

**FINAL**

# **Mitigation Monitoring and Reporting Program for the California WaterFix**

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# Acronyms and Abbreviations

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AASHTO	Association of State Highway and Transportation Officials
ALSPs	Agricultural Lands Stewardship Plans
AMM	avoidance and minimization measures
APE	Areas of Potential Effect
AQMP	Air Quality Mitigation Plan
ARB	Air Resources Board
ATS	Active Treatment Systems
BAAQMD	Bay Area Air Quality Management District
BCDC	Bay Conservation and Development Commission
BETP	built environment treatment plan
BLM	Bureau of Land Management
BMP	Best Management Practice
BPBG	Baseline Plus Background Growth Plus Project
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CDEC	California Data Exchange Center
CDFW	California Department of Fish Wildlife
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CEQ	Council of Environmental Quality
CEQA	California Environmental Quality Act
CFLs	compact florescent lamps
CGP	Construction General Permit
CNG	compressed natural gas
CO-CAT	California Climate Action Team
CSMP	Construction Site Monitoring Program
CTR	California Toxics Rule
CVFPB	Central Valley Flood Protection Board
CWA	Clean Water Act
DMD	Dredge Material Disposal
DMMO	Dredged Material Management Office
DPR	Department of Parks and Recreation
DWR	California Department of Water Resources
EC	environmental commitments
EIRs	Environmental Impact Reports
EMF	electric and magnetic field
EMP	Environmental Monitoring Program
EPA	U.S. Environmental Protection Agency
FEIR/FEIS	Final Environmental Impact Report/Environmental Impact Statement
FR	Federal Register

HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscape Survey
HDLEVIP	Heavy-Duty Low-Emission Vehicle Incentive Program
HMMP	hazardous materials management plan
HRA	health risk assessment
HSR	Historic Structures Reports
IEP	Interagency Ecological Program
IRI	International Roughness Index
ITS	Intelligent Transportation System
LED	Light Emitting Diodes
LID	low impact development
LTMS	Long Term Management Strategy
MCLs	maximum contaminant levels
MLD	most likely descendent
MMPs	mitigation and monitoring plans
MMRP	Mitigation Monitoring and Reporting Program
MNDs	Mitigated Negative Declarations
MSDS	Material Safety Data Sheets
MVCDs	Mosquito and Vector Control Districts
NAHC	Native American Heritage Commission
NALs	Numeric Action Levels
NEL	numeric effluent limitation
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
NTUs	nephelometric turbidity units
OSPR	Office of Spill Prevention and Response
PCI	Pavement Condition Index
PIC	Person in Charge
PRMMP	Paleontological Resources Monitoring and Mitigation Plan
PRS	paleontological resources specialist
QA/QC	quality assurance/quality control
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
Reclamation	U.S. Bureau of Reclamation
RIM	Regional Implementation Manual
ROAs	Restoration Opportunity Areas
ROD	Record of Decision
RTM	Reusable Tunnel Material
RWD	Report of Waste Discharge
Regional Water Board	Regional Water Quality Control Board
SAP	sampling and analysis plan
SCM	supplementary cementitious materials

SFNA	Sacramento Federal Nonattainment Area
San Francisco Bay Water Board	San Francisco Regional Water Quality Control Board
SIP	state implementation plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARTS	Stormwater Multiple Application and Report Tracking System
SPCCPs	Spill Prevention, Containment, and Countermeasure Plans
SQC	Sediment Quality Criteria
SVP	Society of Vertebrate Paleontology
SWAMP	Surface Water Ambient Monitoring Program
SWPPP	Storm Water Pollution Prevention Plan
State Water Board	State Water Resources Control Board
TBM	tunnel boring machine
TDM	Transportation Demand Management
TMC	Transportation Management Center
TMP	Traffic Management Plan
TMT	Traffic Management Team
tpd	one ton per day
USACE	U.S. Army Corps of Engineers
USDA	US Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDR	Waste Discharge Requirements
WQBELs	Water Quality Based Effluent Limits
YSAQMD	Yolo Solano Air Quality Management District

## 1.1 Purpose and Objective

The California Environmental Quality Act (CEQA) requires that agencies approving projects after certifying Final Environmental Impact Reports (EIRs) or adopting Mitigated Negative Declarations (MNDs) must take affirmative steps to determine that all approved mitigation measures are implemented subsequent to project approval.

Effective January 1, 1989, CEQA was amended to add Public Resources Code Section 21081.6. As part of CEQA (state-mandated) environmental review procedures, Section 21081.6 requires a public agency, in approving a project for which mitigation measures have been proposed, to adopt a mitigation monitoring and reporting program as a mechanism for ensuring compliance with all adopted mitigation measures during the implementation of the project. Specifically, the lead or responsible agency must adopt a reporting or monitoring program for mitigation measures incorporated into a project or imposed as conditions of approval. As stated in Public Resources Code, Section 21081.6 (a) (1):

“The public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation. For those changes which have been required or incorporated into the project at the request of a responsible agency or a public agency having jurisdiction by law over natural resources affected by the project, that agency shall, if so requested by the lead agency or a responsible agency, prepare and submit a proposed reporting or monitoring program.”

This Mitigation Monitoring and Reporting Program (MMRP) has been prepared by the California Department of Water Resources (DWR) pursuant to CEQA for the California WaterFix project (the Project), which has been analyzed as Alternative 4A in the Bay Delta Conservation Plan/California WaterFix Final Environmental Impact Report/Environmental Impact Statement (Final EIR/EIS). Consistent with the procedures contemplated by CEQA, DWR will adopt this MMRP at the time it takes action on the Project or on one of the alternatives addressed in the Final EIR/EIS. Specifically, DWR would adopt the final MMRP at the time it adopts “CEQA Findings” pursuant to Public Resources Code section 210181[a] and CEQA Guidelines section 15091[a] (See Cal. Pub. Resources Code, § 21081.6[a]).

Under the NEPA regulations adopted by the Council on Environmental Quality (CEQ), the U.S. Bureau of Reclamation (Reclamation) must identify in its Record of Decision (ROD) mitigation measures that are adopted as part of its proposed action, and must adopt a “monitoring and enforcement program” for such adopted mitigation measures. (40 C.F.R. § 1505.2[c].) The CEQ also recommends federal agencies conduct monitoring to confirm impacts, ensure the effectiveness of mitigation measures, and adapt projects to account for uncertainties in impact predictions (Council on Environmental Quality 1997). Reclamation has indicated that it intends to use this MMRP to support the monitoring and reporting program required in its ROD.

Although neither Public Resources Code section 21081.6[a] nor CEQA Guidelines section 15097, which adds details to the statutory MMRP requirement, expressly requires that MMRPs include

anything other than formal adopted “mitigation measures,” this MMRP includes more. Not only does this MMRP include all of the mitigation measures formulated for the California WaterFix through the above-mentioned Final EIR/EIS, but it also includes project features called “environmental commitments” (ECs) and “avoidance and minimization measures” (AMMs), which, like formal mitigation measures, have the effect of reducing the severity of environmental effects that otherwise might be significant. DWR has chosen to include the ECs and AMMs herein in order to provide to the public, through a transparent and legally enforceable mechanism, assurances that all such ECs and AMMs will be fully carried out. For each mitigation measure, EC and AMM, this MMRP presents the following information:

- **Action.** Includes the text of the mitigation measure, environmental commitment or avoidance and minimization measure as it appears in the FEIR/FEIS;
- **Responsible Parties.** Includes the parties responsible for implementing the action;
- **Location and Timing.** Describes where the action would be implemented and in what time frame implementation would occur; and
- **Reporting Requirements.** Includes any reporting required by an action.

For each mitigation measure, EC, or AMM a table summarizing the action, responsible party, implementation timing, and applicable impacts presented in the FEIR/FEIS is provided followed by a detailed description of the action and action implementation.

## 2.1 Mitigation Measure SW-4: Implement Measures to Reduce Runoff and Sedimentation

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 6, Surface Water			
SW-4: Implement Measures to Reduce Runoff and Sedimentation	DWR and Construction Contractors	Prior to, during, and after construction	Impact SW-4, SW-5, SW-6, SW-9, TRANS-14, TRANS-15, TRANS-17

**Action:** DWR will have to demonstrate no-net-increase in runoff due to construction activities during peak flows. To achieve this, proponents will implement measures to prevent an increase in runoff volume and rate from land-side construction areas and to prevent an increase in sedimentation in the runoff from the construction area as compared to Existing Conditions. To reduce the potential for adverse impacts from large amounts of runoff from paved and impervious surfaces during construction, operations, or maintenance, the proponents will design and implement onsite drainage systems in areas where construction drainage is required. Drainage studies will be prepared for each construction location to assess the need for, and to finalize, other drainage-related design measures, such as a new onsite drainage system or new cross drainage facilities. Based on study findings, if it is determined that onsite stormwater detention storage is required, detention facilities will be located within the existing construction area.

To avoid changes in the courses of waterbodies, DWR will design measures to prevent a net increase in sediment discharge or accumulation in water-bodies compared to Existing Conditions to avoid substantially affecting river hydraulics during peak conditions. A detailed sediment transport study for all water-based facilities will be conducted and a sediment management plan will be prepared and implemented during construction. The sediment management plan will include periodic and long-term sediment removal actions.

Prior to use of existing stormwater channels, drainage ditches, or irrigation canals for conveyance of dewatering flows, a hydraulic analysis of the existing channels will be completed to determine available capacity for conveyance of anticipated dewatering flows. If the conveyance capacity is not adequate, new conveyance facilities or methods for discharge into the groundwater will be developed. In accordance with National Pollutant Discharge Elimination System (NPDES) requirements and requirements of the Stormwater Pollution Prevention Plan (SWPPP), water quality analyses of the dewatering flows will be conducted to avoid water quality contamination.

As described in Section 3.6.1.1, *North Delta Intakes*, facilities to be constructed along the levees would be designed to provide flood neutrality during construction and operations. Facilities located along the levees, including cofferdams at the intake locations, would be designed to provide continued flood management at the same level of flood protection as the existing levees; or if applicable, to a higher standard for flood management engineering and permitting requirements if

the standards are greater than the existing levee design. New facilities would be designed to withstand the applicable flood management standards through construction of flood protection embankments or construction on engineered fill to raise the facilities to an elevation above the design flood elevation for that specific location. The levee design criteria would consider the most recent criteria, including new guidelines for urban and rural levees (DWR 2013, 2014).

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** State Water Resource Control Board (State Water Board) regulations will be followed to prevent violation of water quality and NPDES standards and SWPPP requirements.

**Location:** To reduce the potential for adverse impacts from large amounts of runoff from paved and impervious surfaces during construction, operations, or maintenance, DWR will design and implement onsite drainage systems in areas where construction drainage is required.

**Timing:** A detailed sediment transport study for all water-based facilities will be conducted prior to construction and a sediment management plan will be prepared and implemented during construction. Prior to use of existing stormwater channels, drainage ditches, or irrigation canals for conveyance of dewatering flows, a hydraulic analysis of the existing channels will be completed to determine available capacity for conveyance of anticipated dewatering flows.

**Monitoring:** DWR will oversee development and implementation of the sediment management plan and will conduct monitoring required as identified within the plan. The plan shall include specific information and strategies regarding exactly how DWR will meet the “no-net-increase” standard. Monitoring shall continue until DWR has determined that the “no-net-increase” standard has been met and can continue to be met without further monitoring.

DWR will oversee development of design of facilities to be constructed along the levees to ensure designs provide flood neutrality during construction and operations. Monitoring and reporting requirements will be determined on a site-by-site basis within each sediment management plan, NPDES, and SWPPP.

**Reporting Requirements:** DWR will adhere to reporting requirements as outlined in the SWPPP and NPDES.

## 2.2 Mitigation Measure SW-7: Implement Measures to Reduce Flood Damage

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 6, Surface Water			
SW-7: Implement Measures to Reduce Flood Damage	DWR and Construction Contractors	Prior to and during construction	Impact SW-7

**Action:** Determination of design flood elevation will consider the effects of sea level rise for the lifetime of the project, as determined by the US Army Corps of Engineers (USACE), Central Valley Flood Protection Board (CVFPB), and DWR. A 200-year level of flood protection will be provided for



all applicable new facilities. For levee modifications, the level of flood protection will be the same as required for the modified levee without the new facilities.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** Determination of design flood elevation will consider the effects of sea level rise for the lifetime of the project, as determined by USACE, CVFPB, and DWR.

**Location:** Design and implementation will be carried out at all applicable new facilities.

**Timing:** This mitigation measure will be implemented before construction during the design phase and during construction when facilities will be built.

**Monitoring:** DWR will monitor the development of all applicable designs to ensure application of design for appropriate level of flood protection. DWR will monitor the development of designs for levee modifications to ensure that level of flood protection will be the same as required for the modified levee without the new facilities. All project designs will be reviewed for compliance with this standard throughout conception and before finalization by DWR, CVFPB, and USACE, and will be approved only if compliant with this mitigation measure.

**Reporting Requirements:** In the event the developed designs do not meet the 200-year level of flood protection DWR's monitor will report this to DWR program managers for resolution.

## Mitigation Measure SW-8: Implement Measures to Address Potential Wind Fetch Issues

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 6, Surface Water			
SW-8: Implement Measures to Address Potential Wind Fetch Issues	DWR and Construction Contractors	Prior to and during construction	Impact SW-8

**Action:** Measures will be implemented to prevent an increase in potential damage from wind-driven waves across expanded open water areas at habitat restoration locations. These measures will be designed based upon wind fetch studies that will be completed prior to construction of habitat restoration areas with increased open water in the Delta. To reduce the potential for adverse impacts from the increased open water areas during wind events, levees that would be subject to increased wind-driven waves will be strengthened and possibly raised to avoid levee damage from waves or water entering the landside of the levee due to high waves. Other mechanisms to reduce the effects of wind fetch will be considered to the extent feasible in the design of restoration areas, consistent with the biological goals and objectives of the project.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Design and implementation will be carried out at open water areas as determined by pre-construction wind fetch studies.

**Timing:** Wind fetch studies will be completed prior to construction of habitat restoration areas with increased open water in the Delta. This mitigation measure will be implemented before construction during the design phase and during construction of restoration sites. Measures will be designed based upon wind fetch studies that will be completed prior to construction of habitat restoration areas with increased open water in the Delta.

**Monitoring:** DWR will deploy a qualified monitor to perform and manage wind fetch studies prior to construction. DWR will monitor the design of measures based upon the data collected from the wind fetch studies and implementation of these measures. After construction and implementation of these measures DWR will monitor expanded open water areas at habitat restoration locations and levees that would be subject to increased wind-driven waves to ensure effectiveness of Mitigation Measure SW-8 in preventing potential damage from wind-driven waves. Monitoring shall continue until DWR has determined that, compared to pre-restoration conditions, there has been no increase in the size and intensity of wind-driven waves across expanded open water areas at locations where habitat restoration has occurred.

**Reporting Requirements:** The qualified monitor deployed to perform and manage wind fetch studies will develop a report for DWR of the results of the wind fetch studies and identify locations which may require additional measures to prevent an increase in potential damage from wind-driven waves across expanded open water areas at habitat restoration locations. DWR will use this report to determine measures to prevent wind damage and to reduce the effects of wind fetch. DWR will review all project designs to ensure these measures are implemented satisfactorily. Post-construction monitoring data will be delivered to DWR in order to evaluate the effectiveness of Mitigation Measure SW-8 and determine if any subsequent actions are required on a site-by-site basis. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure.

## 2.4 Mitigation Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering and Conveyance Operations

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 7, Groundwater			
GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering and Conveyance Operations	DWR and Construction Contractors	Prior to and during construction, continuing up to 5 years into operations	Impact GW-1, AG-2, GW-2, AG-2

**Action:** Prior to construction, DWR will determine the location of wells within the anticipated area of influence of construction sites at which dewatering would occur and the location of wells within the anticipated area of influence of conveyance operations on the Sacramento River above and below the north Delta intakes, within an approximately 4-mile wide corridor (about 2 miles on

either side of the river). Based on available information, thorough site investigations, and desk studies; the location of wells, depths of the wells and the depth to groundwater within these wells will be determined. During construction dewatering, monitoring wells should be installed sufficiently close to the groundwater dewatering sites and along the Sacramento River, or if possible, water levels in existing wells will be monitored, in order to be able to detect changes in water levels attributable to dewatering activities and conveyance operations. Monitoring wells would continue to be used as part of a conveyance operation monitoring program. Monitoring would occur and be reported on a monthly basis with an annual summary report prepared by the project proponents for up to 5 years after commencement of conveyance operations. If monitoring data or other substantial evidence indicates that groundwater levels have declined in a manner that could adversely affect adjacent wells, temporarily rendering the wells unable to provide adequate supply to meet preexisting demands or planned land use demands, DWR will implement one or more of the following measures:

- Offset domestic water supply losses attributable to construction dewatering activities and conveyance operations. DWR will ensure domestic water supplies provided by wells are maintained during construction and conveyance operations. Potential actions to offset these losses include installing cutoff walls in the form of sheet piles or slurry walls to depths below groundwater elevations, deepening, modifying or providing new wells used for domestic purposes to maintain water supplies at preconstruction levels, or securing potable water supplies from offsite sources. Offsite sources could include potable water transported from a permitted source or providing a temporary connection to nearby wells not adversely affected by dewatering or operations.
- Offset agricultural water supply losses attributable to construction dewatering activities and conveyance operations. DWR will ensure agricultural water supplies are maintained during construction and operations or provide compensation to offset for crop production losses. If feasible, DWR will install sheet piles to depths below groundwater elevations, or deepening, modifying or providing new wells to ensure agricultural production supported by water supplied by these wells is maintained. If deepening or modifying existing wells is not feasible, DWR will secure a temporary alternative water supply or compensate farmers for production losses attributable to a reduction in available groundwater supplies.

Implementation of Mitigation Measure GW-1 will follow the steps below.

