There is suitable aquatic and basking habitat in the waterways surrounding the island, along with suitable upland nesting

habitat on the interior of the island beyond the levee toe. The landside drainage ditches and ponds located near the Project Area and borrow sites provide specialized habitat and feeding opportunities for young-of-year or juvenile western pond turtles. Western pond turtles do not likely nest on the levee slope because of the compact soils, active levee vegetation management on the interior side of the island, and riprap on the waterside of the island.

Giant garter snake. Though not likely to occur in the Project Area, giant garter snake is included here because of its federal and state listing as threatened. Highly aquatic, this species inhabits marshes, sloughs, ponds, low-gradient streams, agricultural wetlands (predominantly rice fields) and associated waterways (including irrigation and drainage canals and ditches), and adjacent uplands. The three main habitat components required by giant garter snakes are: (1) adequate water and emergent, herbaceous wetland vegetation—such as bulrush or cattails—during the active season for foraging and escape cover; (2) grassy banks and openings in waterside vegetation for basking; and (3) higher elevation uplands with terrestrial burrows or crevices for cover, hibernation, and refugia from seasonal floods (USFWS 1999, Fisher et al. 1994). The active season for giant garter snake is generally early April through late October (USFWS 1999).

There is low potential for giant garter snake to use the Project Area for dispersal based on the lack of nearby sightings and lack of highly suitable habitat. The closest documented occurrence to the Project Area, from 1996, is approximately 1.5 mi to the northeast, located on the southwest end of Medford Island (CDFW 2021b); the record is for a reported shed giant garter snakeskin. The next closest occurrence is a 2014 record from Webb Tract, located approximately 4.8 miles northwest of Bacon Island (CDFW 2021b). Other observations of giant garter snake—from 2015 and 2016—have been confirmed on other Delta islands, including but not limited to: Sherman Island, Twitchell Island, Bouldin Island, Jersey Island, Bradford Island, and Empire Tract (CDFW 2017, 2021b). However, there is no resident breeding population currently known on or near Bacon Island (Hansen, pers. comm., as cited in ICF International 2010), and the extent of the available suitable aquatic habitat is likely not large enough to support a sustainable population. Water features located along the interior of the island with emergent vegetation and water present between May and mid-September may provide suitable aquatic habitat for giant garter snake; such features may include agricultural canals and the pond adjacent to Borrow Site 2, though the lack of a nearby source population reduces the likelihood. The ponding associated with Borrow Site 1 does not have suitable associated uplands due to a lack of cover. Ditches located beyond the levee toe of the Project Area are unsuitable since they do not provide a permanent source of water during the snake's active season.

White-tailed kite. White-tailed kite is a CDFW Fully Protected species. White-tailed kite is a resident (breeding and wintering) species throughout central and coastal California, up to the western edge of the foothills of the Sierra Nevada; California constitutes the stronghold of its North American breeding range (Zeiner et al. 1990a). They are not migratory but may make slight seasonal range shifts in coastal areas during winter (Zeiner et al. 1990a). White-tailed kites breed in lowland grasslands, oak woodlands or savannah, and wetlands with open areas. Riparian corridors represent a preferred landscape characteristic for kites in both the breeding and non-breeding seasons (Erichsen 1995). Groves of trees are required for perching and nesting, though kites do not seem to associate with particular tree species (Dunk 1995). Preferred foraging sites include open and ungrazed grasslands, agricultural fields, wetlands, and meadows that support large populations of small mammals. The white-tailed kite's year-round diet consists almost entirely of small mammals (Erichsen 1995), but can also include birds, insects, and reptiles. White-tailed kites breed between February and October, with peak breeding in May through August (Zeiner et al. 1990a).

There is suitable foraging habitat for white-tailed kite in the open agricultural fields on the landside of the levee. White-tailed kite may nest in isolated trees or groups of trees within the vicinity of the Project Area, possibly in the eucalyptus grove at the southeastern end of the Project Area.

Northern harrier. Northern harrier is a CDFW Species of Special Concern. It is a fairly common winter visitor, and small numbers remain in California to breed. The breeding population now appears to be restricted to north coastal lowlands, the central coast, the northern Central Valley, Klamath Basin, and Great Basin (MacWhirter et al. 1996, Davis and Niemela 2008). Meadows, marshes, and wetlands are optimal habitat types; other suitable habitats include grasslands, ungrazed or lightly grazed pastures, and grain fields (Davis and Niemela 2008). Northern harriers nest on the ground in shrubby vegetation, usually along the edge of marshes. Nests are constructed of larger plants (e.g., willows, cattails) at the base with grasses and sedges lining the interior. Northern harriers feed primarily on voles or other small mammals; birds, frogs, reptiles, and invertebrates make up the rest of their diet (MacWhirter et. al.1996). This highly territorial species breeds from April through September, with peak breeding occurring during June and July (Zeiner et al. 1990a).

Northern harriers have been observed foraging on Bacon Island and in the Project vicinity (including an observation during the March 17, 2021 site visit by Stillwater). There is no suitable nesting habitat in the Project Area, though the species may nest along in-channel wetlands in Connection Slough and/or Santa Fe Cut Corridor.

Swainson's hawk. Swainson's hawk, a migratory raptor that is a spring and summer resident in California's Central Valley, is state listed as threatened. Swainson's hawk nests in only a few species of trees, such as oaks, cottonwoods, sycamores, or willows (CDFG 1994) near large, sparsely vegetated flatlands characterized by valleys, plateaus, broad flood plains, and large open expanses (Bloom 1980). Although Swainson's hawk is not an obligate riparian species, the availability of nesting trees is closely tied to riparian areas, usually associated with main river channels (Bloom 1980, Estep 1989). Nesting sites tend to be adjacent or close to suitable foraging grounds, which may include recently harvested alfalfa, wheat, or hay crops; low-growing crops, such as beets or tomatoes; open pasture; non-flooded rice fields; or post-harvest cereal grain crops (Bloom 1980; CDFG 1992, 1994). Swainson's hawks forage in open areas with low vegetative cover that provides good visibility of prey, such as voles (*Microtus californicus*), ground squirrels (*Spermophilus beecheyi*), pocket gophers (*Thomomys bottae*), and deer mice (*Peromyscus* spp.); they avoid foraging in fields with tall crops that grow much higher than native grasses, which makes prey more difficult to find (CDFG 1994). Migrating Swainson's hawks first arrive in the Central Valley in mid-March through May and migrate south in September and October (Zeiner et al. 1990a). Breeding occurs from late March to late August, with peak activity from late May through July (Zeiner et al. 1990a). Most clutches are completed by mid-April, with fledging occurring from July to mid-August (Estep 1989).

There is high potential for Swainson's hawk to nest within 0.25 mi of the Project Area. Nesting Swainson's hawks were documented along Connection Slough in 2009, as well as at the northern tip of Bacon Island and on Mildred Island (CDFW 2021b), less than 0.25 and 0.50 miles from the Project Area, respectively. There is suitable nesting habitat in and near the Project Area in a relatively small patches of riparian forest and in a few isolated trees. The riparian forest in southeast corner of the Project Area, along the Santa Fe Cut, is composed of blue gum (Figure 2-8). While not usually a preferred tree for species' nesting, there have been documented Swainson's hawk nests in eucalyptus trees along the Middle River in 2000, 2004, and 2010 (CDFW 2021b), all within 0.25 miles of the Project Area.

California black rail. California black rail, state listed as threatened and a CDFW Fully Protected species, is a very secretive bird associated with emergent tidal wetlands, especially where pickleweed (*Salicornia* spp.) and cordgrass (*Spartina* spp.) dominate. Black rails are typically found in the immediate vicinity of tidal sloughs at higher zones at the upper limit of tidal flooding where effects from tidal fluctuations are minimal (Zeiner et al. 1990a). During high flows, black rails may rely on adjacent upland areas for cover (Zeiner et al. 1990a).

There is no potential for black rail to occur in the Project Area as there is no suitable tidal marsh habitat. However, there is moderate potential for black rail to occur along waterways outside of but within 700 ft of the Project Area (700 ft is a typical maximum no-work buffer distance from active nests). There are multiple documented occurrences of black rails using in-channel "islands" composed of emergent wetland vegetation in Connection Slough, Old River, and Middle River from 2010 (CDFW 2021b).

Greater/Lesser sandhill crane. Greater sandhill crane is state-listed as threatened and a CDFW Fully Protected species, while the lesser sandhill crane is a CDFW Species of Special Concern. Both subspecies of sandhill crane roost and forage in the Delta and Central Valley during winter months. In California, sandhill cranes are associated with freshwater marshes and grasslands and also forage in harvested rice fields, corn stubble, barley and newly planted grain fields (Littlefield and Ivey 2000, 2002; Ivey et al. 2003). Lesser sandhill cranes breed in the arctic. Greater sandhill cranes nest in high elevation meadows in the northern Sierra Nevada and Cascade Ranges and high-desert meadows in the northeastern corner of California.

Sandhill cranes (subspecies unknown) were observed foraging on the eastside of Bacon Island in January 2015 (Stillwater Sciences 2015) and may use flooded corn fields near the Project Area in winter.

Loggerhead shrike. Loggerhead shrike, a CDFW Species of Special Concern, prefers open areas with scattered trees or shrubs and short vegetation and and/or bare ground for hunting. This species is highly territorial and aggressive during the breeding season. Loggerhead shrikes prefer tall perches such as trees, tall shrubs, fences, posts, and/or power lines for hunting, territory observation, and breeding defense (Zeiner et al. 1990a, Humple 2008). Nest sites are typically in isolated trees or large shrubs with dense foliage (Yosef 1996).

There is moderate potential that loggerhead shrikes occur in or near the Project Area. Loggerhead shrikes are commonly observed in the Delta and may nest in isolated trees or large shrubs in the Project Area. A loggerhead shrike was observed on Bacon Island by a Stillwater biologist during a plant survey on April 15, 2021.

Modesto song sparrow. The "Modesto" population of song sparrow (hereafter referred to as Modesto song sparrow) is a year-round resident of California and a CDFW Species of Special Concern. This population is endemic to the north-central portion of the Central Valley, locally abundant in the Sacramento–San Joaquin River Delta and Butte Sink areas. The Modesto song sparrow occupies freshwater marsh, riparian woodland, and riparian scrub habitats, as well as vegetated irrigation canals and levees (Gardali 2008). Emergent marsh and riparian scrub may provide primary nesting habitat. Modesto song sparrows breed from mid-March to early August (Gardali 2008).

Modesto song sparrows have been observed on Bacon Island (eBird 2021) and in Old River, Connection Slough, and Middle River near the Project Area (CDFW 2021b, eBird 2021). The

Modesto song sparrow may nest in emergent tule marshes on the waterside of the Project Area levee, or in emergent marsh or riparian scrub near irrigation canals or ponds near the borrow sites.

Tricolored blackbird. Tricolored blackbird, a CDFW Species of Special Concern, is largely endemic to California. It nests in large colonies, typically between February 1 and August 31, in protected stands of cattails, tules, blackberry brambles, or willows within 1,600 ft of open, accessible water (Beedy and Hamilton 1997). Tricolored blackbirds forage in a variety of habitats, including agricultural fields (such as cut grain fields, rice, and alfalfa), dairies and feedlots, irrigated pastures, annual grasslands, ephemeral pools and ponds, wetlands, scrub-shrub, and freshwater marsh (Beedy and Hamilton 1997).

There is moderate potential for tricolored blackbird to forage in agricultural areas in the Project vicinity, or nest in emergent tule marsh on the waterside near the Project Area or ponds near the borrow sites.

Yellow-headed blackbird. Yellow-headed blackbird is a CDFW Species of Special Concern. This species is a common local breeder in the Central Valley, in the Imperial and Colorado River valleys east of the Cascade Range and Sierra Nevada, and at certain locations in the coast range west of the Central Valley (Zeiner et al. 1990a). Winter distribution is restricted mainly to the western portion of the Central Valley and the Imperial Valley (Zeiner et al. 1990a). This species breeds almost entirely in open marshes with relatively deep water and tall emergent vegetation, such as tules (*Schoenoplectus* spp.) or cattails (*Typha* spp.) (Jaramillo 2008). Marshes used by breeding birds are frequently located on the edges of large waterbodies such as lakes, reservoirs, or larger ponds, and the nests are typically made in moderately dense vegetation (Jaramillo 2008). Yellow-headed blackbirds forage for seeds and invertebrates within wetlands and surrounding grasslands and/or croplands (Twedt and Crawford 1995).

Yellow-headed blackbird was observed by Stillwater biologists on Bacon Island during the March 17, 2021 site visit, and additional observations have been documented on the island from 2012 and 2013 (eBird 2021). There is marginally suitable nesting habitat, where emergent vegetation is more densely packed, along the in-channel wetlands network along Connection Slough, Old River, and the Santa Fe Cut, as well as in interior ponds with tall emergent vegetation (e.g., near Borrow Site 1). The Project Area contains marginally suitable foraging habitat, while the interior agricultural fields of Bacon Island provide ample foraging habitat for yellow-headed blackbird.

Other migratory bird and raptor nests. Non-listed migratory birds or raptors could establish nests in suitable trees or other nesting habitat in the Project Area. A great blue heron rookery was present on the southeast corner of Bacon Island during the March 17, 2021, site visit. The rookery contained about eight active nests in the patch of blue gum trees along the water side portion of the levee road. During the site visit an inactive raptor nest (presumed red-tailed hawk [*Buteo jamaicensis*]) was also observed in a metal power pole along the western levee road. The nesting season for migratory birds and raptors is generally between February 15 and August 31.

Additional wildlife species or signs observed during the March 17 and April 15, 2021, site visit and plant survey (respectively) included the following species: greater white-fronted goose (*Anser albifrons*), snow goose (*Chen caerulescens*), cackling goose (*Branta hutchinsii*), Canada goose (*Branta canadensis*), American wigeon (*Anas americana*), mallard (*Anas platyrhynchos*), northern shoveler (*Anas clypeata*), northern pintail (*Anas acuta*), ruddy duck (*Oxyura jamaicensis*), ring-necked pheasant (*Phasianus colchicus*), California quail (*Callipepla californica*), pied-billed grebe (*Podilymbus podiceps*), American white pelican (*Pelecanus erythrorhynchos*), double-crested cormorant (*Phalacrocorax auritus*), great blue heron, great

egret (*Ardea alba*), snowy egret (*Egretta thula*), white-faced ibis (*Plegadis chihi*), turkey vulture (*Cathartes aura*), northern harrier, Swainson's hawk, red-tailed hawk, American kestrel (*Falco sparverius*), American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), greater yellowlegs (*Tringa melanoleuca*), Caspian tern (*Hydroprogne caspia*), mourning dove (*Zenaida macroura*), great horned owl, belted kingfisher (*Megaceryle alcyon*), black Phoebe (*Sayornis nigricans*), Say's Phoebe (*Sayornis saya*), western kingbird (*Tyrannus verticalis*), loggerhead shrike (*Lanius ludovicianus*), tree swallow (*Tachycineta bicolor*), cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (*Hirundo rustica*), marsh wren (*Cistothorus palustris*), hermit thrush (*Catharus guttatus*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), American pipit (*Anthus rubescens*), yellow-rumped warbler (*Setophaga coronate*), common yellowthroat (*Geothlypis trichas*), song sparrow, white-crowned sparrow (*Zonotrichia leucophrys*), red-winged blackbird (*Agelaius phoeniceus*), western meadowlark (*Sturnella neglecta*), yellow-headed blackbird, Brewer's blackbird (*Euphagus cyanocephalus*), Bullock's oriole (*Icterus bullockii*), lesser goldfinch (*Spinus psaltria*), house sparrow (*Passer domesticus*), eared grebe (*Podiceps nigricollis*), house finch (*Haemorhous mexicanus*), California ground squirrel (*Otospermophilus beecheyi*), and coyote (*Canis latrans*).

2.4.2 Findings

a) Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Plant species and natural communities

No special-status species were documented within the Project Area; as such, Project-related impacts on special-status plants are not anticipated. However, special-status plants may exist in areas outside of but near the Project Area (e.g., Suisun Marsh aster along the waterside at or below the ordinary high water line). Per mitigation measure **BIO-1**, special-status plants within or adjacent to the Project Areas that could potentially be damaged or destroyed by Project activities will be staked, fenced, and/or flagged for avoidance prior to construction (Section 1.4.10). Mitigation measure **BIO-2** includes training construction personnel including describing any delineated buffers (Section 1.4.10). Any potential Project-related impacts on special-status plants will be less than significant with implementation of mitigation measures **BIO-1** and **BIO-2**.

Wildlife

Fish. The Project Area does not include adjacent waterways, and no in-water work will occur during Project implementation. As such, special-status fish species will not be directly impacted by construction activities. Furthermore, implementation of conservation measures **HAZ-1**, **HAZ-2**, and **HYD-1** (Section 1.4.9) will ensure that there are no indirect impacts on adjacent aquatic habitat because of hazardous material spills, soil erosion, and/or stormwater runoff during construction.

Western pond turtle. Turtles can be injured or killed by Project vehicles or construction equipment. However, turtles in harm's way will be allowed to move from the construction area on their own accord. Measure **BIO-3**, including pre-construction surveys, will be implemented to ensure that western pond turtles are not adversely affected by the Project (Section 1.4.10). In addition, implementation of **BIO-2** includes training construction personnel in what to do in the event aNorthwestern Pond Turtleis encountered (Section 1.4.10). Therefore, impacts onNorthwestern Pond Turtleare less than significant with mitigation measures **BIO-2** and **BIO-3** incorporated.

Giant garter snake. Giant garter snakes may occur in the Project Area as individuals dispersing to suitable aquatic habitats, though the likelihood of this species occurring is low. Injury or mortality of giant garter snakes could occur during construction activities including grading, clearing, or equipment staging. Potential aquatic giant garter snake habitat will be avoided during construction; the ponded water associated with Borrow Site 1 will be dewatered prior to grading. After the initial clearing phases of construction, visibility of any giant garter snakes would be enhanced and would facilitate avoidance. Mitigation measure **BIO-4** (including pre-construction surveys, approved work windows, use of approved erosion control materials, and dewatering prior to translocating ditches) will be implemented to ensure that giant garter snakes are not adversely affected by the Project (Section 1.4.10). In addition, implementation of mitigation measure **BIO-2** includes training construction personnel in what to do in the event a giant garter snake is encountered (Section 1.4.10). Direct injury or mortality of individuals, or disturbance to habitat is not anticipated for giant garter snake as there is very low likelihood for giant garter snake to occur in the Project Area. While giant garter snake may disperse through or bask in the Project Area, implementation of measures **BIO-2** and **BIO-4** will further limit potential impacts to less than significant.

Nesting birds and raptors. There may be Project-related effects on nesting birds and raptors (including nesting migratory birds/raptors, white-tailed kite, northern harrier, Swainson's hawk, California black rail, loggerhead shrike, Modesto song sparrow, tricolored blackbird, and yellow-headed blackbird) if disturbance occurs to or near active nest sites during the breeding season. Direct impacts may occur as a result of removing or trimming of trees or other plants/structures that provide nesting habitat. Indirect impacts may occur from construction noise (for example, from heavy equipment, vehicles, generators, and human presence) or vibration, which could lead to nest abandonment or premature fledging. Implementation of mitigation measures **BIO-2, BIO-5, BIO-6, BIO-7,** and **BIO-8** (Section 1.4.10) will reduce impacts to less than significant.

Several special-status bird species (the above-mentioned nesting birds and raptors, plus sandhill crane) may occasionally forage in or near the Project Area during construction. Foraging birds can easily disperse away from temporary Project construction noise and vibration; therefore, Project-related adverse effects on these bird species are not anticipated. Because Project implementation will not occur during the winter months, effects on foraging sandhill cranes will be fully avoided.

b) Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

In accordance with the requirements of Assembly Bill 360 (Section 6.2) and DWR's Delta Flood Protection Program requirement for net aquatic habitat improvement, this discussion is focused on Freshwater Marsh, Scrub-shrub, Riparian Forest, and Shaded Riverine Aquatic habitats. Riparian habitat is also protected by San Joaquin County Development Title Section 9-1510.
Sensitive natural communities are addressed above in Section 2.4.2(a).

Waterside. Preparation of the waterside of the levee for armoring the newly placed fill along the levee crown may require removing ruderal weeds and non-native annual plants. The Project will avoid impacts on any Freshwater Marsh, Riparian Forest, and Shaded Riverine Aquatic habitat on the waterside by only working above HTL and MHW and retaining all existing

waterside Riparian Forest trees. Preparation of the waterside of the levee may impact up to 0.14 ac of Scrub-shrub habitat (Figure 2-8 and Table 2-5). In the small number of cases where waterside rock revetment may be placed over Scrub-shrub habitats, these impacts have been pre-mitigated as described in mitigation measure **BIO-9** (Section 1.4.10). As a result, there are no anticipated waterside effects on Freshwater Marsh, Riparian Forest, or Shaded Riverine Aquatic habitats, and anticipated waterside effects on Scrub-shrub will be less than significant with mitigation incorporated.

Landside. There is the potential that landside site preparation and placement of fill material may degrade or remove Riparian Forest (less than approximately 0.26 ac) within the Project footprint (Figure 2-8). This habitat is associated with two blue gum trees along the landside toe of the levee near Station 700+00. The Project will try to avoid removing large trees, but if trees need to be removed for stable levee slope construction, these impacts have been pre-mitigated as described in mitigation measure **BIO-9** (Section 1.4.10). Potential effects on Riparian Forest will therefore be less than significant with mitigation incorporated.