- DWR will be responsible for determining the area of influence of construction dewatering operations and conveyance operations and the location of potentially affected existing wells, in addition to the installation of potential new monitoring wells and the monitoring of existing wells.
- Prior to commencement of construction activities DWR will determine the locations of existing wells which will require monitoring. In addition, shallow monitoring wells may be installed prior to construction dewatering operations and conveyance operations. Monitoring of water levels in these wells will occur during construction and up to 5 years during conveyance operations. Implementation of measures necessary to offset domestic and agricultural water supply losses will occur during construction and conveyance operations as necessary.
- Monitoring wells will be installed; or, if feasible, water levels in existing wells will be monitored, in order to detect changes in water levels attributable to dewatering activities. Water levels in the installed monitoring wells and existing wells will be measured by DWR and/or construction contractors prior to construction dewatering and on a weekly or daily basis, as needed, during

the entire construction dewatering period and on a monthly basis during conveyance operations. Upon completion of construction, the water levels in the monitoring wells will be measured and monitoring will continue for up to 6 months following termination of construction dewatering activities or less if groundwater levels reach preconstruction levels. During Conveyance operations, monitoring will continue for up to 5 years

- All monitoring data will be reported on a monthly basis, and in an annual summary report prepared by DWR that will evaluate the impacts of the construction dewatering for that year. The monthly reports will contain tabular water level data as well as changes in water levels from the previous months. The annual report will summarize monthly data and show the most recent water level contour map as well as the preconstruction contour map. The final report will include water level contour maps for the area of the groundwater aquifer that is affected by dewatering showing initial, preconstruction water levels and final, post-construction and conveyance operations water levels.
- If water level data indicate that dewatering operations or conveyance operations are responsible for reductions in well productivity such that water supplies are inadequate to meet existing or planned land use demands, mitigation will be required and implemented.
- If monitoring data or other substantial evidence indicates that groundwater levels have declined in a manner that could adversely affect adjacent wells, temporarily rendering the wells unable to provide adequate supply to meet preexisting demands or planned land use demands, DWR will contact the affected landowners in a timely manner and implement one or more of the measures described above.

**Responsible Parties:** DWR and its construction contractors will be responsible for determining the area of influence of dewatering operations and conveyance operations and the location of potentially affected existing wells. In addition, the installation of potential new monitoring wells and the monitoring of existing wells will be the responsibility of DWR and its construction contractors.

**Location:** At construction sites where dewatering is required to construct the work within approximately 4-mile wide corridor (about 2 miles on either side of the river) above and below the north Delta intakes. Prior to construction DWR and the construction contractors will identify locations where dewatering is necessary and where monitoring of groundwater is required.

**Timing:** Prior to commencement of construction activities the DWR will determine the location of existing wells which will require monitoring. In addition, shallow monitoring wells may be installed prior to construction dewatering operations. Monitoring of water levels in these wells will occur during construction and may continue following termination of construction dewatering activities to determine if groundwater levels reach preconstruction levels and if conveyance operations are affecting groundwater levels along the Sacramento River. Implementation of measures necessary to offset domestic and agricultural water supply losses will occur during construction and operation as necessary. In the event water levels and supply are impacted after construction, Mitigation Measure GW-1 will minimize these impacts.

**Monitoring:** DWR will assign a qualified monitor to monitor implementation of this mitigation measure through all stages. The qualified monitor will ensure that monitoring wells are installed and that monitoring of water levels in existing wells is performed regularly throughout construction and conveyance operations. Monitoring will be conducted to track the effects of construction and operations on groundwater levels and nearby wells and ensure that actions are taken, if required, to remediate impacts associated with dewatering activities and conveyance operations. Monitoring of

existing wells and installed monitoring wells will be performed daily or weekly during construction and monthly during conveyance operations for up to 5 years, as needed throughout the construction period and following termination of construction until ground water levels reach preconstruction level, or until such time as DWR concludes that such levels will not recover and initiates implementation of the remediation measures as described above in Action. Monitoring will continue to ensure that appropriate actions have been taken to provide compensation or other remediation consistent with this mitigation obligation.

**Reporting Requirements:** All monitoring data will be reported on a monthly basis to DWR and in an annual summary report prepared by DWR and its construction contractors that will evaluate the impacts of the construction dewatering or conveyance operations for that year. The monthly reports will contain tabular water level data as well as changes in water levels from the previous months. The annual report will summarize monthly data and show the most recent water level contour map as well as the pre-construction contour map. The annual report will include water-level contour maps for the area of the groundwater aquifer that is affected by dewatering showing initial, pre-construction water levels and final, post-construction water levels and during conveyance operations will show the initial pre-conveyance water levels and on-going operation water levels.

## 2.5 Mitigation Measure GW-5: Agricultural Lands Seepage Minimization

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 7, Groundwater			
GW-5: Agricultural Lands Seepage Minimization	DWR and Construction Contractors	Prior to and after construction (during operations)	Impact GW-5, GW-6, AG-2, AG-4

**Action:** Areas potentially subject to seepage caused by implementation of habitat restoration and enhancement actions or operation of water conveyance facilities will be monitored and evaluated on a site-specific basis by DWR prior to the commencement of construction activities to identify baseline groundwater conditions. Restoration sites, along with the sites of water conveyance features that could result in seepage, will be subsequently monitored once construction is completed. Monitoring will include placement of piezometers and/or periodic field checks to assess local groundwater levels and salinity and associated impacts on agricultural field conditions. In areas where operation of water conveyance facilities or habitat restoration is determined to result in seepage impacts on adjacent parcels, potentially feasible additional mitigation measures will be developed in consultation with affected landowners. These measures may include installation or improvement of subsurface agricultural drainage or an equivalent drainage measure, as well as pumping to provide for suitable field conditions (groundwater levels near pre-project levels). Such measures will ensure that the drainage characteristics of affected areas would be maintained to the level existing prior to project construction.

The implementation of this mitigation measure will follow the steps below:

- DWR will be responsible for monitoring and evaluation to identify baseline groundwater conditions as well as monitoring after construction is complete.

- Monitoring will occur at areas adjacent to the expanded Clifton Court Forebay portion at Byron Tract, where groundwater recharge from surface water would result in groundwater level increases, and other areas potentially affected by operation of the water conveyance facilities.
- Monitoring and evaluation shall occur prior to commencement of construction activities to identify baseline conditions and with sufficient time allotted to develop additional mitigation measures if needed. Monitoring of restoration sites, along with the sites of water conveyance features that could result in seepage will occur after construction is completed.
- Monitoring shall include placement of piezometers and/or periodic field checks to assess local shallow groundwater levels and salinity and associated impacts on agricultural field conditions.
- Monitoring will collect information on two thresholds:
  1. Water surface elevation (recorded as depth to water)
  2. Shallow groundwater salinity (measured as specific conductance)
- Monitoring of groundwater levels will occur on a daily basis to check real-time measured groundwater levels. This can be performed by equipping the piezometers with electronic water level probes which automatically record levels on a daily basis. Periodic field checks, including measurements of specific conductance will occur on a monthly basis and in the event groundwater levels are above identified thresholds.
- Baseline conditions of shallow groundwater levels and salinity will be determined prior to construction through water level measurements and water testing at the installed piezometers in proximity to restoration areas and conveyance features that might affect drainage on adjacent lands.
- Salinity will be determined by measuring specific conductance at the piezometers with a calibrated field probe before construction begins, and monthly during operation.
- Visual observations will also be used to monitor associated impacts on agricultural field conditions. Visual surveys will be conducted during periodic field checks as well as by local landowners on a continual basis.
- A seepage hotline will be established for landowners to report any visual observations of seepage or deteriorating crop health as a result of an excessive rise in the water table and/or increasing root-zone salinity due to deteriorating shallow groundwater quality.
- All monitoring data will be reported on a monthly basis, and in an annual summary report prepared by DWR that will evaluate the potential impacts of the operation of ECs for that year. The monthly reports will contain tabular water level and salinity data as well as compute changes in water levels and salinity from the previous months. The annual report will summarize monthly data and evaluate if impacts have occurred.
- Groundwater levels at the affected areas will be maintained to the level existing prior to project construction.
- Shallow groundwater salinity will be monitored prior to construction and a threshold will be determined in consultation with the local landowners, based on existing crop salinity tolerance (considerations will include both if shallow groundwater is used for irrigation or if shallow groundwater levels rise and encroach upon the root-zone area).

**Responsible Parties:** DWR and its construction contractors will be responsible for monitoring and evaluation to identify baseline groundwater conditions as well as monitoring during and after construction is complete.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Monitoring for this mitigation measure will occur at areas adjacent to the expanded Clifton Court Forebay portion at Byron Tract, where groundwater recharge from surface water would result in groundwater level increases, and other potentially impacted areas affected by implementation of habitat restoration and enhancement actions or operation of the water conveyance facilities.

**Timing:** Monitoring and evaluation will occur prior to commencement of construction activities to identify baseline conditions and with sufficient time allotted to develop additional mitigation measures if needed. Monitoring of restoration sites, along with the sites of water conveyance features that could result in seepage, will occur after construction is completed.

**Monitoring:** DWR will assign a qualified monitor to monitor implementation of this mitigation measure through all stages. The qualified monitor will ensure monitoring and periodic field checks are performed in the appropriate locations prior to construction. The qualified monitor will be responsible for the following: (i) coordinating DWR's analysis of the results of the monitoring and field check; (ii) determining areas where operation of water conveyance facilities or habitat restoration is resulting in seepage impacts on adjacent parcels; and (iii) developing measures to ensure that the drainage characteristics of affected areas would be maintained to the level existing prior to project construction.

**Reporting Requirements:** All monitoring data will be reported on a monthly basis and in an annual summary report prepared by the DWR that will evaluate the potential impacts of project operation for that year. The monthly reports will contain tabular water level and salinity data as well as compute changes in water levels and salinity from the previous months. The annual report will summarize monthly data and evaluate if impacts have occurred. Monitoring data and summary reports will be submitted to DWR.

## 2.6 Mitigation Measure GW-7: Provide an Alternate Source of Water

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
Chapter 7, Groundwater			
GW-7: Provide an Alternate Source of Water	DWR	Prior to and after construction	Impact GW-7

**Action:** For areas that will be on or adjacent to implemented restoration components, groundwater quality will be monitored by DWR prior to implementation to establish baseline groundwater quality conditions. Unacceptable degradation of groundwater quality will be determined by comparing post-implementation groundwater quality to relevant regulatory standards and with consideration of previously established beneficial uses. For wells affected by degradation in groundwater quality, water of a quality comparable to pre-project conditions would be provided.

Options for replacing the water supply could include drilling an additional well or a deeper well to an aquifer zone with water quality comparable to or better than preconstruction conditions or replacement of potable water supply. Construction activities are anticipated to be localized and would not result in change in land uses. The well drilling activities would result in short-term noise impacts for several days. (Chapter 31, *Other CEQA/NEPA Required Sections, including Mitigation and Environmental Commitment Impacts, Environmentally Superior Alternative, and Public Trust Considerations*, provides an assessment of the impacts of implementing proposed mitigation measures.)

**Responsible Parties:** DWR will be responsible for monitoring before and after construction. In the event groundwater quality exceeds relevant regulatory standards, DWR will be responsible for providing water of a quality comparable to pre-project conditions.

**Regulating/Permitting Agencies:** State Water Board and Regional Water Boards

**Location:** Monitoring will occur in existing wells on or adjacent to implemented restoration components. If degradation in groundwater quality occurs and additional or deeper wells are required to provide alternate sources of water, DWR engineers and hydrologists will determine the appropriate locations for this action; however, any new or deeper wells will be limited to the area of the existing wells and will not result in a change in land use.

**Timing:** Monitoring of existing groundwater quality to establish a baseline will occur prior to beginning construction. Monitoring of groundwater quality will occur post-implementation until it is determined that no groundwater quality degradation has occurred as a result of the project or until any groundwater quality degradation which has occurred has been mitigated for as outlined above by DWR and water of a quality comparable to pre-project conditions has been provided.

**Monitoring:** DWR will deploy monitors to implement the actions of Mitigation Measure GW-7. DWR will ensure monitoring actions are conducted prior to construction.

**Reporting Requirements:** DWR's monitors will prepare a report documenting groundwater quality at restoration sites prior to implementation and will submit this report to the State Water Board and appropriate Regional Water Board. After post-implementation monitoring is complete, DWR's monitors will prepare a second report documenting the groundwater conditions post-implementation, any unacceptable degradation of groundwater quality, and a proposal for providing water of a quality comparable to pre-project conditions. This report will be submitted to the State Water Board and appropriate Regional Water Board for agreement and acceptance. After submittal and acceptance of the post-project conditions report, DWR will be responsible for providing and pre-project condition water supply proposed as well as groundwater monitoring of the new water supply until it is determined the water quality is of pre-project condition.

## 2.7 Mitigation Measure WQ-7e: Implement Terms of the Contra Costa Water District Settlement Agreement

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 8, Water Quality			



Mitigation Measure WQ-7e:  
Implement Terms of the Contra  
Costa Water District Settlement  
Agreement

DWR and CCWD

Prior to  
construction

WQ-7

## **Mitigation Measure WQ-7e: Implement Terms of the Contra Costa Water District Settlement Agreement**

**Action:** DWR and Contra Costa Water District (CCWD) entered into a settlement agreement (Agreement) for reducing potential impacts to CCWD water supply in the Delta related to construction and operation of the BDCP/California WaterFix. This mitigation measure includes conveyance of water to CCWD that meets specified water quality requirements, in quantities and on a schedule defined in the Agreement. The Agreement ensures that the quality of the water CCWD delivers to its customers is not impacted as a result of the BDCP/California WaterFix. The Agreement does not increase the total amount of water that CCWD would otherwise be entitled to divert.

DWR would convey mitigation water to CCWD in one of two ways: 1) the primary method of conveying the water would be through the existing Freeport Regional Water Authority Intake (Freeport Intake) and the existing interconnection between EBMUD's Mokelumne Aqueduct and CCWD's Los Vaqueros Pipeline; and 2) the secondary method of conveying the water would be through the BDCP/California WaterFix's northern intakes and new Interconnection Facilities between the water conveyance facilities and existing CCWD facilities. Two different options for the new Interconnection Facilities are being considered: one on Victoria Island between the water conveyance facilities and the existing CCWD Middle River pipeline; and one at Clifton Court Forebay between the Clifton Court Forebay and the CCWD Los Vaqueros pipeline. No new facilities are required for the EBMUD/Freeport Intake conveyance method. DWR would be responsible for design and construction of the Victoria Island or Clifton Court Forebay facilities.

The Agreement requires an initial conveyance to CCWD of 30 TAF of water. For each year after the initial conveyance, a specified amount of water based on the prior year's operations would be conveyed in arrears. Under the Agreement, CCWD would take the same quantity of water that it would take absent the agreement, but the location and timing of diversions would change. Annual average diversions of mitigation water would be on the order of 30 TAF, and the rate of diversion of the mitigation water would be 150 cfs, with a maximum rate of diversion of 250 cfs upon mutual agreement between DWR and CCWD.

**Responsible Parties:** DWR and CCWD.

**Regulating/Permitting Agencies:** Not applicable for this Mitigation Measure.

**Location:** N/A for this Mitigation Measure.

**Timing:** Prior to construction.

**Monitoring:** DWR will monitor the development of this agreement with CCWD to ensure it is consistent with the description provided above and in Appendix 31B of the Final EIR/EIS.

**Reporting Requirements:** After completion of the agreement, DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (WQ-7e).



## 2.9 Mitigation Measure WQ-11: Effects on Electrical Conductivity Concentrations Resulting from Facilities Operations and Maintenance

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 8, Water Quality			
Mitigation Measure WQ-11e: Implement Real-time Operations, Including Adaptively Managing Diversions at the North and South Delta Intakes, to Reduce or Eliminate Water Quality Degradation in the Western Delta	DWR	After construction	WQ-11
Mitigation Measure WQ-11f: Adaptively Manage Head of Old River Barrier and Diversions at the North and South Delta Intakes to Reduce or Eliminate Exceedances of the Bay-Delta WQCP Objective at Prisoners Point	DWR	After construction	WQ-11

### Mitigation Measure WQ-11e: Implement Real-time Operations, Including Adaptively Managing Diversions at the North and South Delta Intakes, to Reduce or Eliminate Water Quality Degradation in the Western Delta

**Action:** Modeling results for Alternative 4A indicate water quality degradation for electrical conductivity (EC) in the Sacramento River at Emmaton in the months of July through September of below normal, dry and critical water year types, relative to the No Action Alternative (ELT). This mitigation measure establishes performance standards to address the modeled exceedances of Bay-Delta Water Quality Control Plan (WQCP) EC objectives and EC degradation such that impacts to beneficial uses affected by remaining degradation, following mitigation, would be less than significant.

The Bay-Delta WQCP establishes water quality objectives for EC at Emmaton applicable from April 1 through August 15 for the protection of agricultural beneficial uses. To address exceedances of Bay-Delta WQCP EC objectives and EC degradation at Emmaton that has been modeled to occur in July and the first half of August of below normal, dry, and critical water years, DWOR shall rely upon real-time operations (which cannot be fully captured in the modeling) to ensure that Bay-Delta WQCP Emmaton EC objectives are met. As a component of real-time operations, DWR shall ensure adequate releases from upstream reservoirs on a daily time-step and adaptively manage the split between north and south Delta diversions to achieve the Bay-Delta WQCP EC objectives at Emmaton. DWR is required to operate to meet these objectives under Existing Conditions, and would be required to operate to these objectives under the No Action Alternative. Thus, operation of the project alternative to achieve the Bay-Delta WQCP EC objectives would be consistent with Existing Conditions and the No Action Alternative and result in a minimization of EC degradation at Emmaton during July and the first half of August of below normal, dry, and critical water year types.

Hence, the performance standard for July and the first half of August shall be the Bay-Delta WQCP Emmaton EC objectives.

The Bay-Delta WQCP does not establish an EC objective at Emmaton for the latter half of August or September. To address EC degradation at Emmaton that has been modeled to occur during this period of the year with the project alternative, DWR shall manage upstream reservoir releases on a daily basis and adaptively manage the split between north and south Delta diversions of below normal, dry and critical water years. The performance standard for late August and September shall be compliance with the Threemile Slough standard in the North Delta Water Agency Agreement and the Bay-Delta WQCP municipal and industrial objective at Rock Slough as implemented within Decision 1641 or as modified in the future. Allowing sufficient flow in the Sacramento River at Emmaton, through real-time operations, would contribute to reduced EC levels at this location, relative to that modeled for the project alternative, and would reduce EC degradation at Emmaton in late August and September to less-than-significant levels.

This mitigation measure is consistent with the adaptive management and real-time operations that would be utilized to minimize the project alternative's water quality effects to *Microcystis* in the summer months. This mitigation measure also is consistent with the Other (Non-Environmental) Commitment to address reverse flows in the Sacramento River at Freeport that may occur with the project alternative, which are most likely to occur in low flow months of dry and critical years.

**Responsible Parties:** DWR will be responsible for conducting additional evaluations and developing additional modeling (as necessary) to determine how to modify operations to reduce or eliminate the additional exceedances of the Bay-Delta Water Quality Control Plan (WQCP) objectives for EC currently modeled to occur under Alternative 4A. DWR and Reclamation will be responsible for adaptive management of the North and South Delta intakes.