Borrow Sites. No Freshwater Marsh, Riparian Forest, or Shaded Riverine Aquatic habitats are present in either borrow site. The removal of materials from Borrow Site 1 may degrade or remove up to 0.53 ac of Scrub-shrub habitat. If impacts cannot be avoided with the implementation of **BIO-1** and **BIO-2**, any impacts on Scrub-shrub will be less than significant with mitigation incorporated.

c) Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Waters and wetlands on the waterside of the Project levee that fall under the regulatory purview of USACE and the Regional Water Quality Control Board (RWQCB) will be avoided by the Project since no work will occur below the HTL or MHW. While potential wetland areas on the landside of the levee will be avoided to the extent practicable, some areas of freshwater marsh along the landside levee toe resulting from levee seepage may be impacted by vegetation clearing and placement of fill. The Sacramento District of the USACE (regulatory branch) does not typically take jurisdiction over wetlands on the landside of levees associated with ditches and/or levee seepage for levee repair projects in the Delta (USACE 1995); however, Freshwater Marsh habitat is protected under AB 360 as described in (b) above and any impacts have been pre-mitigated as described in mitigation measure **BIO-9** (Section 1.4.10). Therefore, impacts will be less than significant with mitigation.

d) Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The borrow sites and haul route using existing agricultural roads provide little to no habitat value for fish or wildlife. The habitat on the Project levee is more likely to be utilized by wildlife, but it does not serve as a significant migratory corridor or nursery site. Moreover, modifications to existing levee infrastructure will not include construction of any elements that will block wildlife movement. Therefore, the Project will not interfere substantially with the movement of any native resident wildlife species, nor impede the use of any wildlife nursery sites. There will be no impact.

e) Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

San Joaquin County has a tree ordinance to protect native oak trees, heritage trees, and historical trees (Development Title Section 9-1505.3). Native oak trees include valley oak (*Quercus lobata*), interior live oak (*Quercus wislizeni*), coast live oak (*Quercus agrifolia*), and blue oak (*Quercus douglasii*) trees. Heritage oak trees are defined as native oak trees that have a single trunk diameter of 32 inches or greater measured at 4.5 ft above the ground. Historical trees include any tree or group of trees designated by the Planning Commission because of size, age, location, or history. No oak trees or historical trees were documented within the Project Area; thus, there will be no impact.

San Joaquin County also has an ordinance to protect riparian habitat (Development Title Section 9-1510). Loss of riparian habitat, as described in (b) above, if two riparian trees are removed, it is pre-mitigated as described in mitigation measure **BIO-9** (Section 1.4.10); therefore, the impact would be less than significant with the incorporation of mitigation.

f) Would the Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The Project Area is located within the Primary Zone of the Delta covered by the San Joaquin Multispecies Habitat Conservation Plan (SJCOG 2000). The Project does not conflict with provisions of this plan because it does not convert open space to a non-open space use. There are no other Habitat Conservation Plans or Natural Community Conservation Plans applicable to the Project. There will be no impact.

2.5 Cultural Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	❑	✓	❑	❑
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	❑	✓	❑	❑
c) Disturb any human remains, including those interred outside of formal cemeteries?	❑	✓	❑	❑

2.5.1 Environmental setting

The Natural Investigations Company conducted a cultural and paleontological resources assessment for the Project, which included a search of records for known cultural resources in the Project Area and vicinity, and an intensive pedestrian survey of the Project Area (Natural Investigations 2021). Results of records searches and the assessment are synthesized in this

section as well as Section 2.18 Tribal Cultural Resources. The full report contains confidential information (e.g., Sacred Land File search results) and is available to relevant agencies upon request.

2.5.1.1 Prehistoric overview

A tripartite classification scheme for cultural change in California's Sacramento Valley, Sacramento–San Joaquin Delta, and San Joaquin Valley developed as the result of efforts of a number of researchers since the 1930s and has been further refined over the succeeding decades (e.g., Bennyhoff and Fredrickson 1994; Heizer and Fenenga 1939; Heizer 1949; Fredrickson 1973, 1974, 1994; Moratto 2004). As recently summarized by Rosenthal et al. (2007), and with the timeframes adjusted for modern calibration curves for radiocarbon dates, the chronological sequence for the Central Valley is: Paleo-Indian (11,500–8550 cal [calibrated] B.C.), Lower Archaic (8550–5550 cal B.C.), Middle Archaic (5550–550 cal B.C.), Upper Archaic (550 cal B.C.–cal A.D. 1100), and Emergent or Late Prehistoric Period (cal A.D. 1100–Historic Contact).

Subsequent to the Paleo-Indian and Lower Archaic periods, the cultural framework within the greater study region is further divided into three regionally based "patterns." Specific to Central Valley prehistory and the current study region, the regionally based patterns defined by Fredrickson (1973, 1974) are the Windmiller, Berkeley, and Augustine. The patterns mark changes in distinct artifact types, subsistence orientation, and settlement patterns, which began circa 5550 cal B.C. and lasted until historic contact in the early 1800s. They were initially identified at three archaeological sites: the Windmiller site (CA-SAC-107) near the Cosumnes River in Sacramento County; the West Berkeley site (CA-ALA-307) on the east side of the Bay in Alameda County; and the Augustine site (CA-SAC-127) in the Sacramento–San Joaquin Delta. In general, the patterns conform to three temporal divisions: Middle Archaic Period/Windmiller Pattern, Upper Archaic Period/Berkeley Pattern, Late Prehistoric Period/Augustine Pattern.

2.5.1.2 Ethnographic context

The Project Area is located on the border between the Eastern Miwok and the Northern Valley Yokuts. The ethnography of both tribes is provided below.

Eastern Miwok

The Project is within in the ethnographic territory of the Bay and Plains Miwok (also spelled Miwuk) who occupied the eastern portion of Contra Costa County in the area of Mount Diablo, from Walnut Creek in the west, to the Sacramento-San Joaquin Delta in the east. They are two of five Eastern Miwok tribes (Bay, Plains, Northern Sierra, Central Sierra, and Southern Sierra) whose Eastern Miwok language derives from the Miwokan branch of the Utian language family, a subgroup of Penutian linguistic group. Neighboring groups included the Ohlone to the southwest, the Northern Valley Yokuts to the southeast, the Washoe to the east, and the Patwin to the north (Kroeber 1925, Levy 1978). At present, there are seven federally recognized rancherias (Wilton, Shingle Springs, Jackson, Buena Vista, Sheep Ranch, Tuolumne, and Chicken Ranch) in Amador, Calaveras, El Dorado, Lake, and Tuolumne counties that have primarily or exclusively Eastern Miwok populations (BIA 2015, California Indian Assistance Program 2011).

Northern Valley Yokuts

The Project is also within the ethnographic territory of the Northern Valley Yokuts, whose core lands were along the San Joaquin River, extending from north of the Calaveras River southward to the upper San Joaquin River, and from the crest of the Coast (Diablo) Range east to the Sierra Nevada foothills (Kroeber 1976, Wallace 1978). The Northern Valley Yokuts were a Penutian-speaking central California group surrounded by the Southern Valley Yokuts to the south, Salinan

to the southwest, Costanoan (Ohlone) to the west, Plains Miwok to the north, Sierran Miwok on the east, and Foothill Yokuts to the southeast. Because of their rapid decimation as a result of disease, missionization, and European American settlement, the Northern Valley Yokuts are not well documented by ethnographers. At present, approximately 2,000 Yokuts live on the Tule River Reservation (established in 1873 in Tulare County near Porterville) and on three rancherias (Picayune at Coarsegold in Madera County, Santa Rosa in Kings County, and Table Mountain near Friant in Fresno County). Santa Rosa Rancheria is in Southern Valley Yokuts traditional lands, Picayune is located within Foothill Yokuts territory, and Table Mountain is near the division between Northern and Southern Valley Yokuts traditional lands. Additional Foothill Yokuts live with Central Sierran Miwok on the Tuolumne Rancheria in Tuolumne County, and some 600 Yokuts are part of regional tribal communities that are not federally recognized, while others are scattered throughout the state.

2.5.1.3 Historic context

Reclamation District 2028 (District). The District is located between the Old and Middle Rivers in the central Sacramento-San Joaquin River Delta, San Joaquin County, and encompasses the entire aerial extent of Bacon Island. It was established on March 21, 1918, to maintain the island's levee system (District 2021). Today the District maintains a 14.4-mile-long levee system, protecting approximately 5,625 ac of agricultural land, natural resource habitat, local infrastructure, and other on-island assets.

Project Area. A review of the USGS Mineral Resource Data System (MRDS) finds no historical mines within 1 mile of the Project Area. No resources listed in the California Inventory of Historic Resources are present within 1 mile of the Project Area (DPR 1976). Two resources on the island are listed in the Built Environment Resources Directory (BERD), though neither is within the Project Area. The first is George Shima's Camp No. 8 (P-39-000330), which consists of a boarding house, office, warehouse, and four modern structures. It is a contributing element of the Bacon Island Rural Historic Landscape District, which has been determined eligible for listing in the National Register of Historic Places (NRHP) by consensus through Section 106 process (Maniery 1993, OHP 2009). It is listed in the California Register of Historical Resources (CRHR). In 1880, Shima immigrated to California from Japan and began his career as a prominent agriculturalist and entrepreneur. The second resource listed in the BERD is the Bacon Island Road Bridge (#29C-108), which was determined individually eligible for listing in the NRHP by the Keeper and is listed in CRHR. It is a non-contributing element of the Bacon Island Rural Historic Landscape District (Maniery 1993).

A review of later historical topographic maps and aerial photographs finds that the Project Area has been subject to subsequent development. More than 50 minor structures are also depicted in clusters along the perimeter of the island (USGS 1952a,b). Many of these are associated with historical work camps related to Shima's agricultural enterprise on the island.

In 1945 during World War II, a Prisoner of War (POW) camp was briefly established in 1945 on Bacon Island from June to November. This camp was mobile and was made up of 42 tents meant to house 250 German prisoners temporarily. Additional tents were used for offices, storage, washing facilities, a chapel, and a cafeteria. In addition to the prisoners, there were 160 officials in charge of running the camp including guards, "prisoner chasers," cooks, clerks, drivers, and medics. A 155,100-square-foot wire fence enclosed the camp, and portable watch towers were put in place for surveillance purposes (Military Museum 2021).

An aerial photograph of the Project Area taken in 1958 shows the boarding house, office, and warehouse from Shima's Work Camp No. 8, as well other buildings and features related to Shima's agricultural operations (NETR 2021). Later aerial photographs show that modern development has been very limited, a point supporting the historic landscape district designation (Maniery 1993). Crops grown on the interior of the island have primarily included corn, rice, wheat, sunflower, and alfalfa.

2.5.1.4 Record searches

A California Historical Resources Information System (CHRIS) records search was conducted by the Central California Information Center (CCIC) on the campus of California State University, Stanislaus to determine whether prehistoric or historic cultural resources have been previously recorded within the Project Area, the extent to which the Project Area has been previously surveyed, and the number and type of cultural resources within a 0.25-mile radius of the Project limits. The results of the CHRIS search were returned on March 5, 2021. The archival search of the archaeological and historical records, national and state databases, and historic maps included the following sources:

- National Register of Historic Places: listed properties
- California Register of Historical Resources: listed resources
- Historic Property Data File for San Joaquin County
- Archaeological Determinations of Eligibility
- Built Environment Resources Directory
- California Inventory of Historical Resources
- Historical GLO land plat maps

The CHRIS records search indicated that one cultural resource has been previously recorded within the Project Area, and 22 additional resources have been previously recorded within the 0.25-mile search radius. The resource within the Project Area is an eastern segment of the Bacon Island Earthen Levee (P-39-005381), constructed between 1913 and 1915. The levee measures approximately 25 ft wide at the top and 46 ft wide at the base. It is approximately 12 ft tall on the water side and 23 ft tall on the land side. The levee structure follows the entire perimeter of Bacon Island. Bacon Island Road runs along the levee crown and the levee's flanks have been reinforced with riprap (Kirstine 2019). The entire levee system was evaluated as a contributing element of the Bacon Island Rural Historic Landscape District, as it relates to both land reclamation and reclamation facility maintenance, as well as to subsequent farming. Contributing elements of the district consist of engineered, agricultural, architectural, and archaeological resources, with the levee being the most conspicuous of the contributing engineered features. All previously recorded cultural resources within 0.25 miles of the Project Area are historic; no prehistoric cultural resources have been previously recorded.

Of the 22 resources outside the Project Area but within the search radius, 19 are built-environment resources and three are archaeological resources. Six of the built resources are also contributing elements of the NRHP-eligible Bacon Island Rural Historic Landscape District (Maniery 1993, OHP 2009). This includes several historical labor camp facilities that were part of George Shima's potato farm (P-39-000330, -000331, -000333, -000334, and -000336) and the Bacon Island bridge tender's house (P-39-000335).

Descriptions of the Sacred Lands File Search and Native American outreach conducted for the Project by Natural Investigations Company are provided in Sections 2.18.1.1 and Section 2.18.1.2, respectively.

2.5.1.5 Field results

An intensive pedestrian survey of the Project Area was conducted by Natural Investigations Company archaeologist, Phil Hanes (MA, RPA), on March 25, 2021. Nearly all portions of the 40-ac Project Area were surveyed intensively using transects spaced no greater than 15 meters apart, including both linear survey areas along the levee and Borrow Site 2. The northern portion of the Borrow Site 1 was also intensively surveyed, though an approximately 6-ac portion on the south side was surveyed at a cursory level because it was submerged at the time of the field visit. During the pedestrian survey, all visible ground surface within the Project Area was carefully examined for cultural material (e.g., flaked stone tools, tool-making debris, stone milling tools, or fire-affected rock), soil discoloration that might indicate the presence of a cultural midden, soil depressions and features indicative of the former presence of structures or buildings (e.g., postholes, foundations), or historic-era debris (e.g., metal, glass, ceramics). Ground disturbances (e.g., animal burrows, drainages, dirt roads, etc.) and geologic outcrops were visually inspected.

Two previously unrecorded built environment resources were identified and documented during the field survey. The first consists of two electrical transmission towers (NIC-2021-Bacon-01), and the second is an irrigation ditch network (NIC-2021-Bacon-02). One previously recorded historical levee (P-39-005381) was also revisited and its present condition was assessed. California Department of Parks and Recreation (DPR) 523 Series site records and record updates were completed for each resource as appropriate. No prehistoric resources of any kind were observed, and no indication of subgrade cultural materials was noted in areas disturbed by ongoing agricultural uses and other factors. No paleontological resources of any kind were observed.

2.5.1.6 Previously recorded resources

P-39-005381 - Bacon Island Earthen Levee

The Bacon Island Earthen Levee was constructed by the California Delta Farms Company between 1913 and 1915. The levee runs along the entire the perimeter of Bacon Island, with Bacon Island Road present on its crown. The entire extant levee system is a contributing element of the Bacon Island Rural Historic Landscape District, as it relates to land reclamation and related facility maintenance and subsequent farming and was built at the start of the district's period of significance, 1913 to 1942. The present assessment finds that the levee is well maintained and in good condition. It has been subject to numerous modernizing improvements such as those proposed by the Project. The existing resource record notes that despite regular maintenance and improvements, the levee remains relatively unchanged since historic times (Kirstine 2019). Further, the Bacon Island Rural Historic Landscape District eligibility report argues that the district's integrity of association is actually "aided by ongoing… maintenance of the levee, [ditch network], pumphouse, and siphon system; and the configuration of fields, which has remained constant since the historic period" (Maniery 1993).

The entire levee system appears to be an exceptionally well-preserved example of a Delta reclamation district established in the early 20th century. Proposed Project-related improvements are consistent with past maintenance efforts and are not expected to diminish the historical integrity of the levee in any way. On the contrary, to echo Maniery, these improvements will serve to strengthen the physical integrity of the resource, and to help ensure continuity of small-

scale agricultural uses of the island and the continued levee maintenance that makes them possible.

2.5.1.7 Newly recorded resources

NIC-2021-Bacon-01 – Electrical Transmission Towers

NIC-2021-Bacon-01 is the system of electrical transmission towers on the island which have been used historically to supply power to the centrifugal pump in the powerhouse and to agricultural work camps. The original towers were planned and strung by Shima by 1917 as part of the initial reclamation of Bacon Island, though in some cases they have been updated, modified, repositioned, or removed. Today, they are maintained by PG&E. Electrical towers are not named in past documentation as contributing elements of the Bacon Island Rural Historic Landscape District. The initial assessment of these two towers concludes that they are not individually eligible for listing in the NRHP/CRHR as they do not meet any of the applicable eligibility criteria. The Project does not propose to remove or alter either tower in any way, and standard safety measures adopted by the District will help ensure that no inadvertent impacts on the resources occur during Project activities.

NIC-2021-Bacon-02 – Irrigation Ditch Network

NIC-2021-Bacon-02 is the system of irrigation ditches on the island that defines the boundaries of historical agricultural fields and continues to provide water to them. The original network of ditches on the island was plotted and built by Shima during the early years of the island's agricultural use. The system remains largely unchanged since that time and is remarkably well preserved today. Most of the individual ditches date to the period of significance of the Bacon Island Rural Historic Landscape District and the ditch network as a whole is named as a contributing element of the district in eligibility documentation (Maniery 1993). The network is still in operation, contributing significantly to the continuity of agricultural uses on the island. The present assessment records four ditch segments. Project activities are not expected to impact any of the ditch segments recorded. Proposed excavation at the two borrow sites will impact the fields bounded by the ditches, but no direct impact to the ditches themselves is anticipated.

2.5.2 Findings

a) Would the Project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

The newly recorded irrigation ditch network (NIC-2021-Bacon-02) and previously recorded levee (P-39-005381) are contributing elements of the Bacon Island Rural Historic Landscape District, which is eligible for the NRHP and listed in the CRHR. The historic district therefore constitutes an historical resource under CEQA §15064.5 and any impacts on either of the two contributing elements within the Project Area could cause a substantial adverse change in its significance.

Ditch Network (NIC-2021-Bacon-02)

The original ditch network on the island was plotted and built by George Shima during the early years of the island's agricultural use. The system remains largely unchanged and remarkably well preserved, despite being actively used today. It contributes to a strong sense of agricultural continuity in the historic landscape.

Three of the four irrigation ditch segments recorded here may date to the period of significance of the Bacon Island Rural Historic Landscape District, while one post-dates this period. Of the three contributing segments, two are primary perimeter ditches located adjacent to the landside of the

levee. No direct impacts on either location are expected to result from Project activities, and proposed improvements are not expected to cause any significant indirect impacts on the surrounding setting. The third contributing ditch segment marks the northern and eastern boundaries of Borrow Site 1. Direct impacts on this area are expected to occur only in the field delineated by the ditch segment, and not within the ditch itself. To mitigate the risk of impacting the contributing ditch network, and thereby potentially changing the significance of the Bacon Island Rural Historic Landscape District, it is recommended that the ditches documented here be avoided by the Project. As described in mitigation measure **CUL-1b**, an avoidance buffer of 15 ft should be established around each ditch and no ground disturbance should occur within the avoidance area.

Bacon Island Levee (P-39-005381)
The Bacon Island Earthen Levee was constructed by the California Delta Farms Company between 1913 and 1915. The entire extant levee system is a contributing element of the Bacon Island Rural Historic Landscape District, as it relates to land reclamation and related facility maintenance, as well as to subsequent farming. It was built at the start of the district's period of significance, between 1913 and 1915. Like the irrigation ditch network, the levee contributes to a strong sense of continuity in the historic landscape. A key point made in the district eligibility report is that the district's significance is derived not only from its connection with early reclamation and agriculture, but also to reclamation facility maintenance. No change in the overall spatial organization of the levee system, or substantial alteration of its general appearance or function is currently proposed. The Project design involves a widening the levee crown and slope stabilization. Proposed improvements to the levee are not only consistent, visually and functionally, with past historic and modern enhancements; and they not only strengthen the physical integrity of the structure and protect the many other contributing elements of the historic district on the interior of the island; but insofar as they carry forward into the present the tradition of reclamation facility maintenance on the island, they actually bolster the district's integrity of feeling and association and contribute directly to a key facet of the significance upon which its NRHP/CRHR eligibility depends. For these reasons, no mitigation relating to the levee is recommended at this time, and there will be no impact on the resource.

Electrical Transmission Towers (NIC-2021-Bacon-01)
The electrical transmission towers are not contributing elements of the Bacon Island Rural Historic Landscape District, as their construction appears to post-date its period of significance (1913 to 1942). Additionally, the towers do not appear to be individually eligible for listing in the NRHP/CRHR and so do not appear to constitute historical resources under CEQA §15064.5. The electrical lattice towers are of a type that is ubiquitous throughout the Delta. They are unassociated with any significant historical people or events, and their informational value appears to be exhausted in their formal documentation. Finally, the Project does not propose to remove either tower or to alter them in any way. Standard safety measures adopted by the District will help ensure that no inadvertent impacts on the resources occur during Project activities. For these reasons, no mitigation relating to the electrical towers is recommended at this time, and there will be no impact on the resource.