**Regulating/Permitting Agencies:** Reclamation and the State Water Resources Control Board.

**Location:** SWP/CVP delta facilities.

**Timing:** Additional evaluations and modeling will take place prior to, and following, commencement of initial operations of the water conveyance facilities. Identification and evaluation of existing and possible feasible actions will take place based upon the results of these evaluations and will be followed by development and implementation of the actions, at such time as exceedances occur.

**Monitoring:** Water facility operations will be monitored through the Environmental Monitoring Program (EMP), which is implemented by DWR and Reclamation through the Interagency Ecological Program (IEP). The EMP will utilize continuous recorder monitoring of EC at the designated monitoring stations. Continuous monitoring consists of recordings every 1 to 15 minutes with telemetry capabilities. Monitoring data may also be accessed through the California Data Exchange Center (CDEC) database, which compiles monitoring data from over 140 agencies who provide data to the CDEC from throughout the state.

**Reporting Requirements:** Monitoring and evaluation results will be compiled and reported to DWR on a monthly basis or in the event that water quality standards are violated.

**Mitigation Measure WQ-11f: Adaptively Manage Head of Old River Barrier and Diversions at the North and South Delta Intakes to Reduce or Eliminate Exceedances of the Bay-Delta WQCP Objective at Prisoners Point**

**Action:** Modeling results for Alternative 4A indicated additional exceedances of the Bay-Delta WQCP objective for protection of striped bass between Jersey Point and Prisoners Point at Prisoners Point. It is expected that by adaptively managing the Head of Old River Barrier and the fraction of south Delta versus north Delta diversions, exceedances of the EC objective at Prisoners Point could be avoided, and EC levels at Prisoners Point would be decreased to a level that would not adversely affect aquatic life beneficial uses. DWR shall adaptively manage the Head of Old River Barrier and the split between north and south Delta diversions during April-May to avoid exceedances of the objective at Prisoners Point. These actions would not be required in critical water years, when the objective does not apply. DWR shall consult with the CDFW, USFWS, NMFS, and Reclamation to ensure that such actions are warranted to avoid adverse impacts of salinity on striped bass spawning in the San Joaquin River between Jersey Point and Prisoners Point, and to minimize adverse effects these mitigation actions may have on other species. As such, the mitigation performance standard for April and May shall be compliance with the Bay-Delta WQCP EC objective at Prisoner's Point.

**Responsible Parties:** DWR will be responsible for conducting additional evaluations and developing additional modeling (as necessary) to determine how modified operations will reduce or eliminate the additional exceedances of the Bay-Delta WQCP objectives for EC currently modeled to occur under Alternative 4A. DWR will be responsible for adaptive management of the Head of Old River Barrier and the split between north and south Delta diversions during April-May.

**Regulating/Permitting Agencies:** Reclamation, CDFW, USFWS, and NMFS.

**Location:** Head of Old River Barrier and the split between north and south Delta diversions during April-May.

**Timing:** Additional evaluations and modeling will take place prior to, and following, commencement of initial operations of the water conveyance facilities. Identification and evaluation of existing and possible feasible actions will take place based upon the results of these evaluations and will be followed by development and implementation of the actions.

**Monitoring:** Water facility operations will be monitored through the EMP, which is implemented by DWR and Reclamation through the IEP. The EMP will utilize continuous recorder monitoring of EC at the designated monitoring stations. Continuous monitoring consists of recordings every 1 to 15 minutes with telemetry capabilities. Monitoring data may also be accessed through the CDEC database which compiles monitoring data from over 140 agencies who provide data to the CDEC from throughout the state.

**Reporting Requirements:** Monitoring and evaluation results will be compiled and reported to DWR, CDFW, USFWS, and NMFS on a monthly basis or in the event that water quality standards are violated.

## 2.11 Mitigation Measures SOILS-2a and SOILS-2b

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
Chapter 10, Soils			
SOILS-2a: Minimize extent of excavation and soil disturbance	DWR and Construction Contractors	Prior to construction	Impact SOILS-2, SOILS-7
SOILS-2b: Salvage, stockpile, and replace topsoil and prepare a topsoil storage and handling plan	DWR and Construction Contractors	Prior to, during, and after construction	Impact SOILS-2, SOILS-7

### Mitigation Measure SOILS-2a: Minimize extent of excavation and soil disturbance

**Action:** A requirement of the General Permit is to minimize the extent of soil disturbance during construction. As described in Appendix 3B, *Environmental Commitments, AMMs, and CMs*, the Stormwater Pollution Prevention Plans (SWPPPs) prepared for construction activities will include a Best Management Practice (BMP) that specifies the preservation of existing vegetation through installation of temporary construction markers to preclude unnecessary intrusion of heavy equipment into non-work areas. DWR will ensure that the SWPPPs and BMPs limiting ground disturbance are included in the construction contracts and are properly executed during construction by the contractors.

However, the BMP specifying preservation of existing vegetation may only limit the extent of the surface area disturbed and not the area of excavated soils. Accordingly, soil-disturbing activities will be designed such that the area to be excavated, graded, or overcovered is the minimum necessary to achieve the purpose of the activity.

While minimizing the extent of soil disturbance will reduce the amount of topsoil lost, this will result in avoidance of this effect over only a small proportion of the total extent of the graded area that will be required to construct the habitat restoration areas, approximately 5% or less. Consequently, a large extent of topsoil will be affected even after implementation of this mitigation measure.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementation of this Mitigation Measure.

**Regulating/Permitting Agencies:** Implementation will be in compliance with the SWPPP and BMPs.

**Location:** The markers will be installed in the locations where vegetation and soil will be removed; the intakes, pumping plants, the intermediate forebay, the Bryon Tract Forebay, canal and gates between the Byron Tract Forebay tunnel shafts and the approach canal to the Banks Pumping Plant, borrow areas, reusable tunnel material (RTM) and spoil storage areas, setback and transition levees, sedimentation basins, solids handling facilities, transition structures, surge shafts and towers, substations, transmission line footings, access roads, concrete batch plants, fuel stations, bridge abutments, barge unloading facilities, and laydown areas.

**Timing:** Marker installation will be implemented before construction begins. Areas will be marked off before large vehicles start to excavate.

**Monitoring:** DWR will inspect marker placement prior to construction. Construction contractors will monitor construction activities to ensure there is no unnecessary intrusion of heavy equipment into non-work areas. DWR will perform regular site inspections to verify contractor compliance.

**Reporting Requirements:** In the event the marked off perimeter is breached by construction equipment the construction contractor will notify DWR. In the event a fence barrier is breached the construction contractor will halt activity and replace and repair the fence barrier immediately. Any breaches will be recorded in the construction log and the area inspected by a qualified monitor to ensure activities are still in compliance with the SWPPP and fence barrier is installed correctly.

## **Mitigation Measure SOILS-2b: Salvage, stockpile, and replace topsoil and prepare a topsoil storage and handling plan**

**Action:** Depending on the thickness of the topsoil<sup>1</sup> at a given construction or restoration site, up to 3 feet of the topsoil will be salvaged from construction work areas, stockpiled, and then applied over the surface of spoil and RTM storage areas and borrow areas to the maximum extent practicable. Exceptions to this measure are areas smaller than 0.1 acre; areas of nonnative soil material, such as levees, where the near-surface soil does not consist of native topsoil; where the soil would be detrimental to plant growth; and any other areas identified by the soil scientist in evaluating topsoil characteristics (discussed below). This mitigation measure will complement and is related to activities recommended under Mitigation Measure AES-1c, in Chapter 17, *Aesthetics and Visual Resources* as well as to the environmental commitment for Disposal and Reuse of Spoils, RTM, and Dredged Material.

Topsoil excavated to install conveyance or to relocate utilities will be segregated from the subsoil excavated from open-cut trenches, stockpiled, and reapplied to the surface after the pipe has been installed.

The detailed design of the proposed project-related construction activities will incorporate an evaluation, based on review of soil survey maps supplemented by field investigations and prepared by a qualified soil scientist that specifies the thickness of the topsoil that should be salvaged, and that identifies areas in which no topsoil should be salvaged. The soil scientist will use the exceptions listed above as the basis for identifying areas in which no topsoil should be salvaged. DWR will ensure that the evaluation is prepared by a qualified individual, that it adequately addresses all conveyance facilities, and that areas identified for topsoil salvage are incorporated into the project design and that the contractors execute the salvage operations.

DWR will also prepare topsoil stockpiling and handling plans for the individual conveyance and restoration components, establishing such guidelines as the maximum allowable thickness of soil stockpiles, temporary stockpile stabilization/revegetation measures, and procedures for topsoil handling during salvaging and reapplication. The maximum allowable stockpile thickness will depend on the amount of time that the stockpile needs to be in place and is expected to range from approximately three to 10 feet. The plans will also specify that, where practicable, the topsoil be salvaged, transported, and applied to its destination area in one operation (i.e., without stockpiling) to minimize degradation of soil structure and the increase in bulk density as a result of excessive

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<sup>1</sup> For the purposes of this mitigation measure, *topsoil* is defined as the O, Oi, Oe, Oa, A, Ap, A1, A2, A3, AB, and AC horizons. Three feet of topsoil was selected because it corresponds to the primary root zone depth of most crops grown in the Delta. With the exception of the Histosols (i.e., peat and muck soils), most of the topsoils in the Plan Area are less than 3 feet thick.

handling. The stockpiling and handling plans will also specify maximum allowable stockpile sideslope gradients, seed mixes to control wind and water erosion, cover crop seed mixes to maintain soil organic matter and nutrient levels, and all other measures to avoid soil degradation and soil erosional losses caused by excavating, stockpiling, and transporting topsoil. For staging areas and similar areas in which topsoil would not be excavated or overcovered, the stockpiling and handling plans will describe how the soil will be decompacted or otherwise remediated after demobilization, such as the depth and spacing of ripper shanks and number of passes made by the equipment. The intent of this provision will be to ensure that the soil will be returned to a similar bulk density and productivity as it was before the site was used as a staging area as much as practicable. DWR will ensure that each plan is prepared by a qualified individual, that it adequately addresses all relevant activities and facilities, and that its specifications are properly executed during construction by the contractors.

Adherence to this measure will ensure that topsoil is appropriately salvaged, stockpiled, and reapplied. Nevertheless, adverse soil quality effects can also be associated with stockpiling and construction staging. Such effects commonly include increased bulk density, loss of soil carbon, degraded aggregate stability, reduced growth of the mycorrhizal fungi, and reduced nutrient cycling. Such effects may make the soil less productive after it is applied to its destination site, compared to its pre-salvage condition. Depending on the inherent soil characteristics, the manner in which it is handled and stockpiled, and the duration of its storage, the reapplied topsoil may recover quickly to its original condition or require many years to return to its pre-salvage physical, chemical, and biological condition (Strohmayer 1999; Vogelsang and Bever 2010). Implementation will be in compliance with the SWPPP.

**Responsible Parties:** DWR and its construction contractors will be responsible for the salvaging, stockpiling and replacing topsoil. DWR will also develop the topsoil stockpiling and handling plans.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** This measure will apply to all excavated sites unless they are areas smaller than 0.1 acre; areas of nonnative soil material, such as levees, where the soil would be detrimental to plant growth; and any other areas identified by the soil scientist in evaluating topsoil characteristics.

**Timing:** Development of topsoil storage and handling plans will be completed before construction begins. Salvaging, stockpiling, and reapplying of soil will occur throughout construction.

**Monitoring:** DWR will regularly monitor development of preparation stockpiling and handling plans and regularly monitor contractor implementation of stockpiling and handling plans to assure contractor compliance with this mitigation measure. Construction contractors will monitor the salvaging, stockpiling, and replacing of topsoil during construction. DWR will perform regular site inspections to verify contractor compliance.

**Reporting Requirements:** DWR will assure reporting requirements are incorporated into topsoil storage and handling plans. Adherence to the requirements of plans will be documented as top soil handling, storage, and reuse measures are implemented. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (SOILS-2b).

## 2.12 Mitigation Measure AQUA-1a and AQUA-1b



Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
<b>Chapter 11, Fish and Aquatic Resources</b>			
AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise	DWR and Construction Contractors	During construction	Impact AQUA-1, AQUA-19, AQUA-37, AQUA-55, AQUA-73, AQUA-92, AQUA-109, AQUA-127, AQUA-145, AQUA-163, AQUA-181, AQUA-199
AQUA-1b: Use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	DWR and Construction Contractors	Prior to and during construction	Impact AQUA-1, AQUA-19, AQUA-37, AQUA-55, AQUA-73, AQUA-92, AQUA-109, AQUA-127, AQUA-145, AQUA-163, AQUA-181, AQUA-199

**Mitigation Measure AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise**

**Action:** DWR will include specification in any construction contracts involving the installation of in-water or nearshore pilings, that piles will be installed using vibratory methods, or other non-impact driving methods, wherever feasible, especially outside of the in-water work window. Such methods have been shown to effectively minimize physical or substantial behavioral effects on fish and other aquatic species. The method selected will be based on geotechnical studies that will be conducted to determine the feasibility of vibratory installation of sheet pile, intake pipe foundation piles, and dock piles for barge landings. Additionally, the vibratory hammer will be started gradually to alert fish in the area that vibration will occur.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Construction sites where installation of in-water or nearshore pilings will occur.

**Timing:** Minimization of impact pile driving will occur during construction.

**Monitoring:** DWR will review construction contracts to ensure specification that piles will be installed using vibratory methods, or other non-impact driving methods, wherever feasible, especially outside of the in-water work window. DWR's construction monitor will monitor the activities of the construction contractor to ensure the correct methods are implemented during construction.

**Reporting Requirements:** DWR's construction monitor will report any violation or deviance from the specification included in the construction contracts by the construction contractor to DWR. In the event that compliance with this mitigation measure is infeasible, DWR will implement Mitigation Measure AQUA-1b in order to ensure compliance with underwater noise thresholds.

**Mitigation Measure AQUA-1b: Monitor Underwater Noise and if Necessary, Use an Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related Underwater Noise**

**Action:** If the use of vibratory methods as contemplated by Mitigation Measure AQUA-1a cannot feasibly be implemented during pile driving activities that occur in-water, DWR will instead monitor

1 pile-driving noise and attenuate it, if necessary, through the dewatering of the cofferdam area  
 2 and/or the installation of a bubble curtain or other attenuation device to minimize underwater  
 3 noise. This obligation does not apply to sheet pile installations, where it would not be feasible to  
 4 surround the entire sheet pile wall, and which are expected to be installed using a vibratory hammer  
 5 for the majority of the time. Where impact pile driving is required, DWR will monitor underwater  
 6 sound levels to ensure compliance with the underwater noise thresholds at a distance appropriate  
 7 for protection of the species (183 dB SEL<sub>cumulative</sub> for fish less than 2 grams; 187 dB SEL<sub>cumulative</sub> for  
 8 fish greater than 2 grams). If such monitoring shows that noise could exceed applicable thresholds,  
 9 physical or operational attenuation methods will be implemented to ensure compliance with these  
 10 thresholds.

11 **Responsible Parties:** DWR and its construction contractors will be responsible for implementing  
 12 this mitigation measure.

13 **Regulating/Permitting Agencies:** N/A for this mitigation measure.

14 **Location:** Construction sites where installation of in-water or nearshore pilings will occur.

15 **Timing:** Minimization of impact pile driving will occur before and during construction.

16 **Monitoring:** Where impact pile driving is required, DWR will assign a qualified monitor to  
 17 implement monitoring outlined above in *Action*. The qualified monitor will ensure monitoring  
 18 occurs during underwater construction and will determine whether compliance with the  
 19 underwater noise effects thresholds has been achieved based upon monitoring data which will be  
 20 collected daily. The qualified monitor will also be responsible for coordination with DWR if noise is  
 21 expected to exceed applicable thresholds and implementation of measures to minimize noise is  
 22 required.

23 Where the use of vibratory methods pursuant to Mitigation Measure AQUA-1a is determined to be  
 24 infeasible, the monitor shall ensure the use of the techniques described in Mitigation Measure  
 25 AQUA-1b in order to ensure compliance with underwater noise thresholds. DWR's construction  
 26 monitor will be responsible for daily inspections to ensure an attenuation device or other  
 27 mechanism to minimize noise, consistent with underwater noise thresholds, is implemented by the  
 28 construction contractor.

29 **Reporting Requirements:** DWR's qualified monitor will report to DWR any exceedance of the  
 30 noise effects thresholds immediately. The qualified monitor will also report to DWR if noise is  
 31 expected to exceed applicable thresholds. In both such instances, DWR shall act as soon as feasible  
 32 in order to take further steps to ensure compliance with underwater noise thresholds. DWR's  
 33 construction monitor will record his or her inspections daily and report any violations to DWR  
 34 immediately.

**2.13 Mitigation Measure AQUA-22d: DWR will consult with DFW as part of the 2081 incidental take permit process to include spring outflow criteria as necessary to fully mitigate any impacts of operation-related take of longfin smelt attributable to the project, with adjustments through Adaptive Management as appropriate. Implementation of any necessary spring outflow criteria will occur through coordinated operations of the CVP and SWP**

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 11, Fish and Aquatic Resources			
AQUA-22d: DWR will consult with DFW as part of the 2081 incidental take permit process to include spring outflow criteria as necessary to fully mitigate any impacts of operation-related take of longfin smelt attributable to the project, with adjustments through Adaptive Management as appropriate. Implementation of any necessary spring outflow criteria will occur through coordinated operations of the CVP and SWP.	DWR	After construction	Impact AQUA-22

**Action:** DWR will consult with DFW as part of the 2081 incidental take permit process to include spring outflow criteria as necessary to fully mitigate any impacts of operation-related take of longfin smelt attributable to the project, with adjustments through Adaptive Management as appropriate. Implementation of any necessary spring outflow criteria will occur through coordinated operations of the CVP and SWP.

**Responsible Parties:** DWR will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** CDFW will issue a 2081b permit.

**Location:** Operations will be adaptively managed at the existing south Delta diversions and new north Delta diversion.

**Timing:** Mitigation Measure AQUA-22d will be in effect once new north Delta diversion become operational.

**Monitoring:** The Adaptive Management Program will be used to develop and implement an appropriate monitoring and research program.

**Reporting Requirements:** Fulfillment of compliance monitoring and reporting requirements is solely the responsibility of DWR and their contractors. DWR will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix, and will provide results to CDFW.

## 2.14 Mitigation Measure BIO-42: Avoid Impacts on Delta Green Ground Beetle and its Habitat

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impacts
Chapter 12, Terrestrial Biological Resources			
BIO-42-Avoid impacts on delta green ground beetle and its habitat	DWR	Prior to and during construction	Impact BIO-42

**Action:** As part of the design and development of management plans for conservation areas in the area of Jepson Prairie, DWR will implement the following measures to avoid effects on delta green ground beetle.

If habitat restoration or protection is planned for the lands adjacent to Calhoun Cut and noncultivated lands on the western side of Lindsey Slough, these area will be evaluated by a USFWS approved biologist for potential delta green ground beetle habitat (large playa pools, or other similar aquatic features, with low growing vegetation or bare soils around the perimeter). The biologist will have previous experience with identifying suitable habitat requirements for delta green ground beetle.

Any suitable habitat identified by the biologist (with previous experience with delta green ground beetle) within the species current range will be considered potentially occupied and all ground disturbing activities in these areas will be avoided, which for the project area is generally the area west of State Route 113.

Any other areas identified as suitable habitat outside of the current range of the species will be surveyed by a biologist with previous experience in surveying for and identifying delta green ground beetle. No ground disturbing activities will be implemented in areas identified as occupied by delta green ground beetle.

Based on the results of the habitat evaluations and surveys and site-specific restoration and management plans will be developed so that they don't conflict with the recovery goals for delta green ground beetle in the USFWS's 2005 *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (U.S. Fish and Wildlife Service 2005). Plans will include measures to protect and manage for delta green ground beetle so that they continue to support existing populations or allow for future colonization.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Grasslands near Jepson Prairie (lands adjacent to Calhoun Cut; noncultivated lands west of Lindsey Slough; west of State Route 113.

**Timing:** Prior to and during construction of tidal restoration plans in the area

**Monitoring:** DWR will provide a USFWS-approved biologist with previous experience in surveying for and identifying delta green ground beetle to evaluate green ground beetle habitat prior to construction. The biologist will perform site inspections as necessary to ensure compliance with protection and management plans, and to ensure the avoidance of any ground-disturbing activities either in suitable occupied or unoccupied habitat within the species' current range or in areas outside the current range of the species found after surveys to be occupied by delta green ground beetle.

**Reporting Requirements:** The biologist will submit reports to DWR about construction contractor compliance. Based on the results of the habitat evaluations and surveys and site-specific restoration and management plans will be developed so that they don't conflict with the recovery goals for delta green ground beetle in the USFWS's 2005 *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (U.S. Fish and Wildlife Service 2005). Plans will include measures to protect and manage for delta green ground beetle so that they continue to support existing populations or allow for future colonization.

## 2.15 Mitigation Measure BIO-43: Avoid and Minimize Loss of Callippe Silverspot Butterfly Habitat

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
BIO-43: Avoid and Minimize Loss of Callippe Silverspot Butterfly Habitat	DWR	Early January through mid-July; prior to construction	BIO-43

**Action:** As part of the development of site-specific management plans on protected grasslands in the Cordelia Hills and/or Potrero Hills, DWR will implement the following measures to avoid and minimize the loss of callippe silverspot habitat.

- Hilltops in Cordelia Hills and Potrero Hills will be surveyed for callippe silverspot larval host plants (Johnny jump-ups) by a biologist familiar with identifying this plant species. These surveys should occur during the plant's blooming period (typically early January through April)
- If larval host plants are present, then presence/absence surveys for callippe silverspot butterfly larvae will be conducted according to the most recent USFWS approved survey methods by a biologist with previous experience in surveying for and identifying callippe larvae and/or signs of larval presence. These surveys should be conducted prior to the adult flight season, which usually starts in mid-May.
- If larvae are detected then no further surveys are necessary. If larvae are not detected then surveys for adults will be conducted by a biologist familiar with surveying for and identifying callippe silverspot. Surveys typically start in mid-May and continue weekly for 8 to 10 weeks.

- If callippe silverspot butterflies are detected, then the site-specific management plans will be written to include measures to protect and manage for larval host plants and nectar sources so that they continue to support existing populations and/or allow for future colonization.
- Mapping of both larval host plants and nectar sources will be incorporated into the management plans.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Protected grasslands in the Cordelia Hills and/or Potrero Hills.

**Timing:** Prior to construction. Plant survey for Johnny Jump-Ups in its blooming period, early January through April. Surveys for callippe silverspot larvae will begin prior to mid-May. Surveys for adult callippe silverspots begin in mid-May and continuing weekly for 8-10 weeks.

**Monitoring:** DWR will deploy a biologist familiar with Johnny jump-ups, callippe silverspot butterfly larvae, and adult callippe silverspot butterflies that monitor the habitat sites periodically during construction to ensure compliance with the site-specific management plans and to ensure that potentially affected larval host plants and nectar sources continue to support existing populations and/or allow for future colonization.

**Reporting Requirements:** Surveys reports and mapping developed as part of this mitigation measure will be delivered to DWR for review. DWR will review all site-specific management plans and will revise as necessary as a result of survey reports.

## 2.16 Mitigation Measure BIO-55: Conduct Preconstruction Surveys for Noncovered Special-Status Reptiles and Implement Applicable AMMs

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
BIO-55- Conduct Preconstruction Surveys for Noncovered Special-Status Reptiles and Implement Applicable AMMs	DWR	Prior to construction	Impact BIO-55

**Action:** DWR will retain a qualified biologist to conduct a habitat assessment in construction and restoration areas that are relatively undisturbed or have a moderate to high potential to support noncovered special-status reptiles (Blainville's horned lizard and San Joaquin coachwhip) in CZ 4, CZ 7, and CZ 8. The qualified biologist will survey for noncovered special-status reptiles in areas of suitable habitat concurrent with the preconstruction surveys for covered species in CZ 4, CZ 7, and CZ 8. If special-status reptiles are found in work areas, the biologist will first attempt to allow these species move out of the work area on their own but if conditions do not allow this, individuals will be captured by the biologist and relocated to the nearest suitable habitat outside of the work area as determined in consultation with CDFW. To the extent feasible, work in areas with suitable habitat for Blainville's horned lizard and San Joaquin coachwhip should not be conducted during periods of

cold and hot temperatures (below 67 degrees F and above 100 degrees F), because both species would be relatively inactive during these periods and could be taking cover in loose soil, in burrows or crevices, or under structures such as rocks or logs (Morey 2000). This would reduce the impact of being crushed by vehicles and equipment.

In addition, AMM1 Worker Awareness Training, AMM2 Construction Best Management Practices and Monitoring, AMM6 Disposal and Reuse of Spoils, Reusable Tunnel Material, and Dredged Material, and AMM10 Restoration of Temporarily Affected Natural Communities, will be implemented for all noncovered special-status reptiles adversely affected by the project to avoid, minimize, or compensate for impacts.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Construction and restoration areas in CZ 4, CZ 7 and CZ 8 that are relatively undisturbed or have a moderate to high potential to support noncovered special-status reptiles.

**Timing:** Prior to construction.

**Monitoring:** DWR's qualified biologist will reassess the affected area after any passive relocation attempts to identify the presence of any noncovered special-status reptiles.

**Reporting Requirements:** The qualified biologist will report to DWR about any noncovered special-status reptiles detected prior to construction and the results of any passive relocation attempts.

## 2.17 Mitigation Measure BIO-66: California Least Tern Nesting Colonies Shall Be Avoided and Indirect Effects on Colonies Will Be Minimized

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
BIO-66- California Least Tern Nesting Colonies Shall Be Avoided and Indirect Effects on Colonies Will Be Minimized	DWR	Prior to and during construction; April 15-August 15	BIO-65 BIO-67

**Action:** If suitable nesting habitat for California least tern (flat unvegetated areas near aquatic foraging habitat) is identified during planning level surveys, DWR will ensure that a qualified biologist with experience observing the species and its nests conducts at least three preconstruction surveys for this species during the nesting season. DWR will design projects to avoid the loss of California least tern nesting colonies. No construction will take place within 500 feet of California least tern nests during the nesting season (April 15 to August 15 or as determined through surveys). Only inspection, maintenance, research, or monitoring activities may be performed during the least tern breeding season in areas within or adjacent to least tern breeding habitat with USFWS and CDFW approval under the supervision of a qualified biologist.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** Only inspection, maintenance, research, or monitoring activities may be performed during the least tern breeding season in areas within or adjacent to least tern breeding habitat with USFWS and CDFW approval under the supervision of a qualified biologist.

**Location:** suitable nesting habitat for California least tern (flat unvegetated areas near aquatic foraging habitat)

**Timing:** Prior to and during construction; April 15-August 15. Only inspection, maintenance, research, or monitoring activities may be performed during the least tern breeding season in areas within or adjacent to least tern breeding habitat with USFWS and CDFW approval under the supervision of a qualified biologist.

**Monitoring:** DWR will retain a qualified biologist with experience observing the least tern and its nests to conduct at least three preconstruction surveys for this species during the nesting season, in accordance with the action described above. The biologist will report to DWR about locations of least tern nests and determination of nesting season and will inform DWR about any construction undertaken outside of the boundaries described above. A qualified biologist will remain on-site during construction to monitor construction activities and maintain a 500 foot buffer from California least tern nests during the nesting season.

**Reporting Requirements:** The biologist's findings about least tern nesting conditions will be reported to DWR after each preconstruction survey. Any encroachment of construction activities on the 500 foot buffer from California least tern nests during nesting season will be reported to DWR by the biological monitor immediately. After the completion of construction, DWR shall also prepare separate findings explaining how DWR (i) has satisfied all of the survey requirements of this measure, (ii) limited construction to authorized time periods, and (iii) designed its projects so as to avoid the loss of California least tern nesting colonies.



## 2.19 Mitigation Measure BIO-75: Conduct Preconstruction Nesting Bird Surveys and Avoid Disturbance of Nesting Birds

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
BIO-75- Conduct Preconstruction Nesting Bird Surveys and Avoid Disturbance of Nesting Birds	DWR	Prior to and during construction	BIO-75, BIO-78, BIO-80, BIO-81, BIO-109, BIO-111, BIO-116, BIO-119, BIO-121, BIO-123, BIO-129a, BIO-129b, BIO-130, BIO-132, BIO-134, BIO-136, BIO-137, BIO-140, BIO-142, BIO-144, BIO-148, BIO-150

**Action:** To reduce impacts on nesting birds, DWR will implement the measures listed below prior to construction and operations and maintenance activities.

- To the maximum extent feasible, vegetation (trees, shrubs, ruderal areas) removal and trimming will be scheduled during the nonbreeding season of birds (September 1–January 31). If vegetation cannot be removed in accordance with this timeframe, preconstruction/preactivity surveys for nesting birds and additional protective measures will be implemented as described below.
- A qualified wildlife biologist with knowledge of the relevant species will conduct nesting surveys before the start of construction. A minimum of three separate surveys will be conducted within 30 days prior to construction, with the last survey within 3 days prior to construction. Surveys will include a search of all suitable nesting habitat (trees, shrubs, ruderal areas, field crops) in the construction area. In addition, a 500-foot radius around the construction area, where accessible, will be surveyed for nesting raptors and species of special concern (except the Modesto song sparrow), and an area within 50 feet of construction will be surveyed for other non-special status nesting birds or birds protected by the MBTA. If no active nests are detected during these surveys, no additional measures are required.
- If active nests are found in the survey area, no-disturbance buffers will be established around the nest sites to avoid disturbance or destruction of the nest site until the end of the breeding season (approximately September 1) or until a qualified wildlife biologist determines that the young have fledged and moved out of the project area (this date varies by species). A qualified wildlife biologist will monitor construction activities in the vicinity of the nests to ensure that construction activities do not affect nest success. The extent of the buffers will be determined by DWR biologists after consultation with USFWS and CDFW and will depend on the level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. Suitable buffer distances may vary between species.

**Responsible Parties:** DWR will provide a qualified wildlife biologist with knowledge of relevant species to conduct nesting surveys of relevant species before the start of construction.

**Regulating/Permitting Agencies:** A qualified wildlife biologist will monitor construction activities in the vicinity of the nests to ensure that construction activities do not affect nest success. The extent

of the buffers will be determined by DWR biologists after consultation with USFWS and CDFW and will depend on the level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers.

**Location:** All areas of suitable nesting habitat in the construction area; within 500 feet of construction area

**Timing:** To the maximum extent feasible, vegetation (trees, shrubs, ruderal areas) removal and trimming will be scheduled during the nonbreeding season of birds (September 1–January 31). A qualified wildlife biologist with knowledge of the relevant species will conduct nesting surveys before the start of construction. A minimum of three separate surveys will be conducted within 30 days prior to construction, with the last survey within 3 days prior to construction. If active nests are found in the survey area, no-disturbance buffers will be established around the nest sites to avoid disturbance or destruction of the nest site until the end of the breeding season (approximately September 1) or until a qualified wildlife biologist determines that the young have fledged and moved out of the project area (this date varies by species).

**Monitoring:** DWR will provide a qualified wildlife biologist with knowledge of relevant species to conduct surveys in accordance with the actions described above. The biologist will also monitor construction activities in the vicinity of the nests to ensure that construction activities do not affect nest success.

**Reporting Requirements:** The qualified wildlife biologist will report to DWR about the results of the surveys conducted and construction compliance with the vegetation removal schedule and buffering requirements.

## 2.20 Mitigation Measure BIO-117: Avoid Impacts on Rookeries

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
BIO-117: Avoid Impacts on Rookeries	DWR and Construction Contractors	Prior to construction	Impact BIO-116, BIO-117, BIO 119

**Action:** Herons, egrets, and cormorants are highly traditional in their use of nest sites (rookeries); therefore, DWR will avoid direct impacts on rookeries and avoid or minimize indirect impacts on rookeries.

**Responsible Parties:** DWR construction contractors will abide by all measures outlined by DWR for avoidance of rookeries during construction.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** All construction locations in the vicinity of rookeries.

**Timing:** Surveys and plans for avoidance of rookeries will be performed prior to beginning construction. Construction contractors will avoid impacts on rookeries during construction and DWR will perform monitoring during construction.

**Monitoring:** DWR will retain a qualified wildlife biologist with knowledge of above identified species' breeding behaviors. Prior to the commencement of construction, the wildlife biologist shall identify any nest sites (rookeries) for herons, egrets, and cormorants that might be directly or indirectly affected by the proposed construction, and in consultation with the construction contractor, shall develop appropriate measures to avoid direct impacts prior to and during construction. The biologist will monitor construction as appropriate to ensure compliance with the developed measures and the avoidance direct effects on nest sites (rookeries) for herons, egrets, and cormorants.

**Reporting Requirements:** The biologist will report to DWR on the nature of rookeries in use prior to construction. The biologist will report to DWR on construction contractor compliance with the identified measures.

## 2.21 Mitigation Measure BIO-146: Active Bank Swallow Colonies Shall Be Avoided and Indirect Effects on Bank Swallow Will Be Minimized

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 14, Terrestrial Biological Resources			
Mitigation Measure BIO-146-Active Bank Swallow Colonies Shall Be Avoided and Indirect Effects on Bank Swallow Will Be Minimized	DWR	Prior to and during construction (within April 1-August 31); After one year of tunnel material setting and before its removal	Impact BIO-146

**Action:** To the extent practicable, DWR will not conduct restoration activities during the bank swallow nesting season (April 1 through August 31). If restoration cannot be avoided during nesting season, a qualified biologist will conduct preconstruction surveys to determine if active bank swallow nesting colonies are present within 500 feet of work areas. If no active nesting colonies are present, no further mitigation is required. Reusable tunnel material areas are not expected to be colonized by nesting bank swallows, as it is unlikely that the substrate would provide suitable nesting habitat for the species. However, reusable tunnel material sites could become suitable for swallows over time. Surveys of reusable tunnel material areas that have been present for at least 1 year, allowing the substrate to stabilize, will be conducted prior to the removal of reusable tunnel material.

If active colonies are detected, DWR will establish a nondisturbance buffer (determined by DWR in consultation with CDFW and the Bank Swallow Technical Advisory Committee) around the colony during the breeding season. In addition, a qualified biologist will monitor any active colony within 500 feet of construction to ensure that construction activities do not affect nest success.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** If active colonies are detected, DWR will establish a nondisturbance buffer (determined in consultation with CDFW and the Bank Swallow Technical Advisory Committee) around the colony during the breeding season.

**Location:** 500 feet within construction and restoration activities. Surveys of reusable tunnel material areas that have been present for at least 1 year, allowing the substrate to stabilize, will be conducted prior to the removal of reusable tunnel material

**Timing:** Before and during construction, during bank swallow nesting season (April 1 through August 31). After reusable tunnel material has been sitting for one year, survey it prior to removal.

**Monitoring:** DWR will provide a qualified biologist to conduct surveys and monitor colonies as described in the action above. The biologist will inspect reusable tunnel material prior to removal to ensure an appropriate buffer from nesting colonies is maintained.

**Reporting Requirements:** The qualified biologist will report to DWR about any nesting colonies found within reusable tunnel material. The qualified biologist will report to DWR about construction contractor compliance with the established buffer requirement.

## 2.22 Mitigation Measure BIO-147: Monitor Bank Swallow Colonies and Evaluate Winter and Spring Flows Upstream of the Study Area

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
BIO-147: Monitor Bank Swallow Colonies and Evaluate Winter and Spring Flows Upstream of the Study Area	DWR	Prior to and after construction	Impact BIO-147

**Action:** To address the uncertainty of the impact of upstream spring flows on existing bank swallow habitat, DWR will continue to support annual monitoring efforts<sup>2</sup> of existing colonies upstream of the study area. DWR will collect data to be used for quantifying the magnitude of flows that would result in loss of active nest sites or degradation of available nesting habitat, and the extent to which changes in SWP operations attributable solely to the California WaterFix are the cause of such impacts. If DWR determines that changes in SWP operations attributable solely to the California WaterFix have caused loss of active nest sites or degradation of available nesting habitat, replacement habitat will be established at a minimum of 2:1 for the length of bank habitat affected. Replacement habitat will consist of removing bank revetment to create habitat for bank swallow at a location subject to CDFW approval (Bank Swallow Technical Advisory Committee 2013).

**Responsible Parties:** DWR

<sup>2</sup> Bank swallow colonies have historically been and are currently monitored by DWR, USFWS, and CDFW in association with the Bank Swallow Technical Advisory Committee, which is a diverse coalition of state and federal agency and non-governmental organization personnel, created in response to the continued decline of banks swallow populations on the Sacramento River.

**Regulating/Permitting Agencies:** CDFW

**Location:** Bank swallow habitat upstream of study area.

**Timing:** Before and potentially after construction.

**Monitoring:** DWR will provide a qualified wildlife biologist to perform monitoring of the existing colonies and to collect data regarding the potential impacts of upstream spring flows on existing bank swallow habitat in accordance with the actions described above, prior to and after construction.