Per mitigation measure **CUL-1c**, if a cultural resource is inadvertently discovered during Project activities, work must be halted within 30 ft of the find and a qualified archaeologist notified immediately so that an assessment of its potential significance can be undertaken and proper data recovery and/or preservation procedures can be implemented, if necessary. All contractors and equipment operators will be instructed on proper compliance with this measure as part of annual WEAP training (mitigation measure **CUL-1a**). The Project is not expected to cause a substantial

adverse change in the significance of the historical resources in the Project vicinity, there will be less than significant impacts with the incorporation of **CUL-1**.

b) Would the Project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

No archaeological resources of any kind have been previously recorded within the Project Area. Three archaeological resources associated with George Shima's agricultural work camps have been previously recorded elsewhere on the island, but the nearest one to the Project Area is located more than 1,000 ft away and so any impact to it as a result of Project activities is highly unlikely. As the known archaeological resources tend to be located in the clustered work camps along the perimeter of the island, not on the levee and not in the cultivated interior, the potential for the discovery for buried archaeological resources from the historic period during Project activities is estimated to be low.

Geoarchaeological analysis indicates that the Project Area is underlain by Latest Holocene to modern-aged (1,000 years ago to present) delta mud deposits (Qhdm) with younger Rindge and Ryde Series soils formed at their surface. Prehistoric and ethnographic habitation sites in the Delta are primarily found near major watercourses on elevated sandy islands and natural embankments. The Project Area is nearly 5 miles west of the nearest major freshwater source, the San Joaquin River. Additionally, no prehistoric sites have been previously recorded within 0.25 miles of the Project Area, despite 15 past cultural resource studies within that radius. These factors suggest that the Project Area was not conducive to prehistoric occupation. The extent of ground disturbances across the Project Area from past agricultural uses and levee construction further reduces the potential for intact prehistoric deposits. Finally, no indication of subgrade cultural materials was observed in irrigation ditches or other areas of ground disturbance during the field survey. For these reasons, the potential for intact archaeological deposits, including buried archaeological deposits, materials, or features, by implementation of this Project is estimated to be low, despite the Late Holocene to modern age of the underlying landform.

Per mitigation measure **CUL-1c**, if a cultural resource is unexpectedly discovered during Project activities, work must be halted within 30 ft of the find and a qualified archaeologist notified immediately so that an assessment of its potential significance can be undertaken and proper data recovery and/or preservation procedures can be implemented, if necessary. All contractors and equipment operators will be instructed on proper compliance with this measure as part of annual training (mitigation measure **CUL-1a**). Though the risk of substantial adverse change in the significance of an archaeological resource is low, it will less than significant with the adoption of **CUL-1**.

c) Would the Project disturb any human remains, including those interred outside of formal cemeteries?

The results of background research, geoarchaeological analysis, Native American outreach, and field survey suggest that the potential of the Project to disturb human remains is very low (Natural Investigations Company 2021). Per mitigation measure **CUL-1d**, work will be halted and the County Coroner notified immediately should human remains be encountered during construction. All contractors and equipment operators will be instructed on proper compliance with this measure as part of annual training (mitigation measure **CUL-1**). Impacts will be less than significant with the adoption of mitigation measure **CUL-1**.

2.6 Energy

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	❑	❑	✓	❑
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	❑	❑	❑	✓

2.6.1 Environmental setting

Energy sources are either renewable (e.g., solar, wind) or nonrenewable (e.g., fossil fuels) and can be combusted to power vehicles and equipment or converted to electricity as a secondary energy source.

In 2018, California consumed more energy than all other states except Texas, but its per capita consumption of 202 million British thermal units (Btu) was the fourth lowest in the nation (USEIA 2021). The California Energy Commission (CEC), established by the Warren-Alquist Act in 1975, has been instrumental in limiting California's energy consumption, particularly via energy efficiency standards that are updated every three years in Title 24 (CEC 2021).

2.6.2 Findings

a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Project construction equipment will use fossil fuels for power. The use of such equipment is necessary for the levee rehabilitation. The use of such equipment is necessary to rehabilitate the Project levee for flood protection. BMPs included in conservation measure **AIR-1** will ensure construction equipment will be used as efficiently as feasible (e.g., by reducing idling) (Section 1.4.9). Fossil fuel consumption will be on a short-term basis during construction and will not persist upon Project completion. No electricity consumption will be associated with the Project. The impact will therefore be less than significant.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Current state and local plans such as California Title 24 Building Energy Efficiency Standards and the San Joaquin County General Plan establish energy efficiency standards for actions (e.g., new building construction, retrofitting existing developments) that are not associated with the Project. As such, the Project will not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. There will be no impact.

2.7 Geology and Soils

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	❑	❑	❑	✓
ii) Strong seismic ground shaking?	❑	❑	❑	✓
iii) Seismic-related ground failure, including liquefaction?	❑	❑	❑	✓
iv) Landslides?	❑	❑	❑	✓
b) Result in substantial soil erosion or the loss of topsoil?	❑	❑	✓	❑
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	❑	❑	❑	✓
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	❑	❑	✓	❑
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	❑	❑	❑	✓
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	❑	❑	❑	✓

2.7.1 Environmental setting

Bacon Island is composed predominately of marsh muds and peats that accumulated throughout the Holocene (<11,000 years before present) atop sand and eolian deposits from the Pleistocene-age Modesto Formation (Atwater 1982ab; Helley and Graymer 1997). This process of tidal marshland formation occurred throughout the Delta region until land reclamation began in the late 1800s during Euro-American settlement (Whipple et al. 2012). By the 1930s, marsh and wetland draining and extensive levee construction transformed the Delta into an agricultural landscape. These changes in land use allowed for microbial oxidation and depletion of peat, resulting in land-surface subsidence of up to 26 ft below sea level on Delta islands (Drexler et al. 2009). Land surface elevation on Bacon Island ranges from approximately 5 ft below sea level near the levee toe to approximately 20 ft below sea level at the island's interior (Hultgren-Tillis Engineers 2021a,b). The average rate of subsidence on Bacon Island between 1978 and 2006 was 0.87 inches per year (Deverel and Leighton 2010).

Bacon Island soils are typically poorly drained mucks and silty-clayey loams (NRCS and UC Davis 2019). In general, Delta island soils have a relatively high potential for shrink-swell behavior, a primary characteristic of expansive soils.[8] Expansive soils occur on much of Bacon Island (ESA 2014). A recent geotechnical study performed at Borrow sites 1 and 2 within the interior of Bacon Island, which will supply fill material for the Project, confirmed that the borrow site soils included peat, lean clay, silt, silty and clayey sand, and poorly-graded sand with silt down to a depth of about 10 ft below ground surface (Hultgren-Tillis Engineers 2021b). Specifically, laboratory analysis of soil samples collected during the geotechnical investigation had plasticity indices greater than 15% and more than 10% of soil particles passed a No. 200 sieve; the other two provisions that help characterize expansive soils—presence of >10% soil particles being <0.005 millimeter (mm) and soils having an expansion index of >20—were not analyzed. The study investigators concluded that the peat "should not be used for levee or toe berm fill and should be stripped and hauled to a designated area outside of the borrow site."

Groundwater was encountered between 4 and 9 ft below ground surface in Borrow Site 1 and between 6 and 9 ft below ground surface in Borrow Site 2 (Hultgren-Tillis Engineers 2021b). The study authors stated that groundwater levels are artificially maintained below the island interior by pumping, as well as evapotranspiration from farmed crops and irrigation.

The Project Area lies within the Great Valley geomorphic province, which is crossed by few faults, but is bordered by the Coast Range province, which hosts several active fault zones that predominately exhibit right-lateral, strike-slip motion. The Hayward Fault Zone lies about 35 miles to the southwest of the Project Area. The closest active faults[9] designated by the California Geological Survey (CGS) are the Greenville Fault Zone and Green Valley-Concord fault zones, located about 17 miles to the southwest and 26 miles to the west, respectively (ESA 2014; CGS 2018a–c). The closest potentially active fault is the Midland Fault Zone, which runs north-south through the Delta about 2 miles west of the Project Area (Unruh and Hitchcock 2009, CGS 2018b). The most recent displacement along this fault is estimated to be mid- to early-Quaternary (0.7–2.6 million years before present) (CGS 2010).

The Greenville and Green Valley-Concord faults both have estimated slip rates of 1–5 mm/year, (Bryant and Cluett 2002a,b). The USGS estimates a 16% probability of an earthquake of magnitude 6.7 or greater occurring on either of these fault systems by the year 2043 (Aagaard et al. 2016). Peak ground motion[10] estimated by the CGS in the Project Area is a moderately low value of 0.38–0.40 for alluvial materials (CGS 2018b). In general, ground rupture hazards do not affect San Joaquin County. Delta islands are, however, susceptible to liquefaction because of shallow groundwater depths and the presence of sandy-peaty soils with low cohesive strength (CGS 2018b, San Joaquin County 1992). Liquefaction or seismically induced waves in Delta channels may damage levees on Delta islands (San Joaquin County 1992).

[8] Expansive soils are characterized by the ability to undergo significant volume change as a result of varying soil-moisture content. The 2010 California Building Code, Title 24, Part 2, Section 1803.5.3: Geotechnical Investigations defines an expansive soil as meeting the following provisions: (1) plasticity index of $\geq$15; (2) >10% soil particles pass a No. 200 sieve (0.075 mm); (3) >10% soil particles are <0.005 mm; and (4) expansion index of >20.

[9] An "active fault" is defined by the California Geological Survey (CGS) as a fault having surface displacement within the Holocene epoch, or the past 11,700 years (CGS 2018c).

[10] Peak ground motion (10% probability of being exceeded in 50 years) is expressed as a percent of the acceleration due to gravity.

The Natural Investigations Company completed a search of paleontological records maintained by the University of California Museum of Paleontology on April 27, 2021 (Natural Investigations Company 2021). The records indicate no unique geologic features, fossil-bearing strata, or paleontological sites occur within 1 mile of the Project Area. None of the geologic units known to contain fossils in San Joaquin County, including the Franciscan, Mehrten, Modesto, or San Pablo formations, are present within the Project Area (Natural Investigations Company 2021). As no fossils and no unique geologic features have been recorded within the Project Area, and the underlying delta mud deposits are unlikely to contain fossilized remains, the paleontological resource sensitivity of the Project Area is estimated to be low based on Society for Vertebrate Paleontology criteria (SVP 2010, as cited in Natural Investigations Company 2021).

2.7.2 Findings

a) Would the Project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

The Project Area is not located near a delineated Alquist-Priolo fault zone and ground rupture hazards are unlikely to affect the Project Area. The Project levee rehabilitation will result in no operational or land use change that will alter the people or structures exposed to potential rupture of an earthquake fault. Therefore, the Project will have no impact.

ii) Strong seismic ground shaking?

The Project Area is not located near active faults and, accordingly, lies in a zone with low potential for strong seismic ground shaking. The purpose of the Project is to rehabilitate the levee. A geotechnical investigation has been performed to ensure that appropriate material will be used to improve levee stability (Hultgren-Tillis Engineers 2021a,b). The Project levee rehabilitation will result in no operational or land use change that will alter the people or structures exposed to strong seismic ground shaking. Therefore, the project will have no impact.

iii) Seismic-related ground failure, including liquefaction?

The Project Area lies in the Delta, which is potentially susceptible to seismically induced liquefaction that could result in levee failure and flooding. The purpose of the Project is to rehabilitate the levee. A geotechnical investigation has been performed to ensure that appropriate material will be used to improve levee stability (Hultgren-Tillis Engineers 2021a,b). The Project levee rehabilitation will not increase the potential for direct or indirect adverse effects to people or structures due to seismic-related ground failure. Therefore, the project will have no impact.

iv) Landslides?

Except for the levees surrounding the island, the Project Area has a flat topography and is not susceptible to landslides. The Project will rehabilitate levees with geometry that

currently does not meet the minimum requirements of Bulletin 192-82 and will enhance slope stability. The Project levee rehabilitation will not increase the potential for direct or indirect adverse effects related to landslides. Therefore, the project will have no impact.

b) Would the Project result in substantial soil erosion or the loss of topsoil?

The Project will remove topsoil during excavation of borrow material from two borrow sites (Figure 1-2). Due to the flat topography of Project Area, removal of this material will not result in substantial potential for erosion. During active construction, there will be a minor and temporary increase in the potential for stormwater-related erosion of surficial soil from the levee slopes. The levee is and will be made of fill, and there is no topsoil present. To minimize the risk of soil erosion during construction, the Project will implement conservation measure **HYD-1** (Section 1.4.9). Construction will only occur during dry periods. A temporary berm comprised of the removed levee vegetation will be placed along the landside toe of work areas to act as an erosion control barrier. All landside slopes will be constructed with 3:1 (horizontal:vertical) smooth, uniform slope to minimize erosion, and a 2:1 minimum waterside slope armored with riprap. Once constructed, the landslide levee slope will be planted with CDFW-approved native grass seed mix to aid erosion protection. The levee crown roadway will be constructed with a compacted aggregate base and have a 2% slope to the landside to minimize runoff into the adjacent waterway. In the long term, these measures will stabilize the levee slope. Therefore, the Project will have a less than significant impact on soil erosion and loss of topsoil.

c) Would the Project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

The existing earthen levees surrounding Bacon Island overlie potentially unstable geologic units comprised of peat and silt-clay loams. The levees themselves may include high-permeability materials such as sand or gravel, animal burrows, voids from tree roots, and other inclusions that facilitate seepage through the levee. A geotechnical investigation has been performed to ensure that appropriate fill material from the borrow sites will be used to improve levee stability (Hultgren-Tillis Engineers 2021a,b). To accommodate likely settling, the Project levee will be built 12 inches higher than the planned final crest (Hultgren-Tillis Engineers 2021a). Additionally, the survey recommended that the levee fill be constructed in stages to allow the foundation material to strengthen as the soil consolidates. The Project includes construction of a stability berm along the landside toe of the levee. In compliance with California Water Code Section 12316(g), this toe berm will raise the elevation of the land immediately adjacent to the levee and provide a cap over exposed peat that could otherwise oxidize over time, thereby reducing potential subsidence. Levee rehabilitation will improve levee stability; therefore, the Project will not result in increased potential for on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. There will be no impact.

d) Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

The levee areas within the Project Area are composed of expansive soils (i.e., peat and organic materials). The Project has, however, been designed to address the potential for expansive soil. Expansive soils will not be used to construct the levee or toe berm. The levee will be constructed in stages to allow foundation material to strengthen as the soil consolidate, and the levee will be built 12 inches above the final crest elevation and 5 ft wider than the final width to accommodate long-term deformation. Ongoing deformation and cracking are unavoidable due to the underlying

expansive soils (Hultgren-Tillis Engineers 2021a), but the Project will not significantly increase long-term deformation or risks to life and property compared to existing conditions. Therefore, potential effects from the Project being located on and/or utilizing expansive soils will be less than significant.

e) Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

There are five residences between 600 ft and 1,000 ft north of the Project Area near Santa Fe Cut (Section 2.14 Population and Housing) that are expected to use septic tanks. The Project will not include installation or disturbance to any existing septic tanks or alternative wastewater disposal systems. The Project will have no impact.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No unique paleontological resources or geologic features are documented on Bacon Island. Due to their relatively young age, the Holocene muds and peats that cover much of the island are generally considered to have low potential for the presence of fossils. The underlying Pleistocene deposits are more likely to host fossils, but a literature review showed no paleontological sites within 2 miles of the Project. Core samples on Bacon Island indicate that peat can reach depths of approximately 6.5 to 10 ft below ground surface (Drexler et al. 2009). A recent geotechnical study of Borrow sites 1 and 2 found shallower peat depths, between 1 and 3 ft below ground surface. The borrow sites are therefore likely to draw primarily from the Holocene deposits, with low potential for encountering paleontological resources.

Aside from the borrow sites, the levee rehabilitation Project will only affect existing levee areas. Haul routes will be restricted to existing roads. Therefore, the Project will have no impact.

2.8 Greenhouse Gas Emissions

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	❑	❑	✓	❑
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	❑	❑	❑	✓

2.8.1 Environmental setting

Greenhouse gases (GHGs) can absorb and emit infrared radiation, trapping energy in the atmosphere and causing it to warm. GHGs have impacts that are more global than regional and are different from air pollutants that impact the general area near where they are released. GHGs

can occur naturally or as a direct result of human activities. State law defines GHG to include the following emissions: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (Health and Safety Code, § 38505(g)). The most common GHG resulting from human activity is carbon dioxide, followed by methane and nitrous oxide.

In January 2008, California Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, went into effect. This bill required the California Air Resources Board (CARB) to develop regulations to address global climate change due to GHG emissions. The act also requires a statewide GHG emissions limit, equal to the 1990 level, as a limit to be achieved by December 31, 2020. The 2020 GHG emissions limit is 431 million metric tons of CO_2e (CARB 2018), and as of 2017, statewide GHG emissions were 424 million metric tons of CO_2e (CARB 2019). Signed into law in 2016, Senate Bill 32 expanded upon AB 32 by specifying an emissions limit which further requires California to reduce statewide GHG emissions to 40 % below the 1990 level by the year 2030 (CARB 2018).

The SJVAPCD has not adopted quantitative threshold values for greenhouse gas emissions (SJVAPCD 2015). The San Joaquin County General Plan aims to reduce GHG emissions primarily through changes in land use patterns (e.g., alternative transportation systems, sustainable building practices) (San Joaquin County 2016).

2.8.2 Findings

a) Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

The construction of the Project is not expected to generate GHG emissions that would have a significant impact on the environment during any of the annual phases scheduled for the months of May–October in 2022, and May–October in 2023. The results from the Road Construction Emissions model used for determining the significance of Project-related air quality effects predict a total of 1,139 metric tonnes of CO_2e over the duration construction of the Project. The Project will not result in changes to long-term GHG emissions following construction. Therefore, short-term construction-related impacts regarding the generation of greenhouse gas emissions from the Project are expected to be less than significant.

b) Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Emissions associated with Project construction will be temporary and will not inhibit attainment of the statewide GHG emissions limit established by Senate Bill 32, as described in Section 6.2. The SJVAPCD has not established GHG emissions guidance or quantitative significance thresholds for GHG emissions from construction projects, and construction projects are not a mechanism by which the San Joaquin County General Plan aims to reduce GHG emissions (Section 2.8.1). The Project will not result in changes to long-term GHG emissions following construction. The Project will therefore not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases; the Project will have no impact.

2.9 Hazards and Hazardous Materials

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	❑	❑	✓	❑
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	❑	❑	✓	❑
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	❑	❑	❑	✓
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	❑	❑	❑	✓
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project Area?	❑	❑	❑	✓
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	❑	❑	❑	✓
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	❑	❑	❑	✓

2.9.1 Environmental setting

Land uses surrounding the Project Area are predominantly agricultural and open space, along with some residential uses. These lands have the potential to contain hazardous substances. Petroleum products and pesticides are the most likely materials that may have been stored or released into the surrounding environment. Older gas wells and underground storage tanks used to store petroleum products and other hazardous materials may develop leaks. These leaks can lead to the contamination of soils and groundwater. A query of the California Department of Toxic Substances Control's (CDTSC's) database reveals that there are no known sites in the Project Area having cleanup, permitted, or other hazardous materials status (CDTSC 2021).

Groundwater at Bacon Island is hydraulically connected to the surrounding river (CGS 2018b). Groundwater levels are expected to be within a few feet of the ground surface in the island's interior and near mean tide levels within the levees (Hultgren-Tillis Engineers 2021b).

Because the interior of the island is below sea level, it is likely that water flows from the river into storage beneath Bacon Island; therefore, there is potential for any water that becomes contaminated to be transported to the soils within and near the levees. Potential sources of contamination on the surface of the levees may include trash and debris from litter and illegal dumping, contaminant-laden sediment transported in the waterway and deposited, and surficial application of herbicides commonly used for weed control. A recent geotechnical study of the levees did not encounter any hazardous materials (Hultgren-Tillis Engineers 2021a). In addition, a recent geotechnical study performed at Borrow sites 1 and 2 within the interior of Bacon Island, which will supply fill material for the Project, did not encounter any hazardous materials (Hultgren-Tillis Engineers 2021b).

2.9.2 Findings

a) Would the Project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

The Project has the potential to accidently spill diesel fuel and other hazardous materials used by construction equipment during the levee rehabilitation work. To minimize the risk of a hazardous-materials release during construction, the Project will implement hazardous materials BMPs as outlined in **HAZ-1** and **HAZ-2** (Section 1.4.9). All fuels and other hazardous materials will be handled and stored according to the manufacturer's specifications. A containment area will be established for construction equipment where the ground will be protected from potential contamination or spills during Project activities (e.g., staging, refueling). In the event of a spill, crew personnel will stop the spillage at its source, contain the spilled material, and notify Project supervisors and appropriate agency representatives. With incorporation of **HAZ-1** and **HAZ-2** as part of the Project, impacts will be less than significant.

b) Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

See answer to (a) above; the Project will implement BMPs as outlined in **HAZ-1** and **HAZ-2** during construction to limit the release of hazardous materials. With the inclusion of **HAZ-1** and **HAZ-2** as part of the Project (Section 1.4.9), impacts will be less than significant.

c) Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

There are no schools located within one-quarter mile of the Project Area. The closest school is Old River Elementary School located approximately 3.5 miles to the southwest of the Project Area in Contra Costa County. The Project will have no impact.

d) Would the Project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Bacon Island, including the Project Area, is not included on a list of hazardous materials sites. The Project will have no impact.

e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard for people residing or working in the Project area?