**Reporting Requirements:** The qualified wildlife biologist will develop a monitoring report containing monitoring and habitat suitability data for delivery to DWR and CDFW. In the event that monitoring reveals that upstream spring flows are having impacts on existing bank swallow habitat, the biologist shall prepare a report identifying the proposed strategy for providing replacement habitat (through the removal of bank revetment) at a minimum ratio of 2:1 for the length of bank habitat affected. When such replacement habitat has been obtained, the biologist shall file an additional report describing its location and strategies for maintaining its habitat values.

## 2.23 Mitigation Measure BIO-162: Conduct Preconstruction Survey for American Badger

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
Mitigation Measure BIO-162: Conduct Preconstruction Survey for American Badger	DWR	Prior to and during construction	Impact BIO-162, BIO-163

**Action:** A qualified biologist provided by DWR will survey for American badger concurrent with the preconstruction survey for San Joaquin kit fox (AMM24) and burrowing owl (AMM23). If badgers are detected, the biologist will passively relocate badgers out of the work area prior to construction if feasible. If an active den is detected within the work area, DWR will establish a suitable buffer distance and avoid the den until the qualified biologist determines the den is no longer active. Dens that are determined to be inactive by the qualified biologist will be collapsed by hand to prevent occupation of the den between the time of the survey and construction activities. In addition, ground disturbance within project related conservation areas within 50 feet of active American badger dens would be prohibited. Existing trails would be closed within 250 feet of active natal/pupping dens until young have vacated, and within 50 feet of other active dens. No dogs would be allowed on conservation areas with active American badger populations. Rodent control would be prohibited on areas with American badger populations to ensure rodent prey availability. Mitigation Measure BIO-162 is applicable to all ground disturbing activities related to construction, restoration, and operations and maintenance.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Pre construction surveys will be conducted at all construction sites and within a 250 foot buffer of construction/activity.

**Timing:** Prior to and during construction.

**Monitoring:** DWR will provide a qualified biologist to conduct the survey in accordance with the action described above. The biologist will periodically inspect construction sites to determine the need for construction buffers or prohibitions and construction contractor compliance with established buffers, prohibitions, or closures.

**Reporting Requirements:** The biologist will report to DWR on the detection of any badgers or active dens, the effectiveness of the passive removal, and the status of inactive dens. The biologist will report to DWR on construction contractor compliance with any established buffers, prohibitions, or closures.

## 2.24 Mitigation Measure BIO-166: Conduct Preconstruction Surveys for Roosting Bats and Implement Protective Measures

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
BIO-166: Conduct Preconstruction Surveys for Roosting Bats and Implement Protective Measures	DWR	Prior to and during construction	Impact BIO-166, BIO -167

**Action:** The following measure was designed to avoid and minimize adverse direct and indirect effects on special-status bats. However, baseline data are not available or are limited on how bats use the study area, and on individual numbers of bats and how they vary seasonally. Therefore, it is difficult to determine if there would be a substantial reduction in species numbers. Bat species with potential to occur in the study area employ varied roost strategies, from solitary roosting in foliage of trees to colonial roosting in trees and artificial structures, such as buildings and bridges. Daily and seasonal variations in habitat use are common. To obtain the highest likelihood of detection, preconstruction bat surveys will be conducted by DWR and will include these components.

- Identification of potential roosting habitat within project footprint.
- Daytime search for bats and bat sign in and around identified habitat.
- Evening emergence surveys at potential day-roost sites, using night-vision goggles and/or active full-spectrum acoustic monitoring where species identification is sought.
- Passive full-spectrum acoustic monitoring and analysis to detect bat use of the area from dusk to dawn over multiple nights.
- Additional on-site night surveys as needed following passive acoustic detection of special status bats to determine nature of bat use of the structure in question (e.g., use of structure as night roost between foraging bouts).

- Qualified biologists will have knowledge of the natural history of the species that could occur in the study area and experience using full-spectrum acoustic equipment. During surveys, biologists will avoid unnecessary disturbance of occupied roosts.

#### ***Preconstruction Bridges and Other Structure Surveys***

Before work begins on the bridge/structure, qualified biologists will conduct a daytime search for bat sign and evening emergence surveys to determine if the bridge/structure is being used as a roost. Biologists conducting daytime surveys would listen for audible bat calls and would use naked eye, binoculars, and a high-powered spotlight to inspect expansion joints, weep holes, and other bridge features that could house bats. Bridge surfaces and the ground around the bridge/structure would be surveyed for bat sign, such as guano, staining, and prey remains.

Evening emergence surveys will consist of at least one biologist stationed on each side of the bridge/structure watching for emerging bats from a half hour before sunset to 1–2 hours after sunset for a minimum of two nights within the season that construction would be taking place. Night-vision goggles and/or full-spectrum acoustic detectors will be used during emergence surveys to assist in species identification. All emergence surveys would be conducted during favorable weather conditions (calm nights with temperatures conducive to bat activity and no precipitation predicted).

Additionally, passive monitoring with full-spectrum bat detectors will be used to assist in determining species present. A minimum of four nights of acoustic monitoring surveys will be conducted within the season that the construction would be taking place. If site security allows, detectors should be set to record bat calls for the duration of each night. To the extent possible, all monitoring will be conducted during favorable weather conditions (calm nights with temperatures conducive to bat activity and no precipitation predicted). The biologists will analyze the bat call data using appropriate software and prepare a report with the results of the surveys. If acoustic data suggest that bats may be using the bridge/structure as a night roost, biologists will conduct a night survey from 1–2 hours past sunset up to 6 hours past sunset to determine if the bridge is serving as a colonial night roost.

If suitable roost structures would be removed, additional surveys may be required to determine how the structure is used by bats, whether it is as a night roost, maternity roosts, migration stopover, or for hibernation.

#### ***Preconstruction Tree Surveys***

If tree removal or trimming is necessary, qualified biologists will examine trees to be removed or trimmed for suitable bat roosting habitat. High-value habitat features (large tree cavities, basal hollows, loose or peeling bark, larger snags, palm trees with intact thatch, etc.) will be identified and the area around these features searched for bats and bat sign (guano, culled insect parts, staining, etc.). Riparian woodland, orchards, and stands of mature broadleaf trees should be considered potential habitat for solitary foliage roosting bat species.

If bat sign is detected, biologists will conduct evening visual emergence survey of the source habitat feature, from a half hour before sunset to 1–2 hours after sunset for a minimum of two nights within the season that construction would be taking place. Methodology should follow that described above for the bridge emergence survey.

1 Additionally, if suitable tree roosting habitat is present, acoustic monitoring with a bat detector will  
 2 be used to assist in determining species present. These surveys would be conducted in coordination  
 3 with the acoustic monitoring conducted for the bridge/structure.

#### 4 ***Protective Measures for Bats using Bridges/Structures and Trees***

5 Avoidance and minimization measures shall be necessary if it is determined that bats are using the  
 6 bridge/structure or trees as roost sites and/or sensitive bats species are detected during acoustic  
 7 monitoring. Appropriate measures will be determined by DWR in consultation with CDFW and shall  
 8 include, as applicable, the measures listed below.

- 9 • Ensure that bats are protected from noise, vibrations, and light that result from construction  
 10 activities associated with water conveyance facilities, conservation components and ongoing  
 11 habitat enhancement, as well as operations and maintenance of above-ground water  
 12 conveyance facilities, including the transmission facilities. This would be accomplished by either  
 13 directing noise barriers and lights inward from the disturbance or ensuring that the  
 14 disturbances do not extend more than 300 feet from the point source.
- 15 • Disturbance of the bridge will be avoided between March 1 and October 31 (the maternity  
 16 period) to avoid impacts on reproductively active females and dependent young.
- 17 • Installation of exclusion devices from March 1 through October 31 to preclude bats from  
 18 occupying the bridge during construction. Exclusionary devices will only be installed by or  
 19 under the supervision of an experienced bat biologist.
- 20 • Tree removal will be avoided between April 15 and September 15 (the maternity period for bat  
 21 species that use trees) to avoid impacts on pregnant females and active maternity roosts  
 22 (whether colonial or solitary).
- 23 • Tree removal will be conducted between September 15 and October 31 to the maximum extent  
 24 feasible, which corresponds to a time period when bats would not likely have entered winter  
 25 hibernation and would not be caring for flightless young. If weather conditions remain  
 26 conducive to regular bat activity beyond October 31st, later tree removal may be considered in  
 27 consultation with CDFW.
- 28 • Trees will be removed in pieces, rather than felling the entire tree.
- 29 • If a maternity roost is located, whether solitary or colonial, that roost will remain undisturbed  
 30 with a buffer as determined in consultation with CDFW until September 15 or until a qualified  
 31 biologist has determined the roost is no longer active.
- 32 • If a non-maternity roost is found, that roost will be avoided to the maximum extent feasible and  
 33 an appropriate buffer established in consultation with CDFW. Every effort would be made to  
 34 avoid the roost to the maximum extent possible, as methods to evict bats from trees are largely  
 35 untested. However, if the roost cannot be avoided, eviction would be attempted and procedures  
 36 designed in consultation with CDFW to reduce the likelihood of mortality of evicted bats. In all  
 37 cases:
  - 38 ○ Eviction will not occur before September 15th and will match the timeframe for tree  
 39 removal approved by CDFW.
  - 40 ○ Qualified biologists will carry out or oversee the eviction tasks and monitor the tree  
 41 trimming/removal.



- Eviction will take place late in the day or in the evening to reduce the likelihood of evicted bats falling prey to diurnal predators.
- Eviction will take place during weather and temperature conditions conducive to bat activity.
- Special-status bat roosts would not be disturbed.

Eviction procedures shall include but are not limited to:

- Pre-eviction surveys to obtain data to inform the eviction approach and subsequent mitigation requirements. Relevant data may include the species, sex, reproductive status and/or number of bats using the roost, and roost conditions themselves such as temperature and dimensions. Surveys may include visual emergence, night vision, acoustic, and/or capture.
- Structural changes may be made to the roost, performed without harming bats, such that the conditions in the roost are undesirable to roosting bats and the bats leave on their own (e.g., open additional portals so that temperature, wind, light and precipitation regime in the roost change).
- Noninjurious harassment at the roost site to encourage bats to leave on their own, such as ultrasound deterrents or other sensory irritants.
- Prior to removal/trimming, after other eviction efforts have been attempted, any confirmed roost tree would be shaken, repeatedly struck with a heavy implement such as an axe and several minutes should pass before felling trees or trimming limbs to allow bats time to arouse and leave the tree. The biologists should search downed vegetation for dead and injured bats. The presence of dead or injured bats would be reported to CDFW.

Compensatory mitigation at a 1:1 ratio for the loss of roosting habitat would be accomplished by the restoration of 251 acres and protection of 103 acres of valley/foothill riparian habitat.

Compensation may include the construction and installation of suitable replacement roosting habitat onsite as described below. Depending on the species and type of roost lost, various roost replacement habitats have met with some success (e.g., bat houses, “bat bark,” planting cottonwood trees, leaving palm thatch in place rather than trimming). The creation of natural habitat onsite is generally preferable to artificial.

Artificial roosts are often unsuccessful, and care must be taken to determine as closely as possible the conditions in the natural roost to be replaced. Even with such care, artificial habitat may fail. Several artificial roosts have been highly successful in replacing bridge roost habitat when incorporated into new bridge designs. “Bat bark” has been successfully used by Arizona Department of Game and Fish to create artificial crevice-roosting bat habitat mounted on pine trees (Mering and Chambers 2012: 765). Bat houses have at best an inconsistent track record but information is mounting on how to create successful houses. There is no single protocol or recipe for bat-house success. Careful study of the roost requirements of the species in question; the particular conditions at the lost roost site including temperature, orientation of the openings, airflow, internal dimensions and structures (cavity vs. crevice, etc.) should increase the chances of designing a successful replacement.

Restoring riparian woodland with plantings shows signs of success in Colorado. Western red bat activity has been positively correlated with increased vegetation and tree growth, canopy complexity and restoration acreage at cottonwood-willow restoration sites along the Lower

Colorado River (Broderick 2012: 39). These complex woodland areas would ultimately provide a wider range of bat species with preferred roost types, including both foliage-roosting and crevice-/cavity-roosting bats.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies** Avoidance and minimization measures may be necessary if it is determined that bats are using the bridge/structure or trees as roost sites and/or sensitive bats species are detected during acoustic monitoring. Appropriate measures will be determined by DWR in coordination with CDFW. If a non-maternity roost is found, that roost will be avoided to the maximum extent practicable and an appropriate buffer established in consultation with CDFW. Every effort should be made to avoid the roost, as methods to evict bats from trees are largely untested. However, if the roost cannot be avoided, eviction would be attempted and procedures designed in consultation with CDFW to reduce the likelihood of mortality of evicted bats. If weather conditions remain conducive to regular bat activity beyond October 30th, later tree removal may be considered in consultation with CDFW.

**Location:** Bat species with potential to occur in the study area employ varied roost strategies, from solitary roosting in foliage of trees to colonial roosting in trees and artificial structures, such as buildings and bridges. Riparian woodland, orchards, and stands of mature broadleaf trees should be considered potential habitat for solitary foliage roosting bat species.

**Timing:** Surveys prior to construction; eviction or monitoring during construction. Bridge disturbance avoided between April 15 and September 15. Install exclusion device between March and April 14 or September 15 through October 30.

**Monitoring:** DWR will provide biologists to survey for bats, install exclusion devices, conduct emergent surveys, monitor roosts, and potentially evict bats in accordance with the actions described above and in coordination with CDFW. The biologists will inspect implemented avoidance measures as necessary to ensure effectiveness of eviction procedures and deployment of artificial roosts and alter artificial roosts in coordination with CDFW.

**Reporting Requirements:** The biologists will submit pre-construction survey results to DWR. If required, appropriate measures will be determined by DWR in consultation with CDFW. The measures ultimately chosen and implemented shall be described in a follow-up report.

## 2.25 Mitigation Measure BIO-170: Avoid, Minimize, or Compensate for Impacts on Special-Status Plant Species

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
BIO-170: Avoid, Minimize, or Compensate for Impacts on Special-Status Plant Species	DWR	Prior to construction	Impact BIO-170, BIO-175

**Action:** DWR will evaluate all projects for their impacts on special-status plant species, avoid or minimize impacts on species that occur on project sites, and compensate for impacts on species. All impacts on diamond-petaled California poppy and caper-fruited tropidocarpum shall be avoided. Impacts on other special-status plant species will be avoided to the extent feasible, and any unavoidable impacts will be compensated for.

- DWR will conduct surveys for special-status plant species within and adjacent to all project sites. Special-status plant surveys required for project-specific permit compliance will be conducted during the planning phase to allow design of the individual restoration projects to avoid adverse modification of habitat for specified plant species if practicable. The purpose of these surveys will be to verify that the locations of special-status species identified in previous record searches or surveys are extant, identify any new special-status plant species occurrences, and cover any portions of the project area not previously surveyed. The extent of mitigation of direct loss of or indirect effects on special-status plant species will be based on these survey results.
- All surveys will be conducted by qualified biologists using the Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 1996) and Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (California Department of Fish and Game 2009) during the season that special-status plant species would be evident and identifiable, i.e., during their blooming season. Locations of special-status plant species in proposed construction areas will be recorded using a GPS unit and flagged.
- The construction monitoring plan for the protection of special-status fish, wildlife, and plant species, prepared by DWR before implementing an approved project, will provide for construction activity monitoring in areas identified during the planning stages and species/habitat surveys as having special-status plant species.
- Where surveys determine that a special-status plant species is present in or adjacent to a project site, direct and indirect impacts of the project on the species will be avoided if feasible through the establishment of 250-foot activity exclusion zones surrounding the periphery of the occurrences, within which no ground-disturbing activities will take place, including construction of new facilities, construction staging, or other temporary work areas. Activity exclusion zones for special-status plant species will be according to a 250-foot buffer surrounding the periphery of each special-status plant species occurrence, the boundaries of which will be clearly marked with standard orange plastic construction exclusion fencing or its equivalent. The establishment of activity exclusion zones will not be required if no construction-related disturbances will occur

within 250 feet of the occupied habitat site occurrence periphery. The size of activity exclusion zones may be reduced through consultation with a qualified biologist and with concurrence from USFWS or CDFW based on project site-specific conditions.

- Where avoidance of impacts on a special-status plant species is infeasible, DWR will compensate for loss of individuals or occupied habitat of a special-status plant species through the acquisition, protection, and subsequent management in perpetuity of other existing occurrences at a 2:1 (preservation:impact). DWR will provide detailed information to USFWS and CDFW on the location of the preserved occurrences, quality of the preserved habitat, feasibility of protecting and managing the areas in-perpetuity, responsible parties, and other pertinent information. If suitable occurrences of a special-status plant species are not available for preservation, then the project will be redesigned to remove features that would result in impacts on that species.

**Responsible Parties:** DWR.

**Regulating/Permitting Agencies:** CDFW and USFWS

**Location:** Within and adjacent to all project sites.

**Timing:** Prior to construction.

**Monitoring:** DWR will provide a qualified biologist to perform evaluations for special status plant species as described in the action above. The biologist will inspect any buffer or exclusion zones deemed necessary. The biologist will evaluate any compensatory habitat for suitability prior to construction.

**Reporting Requirements:** The biologist will report to DWR and CDFW on the results of special status plant species and recommendations of exclusion zones and habitat compensation. In describing any habitat compensation, DWR will identify or describe the location and quality of the preserved habitat, the feasible means of protecting and managing the areas in-perpetuity, responsible parties, and other pertinent information.

## 2.26 Mitigation Measure BIO-176: Compensatory Mitigation for Fill of Waters of the U.S.

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 12, Terrestrial Biological Resources			
Mitigation Measure BIO-176: Compensatory Mitigation for Fill of Waters of the U.S.	DWR and USACE district engineer	Prior to and during construction	Impact BIO-176, BIO-177

**Action:** All mitigation proposed as compensatory mitigation would be subject to specific success criteria, success monitoring, long-term preservation, and long-term maintenance and monitoring pursuant to the requirements of the Mitigation Rule. All compensatory mitigation will fully replace lost function through the mechanisms discussed below which will result in restoration and/or creation of habitat with at least as much function and value as those of the impacted habitat. In some cases, the mitigation habitat will afford significantly higher function and value than that of impacted habitat.

Compensation ratios are driven by type, condition, and location of replacement habitat as compared to type, condition and location of impacted habitat. Compensatory mitigation usually includes restoration, creation, or rehabilitation of aquatic habitat. The USACE does not typically accept preservation as the only form of mitigation; use of preservation as mitigation typically requires a very high ratio of replacement to impact. It is anticipated that ratios will be a minimum of 1:1, depending on the factors listed above.

Compensatory mitigation will consist of restoration, creation, and/or rehabilitation of aquatic habitat. Typically, impacted habitat will be replaced in-kind, although impacts on some habitat types such as agricultural ditches, conveyance channels, and Clifton Court Forebay, will be mitigated out-of-kind with higher functioning habitat types such as riparian wetland, marsh, and/or seasonal wetland. Compensatory mitigation will be accomplished by one, or a combination of the following methods:

- Purchase credits for restored/created/rehabilitated habitat at an approved wetland mitigation bank;
- On-site (adjacent to the project footprint) restoration or rehabilitation of wetlands converted to uplands due to past land use activities (such as agriculture) or functionally degraded by such activities;
- On-site (adjacent to the project footprint) creation of aquatic habitat;
- Off-site (within the Delta) restoration or rehabilitation of wetlands converted to uplands due to past land use activities (such as agriculture) or functionally degraded by such activities;
- Off-site (within the Delta) creation of aquatic habitat; and/or
- Payment into the Corps' Fee-in-Lieu program.

#### ***Purchase of Credits or Payment into Fee-in-Lieu Program***

It is envisioned that purchase of bank credits and/or payment into a fee-in-lieu program will be utilized for habitat types that would be difficult to restore or create within the Delta. Examples are vernal pool habitat, which requires an intact hardpan or other impervious layer and very specific soil types, and alkali seasonal wetland, which requires a specific set of chemical soil parameters. It is anticipated that only a small amount of compensatory mitigation will fall into these categories.

#### ***On-Site Restoration, Rehabilitation and/or Creation***

Much of the Delta consists of degraded or converted habitat that is more or less functioning as upland. Opportunities will be sought where on-site restoration, rehabilitation, and/or creation could occur immediately adjacent to the project footprint. It is anticipated that some of the compensatory mitigation will fall into this category.

#### ***Off-Site Restoration, Rehabilitation and/or Creation***

There exists, within the immediate vicinity of the project area, Delta land which has been subject to agricultural practices or other land uses which have degraded or even converted wetlands that existed historically. Sites within the Delta will be evaluated for their restoration, rehabilitation, and/or creation potential. It is anticipated that most of the compensatory mitigation will fall into this category.

Compensatory mitigation will result in no net loss of acreage of Waters of the U.S. and will accomplish full functional replacement of impacted wetlands. All impacted wetlands will be replaced with fully functioning wetland habitat demonstrating high levels of habitat, water quality, and hydrologic/hydraulic function. Since many impacted wetlands are likely to function at significantly less than high levels, the compensatory mitigation will result in a significant net increase in wetland function.

**Responsible Parties:** DWR and the USACE district engineer.

**Regulating/Permitting Agencies:** USACE and EPA.

**Location:** N/A for this mitigation measure.

**Timing:** Prior to and during construction.

**Monitoring:** All mitigation proposed as compensatory mitigation would be subject to specific success criteria, success monitoring, long-term preservation, and long-term maintenance and monitoring pursuant to the requirements of the Mitigation Rule. DWR will review all compensatory mitigation created or purchased to ensure compliance with the standards set forth in the above mitigation measure.

As outlined in the Section 404(b)(1) Guidelines (40CFR230), DWR will submit monitoring reports to the USACE to assess the development and condition of the compensatory mitigation project that is required. DWR will develop a mitigation plan that will address the monitoring requirements for the compensatory mitigation project, including the parameters to be monitored, the length of the monitoring period, the party responsible for conducting the monitoring, the frequency for submitting monitoring reports to the USACE district engineer, and the party responsible for submitting those monitoring reports to the USACE district engineer. The USACE district engineer may conduct site inspections on a regular basis (e.g., annually) during the monitoring period to evaluate mitigation site performance (Environmental Protection Agency 2010).

The mitigation plan will determine a monitoring period that is sufficient to demonstrate that the compensatory mitigation project has met performance standards, but not less than five years. A longer monitoring period must be required for aquatic resources with slow development rates (e.g., forested wetlands, bogs). The USACE district engineer must determine what information will be sufficient to determine the progress of the compensatory mitigation project and will include the requirement for this information in monitoring reports. DWR is responsible for submitting monitoring reports in accordance with the special conditions of the DA permit or the terms of the instrument. Failure to submit monitoring reports in a timely manner may result in compliance action by the USACE district engineer. Monitoring reports must be provided by the USACE district engineer to interested federal, tribal, state, and local resource agencies, and the public, upon request (Environmental Protection Agency 2010).

**Reporting Requirements:** The mitigation plan will include a schedule for monitoring and reporting on monitoring results to the USACE district engineer and the party responsible for submitting those monitoring reports to the USACE district engineer. Such reports shall describe, among other things, how the mitigation plan ensures that the restoration and/or creation of habitat will create at least as much function and value as those of the impacted habitat.

## 2.27 Mitigation Measure AG-1: Develop an Agricultural Land Stewardship Plan (ALSP) to Maintain Agricultural Productivity and Mitigate for Loss of Important Farmland and Land Subject to Williamson Act Contracts or in Farmland Security Zones

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impacts
Chapter 14, Agriculture			
Mitigation Measure AG-1: Develop an Agricultural Land Stewardship Plan	DWR	Prior to construction	Impact AG-1, AG- 2, AG-3, AG-4

**Action:** DWR shall develop Agricultural Lands Stewardship Plans (ALSPs) (i) prior to the commencement of any construction activities or other physical activities associated with the project that would involve adverse effects (under NEPA) or significant effects (under CEQA) on Important Farmland or land subject to Williamson Act contracts or in Farmland Security Zones, and (ii) as part of the site-specific environmental review for all other environmental commitment or other site-specific project activities that could involve adverse effects (under NEPA) or significant effects (under CEQA) on Important Farmland or land subject to Williamson Act contracts or in Farmland Security Zones. For each environmental commitment or site-specific project activity other than the water conveyance facility that would cause such effects, a draft ALSP will be included with any publicly circulated environmental document for the proposed environmental commitment or project activity in order to obtain public input. The Plans will contain the three elements identified below for this measure. If a programmatic ALSP is developed for the project, parts of the project, the Delta or parts of the Delta, DWR may rely on these plans to the extent that they include all the elements in this measure.

### AG-1a: Promote agricultural productivity of Important Farmland to the extent feasible

DWR will ensure that the following measures are implemented to reduce adverse effects and/or significant effects as described above if the measures are applicable and feasible. Not all measures listed below may be feasible or applicable to each environmental commitment or to individual parts of each environmental commitment. Rather, these measures serve as an overlying mitigation framework to be used for mitigation of impacts caused by the implementation of specific environmental commitments. The applicability of measures listed below would vary based on the location, timing, nature, and feasibility of each environmental commitment.

- Early Planning
  - Describe the current land use in the project area and identify acreage of all land devoted to agricultural use, including farmland of local importance, grazing land, and confined animal agriculture.
  - Describe the extent to which the project can be part of or complement existing or planned land uses for the Delta. For California WaterFix, this means consulting with county

governments, the Delta Protection Commission, the Delta Conservancy and other individuals and organizations that are considering plans or activities designed for agricultural use; flood management; mitigation and enhancement relating to aquatic and terrestrial habitat; recreation; and tourism. This consultation is particularly important when there are multiple uses being considered for one specific area of land, but it is also important to look at how the project affects or fits into other plans for the region or sub-regions where the project is located.

- DWR should consult with farmers, local agencies and other State and federal agencies, including the California Natural Resources Agency, the California Department of Water Resources, the Central Valley Flood Protection Board, the California Department of Conservation, the California Department of Food and Agriculture, the California Department of Fish and Wildlife, the Delta Stewardship Council, the California Delta Protection Commission, the Delta Conservancy, the United States Fish and Wildlife Service, the National Marine Fisheries Service, and the U.S. Department of Agriculture, including the Natural Resources Conservation Service, to identify design features of the project, if any, that will benefit flood management, agricultural production and natural resource protection.
- Consider whether the proposed land use is consistent with State, regional and local plans. For the California WaterFix, this could include local General Plans, the Delta Protection Commission's Land Use and Resource Management Plan and Economic Strategy, the Delta Stewardship Council's Delta Plan, the California Water Plan Agriculture Strategy, the Delta Conservancy Strategy, the California Department of Food and Agriculture's Ag Vision; the California Natural Resources Agency's California Climate Adaptation Plan, and the California Fish and Wildlife Strategic Vision;
- Consider whether agriculture and/or habitat management activities undertaken pursuant to the proposed land use are consistent with State and local policies relating to flood protection and whether they might provide additional protection because, for example, they (i) provide flood management activities that provide additional protection for agricultural activities or (ii) prevent or divert potential higher groundwater levels that would thwart flood control efforts
- Site Related Avoidance and Mitigation
  - Site projects and project footprints to minimize the permanent conversion of Important Farmland, to nonagricultural uses.
  - When identifying and selecting project areas, give priority to public lands and existing conservation lands.
  - Where choices are possible among or between particular parcels or lands that are available for a project, DWR should look at the characteristics of the different parcels or lands to determine whether one choice would be better from an agricultural resource perspective. If choices can be made regarding different locations for a project and still achieve the project purposes, it may be possible to avoid areas that may have more value from an agricultural resources perspective such as whether the property is (1) "high quality" farmland. (2) unique or has special values, (3) important to maintaining viability of agriculture in a certain area, (4) important to maintaining habitat lands in agriculture in a certain area.
  - Manage project operations to minimize the introduction of invasive species or weeds that may affect agricultural production on adjacent agricultural land.



- 1     • Mitigate on Site
- 2         ○ Design projects so as to optimize contiguous parcels of agricultural land of a size sufficient
- 3             to support their efficient use for continued agricultural production.
- 4         ○ Where the construction or operation of a facility could limit access to ongoing agricultural
- 5             operations, maintain a means of convenient access to these agricultural properties as part of
- 6             project design, construction, and implementation.
- 7         ○ At borrow sites to be returned to agricultural production, remove and stockpile, at a
- 8             minimum, the upper 2 feet of topsoil and replace the topsoil after project completion as part
- 9             of borrow site reclamation.
- 10        ○ In areas permanently disturbed by project activities, and where topsoil is removed as part of
- 11           project construction (e.g., stripping topsoil under a levee foundation) and not reused as part
- 12           of the project, make the topsoil available to less productive agricultural lands that could
- 13           benefit from the introduction of good-quality soil.
- 14        ○ For temporarily impacted diversions:
  - 15           • Provide new water wells until diversion connection is reestablished to ensure
  - 16           agricultural production is maintained
  - 17           • Provide alternate water supply from a permitted source, such as trucking in water or
  - 18           negotiating with adjacent land owners
  - 19           • Compensate owners for production losses attributable to reduction in water supply
  - 20           from the impacted diversions
- 21        ○ For permanently impacted diversions:
  - 22           • Carry out those measures for temporarily impacted diversions until the measures listed
  - 23           below are completed
  - 24           • Relocate and/or replace wells, pipelines, power lines, drainage systems, and other
  - 25           infrastructure that are needed for ongoing agricultural uses and would be adversely
  - 26           affected by project construction or operation.
  - 27           • Provide negotiated settlement that may include some of the above and/or compensation
- 28        ○ Minimize disturbance of Important Farmland and continuing agricultural operations during
- 29           construction by (1) locating construction laydown and staging areas on sites that are fallow,
- 30           already developed or disturbed, or are to be discontinued for use as agricultural land and
- 31           (2) using existing roads to access construction areas.
- 32        ○ Consult with landowners and agricultural operators to develop appropriate construction
- 33           practices to minimize construction-related impairment of agricultural productivity.
- 34           Practices may include coordinating the movement of heavy equipment and implementing
- 35           traffic control measures.
- 36        ○ Consult with landowners and agricultural operators with the goal of sustaining existing
- 37           agricultural operations, at the landowners' discretion, until the individual agricultural
- 38           parcels are needed for project construction.
- 39     • Consult with landowners and agricultural operators on what role they can take if they wish be
- 40       involved in project development. Issues to consider include whether:

- Owner(s) or operator(s) could carry out project activities on their land. To the extent that Important Farmland is part of the project, consideration should be given to providing flexibility to the farmer. To the extent that Important Farmland is part of the project, consideration should also be given to developing working landscapes<sup>3</sup> on project lands
- Some or all of the ownership interests on any project land could remain in private hands or in the hands of a private conservancy in order to keep the property in nongovernmental ownership and thereby on the County tax base;
- Owner(s) and/or operator(s) of land displaced by project facilities and activities could maintain or obtain full or partial ownership of the land on which project activities will be carried out or could be compensated to manage said land;
- Existing agricultural operations on lands could be modified, through such things as crop change, new integrated pest management strategies, altered water usage, or full or partial conversion to habitat uses, in a manner that renders such operations consistent with the goals and objectives of the project by enhancing environmental outcomes in a manner beneficial to species covered by the project;
- Limited agriculture could take place within areas identified for habitat restoration under the project without undermining the achievement of the project goals and objectives;
- Subsidies to allow economically viable rice farming on particular lands could be justified due to the environmental benefits of such rice farming such as the stabilization of subsiding areas or the creation of sinks for greenhouse gases and methylmercury;
- Subsidies to assist the owner(s) and/or operator(s) to make a viable living managing wetlands or other habitat areas could be justified due to the environmental benefits of wetlands or habitat such as the stabilization of subsiding areas or the safer accumulation and isolation of greenhouse gases and methylmercury;
- Implementation
  - The plans should include a framework that encourages adaptive management with regard to agricultural land management.
  - The plans should include reporting and monitoring actions necessary to show that the actions agreed to were being carried out.

<sup>3</sup> The Cal-Fed Working Landscapes Subcommittee of the Bay Delta Public Advisory Committee defined a working landscape as “a place where agriculture and other natural resource-based economic endeavors are conducted with the objective of maintaining the viability and integrity of its commercial and environmental values. On a working landscape, both private production, as well as public regulatory decisions account for the sustainability of families, businesses and communities, while protecting and enhancing the landscape’s ecological health. The working landscape is readily adaptable to change according to economic and ecosystem needs. With respect to CALFED, a working landscape is both an objective and a means to achieve it. A working landscape is efficiently managed largely by private agricultural landowners and managers who are supported and encouraged to manage their lands in ways that fulfill CALFED goals, allowing them to pursue ecological health goals while yielding economic returns on investments, and generating tax revenues that support their local governments” (California Bay-Delta Public Advisory Committee 2002).

## **AG-1b: Minimize impacts on land subject to Williamson Act contracts or in Farmland Security Zones**

DWR will ensure that the following measures are implemented as applicable to reduce effects and preserve agricultural uses on lands with designated agricultural preserves and subject to Williamson Act contracts or in Farmland Security Zones:

- DWR will comply with applicable provisions of California Government Code Sections 51290–51295 with regard to acquiring lands within agricultural preserves and subject to Williamson Act contracts. Sections 51290(a) and 51290(b) specify that State policy, consistent with the purpose of the Williamson Act to preserve and protect agricultural land, is to avoid locating public improvements and any public utilities improvements in agricultural preserves, whenever feasible. If it is infeasible to locate such improvements outside of a preserve, they will be located on land that is not under contract, if feasible.
- More specifically, DWR will comply with the following basic requirements stated in the California Government Code:
  - Whenever it appears that land within a preserve or under contract may be required for a public improvement, the DOC and the city or county responsible for administering the preserve must be notified (Section 51291(b)).
  - Within 30 days of being notified, DOC and the city or county must forward comments, which will be considered by the proponents of the public improvement (Section 51291(b)).
  - A public improvement generally may not be located within an agricultural preserve unless DWR makes specific findings to the effect that (1) the location is not based primarily on the lower cost of acquiring land in an agricultural preserve and (2) for agricultural land covered under a contract for any public improvement, no other land exists within or outside the preserve where it is reasonably feasible to locate the public improvement (Sections 51291(a) and 51291(b)). Findings do not need be made if the action falls within one of the exemptions in Section 51293. The contract is normally terminated when land is acquired by eminent domain or in lieu of eminent domain (Section 51295).
  - DOC must be notified within 10 working days upon completion of the acquisition (Section 51291(c)).
  - DOC and the city or county must be notified before completion of any proposed work of any significant changes related to the public improvement (Section 51291(d)).

If, after acquisition, the acquiring public agency determines that the property would not be used for the proposed public improvement, DOC and the city or county administering the involved preserve must be notified before the land is returned to private ownership. The land will be reenrolled in a new contract or encumbered by an enforceable restriction at least as restrictive as that provided by the Williamson Act (Section 51295).

## **AG-1c: Consideration of an Optional Agricultural Land Stewardship Approach or Conventional Mitigation Approach**

Where DWR has determined that compliance with Mitigation Measures AG-1a and AG-1b is not sufficient to mitigate to a less than significant or adverse level the impacts from the conversion of Important Farmland or of land subject to Williamson Act contracts or in Farmland Security Zones, they will undertake additional feasible mitigation pursuant to this measure (AG-1c).

Exceptions to this requirement will apply where the mitigation already being required for the biological resource values for the land at issue (e.g., for its value as habitat for Swainson's hawk) pursuant to the cultivated lands natural community strategy of Environmental Commitment 3 already requires the equivalent of 1:1 mitigation (based on the net area of land remaining in agriculture) for impacts to Important Farmland or of land subject to Williamson Act contracts or in Farmland Security Zones, provided that the easements for biological values also incorporate agricultural preservation.

DWR will determine the nature and form of any necessary additional mitigation after consultation with, at least, all of the following: (i) the County in which the affected property is located; (ii) the owner(s) and/or operator(s) of said property; (iii) the California Natural Resources Agency; (iv) the California Department of Water Resources; (v) the Central Valley Flood Protection Board; (vi) the California Department of Conservation; (vii) the California Department of Food and Agriculture; (viii) the California Department of Fish and Wildlife; (ix) the Delta Stewardship Council; (x) the California Delta Protection Commission; (xi) the Delta Conservancy; (xii) the United States Fish and Wildlife Service; (xiii) the National Marine Fisheries Service; and (xiv) the U.S. Department of Agriculture, including the Natural Resources Conservation Service. After consulting with these agencies, entities, and/or individuals, the DWR will determine whether or not, under the circumstances surrounding the conversion of particular agricultural lands, the best overall approach to the additional required mitigation is the conventional use of agricultural land conservation property interests (see discussion below on Conventional Mitigation Approach). In making this determination, DWR will give considerable weight to the willingness of the County in which the affected property is located and the owner(s) and/or operator(s) of said property to participate in an Optional Agricultural Land Stewardship Approach, which would seek opportunities to protect and enhance agriculture in the Delta as part of the project landscape and focus on maintaining economic activity on agricultural lands instead or in conjunction with the Conventional Mitigation Approach for purposes of CEQA/NEPA mitigation. Where the County and the owner(s) and/or operator(s) have a preference for participating in an Optional Agricultural Land Stewardship Approach, DWR will attempt to develop a feasible Optional Agricultural Land Stewardship alternative mitigation program acceptable not only to the County and the owner(s) and/or operator(s), but also to the California Department of Fish and Wildlife, the United States Fish and Wildlife Service, and the National Marine Fisheries Service. Where DWR, despite a good faith effort, cannot succeed in achieving the consensus necessary to carry out a feasible Optional Agricultural Land Stewardship Approach, they will undertake instead a Conventional Mitigation Approach, where necessary and feasible, based on the use of agricultural conservation property interests or other measures requiring the preservation or, enhancement of other land of similar agricultural quality in areas that are threatened with encroaching urban development.