There are no public-use airports within 2 miles of the Project Area. According to the San Francisco sectional aeronautical chart (FAA 2021), the closest public or public-use airport is Byron Airport, located approximately 9 miles south-southwest of the Project Area. Therefore, the Project will have no impact.

f) Would the Project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

There are 11 residences on Bacon Island, five of which are located between 600 ft and 1,000 ft north of the Project Area near Santa Fe Cut (Section 2.14 Population and Housing). There will be no road closures, thus residences will have the same access to emergency evacuation routes during Project activities as without construction. The Project will not include the use of barges, therefore not altering or impacting navigation on adjacent waterways. All roadway traffic supporting the Project will adhere to all applicable laws for motor vehicles and with the county's Office of Emergency Services. Therefore, the Project will have no impact.

g) Would the Project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Bacon Island has been designated by the Department of Forestry and Fire Protection (CalFire) as "Unzoned Local Responsibility Area" with no moderate, high, or very high fire hazard severity zones (CalFire 2018). Accordingly, the Project will not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. In addition, the Project will include implementation of **HAZ-3** to reduce the potential for a grass fire (Section 1.4.9). Therefore, the Project will have no impact.

2.10 Hydrology and Water Quality

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	❑	❑	✓	❑
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	❑	❑	❑	✓
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) result in substantial erosion or siltation on- or off-site;	❑	❑	✓	❑
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	❑	❑	❑	✓
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	❑	❑	❑	✓
(iv) impede or redirect flood flows?	❑	❑	❑	✓
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	❑	❑	❑	✓
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	❑	❑	❑	✓

2.10.1 Environmental setting

Bacon Island is surrounded by navigable waterways and encircled by a flood control levee maintained by the District. The Project levee-crown elevations will be raised to 10.1–10.4 ft above sea level (NGVD29) and crest width of 21–25 ft (Section 1.4). The island interior near the landside levee toe presently lies between 7.0 and 13 ft below sea level (NGVD29) (Hultgren-Tillis Engineers 2021b). Groundwater levels are artificially maintained below the island interior by evapotranspiration from the farmed crops and by pumping (Hultgren-Tillis Engineers 2021b).

The Delta and Project Area experiences a two-season Mediterranean-type climate, with cool, wet winters and warm, dry summers. The Central Valley and its surrounding upland drainages receive highly variable annual rainfall punctuated by large episodic events that typically coincide with the El Niño-Southern Oscillation climatic phenomenon. Mean annual rainfall at Bacon Island between 1981 and 2019 was 16 inches (PRISM 2021). Water levels in the adjacent waterways fluctuate predominately from tidal action (daily) and episodic flood events (typically in winter and spring). Bi-directional flow occurs in this part of the Delta due to winter storms (riverflow

directed toward the Sacramento-San Joaquin confluence to the northwest of Bacon Island), tidal actions, and water-supply pumping at the State Water Project intakes in the south Delta. Bacon Island is currently mapped within the Federal Emergency Management Agency's (FEMA) effective 100-year recurrence floodplain designation (CDWR 2021). The Project vicinity is also zoned as part of San Joaquin County's Special Flood Hazard and Potential Dam Inundation Areas (San Joaquin County 2019a). As discussed above under Geology and Soils (Section 2.7), a seismically induced wave in the Delta channels could damage levees (San Joaquin County 1992), causing localized flooding and the potential for salt water intrusion. There are no tsunami risks in the Project Area or vicinity according to the State of California's tsunami inundation map (State of California 2021).

Water quality objectives and beneficial uses for surface water and groundwater are included in the Water Quality Control Plan for the Central Valley (Basin Plan) (Central Valley RWQCB 2018). The water quality objectives apply to all surface waters in the Sacramento and San Joaquin River basins, including the waterways surrounding Bacon Island, within the San Joaquin Delta hydrologic unit. Existing and potential beneficial uses for San Joaquin Delta include municipal and domestic supply, agriculture, process, service supply, recreation (contact and other noncontact), freshwater fish habitat (warm and cold), migration, spawning, and wildlife habitat. In accordance with Section 303(d) of the Clean Water Act, the Delta waterways (central portion), including the waterways surrounding Bacon Island, have been classified as *impaired* by the State Water Resources Control Board (SWRCB) (SWRCB 2012). This designation, as specified in the Basin Plan, is assigned to waterbodies where established water quality objectives are not being met or where beneficial uses are not protected. The SWRCB has classified the Delta waterways (central portion) as *impaired* for metals (mercury), pesticides (chlorpyrifos, Dichlorodiphenyltrichloroethane [DDT], diazinon, group A pesticides), toxicity (unknown), and invasive aquatic species (SWRCB 2012). Classification of a waterbody as *impaired* on the 303(d) list triggers the development of a pollution control plan, called a Total Maximum Daily Load (TMDL). The TMDL for each water body and associated pollutant serves as the means to attain and maintain water quality standards for the *impaired* water body.

Turbidity is a measurement of water clarity and is determined by the cloudiness or haziness of a fluid caused by individual particles (suspended solids). Increases in turbidity may cause nuisance, adversely affect beneficial uses (e.g., municipal and domestic supply and freshwater fish habitat) and harm aquatic life (e.g., special-status fish). Continuous turbidity measurements recorded since 2014 at the USGS San Joaquin stream gage near Mandeville Island (USGS gage 11313460), approximately 4 miles north of Bacon Island, recorded values ranging up to approximately 82 Formazin Nephelometric Unit (FNU) during winter ("wet" season) and 38 FNU during spring through fall ("dry" season) (USGS 2021). The highest turbidity concentrations correlated with winter storm events (USGS 2021). The general water quality objectives for turbidity in waters of the of the Central Delta are subject to the following: except for periods of storm runoff, the turbidity waters shall not exceed 50 Nephelometric Turbidity Units[11] (NTUs) (Central Valley RWQCB 2018).

[11] A Nephelometric Turbidity Unit (NTU) is similar to a Formazin Nephelometric Unit (FNU), but the methods (i.e., EPA Method 190.1 and ISO 7027, respectively) use different light sources (i.e., white and infrared, respectively) to collect the turbidity measurements.

2.10.2 Findings

a) Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

There will be no in-water work associated with the Project. Project-related ground disturbance, however, could temporarily increase the potential for localized erosion and sediment-laden stormwater runoff. The Project will implement a SWPPP during construction to mitigate potential pollution associated with stormwater runoff. The SWPPP will include BMPs to minimize the risk of soil erosion and stormwater runoff during construction (conservation measure **HYD-1**) and hazardous materials BMPs (conservation measures **HAZ-1** and **HAZ-2**) to minimize the potential for accidental spills of hazardous materials to enter waterways and groundwater (Section 1.4.9). To reduce erosion upon completion of the levee construction, the landside slope will be hydroseeded with a native grass seed mix and the levee crown will be covered with compacted aggregate base placed along its surface to create an all-weather roadway. The roadway will be constructed with a 2% landside slope to minimize the potential for runoff into the adjacent waterway. The topography of the potential borrow sites is flat; drainage patterns or erosion in the surrounding areas will not be affected by excavation. Over the long term, the Project will decrease the potential for erosion and sediment-laden runoff through the rehabilitation of the levee, construction of a toe berm, and installation of revetment on the waterside slope, which will reduce flood risk and decrease erosion susceptibility. With implementation of conservation measures **HYD-1**, **HAZ-1**, and **HAZ-2**, impacts to surface or ground water quality will be less than significant.

b) Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Groundwater may seep into the excavated borrow sites. As necessary, pumps will be used to collect ponded water and reuse it for fugitive dust control during Project construction. There will be no long-term decrease in ground water supply or effect on natural recharge potential and the Project would not impede sustainable groundwater management. There will be no impact.

c) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) result in substantial erosion or siltation on- or off-site;

Movement of earth and fill material using large equipment and removal of vegetation during construction could temporarily disturb surficial soils and alter runoff potential at low levels during construction. Appropriate BMPs included in the Project SWPPP will be implemented during construction to minimize potential temporary impacts on waters from erosion during Project construction (conservation measure **HYD-1**, Section 1.4.9). To reduce erosion upon completion of the levee construction, the landside slope will be hydroseeded with a native grass seed mix, and the levee crown will be covered with a compacted aggregate base to create an all-weather roadway. The roadway will be constructed with a 2% landside slope to minimize runoff into the adjacent waterway. The topography surrounding the potential borrow sites is flat; drainage patterns or erosion in the surrounding areas will not be affected by excavation. Over the long term, rehabilitation of the levee will decrease erosion during flood events, thereby reducing

siltation in adjacent waterways. The Project will, therefore, have a less than significant impact.

ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

The Project levees will be widened and raised, a toe berm constructed, revetments installed on waterside slopes, and a landside stability berm installed. The all-weather access road along the levee crest will be constructed with similar drainage patterns and capacity to current conditions. The Project has the potential to cause minor alterations to the existing drainage patterns in a manner that would not substantially increase the rate or amount of surface water that would result in an increased risk of flooding. Completion of the Project will reduce the risk of flooding, therefore there will be no impact.

iii) create or contribute runoff water which would exceed the capacity or existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

There is no existing or planned stormwater drainage system on Bacon Island. The Project's levee design and soil stabilization methods should minimize the potential for runoff relative to current conditions. The all-weather access road along the levee crest will be constructed with similar drainage patterns and capacity to current conditions. Therefore, there will be no impact.

iv) impede or redirect flood flows?

Construction activities on the waterside of the levee, including placement of rock along the levee crown, will be completed above HTL and MHW, not impeding or redirecting flood flows within any adjacent waterways. The rehabilitated levee will ensure flood flows are contained within these waterways and, thereby, protect the landside of the levee. There will be no impact.

d) Would the Project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Bacon Island is not at risk from tsunamis or mudflows (State of California 2021). Bacon Island is classified as a Special Flood Hazard Area Zone AE by FEMA, which indicates it is subject to inundation by a 1-percent-annual-chance flood event (FEMA 2021). Seismically induced earth movements and seiches are possible in the Delta channels. However, the Project will increase the ability of the levee to protect the landside of the island from such events. Because the Project will reduce the risk of flood events, it will in turn reduce the risk of pollutant release associated with unanticipated inundations. There will be no impact.

e) Would the Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The project will not conflict with or obstruct the implementation of the Central Valley Regional Water Quality Control Board Basin Plan (Central Valley RWQCB 2018) or sustainable groundwater management plan. There will be no impact.

2.11 Land Use and Planning

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Physically divide an established community?	❑	❑	❑	✓
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigation an environmental effect?	❑	❑	✓	❑

2.11.1 Environmental setting

The zone designation for Bacon Island under the San Joaquin General Plan is agriculture (ESA 2014). Bacon Island is also part of the Delta Primary Zone, as defined by the Delta Protection Act of 1992, which includes approximately 500,000 ac of waterways, levees, and farmed lands throughout five counties (DPC 2010). The Land Use and Resource Management Plan for the Primary Zone of the Delta guides planning for the conservation and enhancement of the natural resources of the Delta, while sustaining agriculture and meeting increased recreational demand (DPC 2010).

Bacon Island is located within in the boundary covered by the Delta Plan, a comprehensive, long-term management plan for the Delta and Suisun Marsh required by the 2009 Delta Reform Act (Section 6.2). The Delta Reform Act also included the creation of The Delta Stewardship Council in 2010, the state agency responsible for developing and implementing the Delta Plan, which includes recommendations for achieving the coequal goals of protecting and enhancing the Delta ecosystem and providing for a more reliable water supply for California, while protecting and enhancing the unique agricultural, cultural, and recreational characteristics of the Delta.

Additionally, the San Joaquin County General Plan includes Goal and Policy LU 7, which provide for the long-term preservation of productive farmland for the continued viability of commercial agricultural production in the County (San Joaquin County 2016).

In January 2016, the County of San Joaquin adopted Interim Urgency Ordinance 4472, which provides, in relevant part:

> 9-605.7. PROHIBITED USES. All uses, including, but not limited to flooding inconsistent with generally accepted agricultural practices or which presents or could present a threat to the physical integrity of Delta levees, on land with a general plan designation of AG and located within the Primary Zone of the Sacramento-San Joaquin Delta are prohibited, except:
>
> (a) Allowed uses as identified in Tables 9-605.2, 9-605.3 and 9-605.4 of the San Joaquin County Development Title;
>
> (b) The Delta Wetlands Project as defined in the 2011 Delta Wetlands Project Place of Use Environmental Impact Report and reflected in the Protest Dismissal and Settlement Agreement reached in the matter of Central Delta Water Agency et al. v.

Semitropic Water Storage District et al., San Francisco County Superior Court Case No. CPF-II-51175; and

(c) Easements obtained under the San Joaquin Multispecies Habitat Conservation Plan, but not greater than 80 cumulative acres by a single entity.

Interim Urgency Ordinance 4472 has since been codified under the Development Title of the San Joaquin County Code (San Joaquin County 2021).

2.11.2 Findings

a) Would the Project physically divide an established community?

There are no established communities located on Bacon Island and the Project will not change the character or access to any of the residences or farm buildings; therefore, the Project will have no impact.

b) Would the Project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

The Project will not conflict with the goals or policies in the San Joaquin County General Plan or the Land Use and Resource Management Plan for the Primary Zone of the Delta.

Although both borrow sites are zoned for agriculture, it is unlikely they will be returned to agricultural use after Project completion. Despite the potential for loss of some agricultural land (approximately 60 acres), the Project is consistent with the San Joaquin County goals and policies to protect agricultural land because rehabilitation of the Project levee will decrease the potential for levee failure and associated flooding of over 5,000 acres of the remaining, active agricultural land on Bacon Island.

Additionally, the Project does not conflict with Interim Urgency Ordinance 4472, as this ordinance allows for the use of on-site borrow pits with excavation reaching the water table for levee projects that are carried out as part of routine maintenance of Delta levees to protect agricultural lands from inundation as the result of levee overtopping or failure.

The Project is also consistent with the Delta Plans coequal goals of protecting and enhancing the Delta ecosystem and providing for a more reliable water supply for California, while protecting and enhancing the unique agricultural, cultural, and recreational, characteristics of the Delta.

For these reasons, the impact will be less than significant.

2.12 Mineral Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	❑	❑	❑	✓
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	❑	❑	❑	✓

2.12.1 Environmental setting

There are few mineral resources of economic value found in the Delta, with the extraction of peat and sand-gravel occurring on some Delta islands. There are no mineral extraction activities currently occurring on Bacon Island though the Project will extract fill material (i.e., surface mining) from the on-island borrow sites (Figure 1-2); soils from test pits in the borrow sites indicated peat and organic silt over mineral soils (Hultgren-Tillis Engineers 2021b). The closest mineral extraction activities are approximately 2 miles northwest of the Project Area on Decker Island (Clinkenbeard and Gius 2018, USGS 2013). To date, land on Bacon Island has not been classified into mineral resource zones, as pursuant to the California Surface Mining and Reclamation Act of 1975 (SMARA; Section 6.2) (CGS 2015, 2020).

2.12.2 Findings

a) Would the Project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

There are no known mineral resources in the Project Area. The geotechnical study of Borrow sites 1 and 2 noted the presence of peat in the soils (Hultgren-Tillis Engineers 2021b), but the amount and quality of the peat in the soil are not of value. Therefore, the Project will have no impact.

b) Would the Project result in the loss of availability of a locally- important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

There are no known mineral resources in Project Area. Therefore, the Project will have no impact.

2.13 Noise

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	❑	❑	❑	✓
b) Generation of excessive groundborne vibration or groundborne noise levels?	❑	❑	✓	❑
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	❑	❑	❑	✓

2.13.1 Environmental setting

2.13.1.1 Noise

Noise can be defined as unwanted sound and is generally measured in decibels (dB). A whisper is about 30 dB, normal speaking is roughly 60 dB, and a shout is approximately 110 dBA (CDC 2019). Long-term exposure to noises exceeding a level of 70 dB can cause negative effects, including hearing loss.

Typical construction equipment noise emissions for the Project are estimated between 80 and 85 dBA, 50 ft from the source equipment (Table 2-7). Generally, noise from a point source decreases by 6 dBA for each doubling of distance from the source (FHA 2017).

Table 2-7. Typical construction equipment noise levels.

Equipment description	Typical noise level (dBA) from 50 ft
Backhoe	80
Dozer	85
Dump Truck	84
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Grader	85
Scraper	85
Tractor	84

Source: Federal Transit Administration 2018

Noise-sensitive land uses are defined as uses that can be adversely affected by high levels of noise. Residences, schools, hospitals, nursing homes, religious facilities, libraries, hotels, and other areas of similar use are often considered to be sensitive receptors to noise. Potentially sensitive receptors to noise from the Project are limited to the 11 residences on Bacon Island, five of which are located between 600 ft and 1,200 ft north of the Project Area near Santa Fe Cut.

Noise in the Project Area is primarily caused by boat traffic along adjacent waterways, light vehicular traffic along Bacon Island Rd, and routine agricultural and maintenance activities on Bacon Island.

The San Joaquin County Development Title (Section 9-1025.I) states that noise sources associated with construction are exempt from noise level regulations on all days, provided that construction activities take place between 6:00 a.m. and 9:00 p.m.

2.13.1.2 Vibration

Vibrations are periodic oscillations of a medium, including groundborne vibrations caused by machinery or construction equipment. Groundborne noise is produced by the vibration of other objects, such as room surfaces, resulting from groundborne vibrations. Vibrations are typically measured by their root mean squared velocity expressed as vibration decibels (VdB). Vibrations begin to be perceptible at approximately 65 VdB, become distinctly perceptible around 75 VdB, and become bothersome around 85 VdB (Federal Transit Administration 2018).

Existing vibration levels are relatively low near the Project Area. Vibrations in the vicinity are primarily produced by routine agricultural and maintenance vehicles and equipment.

Vibration levels for heavy equipment and loaded haul trucks to be used during Project construction are not expected to exceed 87 VdB, 25 feet from the source (Federal Transit Administration 2018).

The San Joaquin County Development Title (Section 9-1025.5(c)) states that vibration sources associated with construction or demolition of structures or infrastructure are exempt from vibration level regulations.

2.13.2 Findings

a) Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

The San Joaquin County Development Title (Section 9-1025.9(c)) states that noise sources associated with construction are exempt from noise level regulations, provided that construction activities take place between 6:00 a.m. and 9:00 p.m. Project construction activities will take place between 6:00 a.m. and 6:00 p.m., and Bacon Island is not covered by any other local ordinances; therefore, there will be no impact.

b) Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

The nearest potential sensitive receptors on Bacon Island are associated with 11 residences on the island, the closest of which are five residences associated with Camp 12, located between 600 ft

and 1,200 ft north of the Project Area near Santa Fe Cut (Section 2.14 Population and Housing). Some structures are within 30 ft of haul routes and construction areas; however, they are not occupied. The unoccupied structures are used for staging farm equipment and storage purposes.

People using the occupied structures or storage buildings located at least 0.25 miles away from the Project Area are unlikely to experience any noticeable increase in groundborne vibration or noise levels during Project activities. Vibration levels will likely only be distinctly perceptible (i.e. greater than 75 VdB) when heavy equipment (e.g., large bulldozers, loaded haul trucks) is within approximately 30 ft of sensitive receptors (FTA 2018); noise levels will only exceed those that cause negative effects or hearing loss (i.e., 70 dB) when heavy equipment is within approximately 200 ft. Furthermore, vibration and noise levels will diminish as the construction work progresses through the Project Area and moves farther away from sensitive receptors. The construction areas and haul routes in the Project Area are regularly travelled, and often already have equipment and noise associated with farming activities (e.g., disking, harvesting, or ground/aerial pesticide application). There will be no construction work outside of the approved working hours of 6:00 a.m. and 6:00 p.m. Additionally, island residents along haul routes are likely away from residences during construction hours, and vibration and noise produced by Project construction activities during daytime hours are exempt from San Joaquin County regulations. There will be no increase in operational vibration or noise levels following Project construction. Due to the short duration of exposure to noise, restricted work hours, and existing ambient noise associated with daily farming activities, the potential exposure of persons to increased groundborne vibration or noise from the Project is less than significant.

c) For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The Project site is not located within the vicinity of a private airstrip, or airport land use plan. There is no airport within 2 miles of the Project Area. Therefore, the Project will have no impact.

2.14 Population and Housing

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	❑	❑	❑	✓
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	❑	❑	❑	✓

2.14.1 Environmental setting

The Project is located within San Joaquin County in a rural area with a generally low population density. Areas surrounding the Project are primarily agricultural with a few domestic residences. The island currently has three clusters of buildings which include equipment sheds, abandoned buildings, and eleven active residences; there is one residence at Camp 2, five residences at Camp 3, and five residences at Camp 12. Structures closest to the Project Area are associated with Camp 12, comprised of five residences (Figure 2-9). Camp 12 is located at the southeastern corner of the island between stations 712+00 and 720+00; associated residences are between 600 ft and 1,200 ft north of the Project Area near Santa Fe Cut. Project activities will avoid active residences and abandoned buildings and will not displace any inhabitants.

Figure 2-9. Residences at Camp 12 on Bacon Island (Google Earth satellite photo, imagery date 6/29/2021).

2.14.2 Findings

a) Would the Project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

This Project does not include the addition of new homes or businesses. While the Project will rehabilitate the levee and reduce flood risk, the zoning of Bacon Island as agriculture precludes substantial population growth, and the Project will not result in population growth. Therefore, there will be no impact.

b) Would the Project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No existing housing or people on Bacon Island will be displaced. There will be no impact.

2.15 Public Services

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	❑	❑	❑	✓
Fire protection?	❑	❑	❑	✓
Police protection?	❑	❑	❑	✓
Schools?	❑	❑	❑	✓
Parks?	❑	❑	❑	✓
Other public facilities?	❑	❑	❑	✓

2.15.1 Environmental setting

Bacon Island is owned by the Metropolitan Water District of Southern California, and its levees are maintained by Reclamation District No. 2028. The island is managed for agriculture, and there are no government facilities, public resources, or services on the island.

2.15.2 Findings

a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

Fire protection?
Police protection?
Schools?
Parks?
Other public facilities?

The Project will not affect public services including fire protection, police protection, schools, parks, or other public facilities. None of these services currently exist on Bacon Island, and access routes will be maintained to allow fire and police protection services to reach the residences near the Project Area. There will be no impact.

2.16 Recreation

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	❑	❑	❑	✓
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	❑	❑	❑	✓

2.16.1 Environmental setting

The Sacramento-San Joaquin Delta waterways surrounding Bacon Island are a recreational resource for boating, fishing, wildlife viewing, and hunting. Bacon Island is a privately owned island and as such, it is not designated by the County as a Recreation Area, Boater Destination Site, or Fishing Access Site.

2.16.2 Findings

a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

The Project will not change the current use of recreational facilities near the island. There will be no impact.

b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

The Project does not include recreational facilities or require the construction or expansion of recreational facilities. Therefore, there will be no impact.

2.17 Transportation

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	❑	❑	❑	✓
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	❑	❑	❑	✓
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	❑	❑	❑	✓
d) Result in inadequate emergency access?	❑	❑	❑	✓

2.17.1 Environmental setting

Bacon Island is accessible by only one bridge from Lower Jones Tract. The only road access to Mandeville Island (located to the north of Bacon Island) is via a bridge from Bacon Island Road, located along the levee. The Project Area is accessible from Bacon Island Road. The existing levee also has a road along its crown that is used for levee maintenance, which will be replaced on the crown of the rehabilitated levee. A portion of the Project Area along the Connection Slough levee road is behind a locked gate (west of the Mandeville Island bridge) and is only used to access agricultural fields on the west side of the island. This section of the levee road is used solely by the Reclamation District for island maintenance and by farmers who lease land from the District for agriculture.

2.17.2 Findings

a) Would the Project conflict with a program, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

There are no transportation plans established for Bacon Island; the general public does not use project roads on Bacon Island for transportation. There will be no impact.

b) Would the Project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Automobile vehicle miles traveled are not expected to change due to the Project since no detours will be implemented during construction and no transportation systems will change permanently. There will be no impact.

c) Would the Project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The design features of the improved levee road will be similar to the existing road and will be compatible with existing uses of the island. There will be no impact.

d) Would the Project result in inadequate emergency access?

The island is accessible by only one bridge from Lower Jones Tract and provides road access to Mandeville Island via only one bridge at the north end of Bacon Island. To maintain emergency vehicle access to Mandeville Island, one lane will remain open during construction. The improvements to the levee will increase road quality and reduce the likelihood of a catastrophic flood or levee breach. There will be no change to emergency access to the island; therefore, there will be no impact.

2.18 Tribal Cultural Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resource Code 5020.1(k), or	❑	✓	❑	❑
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5021.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	❑	✓	❑	❑

2.18.1 Environmental setting

An “historical resource” as defined in PRC Section 21084.1, a “unique archaeological resource” as defined in PRC Section 21083.2(g), or a “nonunique archaeological resource” as defined in PRC Section 21083.2(h) may also be a *tribal cultural resource*. As defined under PRC Section 21074, Tribal cultural resources are “sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe” that are either: (1) included or determined to be eligible for inclusion in the California Register of Historic Resources; included in a local register of historical resources as defined in PRC Section 5020.1(k); or (2) determined

by the lead agency to be significant pursuant to the criteria for inclusion in the CRHR set forth in PRC Section 5024.1(c), if supported by substantial evidence and taking into account the significance of the resource to a California Native American tribe. The ethnographic context of the Project Area and vicinity is provided in Section 2.5.1.2.

2.18.1.1 Sacred Lands File Search

Natural Investigations Company contacted the NAHC requesting a search of their Sacred Lands File for tribal cultural resources within or near the Project Area. The results of the Sacred Lands File search returned by the NAHC on March 30, 2021 were negative for Native American cultural resources in the Project vicinity (Natural Investigations Company 2021). The NAHC provided a list of 17 tribal individuals and organizations to be contacted for more information on the potential for indigenous resources within or near the Project Area.

2.18.1.2 Native American Outreach

Natural Investigations Company sent Project information letters to each of the tribes and individuals included on the NAHC list on March 31, 2021. If no replies were received, follow-up phone calls were made on April 14, 2021. To date, one response has been received. The consultation department of the Ione Band of Miwok Indians responded via email on May 1, 2021, requesting all documentation related to the cultural resources inventory for the Project. Natural Investigations Company responded on May 3, 2021, providing a summary of cultural resources background research and field survey, and stating that the tribe's request would be included in the cultural resources report and tribal outreach log.

2.18.2 Findings

Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resource Code 5020.1(k), or

Native American outreach efforts undertaken in support of the Project give no indication that tribal cultural resources are present within the Project Area, but rather suggest strongly that their presence is unlikely. Mitigation measure **CUL-1** describes training on tribal cultural resources for construction personnel and the process to mitigate the inadvertent find of a tribal cultural resource during excavation in the unlikely event one is found. The impact will be less than significant with incorporation of mitigation.

b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5021.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Native American outreach, Sacred Lands File records, and the Natural Investigations Company pedestrian survey indicate that there are no tribal cultural resources listed or eligible for listing in the CRHR within or near the Project Area. Furthermore, inundation of the Project Area would have precluded human occupation prior to twentieth-century reclamation for agriculture.

Mitigation measure **CUL-1** describes training on tribal cultural resources for construction personnel and the process to mitigate the inadvertent find of a tribal cultural resource during excavation in the unlikely event one is found. The impact will be less than significant with mitigation incorporated.

2.19 Utilities and Service Systems

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	❑	❑	❑	✓
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	❑	❑	❑	✓
c) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	❑	❑	❑	✓
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	❑	❑	❑	✓
e) Comply with federal, state, and local statutes and regulations related to solid waste?	❑	❑	❑	✓

2.19.1 Environmental setting

There are no public wastewater treatment facilities, stormwater drainage facilities, or other public utilities, or service systems located on the island. Waste is managed by a septic system.

2.19.2 Findings

a) Would the Project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or

telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The Project will not require or result in relocation, construction, or expansion of facilities including water, wastewater treatment, stormwater drainage, power, gas, or telecommunications facilities. There will be no impact.

b) Would the Project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

The Project will utilize water trucks for dust control as referenced in Section 1.4.7 and Section 1.4.9. Sufficient water for dust control is expected to be available on site (e.g., pumped from the borrow sites) during construction. The Project will not create a need for increased water supply for continued agricultural operations. There will be no impact.

c) Would the Project result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?

The Project will not create a need for increased wastewater treatment capacity. There will be no impact.

d) Would the Project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

The Project will not create solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. There will be no impact.

e) Would the Project comply with federal, State, and local statutes and regulations related to solid waste?

The Project will not create solid waste, nor result in violation of solid waste statutes and regulations. There will be no impact.

2.20 Wildfire

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	❑	❑	❑	✓
b) Due to slope, prevailing winds, and other factors, exacerbate wildlife risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	❑	❑	❑	✓
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts on the environment?	❑	❑	❑	✓
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	❑	❑	❑	✓

2.20.1 Environmental setting

Within San Joaquin County, the highest wildfire risk is in the southern portion of the county containing foothill or mountain areas with potentially large fuel loads. The Project Area has generally flat topography and primarily includes agricultural land surrounded by waterways. The Project Area is in unzoned State and Local Responsibility Areas and does not contain lands classified as moderate, high, or very high fire hazard severity zones (CalFire 2008).

2.20.2 Findings

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

The Project Area is not located in or near a state responsibility area or lands classified as very high fire hazard severity zones and does not occur along any major roads designated for emergency evacuation (San Joaquin County 2019b). There will be no impact.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

The Project Area is not located in or near a state responsibility area or lands classified as a very high fire hazard severity zone. The Project will reduce the slope of the levee and will not exacerbate wildfire risk. There will be no impact.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts on the environment?

The Project Area is not located in or near a state responsibility area or lands classified as very high fire hazard severity zones and does not require the installation of associated infrastructure. There will be no impact.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

The Project Area is not located in or near a state responsibility area or lands classified as very high fire hazard severity zones. The topography in the Project Area is generally flat and will not result in increased runoff or slope instability, and the levee rehabilitation will provide increased flood protection to Bacon Island. There will be no impact.

2.21 Mandatory Findings of Significance

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
a) Does the Project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	❑	✓	❑	❑
b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects)	❑	❑	❑	✓
c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	❑	❑	❑	✓

3 DETERMINATION

On the basis of this initial evaluation:

I find that the Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	❑
I find that although the Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	✓
I find that the Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	❑
I find that the Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	❑
I find that although the Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Project, nothing further is required.	❑

_____ _____

Signature Date

_____ _____

Printed Name

4 LIST OF PREPARERS

The table below lists the preparers of this Initial Study/Mitigated Negative Declaration and participants in the related planning, data gathering, and analytical tasks.

Name	Title	Affiliation	Project role
Tina Anderson	Senior Project Manager	MBK Engineers	Project management and support
Brian Janowiak, P.E.	Supervising Engineer	MBK Engineers	Engineering, Project design
Esther Adelstein	Environmental Scientist	Stillwater Sciences	Environmental analysis, document preparation, geology and soils, hazards and hazardous materials
Emily Applequist	Environmental Scientist	Stillwater Sciences	Environmental analysis, document preparation, botanical resources
Anna Ballasiotes	GIS Analyst	Stillwater Sciences	GIS support, map and figure production
Holly Burger	Senior Wildlife Biologist	Stillwater Sciences	Project Manager, environmental analysis, document review, wildlife resources
Christian Braudrick	Senior Geomorphologist	Stillwater Sciences	Document review, geology and soils, hazards and hazardous materials, hydrology and water quality
Christina Buck	Biologist	Stillwater Sciences	Environmental analysis, document preparation, hydrology and water quality
Emily Jadeski	GIS Technician	Stillwater Sciences	Map and figure production
Kelli Wheat Dawson	Document Production	Stillwater Sciences	Document production
Megan Keever	Senior Botanist	Stillwater Sciences	Document review, botanical resources
Marissa Montjoy	Biologist	Stillwater Sciences	Environmental analysis, document preparation, wildlife resources
Krista Orr	Senior Ecologist	Stillwater Sciences	Environmental analysis, document preparation, and senior review
Rob Thoms	Botanist	Stillwater Sciences	Environmental analysis, document preparation, botanical resources
Wayne Swaney	Environmental Scientist	Stillwater Sciences	Environmental analysis, document preparation, air quality, greenhouse gases
Tim Spillane, MA	Registered Professional Archaeologist	Natural Investigations Company, Inc	Cultural resources, tribal cultural resources
Phil Hanes, MA	Registered Professional Archaeologist	Natural Investigations Company, Inc	Cultural resources, tribal cultural resources
Alicia Hedges, MA	Registered Professional Archaeologist	Natural Investigations Company, Inc	Cultural resources, tribal cultural resources

5 CONSULTATION AND COORDINATION

The Draft IS/MND was circulated to agencies, individuals, and/or organizations known to have a special interest in the proposed Project and was made available to the public for a 30-day review period. The public was notified as follows:

- A Notice of Intent (NOI) to adopt an MND was posted for publication in a local newspaper and filed with the San Joaquin County Clerk.
- The proposed IS/MND, NOI, and Notice of Completion (NOC), were electronically submitted to the State Clearinghouse via the CEQAnet Web Portal for distribution.
- The proposed IS/MND was distributed electronically by the State Clearinghouse to interested parties.
- Copies of the proposed IS/MND were made available for public review at MBK Engineers offices in Sacramento.

6 COMPLIANCE WITH FEDERAL AND STATE ENVIRONMENTAL LAWS AND REGULATIONS

6.1 Federal

Bald and Golden Eagle Protection Act. The BGEPA prohibits unauthorized take, possession, and sale of bald eagles or golden eagles (*Aquila chrysaetos*), as well as their feathers, nests, and eggs. Mitigation measures incorporated into the Project will ensure the protection of eagles potentially affected by the Project and compliance with the BGEPA.

Clean Air Act. Section 176(c) of this act prohibits federal action or support of activities that do not conform to a State Implementation Plan. The Project is not expected to violate any air quality standard, increase air quality violations in the Project region, exceed the EPA's general conformity *de minimis* threshold, or hinder the attainment of air quality objectives in the local air basin. The Project will have no adverse effect on the future air quality of the Project Area and is in compliance with this act.

Clean Water Act (Sections 401 and 404). Section 404 of this act requires that a permit be obtained from the USACE for fill of waters of the U.S., including wetlands, prior to Project implementation. In compliance with Section 401 of the Act, a water quality certification or a waiver of water quality certification needs to be obtained from the Central Valley RWQCB. This Project does not require 404 or 401 permits since there will be no waterside work below HTL or MHW. If it is determined that the Project may impact waters of the U.S., then Section 404 and 401 permits will be secured prior to Project implementation, in compliance with this act.

Endangered Species Act. The ESA prohibits unauthorized take of species listed or proposed for listing as threatened or endangered. The ESA also ensures that the actions of federal agencies do not jeopardize the continued existence of threatened and endangered species. The conservation and mitigation measures incorporated into the Project will assure compliance with the ESA.

Migratory Bird Treaty Act. Protection of migratory birds, their occupied nests, and their eggs is required by the Migratory Bird Treaty Act (MBTA) (16 USC 703 et seq.), Title 50 Code of Federal Regulations (part 10), and CDFG Code Sections 3503, 3513, and 3800. The full list of the species protected under the MBTA appears in Title 50, section 10.13, of the Code of Federal Regulations (50 CFR 10.13) and includes federally and state-listed migratory birds as well as other non-listed migratory birds. Conservation and mitigation measures incorporated into the Project will assure compliance with the MBTA.

Rivers and Harbors Act (Section 10). Section 10 of the Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of any navigable water of the United States. All features below MHW are subject to Section 10 of the Rivers and Harbors Act and are considered navigable waters by USACE. This Project does not require a Section 10 permit since there will be no waterside work below MHW. If it is determined that the Project may impact navigable waters, then a Section 10 permit will be secured prior to Project implementation.

6.2 State

Assembly Bill 32 and Senate Bill 32. AB 32 required CARB to develop regulations to address global climate change due to GHG emissions. The bill also required attainment of a statewide GHG emissions limit, equal to the 1990 level, by December 31, 2020. As of 2019, statewide

GHG emissions (418.4 million metric tons of CO_2e) (CARB 2021d) were below the 2020 GHG emissions limit (431 million metric tons of CO_2e) (CARB 2018). Signed into law in 2016, Senate Bill 32 expanded upon AB 32 by specifying an emissions limit which further requires California to reduce statewide GHG emissions to 40% below the 1990 level by the year 2030 (CARB 2018). Emissions associated with Project construction will be temporary and will not inhibit attainment of the statewide GHG emissions limits established by these bills.

Assembly Bill 52. AB 52 provides a method for incorporation of Native American tribal knowledge into the CEQA review process via formal consultation. In compliance with AB 52, 17 tribal individuals or organizations, provided by the NAHC, were contacted for information on the potential for indigenous resources in or near the Project Area. Results of tribal outreach efforts undertaken in support of the Project gave no indication that tribal cultural resources are present within the Project Area and strongly suggest that their presence is unlikely.

Assembly Bill 360. AB 360 established provisions, including mitigation requirements, for the protection of fish and wildlife habitat in the Delta (i.e., Freshwater Marsh, Scrub-shrub, Riparian Forest, and Shaded Riverine Aquatic habitats). Mitigation measures incorporated into the Project will assure compliance with AB 360.

California Environmental Quality Act. This Initial Study/Mitigated Negative Declaration has been prepared to comply with CEQA.

California Endangered Species Act. Generally, CDFW administers the state laws providing protection of fish and wildlife resources, including the CESA. CESA parallels the ESA and was written to protect state endangered and threatened species. Conservation and mitigation measures incorporated into the Project will assure compliance with CESA.

CDFW Species of Special Concern. CDFW designates Species of Special Concern (SSC), which carries no formal legal status but allows focus on native California wildlife species at conservation risk before they meet CESA criteria for listing. Section 15380 of the CEQA Guidelines indicates that species of special concern should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined therein.

Delta Protection Act. The Delta Protection Act was established in recognition of the increasing threats to the resources of the Primary Zone of the Delta from urban and suburban encroachment which have the potential to impact agriculture, wildlife habitat, and recreational uses. Pursuant to the Delta Protection Act, the Land Use and Resource Management Plan for the Primary Zone of the Delta was completed and adopted by the Delta Protection Commission in 1995 (updated in 2002). The Project will not result in urban or suburban encroachment and is, therefore, in compliance with this act.

Delta Reform Act. The Delta Reform Act created the Delta Stewardship Council to oversee the management of water and environmental resources in the Delta through the development and implementation of the Delta Plan. Bacon Island is located within the boundary covered by the Delta Plan, and if it is determined that the Project is a covered action, a consistency determination will be obtained from the Delta Stewardship Council.

Fish and Game Code Section 1600 et seq. California Fish and Game Code Section 1600 et seq. gives authority to CDFW to regulate activities that would interfere with the natural flow of, or substantially alter the channel, bed, or bank of a lake, river, or stream. Because the Project includes work on the waterside levee below the hinge point or waterside crest, the District is

required to notify CDFW. If CDFW determines that the Project will have potential adverse effects on fish and wildlife resources, they will issue a Lake and Streambed Alteration Agreement (LSAA) that includes conditions to protect these resources. The Project will therefore comply with this Fish and Game Code section.

Fish and Game Code Sections 86, 3503, and 3513. California Fish and Game Code Section 86 defines take as hunting, pursuing, catching, capturing, or killing, or attempting to hunt, pursue, catch, capture, or kill. Under Fish and Game Code Section 3503 it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided. Fish and Game Code Section 3503.5 protects all birds-of-prey (raptors) and their eggs and nests and under Section 3513 it is unlawful to take or possess any migratory non-game bird designated under the MBTA. Mitigation measures incorporated into the Project will assure compliance with these Fish and Game Code sections.

Fish and Game Code Sections 3511, 4700, 5050, and 5515. California Fish and Game Code Sections 3511, 4700, 5050, and 5515 designated rare fish and wildlife species as Fully Protected in California. This designation provides additional protection to these species from unauthorized take or possession. Mitigation measures incorporated into the Project will assure compliance with these sections.

Native Plant Protection Act. The California Native Plant Protection Act (NPPA) of 1973 directed CDFW to preserve, protect, and enhance native plants. It gave CDFW the power to designate native plants as endangered or rare and requires that landowners who have been notified of state-listed species on their property, and who wish to destroy those plants and their habitat, must provide CDFW with 10 days' notice to salvage the plants before destruction occurs. Many of the species designated under the NPPA were subsumed by CESA, but there is a subset of species, subspecies, and varieties of plants that were not, and are protected as rare under the NPPA. Mitigation measures incorporated into the Project, which include NPPA rare plants that may be impacted, will assure compliance with NPPA.

Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Control Act was established to protect water quality and beneficial uses of water in California. This act requires that National Pollutant Discharge Elimination System (NPDES) and Waste Discharge Requirement (WDR) permits for point and nonpoint source discharges, respectively, be obtained from the RWQCB to protect water quality in surface waters, groundwater, and wetlands. If it is determined that the Project may impact waters of the U.S/State., then NPDES and WDR permits will be secured prior to Project implementation, in compliance with this act.

Surface Mining and Reclamation Act (SMARA). SMARA includes policies for the regulation of surface mining operations to balance production of state mineral resources with minimization of adverse environmental impacts associated with these activities. In support of these goals, state lands are classified into mineral resource zones based on known or inferred mineral resources. No land on Bacon Island has been classified into mineral resource zones, so the Project will not conflict with the policies in this act.

Williamson Act (also known as the California Land Conservation Act). The Williamson Act allows for the formation of contracts between local governments and private landowners to restrict use of specific parcels to agricultural or related open space land uses. The Project Area is not covered by a Williamson Act contract.

7 REFERENCES

Aagaard, B. T., J. L. Blair, J. Boatwright, S. H. Garcia, R. A. Harris, A. J. Michael, D. P. Schwartz, and J. S. DiLeo. 2016. Earthquake outlook for the San Francisco Bay region 2014–2043 (ver. 1.1, August 2016): U.S. Geological Survey Fact Sheet 2016–3020. Available at: http://dx.doi.org/10.3133/fs20163020 [Accessed March 2021].

Atwater, B. F. 1982a. Geologic Maps of the Sacramento-San Joaquin Delta, California. Miscellaneous Field Studies Map MF-1401. Woodward Island quadrangle. Scale 1:24,000. Available at: https://ngmdb.usgs.gov/Prodesc/proddesc_7126.htm [Accessed March 2021].