Specific strategies that could be used in formulating an Optional Agricultural Land Stewardship Approach are described in Appendix 14B, *Delta Agricultural Stewardship Strategies*. In determining the potential nature and form of an Optional Agricultural Land Stewardship Approach, DWR will, at a minimum, consider the following, as applicable:

- whether there is Important Farmland in the Delta reasonably accessible to DWR and/or to the owner(s) and/or operators for use for agriculture and/or habitat management in a manner consistent with the goals and objectives of the California WaterFix;
- whether there is Important Farmland that might not remain in agriculture if it was not protected by means of an agricultural conservation property interest because of threats of urban

development (e.g. in the secondary zone in the Delta) or wind/solar and other non-renewable energy projects, or the productive value of which is so high, it should remain in agriculture instead of being used for restoration or other open-space projects because, for example, it is:

- unique or has special values
- important to maintaining viability of agriculture in the region
- critical to prevent a “tipping” point that could lead to elimination of a crop in the region
- important to maintaining habitat lands in agriculture in the region
- whether Agricultural Land Stewardship Strategies<sup>4</sup> benefit agricultural lands by providing feasible CEQA/NEPA mitigation (or providing funding for such mitigation) for potential significant environmental agricultural impacts at both the farm and the regional level. In determining whether the funds necessary to make an Optional Agricultural Land Stewardship Approach feasible are available, DWR will be guided by the principle that funds that might otherwise be used for off-site preservation or another form of compensation may be made available instead to assist with making the Optional Agricultural Land Stewardship Approach work. Such strategies could include:
  - Potential strategies to help maintain farming in the Delta
    - Improve flood protection (Strategy 1)
    - Provide technical and financial assistance to help farmers maintain or improve agricultural production (Strategy 2)
    - Provide technical and financial assistance to help farmers comply with regulatory requirements for water quality (Strategy 3)
    - Control terrestrial weeds (Strategies 6a, 6b, and 6c)
    - Reduce conflict between agriculture and nearby habitat lands by creating a “good neighbor” policy (Strategy 7)
    - Work with other interests to explore the value of reinstating state funding of Williamson Act subventions (Strategy 8)
    - Work with counties to expand Williamson Act authorized uses to include open space/habitat lands in Williamson Act Preserves (Strategy 9)
    - Investigate options for in lieu tax revenue for counties and payments for local districts (Strategy 10)
    - Provide for Agricultural Conservation Easements (Strategy 11)
  - Potential strategies that provide incentives for conservation on farmland
    - Partner with others to maintain and enhance environmental quality on farmland (Strategy 12)
    - Compensate farmers to manage agricultural land as habitat for wildlife (Strategy 13)

<sup>4</sup> Strategies developed so far, and other materials relating to their development and implementation, can be found at <https://bdcpdf.water.ca.gov/home>. These are given as examples to consider at this time. It is expected that existing strategies will evolve and change over time and that additional strategies will be developed.

- Provide incentives for farmers to take part in a market-based conservation program (Strategy 14)
- Potential strategies to manage land for purposes other than conventional crop production
  - Provide technical and financial assistance to stabilize or reverse land subsidence on Delta island (Strategy 15)
  - Assist landowners to produce and sell greenhouse gas offset credits in the AB 32 Cap-and-Trade program (Strategy 16)
  - Compensate farmers to manage habitat lands (Strategy 17)
  - Designate carbon sequestration and subsidence reversal crops as agricultural production for regulatory and incentive programs (Strategy 18)
- Potential strategies that provide for economic development and other benefits
  - Provide technical and financial assistance to develop an economic study of agricultural activity and related infrastructure (Strategy 19)
  - Provide technical and financial assistance for to promote economic development (Strategy 20)
  - Provide technical and financial assistance to promote transportation infrastructure improvements (Strategy 21)
  - Provide technical assistance to farmers to help in complying with the regulatory framework present in the Delta (Strategy 22)
  - Provide technical, risk reduction, promotion, and financial assistance for farmers to manage land to incorporate recreation and tourism (Strategy 23)
  - Work with others to better align the regulatory system to help farmers who engage in ecological restoration and enhancement projects (Strategy 24)
  - Develop Agricultural Land Stewardship Plans (Strategy 25)
- In addition, DWR will explore the following funding sources to implement strategies that are in addition to those required under CEQA/NEPA in order to maintain agriculture In the Delta. These strategies include those listed above for CEQA/NEPA mitigation.
  - Work with the California Air Resources Board (CARB) to establish a greenhouse gas offset market using credits created through the development and restoration of wetlands.
  - Seek available funding from CARB's "Cap and Trade" program developed pursuant to the Global Warming Act Solutions Act of 2006 (AB 32).
  - Work with others to explore the value of reinstating state funding for Williamson Act subventions from Cap and Trade Funding or other sources
  - Consider recommending to the Governor and Legislature that funds for be included in any bond measure(s) placed on the statewide ballot (e.g. the Delta Investment Fund authorized by the Delta Reform Act).
  - Work with other governmental and private entities to identify other funds that can be used for the Optional Agricultural Land Stewardship Approach.

**Strategy for implementing a Conventional Mitigation Approach.** Where DWR, despite a good faith effort, cannot succeed in achieving the consensus necessary to carry out a feasible Optional Agricultural Land Stewardship Approach, they will undertake instead, where necessary and feasible, a Conventional Mitigation Approach based on the purchase of property interests in agricultural lands (e.g., conservation easements) or other compensation arrangements (collectively referred to as “agricultural conservation property interests”), requiring the preservation and/or enhancement of other land of similar agricultural quality. The standard ratio for purchase of agricultural conservation property interests to mitigate for permanently converted Important Farmland not included, as discussed above, as part of mitigation for biological resources, will be at a ratio of 1:1 for similar types of Important Farmland.

Where feasible, mitigation will generally result in the purchase of agricultural conservation property interests, such as easements on other agricultural lands of the same overall quality and acreage either directly or indirectly. The two preferred forms of mitigation in this context will be (i) the inclusion of sufficient acreages within agricultural preserves within California WaterFix lands to satisfy CEQA and NEPA agricultural resource mitigation in addition to meeting DWR objectives under the federal and state Endangered Species Act and (ii) reliance on the California Farmland Conservancy Program or on other established programs in the Delta supported by the county where the project is located, the Delta Stewardship Council, the Delta Planning Commission, or the Delta Conservancy. Where DWR chooses to rely on the latter strategy, they will confirm, prior to submitting funds into any program both (a) that the program meets the standards under CEQA case law for a “reasonable mitigation plan” and (b) that they can spend the funds at issue for the preservation and, where appropriate, the enhancement, of land that is reasonably proximate to the land being impacted and of a similar quality or extent. Where these two preferred options are unavailable or infeasible, DWR will be responsible for purchasing agricultural conservation property interests on their own.

Where feasible, agricultural land conservation interests should be acquired in the county in which the conversion will take place, provided that any such land either would be at-risk for conversion from agricultural uses in the absence of such long-term protection, unless such purchases would potentially put off-limits lands that may be needed for habitat purposes under Alternative 4A or are necessary for other habitat conservation plans. Thus, acquisition of such agricultural land conservation interests cannot be located in areas targeted for habitat restoration if doing so would thwart implementation of the habitat restoration objectives of the mitigation for California WaterFix.

Where a property identified for purchase of an agricultural land conservation interest serves non-agricultural purposes such as providing wildlife habitat or flood control or flood management benefits, the terms of the agricultural land conservation interest will require the farm operator to continue to use the property in a manner that preserves these benefits (e.g., by continuing to support certain crop types known to provide, or be consistent with, such benefits) unless similar benefits are provided through some other means. The value of the agricultural land conservation interest would need to take such limitations on agricultural practices into account.

Absent an adequate supply of similar quality Important Farmland within the county where conversion occurs, the agricultural land conservation interest may be obtained in another county. If so, the proponents will seek to obtain farmland of equivalent qualities, preferring locations within the greater Sacramento and Stockton metropolitan areas. The priority for purchase or encumbrance would be Important Farmland at-risk for conversion from agricultural uses to urban development

without such long-term protection. However, no purchase shall conflict with or undermine the overall California WaterFix by potentially putting off-limits lands that may be needed for habitat purposes during the permit duration of the project.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** DFW, USFWS, NMFS, County Boards of Supervisors

**Location:** Plan Area and Areas of Additional Analysis

**Timing:** Prior to construction.

**Monitoring** DWR will appoint a coordinator responsible for oversight of the development and implementation of ALSPs and any other appropriate mitigation practices as described above. The coordinator will periodically monitor land protection efforts and manage communications with the appropriate agencies, entities, and individuals necessary to perform the actions described above.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of these Mitigation Measures (AG-1a, 1b, and 1c).

## 2.28 Mitigation Measure REC-2: Provide alternative bank fishing access sites

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
REC-2: Provide alternative bank fishing access sites	DWR in consultation with Yolo, Sacramento, and Contra Costa counties.	Prior to construction	REC-2 REC-4

**Action:** Construction-related impacts on informal fishing access sites near the proposed water conveyance facilities, such as along the east bank of the Sacramento River, in the vicinity of the proposed intakes, and in the vicinity of the expanded Clifton Court Forebay, would be considered significant because construction would alter the river bank and/or restrict access, making these sites unusable. To compensate for the loss of these informal sites during construction, DWR will enhance nearby formal fishing access sites, including partnering with Yolo County to enhance the Clarksburg Fishing Access site on the west bank of the Sacramento River, and with the Sacramento County Department of Regional Parks to enhance the Cliffhouse Fishing Access site on the east bank of the Sacramento River and the Georgiana Slough Fishing Access site east of the Sacramento River, and with Contra Costa County to enhance fishing sites near Clifton Court Forebay, as well as other nearby sites. Prior to construction of the proposed water conveyance facilities, DWR will ensure adequate signage will be placed at the informal sites that would be directly affected by construction of the intakes, directing anglers to the formal sites. Upgrading the existing fishing access sites will be completed prior to beginning construction of the intakes.

Where intake locations would remove existing public access to the Sacramento River for recreational purposes as part of design of the intakes, DWR will ensure that public access to the Sacramento River, including fishing access, will be incorporated into the design of the intakes. The access sites will be placed a reasonable distance from the intake to ensure the safety of



recreationists and to compensate for the loss that would occur as a result of constructing the intakes.

**Responsible Parties:** DWR, following input from Yolo County; Sacramento County Department of Regional Parks; Contra Costa County.

**Regulating/Permitting Agencies:** Construction of recreational access sites and facilities adjacent to waterways will require consultation with DFW (1600 Agreement for alterations in riparian areas); USACE (Clean Water Act [CWA] 404 Permit); California Regional Water Quality Control Board (Regional Water Board) (CWA 401 Water Quality Certification).

**Locations:** Clarksburg Fishing Access site (west bank of the Sacramento River); Cliffhouse Fishing Access site (east bank of the Sacramento River); Georgiana Slough Fishing Access site (east of the Sacramento River); Clifton Court Forebay; near respective proposed Intake construction sites (3).

**Timing:** If feasible, and dependent on the extent of cooperation from Yolo County, the Sacramento County Department of Regional Parks, and Contra Costa County, the Mitigation Measure should be completed before public closure of the areas where Intake construction and Clifton Court Forebay enlargement will occur (before pre-construction site preparation commences).

**Monitoring:** DWR will monitor and review development of intake and facility designs to ensure compliance with this mitigation measure in the design phase. Operation and maintenance of the respective, improved recreation areas will continue, undertaken by the respective county entities that operate existing facilities at these locations. DWR will request written approval from the respective county entities about the suitability of the alternative sites and directional signage for the purposes described in the action above.

**Reporting Requirements:** DWR will develop intake and facility designs in compliance with this mitigation measure. Reporting will occur as required by the Permitting Agencies, associated with the construction phase of this Mitigation Measure. DWR will report the approvals of the respective county entities and, if requested by the entities, publish information about the replacement sites.

## 2.29 Mitigation Measure REC-6: Provide a temporary alternative boat launch to ensure access to San Luis Reservoir

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 15, Recreation			
REC-6: Provide a temporary alternative boat launch to ensure access to San Luis Reservoir	DWR, DPR (Division of Boating and Waterways)	During and/or after construction	REC-6

**Action:** Consistent with applicable recreation management plans, DWR and Reclamation will work with DPR to establish a boat ramp extension at or near the Basalt boat launch or other alternative boat ramp site at San Luis Reservoir to maintain reservoir access in years when access becomes unavailable.

**Responsible Parties:** DWR, in consultation with California State Parks (Division of Boating and Waterways).

**Regulating/Permitting Agencies:** Construction of in-water and waterside boat ramps is typically regulated by DFW (1600 Agreement for alterations in riparian areas); USACE (CWA 404 Permit); and Regional Water Board (CWA 401 Water Quality Certification). Additionally, the Department of Parks and Recreation (DPR), Division of Boating and Waterways will likely impose design criteria as a Responsible Agency.

**Location:** San Luis Reservoir, Basalt Boat Ramp, below Elevation 340'.

**Timing:** Planning and construction can occur any time before revised water management operations associated with the project are implemented. Project planning should occur prior to construction, so that construction associated with this Mitigation Measure can expect to occur at the first occurrence of San Luis Reservoir water elevation falling below Elevation 340' (under existing operating criteria).

**Monitoring:** DWR will seek approval from DPR of the completed boat ramp and request San Luis Reservoir visitor use data from California State Parks to assess Mitigation Measure success.

**Reporting Requirements:** DWR will report DPR's approval of the completed boat ramp and report a comparison of boat ramp usage prior to, during, and after construction, in addition to any reporting required by the Permitting Agencies, associated with the construction phase of this Mitigation Measure.

## 2.30 Mitigation Measure AES-1a, 1b, 1c, 1d, 1e, 1f, & 1g

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 17, Aesthetics			
AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible	DWR and Construction Contractors	Prior to and during construction	Impact AES-1, AES-2, AES-3, AES-6
AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors	DWR and Construction Contractors	Prior to construction	Impact AES-1, AES-6
AES-1c: Develop and Implement a Spoil/Borrow and Reusable Tunnel Material Area Management Plan	DWR, Construction Contractors, affected agencies	Prior to and during construction	Impact AES-1, AES-2, AES-3, AES-6
AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned	DWR and Construction Contractors	Prior to and after construction	Impact AES-1, AES-6

AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible	DWR, building architect, design engineer, landscape architect, and Construction Contractors	Prior to and during construction	Impact AES-1, AES-2, AES-3, AES-6
AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities	DWR and Construction Contractors	Prior to, during, and after construction	Impact AES-1, AES-6
AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan	DWR and Construction Contractors	Prior to, during, and after construction	Impact AES-1, AES-6

**Mitigation Measure AES-1a: Locate New Transmission Lines and Access Routes to Minimize the Removal of Trees and Shrubs and Pruning Needed to Accommodate New Transmission Lines and Underground Transmission Lines Where Feasible**

**Action:** DWR will make site-specific design decisions to locate new permanent transmission lines and access routes to minimize effects on vegetation where feasible. Design considerations will include the following actions.

- Working with the design engineer, site-specific location adjustments will be identified to avoid adversely affecting mature tree and shrub groupings to the extent feasible and to avoid creating large, linear swaths of vegetation clearing through the construction of new transmission lines and access routes.
- Where new transmission lines are located near trees along designated scenic route portions of SR 160 and River Road, the construction contractor will be required to utilize selective pruning techniques to avoid hard pruning of tree canopies that would negatively affect those scenic resources and views along those routes.
- Existing transmission corridors will be evaluated for placement of the new transmission lines to avoid creating new transmission corridors to the extent feasible.
- Undergrounding transmission lines.

Implementation of this measure will minimize the effects on existing visual quality and character that would result from removal and pruning of mature vegetation within proposed new transmission lines and access road routes. This measure will provide for a reduction in the number of trees and shrubs removed from installation of transmission lines and development of access roads.

**Responsible Parties:** DWR will work with the design engineer to create site-specific design decisions and evaluate existing transmission corridors. The construction contractors will be responsible for installation of new transmission lines and access routes as well as utilization of selective pruning techniques. A resident engineer will oversee the implementation of this mitigation measure.

**Regulating/Permitting Agencies:** The locations of underground transmission lines will be determined and permitted in coordination with the three utility providers: Pacific Gas and Electric Company, Western Area Power Administration, and Sacramento Municipal Utility District.

Additional agency coordination and permitting (e.g., DFW) may be needed if undergrounding of the lines will impact surface features.

**Location:** Proposed transmission line corridors are shown in Mapbook Figure M3-4. Access roads would be located in areas in where the landscape sensitivity levels range from low to high. Most of the temporary and permanent access roads follow alignments that have previously been cleared and that serve as agricultural access routes. Construction would include improving the condition of these existing access routes to accommodate construction access. Vegetation removal would likely occur along the rights-of-way of access roads and would negatively affect views from SR 160, River Road, and other roadways in the study area. Site-specific design decisions for the location of transmission lines and access routes to minimize effects on vegetation where feasible will be developed with the design engineer.

**Timing:** This measure will be implemented prior to or during construction.

**Monitoring:** Implementation of the actions within this measure is the responsibility of DWR and the construction contractors. DWR will ensure the actions outlined above in *Action* are implemented into site-specific designs and will appoint a construction monitor to perform site inspections to verify contractor compliance with the mitigation measure. The resident engineer will be responsible for overseeing implementation of the appropriate actions determined as a part of this mitigation measure in site-specific plans as well as during construction.

**Reporting Requirements:** DWR's construction monitor and resident engineer will report any deficiency in compliance with this mitigation measure to DWR immediately. The construction monitor will monitor daily and will retain inspection records in the project file. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (AES 1-a).

#### **Mitigation Measure AES-1b: Install Visual Barriers between Construction Work Areas and Sensitive Receptors**

**Action:** To reduce the impact on sensitive receptors from the change in existing visual quality, DWR will install temporary visual barriers at the construction work areas with direct line-of-sight from sensitive receptors. Barriers will be placed to obscure views of work areas where construction activity and equipment would be disruptive and lower the existing visual quality. These efforts will include the following actions and performance standards.