Atwater, B. F. 1982b. Geologic Maps of the Sacramento-San Joaquin Delta, California. Report to accompany Map MF-1401. Available at: https://pubs.usgs.gov/mf/1401/report.pdf [Accessed March 2021].

Beedy, E. C., and W. J. Hamilton, III. 1997. Tricolored blackbird status update and management guidelines. Prepared by Jones & Stokes Associates, Inc. and University of California, Davis for U.S. Fish and Wildlife Service, and California Department of Fish and Game.

Bennyhoff and Fredrickson. 1994. Proposed Integrative Taxonomic System for Central California Archaeology. Contributions of the University of California Archaeological Research Facility, volume Toward a New Taxonomic Framework for Central California Archaeology: Essays by James A. Bennyhoff and David A. Fredrickson, pp 15-24.

BIA. 2015. Pacific Region: Tribes Served. Bureau of Indian Affairs. http://www.bia.gov/WhoWeAre/RegionalOffices/Pacific/WeAre/Tribes/index.htm.

Bloom, P. H. 1980. The status of the Swainson's hawk in California, 1979. California Department of Fish and Game and USDI Bureau of Land Management, Sacramento, California.

Bryant, W. A., and S. E. Cluett, compilers. 2002a. Fault number 53b, Greenville fault zone, Marsh Creek-Greenville section. Quaternary fault and fold database of the United States: U.S. Geological Survey website. Available at: https://earthquake.usgs.gov/static/lfs/nshm/qfaults/Reports/53b.pdf [Accessed March 2021].

Bryant, W. A., and S. E. Cluett, compilers. 2002b, Fault number 37, Green Valley fault, in Quaternary fault and fold database of the United States: U.S. Geological Survey website. Available at: https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=37&section_id= [Accessed March 2021].

CalFire (California Department of Forestry and Fire Protection). 2008. Fire hazard severity zones in state responsibility area (SRA) and local responsibility area (LRA), San Joaquin County, California. Available at: https://osfm.fire.ca.gov/media/6794/fhszl06_1_map39.pdf [Accessed April 2021].

CalFire. 2018. Map of California Fire Hazard Severity Zones (FHSZ). Available at: https://www.arcgis.com/home/item.html?id=31219c833eb54598ba83d09fa0adb346 [Accessed March 2021].

California Indian Assistance Program. 2011. 2004 Field Directory of the California Indian Community. 2004 Field Directory of the California Indian Community. Available at: http://www.idrsinc.org/wp-content/uploads/2011/08/Tribal-Directory.pdf.

Caltrans (California Department of Transportation). 2017a. Construction Site Best Management Practices (BMP) Manual. Available at: http://www.dot.ca.gov/hq/construc/stormwater/CSBMP-May-2017-Final.pdf

Caltrans. 2017b. California Eligible and Officially Designated Scenic Highway Routes. Feature Service. Available at: https://www.arcgis.com/home/item.html?id=f0259b1ad0fe4093a5604c9b838a486a [Accessed April 2021].

CARB (California Air Resources Board). 2018. AB 32 Scoping Plan. Available at: https://ww3.arb.ca.gov/cc/scopingplan/scopingplan.htm

CARB. 2019. California Greenhouse Gas Emission Inventory: 2000–2017, 2019 edition. Available at: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf?_ga=2.41074274.1903261348.1588278400-1589787952.1543448564 [Accessed May 2021].

CARB. 2021a. Air Quality Standards. Available at: https://ww2.arb.ca.gov/resources/background-air-quality-standards [Accessed July 2021].

CARB. 2021b. State Area Designations describing summary statistics for pollutants. Available at: https://www.arb.ca.gov/adam/trends/trends1.php [Accessed July 2021].

CARB. 2021c. Summaries of Historical Area Designations for State Standards. Available at: https://ww2.arb.ca.gov/our-work/programs/state-and-federal-area-designations/state-area-designations/summary-tables [Accessed July 2021].

CDC (Centers for Disease Control and Prevention. 2019. What Noises Cause Hearing Loss? National Center for Environmental Health. October 7. Available at: https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html [Accessed July 2021].

CDFG (California Department of Fish and Game). 1992. Annual report on the status of California State listed threatened and endangered animals and plants. Fish and Game Commission, Sacramento.

CDFG. 1993. Fish and Wildlife Habitat Mitigation Agreement by and Between Reclamation District 2041 and the California Department of Fish and Game. Signed September 20, 1993.

CDFG. 1994. Staff report regarding mitigation for impacts to Swainson's hawks (*Buteo swainsoni*) in the Central Valley of California.

CDFW. 2017. Letter to Dave Forkel, Chairman, Board of Trustees, Reclamation District No. 2028, from CDFW regarding review of the Draft Initial Study/Mitigated Negative Declaration (IS/MND) for the Bacon Island Levee Rehabilitation Project, dated February 27, 2017.

CDFW (California Department of Fish and Wildlife). 2018. Protocols for surveying and evaluating impacts to special-status native plant populations and sensitive natural communities. California Natural Resources Agency, Sacramento, California. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959

CDFW. 2020. List of California Sensitive Natural Communities. Vegetation Classification and Mapping Program, California Department of Fish and Game, Sacramento, California. 9 September 2020. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153609&inline.

CDFW. 2021a. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. [Accessed April 2021].

CDFW. 2021b. California Natural Diversity Database (CNDDB). Rarefind Version 5. Internet Application. California Department of Fish and Wildlife, Sacramento, California. [Accessed March 2021].

CDTSC (California Department of Toxic Substances Control). 2021. EnviroStor online map viewer database. Available at: http://www.envirostor.dtsc.ca.gov/ [Accessed March 2021].

CDWR (California Department of Water Resources). 2021. FEMA Effective 100-Year Floodplain. San Joaquin County. Best Available Map geospatial dataset. Available at: https://gis.bam.water.ca.gov/bam/ [Accessed June 2021].

CEC (California Energy Commission). 2021. California Energy Commission: About. Available at: https://www.energy.ca.gov/about [Accessed April 2021].

Central Valley RWQCB (California Regional Water Quality Control Board). 2018. The Water Quality Control Plan (Basin Plan) for the Central Valley Region – 5th addition. Available at: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf.

CGS (California Geological Survey). 2010. Fault activity map of California. Compilation and interpretation by C. W. Jennings and W. A. Bryant with assistance from G. Saucedo. Available at: https://maps.conservation.ca.gov/cgs/fam/App/ [Accessed March 2021].

CGS. 2015. CGS Information Warehouse: Mineral Land Classification. Available at: https://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=mlc [Accessed December 2021].

CGS. 2018a. MapService of the Alquist-Priolo Fault Zones defined under the Alquist-Priolo Earthquake Fault Zoning Act. Available at https://gis.conservation.ca.gov/portal/home/item.html?id=c280aad6034449e085023ef4f8d7e2ad [Accessed April 2021].

CGS. 2018b. Seismic Hazard Zone Report for the Woodward Island 7.5-minute Quadrangle, Contra Costa County, California. Seismic Hazard Zone Report 121. Available at: https://maps.conservation.ca.gov/cgs/informationwarehouse/ [Accessed March 2021].

CGS. 2018c. Special Publication 42. Earthquake fault zones: A guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California. Available at: https://www.conservation.ca.gov/cgs/Documents/Publications/Special-Publications/SP_042.pdf [Accessed April 2021].

CGS. 2020. Publications of the SMARA Mineral Land Classification Project Dealing with Mineral Resources in California. Mineral Resources Program, Sacramento, California. August.

Clinkenbeard, J. P., and F.W. Gius. 2018. Aggregate sustainability in California, fifty-year aggregate demand compared to permitted aggregate reserves. 2018 Update to California Geological Survey Map Sheet 52. Available at: https://www.conservation.ca.gov/cgs/PublishingImages/Publications/MS_52_California_Aggregates_Map_201807_preview.jpg [Accessed March 2021].

CNPS (California Native Plant Society). 2021. Inventory of rare and endangered plants of California (online edition, v8-03 0.39). Rare Plant Program, California Native Plant Society, Sacramento, California. [Accessed March 2021].

Davis, J. N., and C. A. Niemala. 2008. Northern harrier (*Circus cyaneus*). Pages 149–155 *in* W. D. Shuford and T. Gardali, editors. California bird species of special concern: a ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of western birds no. 1. Western Field Ornithologists, Camarilla, California and California Department of Fish and Game, Sacramento, California.

Deverell, S. J., and D. A. Leighton. 2010. Historic, Recent, and Future Subsidence, Sacramento-San Joaquin Delta, California, USA. San Francisco Estuary and Watershed Science 8: doi: 10.15447/sfews.2010v8iss2art1.

Drexler, J. Z, C. S. de Fontaine, and T. A. Brown. 2009. Peat Accretion Histories During the Past 6000 Years in Marshes of the Sacramento-San Joaquin Delta, California, USA. Estuaries and Coasts 32: 871–892.

DPC (Delta Protection Commission). 2010. Land Use and Resource Management Plan for the Primary Zone of the Delta. Available at: http://delta.ca.gov/wp-content/uploads/2019/12/Land-Use-and-Resource-Management-Plan-2.25.10_-m508.pdf [Accessed April 2021]

DPR (Department of Parks and Recreation). 1976. California Inventory of Historic Resources. California Department of Parks and Recreation, Sacramento.

Dunk, J. R. 1995. White-tailed kite (*Elanus leucurus*). *In* A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. http://bna.birds.cornell.edu/bna/species/178/articles/introduction.

eBird. 2021. eBird: An online database of bird distribution and abundance. Website [Accessed May 2021]. eBird, Cornell Lab of Ornithology, Ithaca, New York.

Erichsen, A. L. 1995. The white-tailed kite (*Elanus leucurus*): nesting success and seasonal habitat selection in an agricultural landscape. Master's thesis. University of California at Davis, Davis.

ESA. 2014. Draft San Joaquin County 2035 General Plan Environmental Impact Report. Prepared for San Joaquin County. Available at: https://www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/Environmental%20Impact%20Reports/GENERAL%20PLAN%202035%20-%20DRAFT%20EIR.pdf [Accessed March 2021].

ESA. 2015. Delta Wetlands Project Draft Compensatory Mitigation Plan. Prepared for Delta Wetlands Properties. January 2015.

Estep, J. A. 1989. Biology, movements, and habitat relationships of the Swainson's hawk in the Central Valley of California, 1986–87. California Department of Fish and Game, Nongame Bird and Mammal Sec. Rep.

FAA (Federal Aviation Administration). 2021. San Francisco sectional aeronautical chart. Scale 1:500,000. 105th edition effective February 25, 2021. Available at: http://aeronav.faa.gov/content/aeronav/sectional_files/PDFs/San_Francisco_97_P.pdf [Accessed March 2021].

FEMA (Federal Emergency Management Agency). 2021. FEMA Flood Map Service Center: Search By Address. Available at: https://msc.fema.gov/portal/home [Accessed February 2022].

FHWA (Federal Highway Administration). 1981. Visual impact assessment for highway projects. US Department of Transportation Publication No. FHWA-HI-88-054. Washington, D.C.

FHA. 2017. Highway Traffic Noise Analysis and Abatement Policy and Guidance: Noise Fundamentals. Available at: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm [Accessed June 2021].

FTA (Federal Highway Administration). 2018. Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Prepared by John A. Volpe National Transportation Systems Center.

Fisher, R., G. Hansen, R. W. Hansen, and G. Stewart. 1994. Giant garter snake. Pages 284–287 *in* C. G. Thelander and M. Crabtree, editors. Life on the edge: a guide to California's endangered natural resources: wildlife. Biosystems Books, Santa Cruz, California.

FMMP (Farmland Mapping and Monitoring Program). 2021. California Important Farmland Finder. California Department of Conservation, Division of Land Resources Protection, Farmland Mapping and Monitoring Program. Available at: https://maps.conservation.ca.gov/DLRP/CIFF/ [Accessed May 2021]

Fredrickson, D. A. 1973. Early Cultures of the North Coast Ranges, California. Ph.D. Dissertation, University of California Davis.

Fredrickson, D. A. 1974. Cultural Diversity in Early Central California: A View from the North Coast Ranges. The Journal of California Anthropology 1 :41–53.

Fredrickson, D. A. 1994. Archaeological Taxonomy in Central California Revisited. Pages 91–103 *in* Bennyhoff, J. A., Fredrickson, D. A., and Hughs R. E., editors. Toward a New Taxonomic Framework for Central California Archaeology: Essays by, Contributions of the University of California Archaeological Research Facility. Berkeley.

Gardali, T. 2008. Modesto song sparrow (*Melospiza melodia*). Pages 400–404 *in* W. D. Shuford and T. Gardali, editors. California bird species of special concern: a ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California.

Studies of western birds no. 1. Western Field Ornithologists, Camarillo, California and California Department of Fish and Game, Sacramento, California.

Heizer, R. F. 1949. The Archaeology of Central California, I: The Early Horizon. University of California Anthropological Records 12: 1–83.

Heizer, R.t F., and F. Fenenga. 1939. Archaeological Horizons in Central California. American Anthropologist 41: 378–399.

Helley, E. J., and R. W. Graymer. 1997. Quaternary geology of Contra Costa County, and surrounding parts of Alameda, Marin, Sonoma, Solano, Sacramento, and San Joaquin Counties, California: A digital database. U.S. Geological Survey Open-File Report 97-98. Available at: http://pubs.usgs.gov/of/1997/of97-098/ [Accessed March 2021].

Holland, D. C. 1994. The western pond turtle: habitat and history. Final Report DOE/BP-62137-1. Bonneville Power Administration, Portland, Oregon.

Hultgren-Tillis Engineers. 2021a. Borrow Site Investigation. Bacon Island North and South Evees, San Joaquin County, California. Prepared by Hultgren – Tillis Engineers, Concord, CA for Reclamation District 2028 Sacramento, CA and MBK Engineers, Sacramento, CA.

Hultgren-Tillis Engineers. 2021b. Geotechnical Investigation, Bacon Island North and South Levees, San Joaquin County, California. Prepared by Hultgren – Tillis Engineers, Concord, CA for Reclamation District 2028 Sacramento, CA and MBK Engineers, Sacramento, CA.

Humple, D. 2008. Loggerhead shrike (*Lanius ludovicianus*). Pages 271–277 *in* W. D. Shuford and T. Gardali, editors. California bird species of special concern: a ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of western birds no. 1. Western Field Ornithologists, Camarilla, California and California Department of Fish and Game, Sacramento, California.

ICF International. 2010. Draft Delta Wetlands Project Place of Use Environmental Impact Report. Prepared for Semitropic Water Storage District. http://www.deltawetlandsproject.com/

Ivey, G. L., C. P. Herziger, and M. Gause. 2003. Farming for Wildlife: an overview of agricultural operations at Staten Island, San Joaquin County, California. Prepared for the Nature Conservancy.

Jaramillo, A., 2008. Yellow-headed blackbird (Xanthocephalus xanthocephalus). In W. D. Shuford, and T. Gardali, editors. California Bird species of special concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of western birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Jennings, M. R., and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. Final Report. Prepared by California Academy of Sciences, Department of Herpetology, San Francisco and Portland State University, Department of Biology, Portland, Oregon for California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova.

Jepson Flora Project. 2021. Jepson eFlora. http://ucjeps.berkeley.edu/eflora/ [Accessed June 2021].

Kirstine, V. 2019. Primary Record for P-39-005381. Padre Associates, Inc. On file at the Central California Information Center, California Historical Resources Information System, Turlock, California.

Kroeber, A. L. 1925. Handbook of the Indians of California. Smithsonian Institution Bureau of American Ethnology Bulletin 78. Government Printing Office, Washington.

Kroeber, A. L. 1976. Handbook of the Indians of California. Dover Publications, New York.

Levy, R.. 1978. Eastern Miwok. In California, Robert F. Heizer, editor, pp. 398–413. Handbook of North American Indians vol. 8. Smithsonian Institution, Washington DC.

Littlefield, C. D., and G. L. Ivey. 2000. Conservation assessment for greater sandhill cranes wintering on the Cosumnes River floodplain and Delta regions of California. The Nature Conservancy, Galt, California.

Littlefield, C. D., and G. L. Ivey. 2002. Washington State Recovery Plan for the sandhill crane. Washington Department of Fish and Wildlife, Olympia, Washington.

MacWhirter, R., B. Bildstein, K. L. Bildstein. 1996. Northern harrier (*Circus cyaneus*). *In* A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. http://bna.birds.cornell.edu/bna/species/210/articles/introduction.

Maniery, M. 1993. National register of historic places determination of eligibility report, Bacon Island Rural Historic District, San Joaquin County, California. Submitted to Jones & Stokes Associates, Inc. by PAR Environmental Services, Inc., Sacramento, California.

Maniery, M. L., and K. A. Syda. 1989. Cultural resources inventory and evaluation of Delta Wetlands Water Storage Project, Contra Costa and San Joaquin counties, California. PAR and Associates.

Military Museum. 2021. Bacon Island Prisoner of War Branch Camp. Available at: http://www.militarymuseum.org/BaconIslandPWCamp.html.

Moratto, M. J. 2004. California Archaeology. New world archaeological record. Coyote Press, Salinas, California.

Natural Investigations Company. 2021. Cultural and Paleontological Resources Assessment for the Bacon Island Levee Rehabilitation Project at Connection Slough and Santa Fe Cut, Reclamation District 2028, Bacon Island, San Joaquin County, California.

NETR. 2021. Historic Aerials. Nationwide Environmental Title Research, LLC. https://www.historicaerials.com.

NRCS and UC Davis (Natural Resources Conservation Service and University of California, Davis). 2019. SoilWeb. University of California; USDA-NRCS. Prepared by NRCS and University of California, Davis, Soil Resource Lab; University of California, Division of Agriculture and Natural Resources Available at: https://casoilresource.lawr.ucdavis.edu/gmap/. [Accessed March 2021].

OHP. 2009. Archaeological Determinations of Eligibility - San Joaquin County. California Office of Historic Preservation.

Potter, D., H. Bartosh, G. Dangl, J. Yang, R. Bittman, and J. Preece. 2018. Clarifying the Conservation Status of Northern California Black Walnut (*Juglans hindsii*) Using Microsatellite Markers. Madroño 65(3):131–140.

PRISM (PRISM Climate Group). 2021. Average annual precipitation data: 19871–20002019. PRISM Climate Group, Oregon State University, Corvallis, OR. Available at: http://prism.oregonstate.edu [Accessed May 2021].

RD 2028 (Reclamation District 2028). 2021. Bacon Island Reclamation District 2028 website. Available at: https://baconisland.org/

RD 2028. 2019. Delta Levees Special Flood Control Projects – Full Proposal, Reclamation District No. 2028 (Bacon Island).

Rosenthal, J. S., G. G. White, and M. Q. Sutton. 2007. The Central Valley: a view from the catbird's seat. Pages 147–163 in Jones, T. L., and Klar, K. A., editors. California Prehistory: Colonization, Culture, and Complexity. AltaMira Press, Lanham, Maryland.

San Joaquin County. 1992. San Joaquin County General Plan 2010. Section III.A Seismic and Geological Hazards. Available at: https://www.sjgov.org/commdev/cgi-bin/cdyn.exe/handouts-planning_GP-V3-III-A?grp=handouts-planning&obj=GP-V3-III-A [Accessed March 2021].

San Joaquin County. 2014. San Joaquin County General Plan. Policy Document. Public Review Draft. October 2014. Available at: https://www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/Environmental%20Impact%20Reports/GENERAL%20PLAN%202035%20-%20PUBLIC%20REVIEW%20DRAFT.pdf [Accessed April 2021].

San Joaquin County. 2016. San Joaquin County General Plan. Policy Document. Prepared by Mintier Harnish Planning Consultants. December.

San Joaquin County. 2019a. San Joaquin County Flood and Dam Failure Hazard Annex. March 2019.

San Joaquin County. 2019b. San Joaquin County Evacuation Maps. Available at: http://www.sjmap.org/evacmaps/ [Accessed February 2022].

San Joaquin County. 2021. San Joaquin County Development Title. Online content updated on April 12, 2021. Available at: https://library.municode.com/ca/san_joaquin_county/codes/development_title [Accessed April 2021].

San Joaquin County Assessor. 2015. San Joaquin County Williamson Act Parcels, 08/2015. Dataset available at: https://sjvp.databasin.org/datasets/a32f8f44b4524b07b1861e779a0857c0/ [Accessed April 2021].

SJCOG (San Joaquin Council of Governments). 2000. San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP). Stockton, California. November 14.

SJVAPCD (San Joaquin Valley Unified Air Pollution Control District). 2012. Air Quality Attainment Plans. Available at: http://valleyair.org/Air_Quality_Plans/air-quality-plans.htm [Accessed December 2021].

SJVAPCD. 2015. Final Draft Guidance for Assessing and Mitigating Air Quality Impacts.

SVP (Society for Vertebrate Paleontology). 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontological Resources. Society of Vertebrate Paleontology. http://vertpaleo.org/The-Society/Governance-Documents.aspx

State of California. 2021. California Tsunami Maps and Data. Produced by California Emergency Management Agency, California Geological Survey, and University of Southern California–Tsunami Research Center. Available at: https://www.conservation.ca.gov/cgs/tsunami/maps [Accessed May 2021].

Stillwater Sciences. 2015. Bacon Island Levee Rehabilitation Project: 2015 Biological Resources Evaluation for Stations 0+00 to 305+00 and 625+00 to 756+92. Technical Memorandum to MBK, February 2016.

Stillwater Sciences. 2016. Bacon Island Levee Maintenance Project (BN-12-1.0), pre-construction survey methods and results. Technical Memorandum to MBK, March 2016.

SWRCB (State Water Resources Control Board). 2012. 2012 integrated report (Clean Water Act Section 303(d) list/305(b) report) – Statewide. Online map viewer available at: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml?wbid=CAR5151000020000208113114 [Accessed May 2021].

Twedt, D. J. and R. D. Crawford. 1995. Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*). *In* A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Available at: http://bna.birds.cornell.edu/bna/species/192

Unruh, J. R. and C. S. Hitchcock. 2009. Characterization of potential seismic sources in the Sacramento-San Joaquin Delta, California. Prepared by Fugro William Lettis & Associates, Inc. Walnut Creek, CA for the U.S. Geological Survey, National Earthquake Hazards Reduction Program. Available at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/dd_jardins/DDJ-142_Unruh.pdf [Accessed March 2021].

USACE (U.S. Army Corps of Engineers). 1995. Delta levee maintenance. Memorandum for regulatory branch personnel by Art Champ, Chief of the Regulatory Branch, CESPK-CO-R.

USEIA (U. S. Energy Information Administration). 2021. Rankings: Total Energy Consumed per Capita, 2017 (million Btu). Available at: https://www.eia.gov/state/rankings/?sid=US [Accessed April 2021].

USFWS (U.S. Fish and Wildlife Service). 1996. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants.

USFWS. 1997. Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa,

Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California. Letter from USFWS to USACE on November 13, 1997.

USFWS. 1999. Draft recovery plan for the giant garter snake (*Thamnophis gigas*). U.S. Fish and Wildlife Service, Portland, Oregon.

USFWS. 2000. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants.

USFWS. 2017. Framework for assessing impacts to the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). U.S. Fish and Wildlife Service, Sacramento, California.

USFWS. 2021. Information for Planning and Consultation (IPaC): online project planning tool. https://ecos.fws.gov/ipac/ [Accessed March 2021].

USGS (United States Geological Survey). 1952a. Woodward Island. Topographic Quadrangle Map. Reston, Virginia. USGS Topoview available at: https://ngmdb.usgs.gov/maps/topoview/viewer.

USGS. 1952b. Bouldin Island. Topographic Quadrangle Map. Reston, Virginia. USGS Topoview available at: https://ngmdb.usgs.gov/maps/topoview/viewer.

USGS. 2013. Mineral resource data system: conterminous US. Online spatial database available at: http://mrdata.usgs.gov/mineral-resources/mrds-us.html [Accessed March 2021].

USGS. 2021. Stream gage data for USGS 11313460 San Joaquin River at Prisoners Point near Terminous, CA. Web interface available at: http://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=11313460 [Accessed May 2021].

Wagner, D. H. 1995. A rule of thumb for botanists: the 1 in 20 rule. Oregon Flora On-Line 1(3)

Wallace, W. J. 1978. Yokut. Pages 462–470 *in* Heizer, R. F., editor. California, Handbook of North American Indians vol. 8. Smithsonian Institution, Washington, D.C.

Whipple, A. A., R. M. Grossinger, D. Rankin, B. Stanford, and R. A. Askevold. 2012. Sacramento-San Joaquin Delta historical ecology investigation: exploring pattern and process. Prepared for the California Department of Fish and Game and Ecosystem Restoration Program. A report of SFEI-ASC's Historical Ecology Program, Publication #672, San Francisco Estuary Institute-Aquatic Science Center, Richmond, California. Available at: http://www.sfei.org/DeltaHEStudy [Accessed March 2021].

Yosef, R. 1996. Loggerhead shrike (*Lanius ludovicianus*). *In* A. Poole, editor. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. http://bna.birds.cornell.edu/bna/species/231

Zeiner, D. C., W. F. Laudenslayer Jr., K. E. Mayer, and M. White, editors. 1990a. California's wildlife. Volume II. Birds. California Statewide Habitat Relationships System. California Department of Fish and Game.

Zeiner, D. C., W. F. Laudenslayer Jr., K. E. Mayer, and M. White, editors. 1990b. California's wildlife. Volume III. Mammals. California Statewide Habitat Relationships System. California Department of Fish and Game.

Appendices

Appendix A

Road Construction Emissions Model Data Entry and Emissions Summary Sheets

Appendix B

Special-status Plant Species and Sensitive Natural Communities Documented in the Project Region

Table B-1. Database query results for special-status plant species documented in the Project Region.

Scientific name	Common name	Status (CRPR/CESA/FESA)	Query source	Blooming period	Elevation range (feet)	Habitat associations	Potential to occur in the Project Area
Amsinckia grandiflora	large-flowered fiddleneck	FE/CE/1B.1	–/–/USFWS	(March) April–May	886–1,804	Cismontane woodland and valley and foothill grassland	No; outside of elevation range
Androsace elongata subsp. *acuta*	California androsace	–/–/4.2	CNPS/–/–	March–June	490–4,280	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley foothill and grassland	No; outside of elevation range
Arctostaphylos manzanita subsp. *laevigata*	Contra Costa manzanita	–/–/1B.2	/CNDDB/–	January–March (April)	1,411–3,609	Rocky chaparral	No; suitable habitat not present and outside of elevation range
Astragalus tener var. *tener*	alkali milk-vetch	–/–/1B.2	CNPS/CNDDB/–	March–June	0–195	Alkaline areas of playas, adobe clay areas in valley and foothill grassland, and vernal pools	No; suitable habitat not present
Atriplex cordulata var. *cordulata*	heartscale	–/–/1B.2	CNPS/CNDDB/–	April–October	0–1,835	Saline or alkaline areas in chenopod scrub, meadows and seeps, and sandy areas in valley and foothill grassland	No; suitable habitat not present
Atriplex coronata var. *coronata*	crownscale	–/–/4.2	CNPS/–/–	March–October	0–1,935	Alkaline, often clay areas in chenopod scrub, valley and foothill grassland, and vernal pools	No; suitable habitat not present
Atriplex coronata var. *vallicola*	Lost Hills crownscale	–/–/1B.2	CNPS/–/–	April–September	160–2,085	Alkaline areas in chenopod scrub, valley and foothill grassland, and vernal pools	No; suitable habitat not present and outside of elevation range
Atriplex depressa	brittlescale	–/–/1B.2	CNPS/CNDDB/–	April–October	0–1,050	Alkaline and clay areas in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, and vernal pools	No; suitable habitat not present

Scientific name	Common name	Status (CRPR/CESA/FESA)	Query source	Blooming period	Elevation range (feet)	Habitat associations	Potential to occur in the Project Area
Atriplex minuscula	lesser saltscale	–/–/1B.1	CNPS/CNDDB/–	May–October	45–655	Alkaline, sandy areas in chenopod scrub, playas, and valley and foothill grassland	Yes; suitable habitat may be present
Blepharizonia plumosa	big tarplant	–/–/1B.1	CNPS/CNDDB/–	July–October	95–1,655	Usually, clay areas in valley and foothill grassland	No; suitable habitat not present
Brasenia schreberi	watershield	–/–/2B.3	CNPS/CNDDB/–	June–September	95–7,220	Freshwater marshes and swamps	Yes; suitable habitat may be present
Calochortus pulchellus	Mt. Diablo fairy-lantern	–/–/1B.2	CNPS/CNDDB/–	April–June	95–2,755	Chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland	Yes; suitable habitat may be present
Carex comosa	bristly sedge	–/–/2B.1	CNPS/CNDDB/–	May–September	0–2,050	Coastal prairie, lake margins of marshes and swamps, and valley and foothill grassland	Yes; suitable habitat may be present
Centromadia parryi subsp. *congdonii*	Congdon's tarplant	–/–/1B.1	CNPS/CNDDB/–	May–October (November)	0–755	Alkaline areas in valley and foothill grassland	No; suitable habitat not present
Centromadia parryi subsp. *rudis*	Parry's rough tarplant	–/–/4.2	CNPS/–/–	May–October	0–330	Alkaline or vernally mesic areas, seeps, or sometimes roadsides in valley and foothill grassland, and vernal pools	Yes; suitable habitat may be present
Chloropyron molle subsp. *molle*	soft bird's-beak	FE/CR/1B.2	CNPS/CNDDB/–	June–November	0–10	Coastal salt marshes and swamps	No; suitable habitat not present
Cicuta maculata var. *bolanderi*	Bolander's water-hemlock	–/–/2B.1	CNPS/CNDDB/–	July–September	0–655	Marshes and swamps, and coastal, fresh, or brackish water	Yes; suitable habitat may be present
Convolvulus simulans	small-flowered morning-glory	–/–/4.2	CNPS/–/–	March–July	95–2,430	Clay areas, serpentine seeps in openings in chaparral, coastal scrub, and valley and foothill grassland	No; suitable habitat not present

Scientific name	Common name	Status (CRPR/CESA/FESA)	Query source	Blooming period	Elevation range (feet)	Habitat associations	Potential to occur in the Project Area
Delphinium recurvatum	recurved larkspur	–/–/1B.2	CNPS/CNDDB/–	March–June	5–2,590	Alkaline areas of chenopod scrub, cismontane woodland, and valley and foothill grassland	No; suitable habitat not present
Eryngium racemosum	Delta button-celery	–/CE/1B.1	CNPS/CNDDB/–	June–October	5–100	Vernally mesic clay depressions in riparian scrub	No; suitable habitat not present
Eryngium spinosepalum	spiny-sepaled button-celery	–/–/1B.2	CNPS/CNDDB/–	April–June	260–3,200	Valley and foothill grassland, and vernal pools	No; outside of elevation range
Eschscholzia rhombipetala	diamond-petaled California poppy	–/–/1B.1	CNPS/CNDDB/–	March–April	0–3,200	Alkaline and clay areas in valley and foothill grassland	No; suitable habitat not present
Extriplex joaquinana	San Joaquin spearscale	–/–/1B.2	CNPS/CNDDB/–	April–October	0–2,740	Alkaline and clay areas in chenopod scrub, meadows and seeps, playas, and valley and foothill grassland	No; suitable habitat not present
Fritillaria agrestis	stinkbells	–/–/4.2	CNPS/CNDDB/–	March–June	30–5,100	Clay, and sometimes serpentine areas of chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland	No; suitable habitat not present
Helianthella castanea	Diablo helianthella	–/–/1B.2	CNPS/–/–	March–June	195–4,265	Usually rocky, axonal soils, and often in partial shade areas in broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland	No; suitable habitat not present and outside of elevation range
Hesperevax caulescens	hogwallow starfish	–/–/4.2	CNPS/–/–	March–June	0–1,655	Alkaline mesic and clay areas in valley and foothill grassland, and shallow vernal pools	No; suitable habitat not present

Scientific name	Common name	Status (CRPR/CESA/FESA)	Query source	Blooming period	Elevation range (feet)	Habitat associations	Potential to occur in the Project Area
Hesperolinon breweri	Brewer's western flax	–/–/1B.2	CNPS/CNDDB/–	May–July	95–3,100	Usually serpentine areas of chaparral, cismontane woodland, and valley and foothill grassland	No; suitable habitat not present
Hibiscus lasiocarpos var. *occidentalis*	woolly rose-mallow	–/–/1B.2	CNPS/CNDDB/–	June–September	0–395	Often in riprap on sides of levees of freshwater marshes and swamps	Yes; suitable habitat may be present
Juglans hindsii	northern California black walnut	CBR[2]/–/–	CNPS/–/–	April–May	0–1,445	Riparian forest and riparian woodland	No; although suitable habitat may be present, the CNDDB documented occurrence in the Project Region was extirpated and any other black walnuts in the area are likely of hybrid origin and thus not protected
Lasthenia conjugens	Contra Costa goldfields	FE/–/1B.1	CNPS/–/–	March–June	0–1,540	Mesic areas in cismontane woodland, alkaline playas, valley and foothill grassland, and vernal pools	No; suitable habitat not present
Lasthenia ferrisiae	Ferris' goldfields	–/–/4.2	CNPS/–/–	February–May	65–2,295	Alkaline and clay vernal pools	No; suitable habitat not present
Lathyrus jepsonii var. *jepsonii*	Delta tule pea	–/–/1B.2	CNPS/CNDDB/–	May–July (August–September)	0–15	Freshwater and brackish marshes and swamps	Yes; suitable habitat may be present
Lilaeopsis masonii	Mason's lilaeopsis	–/CR/1B.1	CNPS/CNDDB/–	April–November	0–35	Freshwater and brackish marshes and swamps and riparian scrub	Yes; suitable habitat may be present
Limosella australis	Delta mudwort	–/–/2B.1	CNPS/CNDDB/–	May–August	0–10	Freshwater and brackish marshes and swamps, and riparian scrub	Yes; suitable habitat may be present

Scientific name	Common name	Status (CRPR/CESA/FESA)	Query source	Blooming period	Elevation range (feet)	Habitat associations	Potential to occur in the Project Area
Myosurus minimus subsp. *apus*	little mousetail	–/–/3.1	CNPS/–/–	March–June	65–2,100	Valley and foothill grassland and alkaline vernal pools	Yes; suitable habitat may be present
Navarretia nigelliformis subsp. *nigelliformis*	adobe navarretia	–/–/4.2	CNPS/–/–	April–June	325–3,280	Clay and sometimes serpentine, vernally mesic valley and foothill grassland, and sometimes vernal pools	No; outside of elevation range
Navarretia nigelliformis subsp. *radians*	shining navarretia	–/–/1B.2	CNPS/CNDDB/–	(March) April–July	210–3,280	Sometimes clay areas in cismontane woodland, valley and foothill grassland, and vernal pools	No; outside of elevation range
Oenothera deltoides subsp. *howellii*	Antioch Dunes evening-primrose	FE/CE/1B.1	CNPS/CNDDB/–	March–September	0–100	Inland dunes	No; suitable habitat not present
Potamogeton zosteriformis	eel-grass pondweed	–/–/2B.2	CNPS/CNDDB/–	June–July	0–6,100	Assorted freshwater marshes and swamps	Yes; suitable habitat may be present
Puccinellia simplex	California alkali grass	–/–/1B.2	CNPS/CNDDB/–	March–May	5–3,050	Alkaline, vernally mesic; sinks, flats and lake margins of chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools	No; suitable habitat not present
Sagittaria sanfordii	Sanford's arrowhead	–/–/1B.2	CNPS/CNDDB/–	May–October (November)	0–2,135	Assorted freshwater marshes and swamps	Yes; suitable habitat may be present
Scutellaria galericulata	marsh skullcap	–/–/2B.2	CNPS/CNDDB/–	June–September	0–6,890	Lower montane coniferous forest, mesic meadows and seeps, and marshes and swamps	Yes; suitable habitat may be present
Scutellaria lateriflora	side-flowering skullcap	–/–/2B.2	CNPS/CNDDB/–	July–September	0–1,640	Mesic meadows and seeps and marshes and swamps	Yes; suitable habitat may be present
Senecio aphanactis	chaparral ragwort	–/–/2B.2	CNPS/CNDDB/–	January–April (May)	45–2,625	Sometimes alkaline areas in chaparral, cismontane woodland, and coastal scrub	No; suitable habitat not present
Spergularia macrotheca var. *longistyla*	long-styled sand-spurrey	–/–/1B.2	CNPS/CNDDB/–	February–May (June)	0–835	Alkaline meadows and seeps and marshes and swamps	Yes; suitable habitat may be present

Scientific name	Common name	Status (CRPR/CESA/FESA)	Query source	Blooming period	Elevation range (feet)	Habitat associations	Potential to occur in the Project Area
Symphyotrichum lentum	Suisun Marsh aster	–/–/1B.2	CNPS/CNDDB/–	(April) May–November	0–10	Brackish and freshwater marshes and swamps	Yes; suitable habitat may be present
Tropidocarpum capparideum	caper-fruited tropidocarpum	–/–/1B.1	CNPS/CNDDB/–	March–April	0–1,495	Alkaline hills in valley and foothill grassland	No; suitable habitat not present

[1] Status:

Federal

FE Federally listed as endangered
– No federal status

State

CE State listed endangered
CR State listed as rare
– No State status

California Rare Plant Rank (CRPR)

1B Plants rare, threatened, or endangered in California and elsewhere
2B Plants rare, threatened, or endangered in California, but more common elsewhere
3 More information needed about this plant, a review list
4 Plants of limited distribution, a watch list
0.1 Seriously threatened in California (high degree/immediacy of threat)
0.2 Fairly threatened in California (moderate degree/immediacy of threat)
0.3 Not very threatened in California (low degree/immediacy of threats or no current threats known)
CBR Considered but rejected

[2] The CRPR of northern California black walnut was changed from 1B.1 to CBR in 2019 based on data in Potter et al. (2018) indicating that genetically pure representatives of the species are common throughout California.

Table B-2. CNDDB query results for sensitive natural communities previously documented in the Project Region.

Natural community (Holland 1986)	Status[1]	Elevation range (feet)	Habitat description[2]	Potential to occur in the Project Area
Alkali Meadow	S2.1	0–7,000	On fine-textured, more or less permanently moist, alkaline soils	No; neither characteristic species nor hatitat present
Alkali Seep	S2.1	0–6,889	Temporarily exposed to permanently flooded alkali marshes	No; neither characteristic species nor habitat present
Cismontane Alkali Marsh	S1.1	0–1,000	Standing water or saturated alkaline soil	No; neither characteristic species nor habitat present
Coastal and Valley Freshwater Marsh	S2.1	0–6,889	Quiet sites (lacking significant current) permanently flooded by fresh water (rather than brackish, alkaline, or variable)	Yes; characteristic species occur adjacent to (but not within) the Project Area below MHW
Great Valley Oak Riparian Forest	S1.1	0–2,543	Restricted to the highest parts of floodplains, most distant from or higher above active river channels and therefore less subject to physical disturbance from flooding, but still receiving annual inputs of silty alluvium and subsurface irrigation	No; characteristic species not present
Northern Claypan Vernal Pool	S1.1	0–328	Fairly old, circum-neutral to alkaline, Si-cemented hardpan soils	No; neither characteristic species nor habitat present
Valley Needlegrass Grassland	S1.1	0–4,265	Usually on fine-textured (often clay) soils, moist or even waterlogged during winter, but very dry in summer	No; characteristic species not present
Valley Sink Scrub	S1.1	0–5,906	Heavy, saline and/or alkaline clays of lakebeds or playas	No; neither characteristic species nor habitat present

[1] **State ranks for sensitive natural communities**
S1 Fewer than six viable occurrences Statewide
S2 6–20 viable occurrences Statewide
0.1 Very threatened
[2] Source: Holland (1986) unless otherwise noted.
[3] Source: CNPS 2021.

Appendix C

Special-status Wildlife Species Documented in the Project Region

Table C-1. Special-status wildlife species documented in the Project Region.

Common name Scientific name	Query sources	Status[a] Federal/ State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Invertebrates					
Longhorn fairy shrimp *Branchinecta longiantenna*	CNDDB, USFWS	FE/–	Four known populations in San Luis Obispo, Merced, Alameda, and Contra Costa counties	Vernal pools; also found in sandstone rock outcrop pools, grass-bottomed pools, and claypan pools	None; no suitable habitat present
Vernal pool fairy shrimp *Branchinecta lynchi*	CNDDB, USFWS	FT/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County; isolated populations also in Riverside County	Vernal pools; also found in sandstone rock outcrop pools	None; no suitable habitat present
Vernal pool tadpole shrimp *Lepidurus packardi*	USFWS	FE/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	None; no suitable habitat present
Western bumble bee *Bombus occidentalis*	CNDDB	–/SCE	Throughout California and adjacent states, uncommon in southern portions of the state	Uses flowering plants in meadows and forested openings; abandoned rodent burrows are used for nest and hibernation sites for queens	None; no suitable habitat present
Crotch's bumble bee *Bombus crotchii*	CNDDB	–/SCE	Mediterranean region, Pacific Coast, Western Desert, Great Valley, and adjacent foothills through most of southwestern California	Inhabits open grassland and scrub habitats. Nests are often located underground in abandoned rodent burrows, or above ground in tufts of grass, rock piles, or tree cavities	None; no suitable habitat present
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	CNDDB, USFWS	FT/–	Streamside habitats throughout the Central Valley; below 915 m (3,000 ft)	Riparian and oak savanna habitats with host plant *Sambucus* sp. (blue elderberry)	None; no suitable elderberry habitat present
San Bruno elfin butterfly *Callophrys mossii bayensis*	USFWS	FE/–	Largest population on San Bruno Mountain in San Mateo County; smaller populations may occur in Contra Costa and Marin counties	Coastal scrub; host plant is Pacific stonecrop (*Sedum spathulifolium*)	None; no suitable habitat present, and outside of species' range

Common name Scientific name	Query sources	Status[a] Federal/ State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Amphibians					
California tiger salamander *Ambystoma californiense*	CNDDB, USFWS	FT/ST	Very fragmented; along the coast from Sonoma County to Santa Barbara County, in the Central Valley and Sierra foothills from Sacramento County to Tulare County	Grassland, oak savannah, or edges of woodland that provide subterranean refuge (typically mammal burrows); breeds in nearby temporary ponds, vernal pools, or slow-moving parts of streams	None; no suitable habitat present
Western spadefoot *Spea hammondii*	CNDDB	–/SSC	Near Redding, south throughout the Central Valley and nearby foothills; Coast Ranges south of Monterey Bay; and coastal southern California south of the Transverse Mountains and west of the Peninsular Mountains	Areas with sparse vegetation and/or short grasses in sandy or gravelly soils; primarily in washes, river floodplains, alluvial fans, playas, alkali flats, among grasslands, chaparral, or pine-oak woodlands; breeds in ephemeral rain pools with no predators	None; no suitable habitat present
California red-legged frog *Rana draytonii*	CNDDB, USFWS	FT/SSC	Largely restricted to coastal drainages on the central coast from Mendocino County to Baja California; in the Sierra foothills south to Tulare and possibly Kern counties	Breeds in still or slow-moving water with emergent and overhanging vegetation, including wetlands, wet meadows, ponds, lakes, and low-gradient, slow moving stream reaches with permanent pools; uses adjacent uplands for dispersal and summer retreat	None; no suitable habitat present, and outside of species' range

Common name Scientific name	Query sources	Status[a] Federal/ State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Reptiles					
Western pond turtle *Actinemys marmorata*	CNDDB	–/SSC	From the Oregon border along the coast ranges to the Mexican border, and west of the crest of the Cascades and Sierras	Permanent, slow-moving fresh or brackish water with available basking sites and adjacent open habitats or forest for nesting	High; suitable aquatic and upland nesting habitat in Project vicinity; species documented on Bacon Island, and in the surrounding water (Stillwater Sciences 2016, CDFW 2021b)
Blainville's horned lizard *Phrynosoma blainvillii*	CNDDB	–/SSC	West of deserts and Cascade-Sierran highlands, as far north as Shasta Reservoir	Open areas with sandy soil and/or patches of loose soil and low/scattered vegetation in scrublands, grasslands, conifer forests, and woodlands; frequently found near ant hills	None; no suitable habitat present
California legless lizard *Anniella pulchra*	CNDDB	–/SSC	Northern Contra Costa County south to northwestern Baja California; scattered occurrences in San Joaquin Valley, along the southern Sierra Nevada mountains, and in the western Mojave Desert	Sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces; warm, moist, loose soil for burrowing	None; no suitable habitat present
San Joaquin coachwhip *Masticophis flagellum ruddocki*	CNDDB	–/SSC	From the Sacramento Valley (Colusa County) south to San Joaquin Valley (Kern County) and west into the South Coast Ranges; an isolated population in the Sutter Buttes	Open, dry, treeless areas, including grassland and saltbush scrub; uses rodent burrows, shaded vegetation, and surface objects as refuge	None; outside of species' range
Alameda whipsnake *Masticophis lateralis euryxanthus*	CNDDB	FT/ST	Inner coast range, mostly Contra Costa and Alameda counties; additional records in San Joaquin and Santa Clara counties	Chaparral (northern coastal sage scrub and coastal sage) and rocky outcrops; may venture into adjacent habitats including grassland, oak savanna, and woodlands	None; outside of species' range

Common name Scientific name	Query sources	Status[a] Federal/ State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Giant garter snake *Thamnophis gigas*	CNDDB, USFWS	FT/ST	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low- gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	Low; marginally suitable habitat present and no known nearby populations
Birds					
White-tailed kite *Elanus leucurus*	CNDDB	–/SFP	Year-round resident; found in nearly all lowlands of California west of the Sierra Nevada mountains and the southeast deserts	Lowland grasslands and wetlands with open areas; nests in trees near open foraging area	High; may forage or nest in the Project vicinity; documented observation from 2021 on Bacon Island (eBird 2021)
Northern harrier *Circus cyaneus*	CNDDB, Stillwater Sciences Site Visit	–/SSC	Year-round resident; scattered throughout California; in the northwest, nests largely within coastal lowlands from Del Norte County south to Bodega Head in Sonoma County, inland to Napa County	Nests, forages, and roosts in wetlands or along rivers or lakes, but also in grasslands, meadows, or grain fields	High; may forage or nest in the project vicinity; observed foraging on Bacon Island (Stillwater Sciences 2016, eBird 2021)

Common name Scientific name	Query sources	Status[a] Federal/ State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Swainson's hawk *Buteo swainsoni*	CNDDB, Stillwater Sciences Site Visit	–/ST	Summer resident; breeds in lower Sacramento and San Joaquin valleys, the Klamath Basin, and Butte Valley; highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	High; documented observation in 2021 of species foraging in agricultural field on Bacon Island (eBird 2021); Nests have been documented within 0.5 miles of the Project Area (along Connection Slough, Mildred Island, and along Middle River) (CDFW 2021b)
Golden eagle *Aquila chrysaetos*	CNDDB	BGEPA/ SFP	Uncommon permanent resident and migrant throughout California, except center of Central Valley	Open woodlands and oak savannahs, grasslands, chaparral, sagebrush flats; nests on steep cliffs or medium to tall trees	Low (foraging only); marginally suitable foraging habitat present
American peregrine falcon *Falco peregrinus anatum*	CNDDB	FD/SD, SFP	Most of California during migrations and in winter; nests primarily in the Coast Ranges, northern Sierra Nevada Mountains, and other mountainous areas of northern California	Wetlands, woodlands, cities, agricultural lands, and coastal area with cliffs (and rarely broken-top, predominant trees) for nesting; often forages near water	Low (foraging only); marginally suitable foraging habitat present
California black rail *Laterallus jamaicensis coturniculus*	CNDDB	–/ST, SFP	Northern San Francisco Bay area (primarily San Pablo and Suisun bays) and Sacramento-San Joaquin Delta	Large tidally influenced marshes with saline to brackish water, typically with a high proportion of pickleweed (*Salicornia virginica*); also can be associated with bulrush (*Schoenoplectus* spp.), cattail (*Typha* spp.), or rushes (*Juncus* spp.); peripheral vegetation at and above mean high higher water necessary to protect nesting birds during extremely high tides	Moderate; may nest in nearby marsh habitats outside of the Project Area; multiple observations documented in 2010 of species utilizing in-channel islands surrounding Bacon Island in Connection Slough, Old River, and Middle River (CDFW 2021b)

Common name Scientific name	Query sources	Status[a] Federal/ State	Distribution in California	Habitat association	Likelihood to occur in Project Area
California Ridgway's rail *Rallus obsoletus obsoletus*	USFWS	FE/SE, SFP	Predominantly in the marshes of the San Francisco estuary: South San Francisco Bay, North San Francisco Bay, San Pablo Bay, and sporadically throughout the Suisun Marsh area east to Browns Island	Salt and brackish water marshes, typically dominated by pickleweed (*Salicornia virginica*) and Pacific cordgrass (*Spartina foliosa*)	None; outside of the species' range
Greater sandhill crane/ Lesser sandhill crane *Grus canadensis tabida/ Grus canadensis*	Stillwater Sciences 2015	–/ST, SFP (Greater), SSC (Lesser)	Winter visitor and migrant; scattered locations in the Central Valley; Greaters breed in extreme northeastern California	Forages in freshwater marshes and grasslands as well as harvested rice fields, corn stubble, barley, and newly planted grain fields	High (foraging only); species observed foraging in agricultural fields on Bacon Island in winter (Stillwater Sciences 2015, eBird 2021)
Western burrowing owl *Athene cunicularia hypugaea*	CNDDB	–/SSC	Year-round resident throughout much of the state; Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast	Level, open, dry, heavily grazed or low- stature grassland or desert vegetation with available burrows	Low; marginally suitable habitat present, no suitable burrows currently identified in Project Area; documented occurrences in the winter of 2019 in Holland Tract, approximately 1 mile from the Project Area (eBird 2021)
Loggerhead shrike *Lanius ludovicianus*	CNDDB, Stillwater Sciences Site Visit	–/SSC	Year-round resident in most of California except for the forested coastal slope and the high elevations of the Sierra Nevada, southern Cascade, and Transverse Ranges	Open shrubland or woodlands with short vegetation and and/or bare ground for hunting; some tall shrubs, trees, fences, or power lines for perching; typically nest in isolated trees or large shrubs	Moderate; may forage or nest in Project vicinity; species observed on Bacon Island in 2021 by a Stillwater biologist during a botanical survey; observations documented in 2013 and 2016 on Bacon Island (eBird 2021)

Common name Scientific name	Query sources	Status[a] Federal/ State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Bank swallow *Riparia riparia*	CNDDB	–/ST	Summer resident; occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American rivers; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou counties; small populations near the coast from San Francisco County to Monterey County	Nests in vertical bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam	Low (foraging only); no suitable nesting habitat in Project Area; observations documented in 2020 near Rock Slough (eBird 2021)
Grasshopper sparrow *Ammodramus savannarum*	CNDDB	–/SSC	Summer resident; nests in Mendocino, Trinity, and Tehama counties south, west of the Cascade–Sierra Nevada axis and southeastern deserts, to San Diego County	Typically found in moderately open grasslands with scattered shrubs	None; no suitable habitat present, and outside of species' range
Song sparrow ("Modesto" population) *Melospiza melodia*	CNDDB	–/SSC	Year-round resident; north-central portion of the Central Valley	Emergent freshwater marshes, riparian willow thickets, and riparian forests	Moderate; may nest in Project vicinity
Tricolored blackbird *Agelaius tricolor*	CNDDB	–/ST, SSC	Permanent resident, but makes extensive migrations both in breeding season and winter; common locally throughout Central Valley and in coastal areas from Sonoma County south	Feeds in grasslands and agriculture fields; nesting habitat components include open accessible water, a protected nesting substrate (including flooded or thorny vegetation), and a suitable nearby foraging space with adequate insect prey	Moderate; may nest or forage in Project vicinity

Common name Scientific name	Query sources	Status[a] Federal/ State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	Stillwater Sciences Site Visit	–/SSC	Primarily a migrant and summer resident, though small numbers remain in winter; Central Valley, northeastern California, central and southern coasts, and southern deserts	Breeds almost entirely in open marshes with relatively deep water and tall emergent vegetation, such as bulrush (*Schoenoplectus* spp.) or cattails (*Typha* spp.); nests are typically in moderately dense vegetation; forage within wetlands and surrounding grasslands and croplands	High; observation on Bacon Island during Stillwater Sciences site visit in March 2021
Mammals					
Riparian brush rabbit *Sylvilagus bachmani riparius*	CNDDB	FE/SE	Single, known extant population restricted to the Stanislaus River in Caswell Memorial State Park	Brushy understory of valley riparian forests	None; outside species' range
Western red bat *Lasiurus blossevillii*	CNDDB	–/SSC	Near the Pacific Coast, Central Valley, and the Sierra Nevada	Riparian forests, woodlands near streams, fields and orchards	Low; no suitable riparian habitat in the Project Area
San Joaquin kit fox *Vulpes macrotis mutica*	CNDDB, USFWS	FE/ST	San Joaquin Valley floor and surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi mountains	Annual grasslands or open areas dominated by scattered brush, shrubs, and scrub	None; no suitable habitat present
American badger *Taxidea taxus*	CNDDB	–/SSC	Throughout the state except in the humid coastal forests of Del Norte County and the northwest portion of Humboldt County	Shrubland, open grasslands, fields, and alpine meadows with friable soils	None; no suitable habitat present

[a] Status codes:

Federal
FE = Listed as endangered under the federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act
FPT = Federally proposed as threatened
FD = Federally delisted
BGEPA = Federally protected under the Bald and Golden Eagle Protection Act

State
SE = Listed as Endangered under the California Endangered Species Act
ST = Listed as Threatened under the California Endangered Species Act
SCE = State Candidate Endangered
SD = State Delisted
SSC = CDFW Species of Special Concern
SFP = CDFW Fully Protected species

Appendix D

Comprehensive List of Plant Species Documented in the Project Area in 2021

Table D-1. Comprehensive list of plant species documented in the Bacon Island Levee Rehabilitation Project Area in 2021.

Scientific name	Common name	Family	Nativity status	Cal-IPC rating[1]
Atriplex prostrata	fat-hen	Chenopodiaceae	Naturalized	–
Abutilon theophrasti	velvet-leaf	Malvaceae	Naturalized	–
Amaranthus albus	tumbleweed	Amaranthaceae	Naturalized	–
Amaranthus retroflexus	redroot pigweed	Amaranthaceae	Naturalized	–
Anthriscus caucalis	bur-chervil	Apiaceae	Naturalized	–
Apocynum cannabinum	hemp dogbane	Apocynaceae	Native	–
Asclepias cordifolia	purple milkweed	Apocynaceae	Native	–
Athyrium filix-femina var. cyclosorum	subarctic ladyfern	Athyriaceae	Native	–
Atriplex semibaccata	Australian saltbush	Chenopodiaceae	Naturalized	Moderate
Avena barbata	slender wild oat	Poaceae	Naturalized	Moderate
Avena fatua	wild oat	Poaceae	Naturalized	Moderate
Bidens frondosa	sticktight	Asteraceae	Native	–
Brassica rapa	field mustard	Brassicaceae	Naturalized	Limited
Bromus diandrus	ripgut grass	Poaceae	Naturalized	Moderate
Bromus hordeaceus	soft chess	Poaceae	Naturalized	Limited
Bromus madritensis	Madrid brome	Poaceae	Naturalized	–
Calystegia sepium subsp. limnophila	hedge false bindweed	Convolvulaceae	Native	–
Capsella bursa-pastoris	shepherd's purse	Brassicaceae	Naturalized	–
Carduus pycnocephalus subsp. pycnocephalus	Italian thistle	Asteraceae	Naturalized	Moderate
Centromadia pungens subsp. pungens	common spikeweed	Asteraceae	Native	–
Cephalanthus occidentalis	California button willow	Rubiaceae	Native	–
Chenopodium album	lamb's quarters	Chenopodiaceae	Naturalized	–
Cirsium vulgare	bull thistle	Asteraceae	Naturalized	Moderate
Citrullus lanatus var. citroides	wild watermelon	Cucurbitaceae	Naturalized	–
Conium maculatum	poison hemlock	Apiaceae	Naturalized	Moderate
Convolvulus arvensis	bindweed	Convolvulaceae	Naturalized	–
Cornus sericea	American dogwood	Cornaceae	Native	–
Cotula coronopifolia	brass-buttons	Asteraceae	Naturalized	Limited
Crypsis schoenoides	swamp prickle grass	Poaceae	Naturalized	–
Cuscuta campestris	field dodder	Convolvulaceae	Native	–
Cynodon dactylon	Bermuda grass	Poaceae	Naturalized	Moderate
Cyperus eragrostis	tall flatsedge	Cyperaceae	Native	–
Cyperus erythrorhizos	redroot flatsedge	Cyperaceae	Native	–
Cyperus esculentus	yellow nutsedge	Cyperaceae	Native	–
Cyperus odoratus	fragrant flatsedge	Cyperaceae	Native	–
Datura stramonium	jimsonweed	Solanaceae	Naturalized	–

Scientific name	Common name	Family	Nativity status	Cal-IPC rating[1]
Dysphania ambrosioides	Mexican tea	Chenopodiaceae	Naturalized	–
Echinochloa crus-pavonis var. *crus-pavonis*	Gulf cockspur grass	Poaceae	Naturalized	–
Eichhornia crassipes	common water hyacinth	Pontederiaceae	Naturalized	High
Elymus triticoides	beardless wild rye	Poaceae	Native	–
Epilobium brachycarpum	tall annual willowherb	Onagraceae	Native	–
Epilobium ciliatum	fringed willowherb	Onagraceae	Native	–
Equisetum ×ferrissii	Ferriss' horsetail	Equisetaceae	Native	–
Erigeron bonariensis	flax-leaved horseweed	Asteraceae	Naturalized	–
Erigeron canadensis	horseweed	Asteraceae	Native	–
Erodium moschatum	greenstem filaree	Geraniaceae	Naturalized	–
Eucalyptus globulus	blue gum	Myrtaceae	Naturalized	Limited
Euphorbia serpyllifolia subsp. *serpyllifolia*	thyme leafed spurge	Euphorbiaceae	Native	–
Festuca microstachys	desert fescue	Poaceae	Native	–
Festuca perennis	rye grass	Poaceae	Naturalized	Moderate
Ficus carica	edible fig	Moraceae	Naturalized	Moderate
Galium aparine	goose grass	Rubiaceae	Native	–
Helianthus annuus	common sunflower	Asteraceae	Native	–
Heliotropium curassavicum var. *oculatum*	alkali heliotrope	Boraginaceae	Native	–
Hirschfeldia incana	shortpod mustard	Brassicaceae	Naturalized	Moderate
Hordeum brachyantherum	meadow barley	Poaceae	Native	–
Iris pseudacorus	pale yellow iris	Iridaceae	Naturalized	Limited
Juglans hindsii	northern California black walnut	Juglandaceae	Native	–
Juncus bufonius var. *bufonius*	toad rush	Juncaceae	Native	–
Lactuca serriola	prickly lettuce	Asteraceae	Naturalized	–
Lamium amplexicaule	henbit	Lamiaceae	Naturalized	–
Lemna minor	common duckweed	Araceae	Native	–
Lepidium didymum	lesser swine cress	Brassicaceae	Naturalized	–
Lepidium latifolium	perennial pepperweed	Brassicaceae	Naturalized	High
Leptochloa fusca subsp. *uninervia*	Mexican sprangletop	Poaceae	Native	–
Ludwigia hexapetala	Uruguayan primrose-willow	Onagraceae	Naturalized	High
Malva nicaeensis	bull mallow	Malvaceae	Naturalized	–
Malvella leprosa	alkali-mallow, white-weed	Malvaceae	Native	–
Medicago sativa	alfalfa	Fabaceae	Naturalized	–
Mentha canadensis	American cornmint	Lamiaceae	Native	–
Paspalum urvillei	Vasey's grass	Poaceae	Naturalized	Watch
Persicaria lapathifolia	willow weed	Polygonaceae	Native	–

Scientific name	Common name	Family	Nativity status	Cal-IPC rating[1]
Persicaria maculosa	lady's thumb	Polygonaceae	Naturalized	–
Phalaris minor	little-seeded canary grass	Poaceae	Naturalized	–
Phragmites australis	common reed	Poaceae	Native	–
Poa annua	annual blue grass	Poaceae	Naturalized	–
Polygonum aviculare	knotweed, knotgrass	Polygonaceae	Naturalized	–
Polypogon monspeliensis	rabbitfoot grass	Poaceae	Naturalized	Limited
Populus fremontii subsp. *fremontii*	Fremont cottonwood	Salicaceae	Native	–
Portulaca oleracea	purslane	Portulacaceae	Naturalized	–
Potentilla anserina	silverweed cinquefoil	Rosaceae	Native	–
Pseudognaphalium luteoalbum	jersey cudweed	Asteraceae	Naturalized	–
Pseudognaphalium stramineum	cottonbatting plant	Asteraceae	Native	–
Raphanus sativus	radish	Brassicaceae	Naturalized	Limited
Rorippa curvisiliqua	curvepod yellowcress	Brassicaceae	Native	–
Rorippa palustris subsp. *palustris*	western bog yellowcress	Brassicaceae	Native	–
Rosa californica	California rose	Rosaceae	Native	–
Rubus armeniacus	Himalayan blackberry	Rosaceae	Naturalized	High
Rubus ursinus	California blackberry	Rosaceae	Native	–
Rumex occidentalis	western dock	Polygonaceae	Native	–
Ruppia maritima	widgeongrass	Ruppiaceae	Native	–
Salix exigua	narrowleaf willow	Salicaceae	Native	–
Salix gooddingii	Goodding's black willow	Salicaceae	Native	–
Salix lasiolepis	arroyo willow	Salicaceae	Native	–
Schoenoplectus californicus	southern bulrush	Cyperaceae	Native	–
Senecio vulgaris	common groundsel	Asteraceae	Naturalized	–
Sesuvium verrucosum	western sea-purslane	Aizoaceae	Native	–
Setaria parviflora	knotroot bristle grass	Poaceae	Native	–
Silybum marianum	blessed milkthistle	Asteraceae	Naturalized	Limited
Solanum americanum	American black nightshade	Solanaceae	Native	–
Sonchus asper subsp. *asper*	prickly sow thistle	Asteraceae	Naturalized	–
Sonchus oleraceus	common sow thistle	Asteraceae	Naturalized	–
Sorghum halepense	Johnson grass	Poaceae	Naturalized	–
Spergula arvensis	stickwort, starwort	Caryophyllaceae	Naturalized	–
Spergularia marina	saltmarsh sand-spurrey	Caryophyllaceae	Native	–
Stipa pulchra	purple needle grass	Poaceae	Native	–
Symphyotrichum subulatum var. *parviflorum*	annual saltmarsh aster	Asteraceae	Native	–
Tribulus terrestris	puncturevine	Zygophyllaceae	Naturalized	Limited

Scientific name	Common name	Family	Nativity status	Cal-IPC rating[1]
Typha angustifolia	narrow-leaved cattail	Typhaceae	Native or naturalized	–
Typha latifolia	broad-leaved cattail	Typhaceae	Native	–
Urtica dioica	stinging nettle	Urticaceae	Native	–
Urtica urens	dwarf nettle	Urticaceae	Naturalized	–
Verbena litoralis	seashore vervain	Verbenaceae	Naturalized	–
Xanthium strumarium	cocklebur	Asteraceae	Native	–