- Visual barriers will be installed to minimize sensitive receptors' (i.e., residents and recreational areas) views of construction work areas.
  - The visual barriers will be placed to protect residents and recreational areas that are located within 0.25 mile of a project construction site and where views to the work areas represent a significant visual impact.
  - The visual barrier may include chain link fencing with privacy slats, fencing with windscreen material, cofferdam, silt fence, wood or concrete barrier/soundwall, strategically placed landscaping, or other similar barrier.
  - The visual barrier will be a minimum of 6 feet high to help to maintain the privacy of residents and block long-term ground-level views toward construction activities.

While the visual barriers would introduce a visual intrusion, they would greatly reduce the visual effects associated with visible construction activities and screening construction activities and protecting privacy is deemed desirable. The visual barriers are an effective means of reducing the visibility of active construction work areas, thereby minimizing the impact on existing localized visual quality.

**Responsible Parties:** DWR through the construction contractors will be responsible for establishing the location and installation of visual barriers.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Visual barriers will be installed along the edges of construction work sites where necessary to reduce visual intrusion to sensitive receptors within .25 miles of work areas.

**Timing:** Visual barriers will be installed prior to commencement of construction in the vicinity.

**Monitoring:** Installation of the visual barriers will be the responsibility of the construction contractor. DWR will appoint a construction monitor to perform site inspections daily to verify contractor compliance with the mitigation measure and upkeep of the barriers throughout construction.

**Reporting Requirements:** DWR's construction monitor will report any deficiency in compliance with this mitigation measure to DWR and will retain inspection records in the project file. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (AES-1b).

#### **Mitigation Measure AES-1c: Develop and Implement a Spoil/Borrow and Reusable Tunnel Material (RTM) Area Management Plan**

**Action:** DWR will develop and implement a spoil/borrow and RTM area management plan consistent with the "Disposal and Reuse of Spoils, RTM, and Dredged Material," in Appendix 3B, *Environmental Commitments, AMMs, and CMs*, to reduce the extent of negative visual alteration of existing visual quality or character of spoil and borrow sites from construction through remediation of terrain, revegetation, and other practices as described below. The purpose of this measure is to prevent flattened, highly regular, or engineered slopes which create visual discordance and incongruence from native topography and to re-establish natural looking vegetative communities that are indigenous to the project environment. The exception to grading flattened, regular sites is if the intended use of the site is agriculture. This mitigation measure will complement and is related to activities described under Mitigation Measure SOILS-2b, Chapter 10, *Soils*, Impact SOILS-2.

Prior to construction mobilization, DWR will develop a management plan that identifies site-specific measures to remediate exposed soil and terrain to make it suitable for planned development, agriculture, or reuse as natural habitat and to mitigate visual effects. Existing information, such as topographical maps, vegetative surveys or records, and historical and existing photographs, that show preexisting, site-specific (or reference site) conditions prior to the conversion to agriculture will be evaluated and used as tools for restoring disturbed sites. Where appropriate, the management plan will consider recreational or mixed uses. In general, however, the majority of the sites will be evaluated for restoration to native habitat due to the amount of terrain alteration and vegetation and habitat loss resulting from construction of the water conveyance facilities. At a minimum, the management plan will meet the following performance standards.

- 1 • Plantings will be native and indigenous to the area, and no invasive plant species will be used  
2 under any conditions. If indigenous plantings are not available, DWR will coordinate with CDFW  
3 to use a mutually acceptable plant mix palette.
- 4 • In areas to be used for agriculture, the management grading plan will mimic the preexisting  
5 landform pattern to the greatest degree possible, given geotechnical or environmental  
6 constraints.
- 7 • In areas of habitat restoration, the terrain will be designed and graded to be undulating,  
8 avoiding large, flat-sloped areas.
- 9 • In areas of proposed development, a combination of terrains may be implemented to encourage  
10 visual variety.
- 11 • Terrain will be designed and graded to be rounded, avoiding sharp angles and steep or abrupt  
12 grade breaks except for areas involved with agriculture.
- 13 • Special attention will be paid to transitions between undisturbed and disturbed terrains to  
14 ensure that the transition appears as natural as possible and to blend the lines between the two  
15 for a natural, organic appearance.
- 16 • The site will be visually surveyed prior to any vegetation removal for the presence of rock  
17 outcroppings, downed trees, or similar features.
- 18 • Any restoration with trees will be placed to mimic natural patterns during management to  
19 provide visual congruity once revegetation plantings mature and to restore the habitat values  
20 they provide.

21 Implementation of this measure would be expected to result in successful management of  
22 borrow/spoils and RTM areas, thereby reducing the overall impact on the visual quality in the study  
23 area.

24 **Responsible Parties:** DWR will be responsible for the development of a spoil/borrow and RTM  
25 area management plan consistent with the “Disposal and Reuse of Spoils, RTM, and Dredged  
26 Material,” in Appendix 3B, *Environmental Commitments, AMMs, and CMs*. DWR will, through the  
27 construction contractor, implement the performance standards outlined in the spoil/borrow and  
28 RTM area management plan. DWR will also prepare site-specific management plan for habitat  
29 restoration sites to implement mitigation and monitoring and to measure and report the efficacy of  
30 restored sites to the appropriate agency.

31 **Regulating/Permitting Agencies:** Agency coordination and permitting (e.g., DFW) may be needed  
32 if surface features impact sensitive habitats or sensitive species.

33 **Location:** The performance standards determined in the management plan will be site-specific for  
34 each of the material reuse sites. These locations will be further refined prior to construction as  
35 described in the Environmental Commitment “Disposal and Reuse of Spoils, RTM, and Dredged  
36 Material,” in Appendix 3B, *Environmental Commitments, AMMs, and CMs*.

37 **Timing:** A spoil/borrow and RTM area management plan(s) will be developed prior to initiation of  
38 any tunneling work. Implementation of the plan will occur throughout construction.

39 **Monitoring:** DWR will prepare the RTM Area Management Plan so as to ensure inclusion of the  
40 performance standards outlined above in *Action* and satisfactory incorporation of Mitigation  
41 Measure AES-1c into the plan. Implementation of the plan will be included in contract language with

construction contractors. The construction monitor and facility inspector will perform site inspections to verify contractor compliance with the mitigation measure and to ensure performance standards defined by the plan and actions associated with the plan are implemented by the construction contractors.

**Reporting Requirements:** DWR's construction monitor will submit reports to DWR on implementation of the RTM area management plan in compliance with the reporting schedule which will be developed in the plan. Any deficiency in compliance with this mitigation measure will be reported immediately to DWR, along with either recommended steps for curing the deficiency or a description of how the deficiency has already been cured. Inspection records will be retained in the project file.

#### **Mitigation Measure AES-1d: Restore Barge Unloading Facility Sites Once Decommissioned**

**Action:** DWR will restore barge unloading facility sites once the facilities are decommissioned and removed to minimize the impact on visual quality and character at these sites. Restoration of the decommissioned sites will meet the following performance standards.

- Grading or re-contouring disturbed terrain.
- Replacement plantings will be installed in areas where vegetation was removed.
  - Replacement plantings will be native and indigenous to the area. If indigenous plantings are not available, DWR will coordinate with CDFW to use a mutually acceptable plant mix palette.
  - No invasive plant species will be used under any conditions.

Implementation of this measure will result in restoration of the barge unloading facility sites.

**Responsible Parties:** DWR and Construction Contractors.

**Regulating/Permitting Agencies:** Agency coordination and permitting (e.g., DFW) may be needed if surface features impact sensitive habitats or sensitive species

**Location:** Alternative 4A includes temporary barge unloading facilities at Snodgrass Slough, Potato Slough, San Joaquin River, Middle River, Connection Slough, Old River, and the West Canal. Once these facilities are decommissioned, restoration will occur on these sites and surrounding areas.

**Timing:** Development of the revegetation plan and site-specific management plans will occur prior to completion of construction. Restoration of the barge unloading facility sites will occur once the facilities are decommissioned and removed after construction is complete.

**Monitoring:** The revegetation plan will specify the planting stock appropriate for each land cover type and each mitigation site. DWR will monitor the planting annually 5 years post construction to ensure successful establishment.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (AES-1d). DWR will document condition of the site and survival rate for 5 years post construction.

## Mitigation Measure AES-1e: Apply Aesthetic Design Treatments to All Structures to the Extent Feasible

**Action:** DWR will use aesthetic design treatments, where and to the extent feasible, to minimize the impact on existing visual quality and character in the study area associated with the introduction of water conveyance structures.

DWR will evaluate similar, local well-designed water conveyance structures, including those with historic value and use these features as design precedent to develop designs for the intake facilities, pumping plants, control structures, fish screens, operable barriers, and bridges, so that the resultant design will complement the natural landscape, be aesthetically pleasing, and minimize the effects of visual intrusion of the project facilities on the landscape, to the extent feasible.

Where no local design precedent exists, DWR will research structure designs outside the local area. For example, the Freeport Regional Water Project intake facility design incorporates aesthetic design treatments that create a landmark feature in the landscape. The DWR will consider design details to ensure that all intake structures are complementary of one another so that these facilities do not create further visual discordance in the landscape.

The following minimum performance standards will apply.

- The height of new structures will be minimized as feasible. In addition, the visual intrusion of ancillary features (e.g., antennas or other equipment) will be minimized through proper siting.
- New structures will be painted with a shade that is two to three shades darker than the general surrounding area, unless aesthetic design treatments indicate another color selection with the intent to specifically improve aesthetics. Otherwise, colors will be chosen from the Bureau of Land Management (BLM) Standard Environmental Colors Chart CC-001: June 2008. Because color selection will vary by location, DWR, working with the facility designers, will employ the use of color panels evaluated from key observation points during common lighting conditions (front versus backlighting) to aid in the appropriate color selection. DWR will select colors for the coloring of the most prevalent season. Panels will be a minimum of 3 by 2 feet in dimension and will be evaluated from various distances, but within 1,000 feet, to ensure the best possible color selection. Refer to <http://www.blm.gov/bmp> for more information on this technique and other best management practices and techniques for visual screening.
  - All paints used for the color panels and structures will be color matched directly from the physical color chart, rather than from any digital or color-reproduced versions of the color chart.
  - Paints will be of a dull, flat, or satin finish only. Appropriate paint type will be selected for the finished structures to ensure long-term durability of the painted surfaces.
  - DWR will maintain the paint color over time.
- In the design of permanent transmission poles and chain link fencing, DWR will consult with utility providers on incorporating the following design measures.
  - Transmission poles and towers will be painted or powder coated with colors selected using the BLM selection techniques to make the structures recede into the visual landscape.
  - Chain link fences will be plastic or vinyl coated with colors selected using the BLM selection techniques to make chain link fences to appear more see-through than non-treated, light grey fencing that acts as a visual barrier to a degree.



- Finishes will be selected for their ability to achieve the correct color selection, durability, and environmental safety.
- DWR will implement aesthetic design features at concrete or shotcrete structures that are highly visible to the public. These features may include mimicking natural material (e.g., stone or rock surfacing) and integral color, in the same theme, to reduce visibility and to better blend with the landscape.
- DWR will evaluate bridge crossing designs using lattice steel, consistent with other bridges in the Delta. Such a structure would be less visually confining than concrete structures, provide better visual access to points beyond, allow light to travel through the structure, and may appear less like a visual barrier within the landscape.
- DWR will ensure that visible pipelines, guardrails, and signs will be of a material or color that helps surfaces to blend better with the surroundings. These elements will be constructed with low-sheen and non-reflective surface materials to reduce potential for glare, and the use of glossy paints or surfaces would be avoided.

Implementation of this measure and application of the aesthetic design treatments for alternative structure would help minimize the impact on visual quality from the development of the water conveyance structures in the study area, using techniques that serve to make the structures blend into the surrounding environment, to the extent possible. However, the overall change in visual character would still be substantial because physical structures of this scale do not presently exist.

**Responsible Parties:** DWR, building architects, design engineers, landscape architects, and construction contractors will be responsible for implementation of this measure. The building architects, design engineers, landscape architects, and construction contractors will ensure that surface treatments are environmentally friendly and do not result detrimental environmental impacts.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Aesthetic design treatments will be applied to all water conveyance structures constructed as a result of the project.

**Timing:** Evaluation and design of aesthetic treatments will occur during design of the facilities. Application of the aesthetic treatments determined in design will be applied during construction and maintained throughout the life of the facilities.

**Monitoring:** DWR will ensure the design of conveyance structures complies with the mitigation measure. DWR will perform site inspections to verify contractor compliance with approved design treatments and the mitigation measure. DWR's facility operators will inspect facilities for the visual condition of treatments throughout the life of operation.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (AES-1e).

### **Mitigation Measure AES-1f: Locate Concrete Batch Plants and Fuel Stations Away from Sensitive Visual Resources and Receptors and Restore Sites upon Removal of Facilities**

**Action:** DWR will locate concrete batch plants and fuel stations in construction work areas away from sensitive visual resources (i.e., state scenic highways) and receptors to minimize the impact on

visual quality. In addition, these sites will be restored after construction to minimize the long-term impact on localized visual character. The relocation approach for the individual facilities is described below. DWR will incorporate these facility location changes into the design plans prior to construction.

- Locate the concrete batch plants and fuel stations that are proposed to be adjacent to SR 160, near the intakes so that these operations are set back from the state scenic highway as far as site conditions allow. These features will be located toward the east side of the intake, in closer proximity to the shaft site.
- Structures associated with the concrete batch plants and fuel stations will be designed, to the extent feasible to be low-profile to reduce their apparent scale and visual prominence within the viewshed.
- In addition, the structures and storage piles associated with the concrete batch plants and fuel stations for the canal alignment just south of Snodgrass Slough and on Webb Tract north of False River will be set as far west from the waterways, as possible.
- Structures and storage piles associated with the concrete batch plants and fuel stations east of Byron Highway will be set back off of the highway as much as possible and toward the northern edge of the proposed sites. The same principles will be applied to the concrete batch plant and fuel station along Willow Point Road, for the western canal alignment.
- Locate the concrete batch plant and fuel station proposed between Intakes W3 and W4 to an arrangement opposite each other along the agricultural access road, instead of adjacent to one another. They will be placed in closer proximity to the existing development at this location so that they appear to be more of a continuation of existing development.
- All disturbed terrain will be restored.
- Replacement plantings will be installed in areas where vegetation was removed.
  - Replacement plantings will be native and indigenous to the area or will match surrounding agricultural plantings.
  - No invasive plant species will be used under any conditions.

Implementation of this measure will minimize the impact on visual quality from the construction and use of the concrete batch plant and fuel station facilities. In addition, this measure will help restore the concrete batch plant and fuel station locations to a preconstruction condition.

**Responsible Parties:** DWR will be responsible for incorporation of facility location changes into design plans prior to construction and will, through the construction contractors, be responsible for relocation and placement of the proposed concrete batch plants and fuel stations away from sensitive visual resources and receptors. DWR will be responsible for the restoration and monitoring of the sites after removal of the facilities.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** The specific locations of the facilities will be incorporated into the design plans prior to construction and will be consistent with the relocation approach described above in *Action*.

**Timing:** The facility location changes will be determined in the design phase prior to construction. Concrete batch plants and refueling facilities will be installed during construction and

decommissioned and removed after construction is complete. Restoration of the facility sites will take place after facilities are decommissioned and removed.

**Monitoring:** Facility locations will be incorporated into the design plans, which will be adhered to by the construction contractors. The construction monitor will perform site inspections to verify contractor compliance with the mitigation measure. The revegetation plan will specify the planting stock appropriate for each riparian land cover type and each mitigation site. DWR will monitor the planting annually for 5 years post construction.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (AES-1f). DWR will prepare monitoring reports to document survival for 5 years post construction.

### **Mitigation Measure AES-1g: Implement Best Management Practices to Implement Project Landscaping Plan**

**Action:** DWR will apply additional landscape treatments and use best management practices as part of implementing the project landscaping plan (as set forth by DWR's WREM No. 30a requirements) to restore and maintain local character, improve aesthetics, and reduce the visual scale of the proposed water conveyance elements in the study area.

In addition to the guidance set forth in DWR's WREM No. 30a, *Architectural Motif, State Water Project*, in those aesthetic areas significantly impacted by the project, DWR will utilize landscaping to minimize such impacts by relying on one or more of the following: street trees, welcome signs, decorative lighting, and other streetscape design techniques. In addition, trees, shrubs, and grasslands native to the study area will be planted to preserve the visual integrity of the landscape, provide habitat conditions suitable for native vegetation and wildlife, and ensure that a maximum number and variety of well-adapted plants are maintained.

The following practices will be adhered to in implementing the project landscaping plan.

- Design and implement low impact development (LID) measures that disperse and reduce runoff by using such features as vegetated buffer strips between paved areas that catch and infiltrate runoff, bioswales, cisterns, and detention basins. In addition, DWR will evaluate the potential use of pervious paving to improve infiltration and to reduce the amount of surface runoff from entering waterways and the stormwater system. However, LID measures will not be used where infiltration could result in adverse environmental effects.
- Vegetative accents and screening will be used to aid in a perceived reduction in the scale and mass of the built features, while accentuating the design treatments that will be applied to built features. Plant selection will be based on its ability to screen built features and provide aesthetic accents.
- Realignment of SR 160 and South River Road will be landscaped in a manner that visually ties the new alignment in to the old alignment by implementing roadside landscaping that helps achieve a continuation of the existing roadside vegetation while screening built features.
- Landscape berms, combined with tree and shrub plantings will be used to help screen built features from existing viewpoints by allowing for additional height. The landscape berms will be constructed in a manner that has a more natural form, as opposed to one that is highly regular

and levee-like. The berms will be seeded with a native meadow erosion control seed mix and be planted to comply with directions set forth below.

- Plantings will be native and indigenous to the area, and no invasive plant species will be used under any conditions. If indigenous plantings are not available, DWR will coordinate with CDFW to use a mutually acceptable plant mix palette.
- The species list will include trees, shrubs, and an herbaceous understory of varying heights, as well as both evergreen and deciduous types. Plant variety will increase the effectiveness of revegetated areas by providing multiple layers, seasonality, diverse habitat, and reduced susceptibility to disease.
- The use of native grass and wildflower seed in erosion control measures will be required where such a measure would improve aesthetics.
  - Wildflowers will provide seasonal interest to areas where trees and shrubs are removed or grading has occurred.
  - Species will be chosen that are native and indigenous to the study area and for their appropriateness to the surrounding habitat. For example, upland grass and wildflower species will be chosen for drier, upland areas and wetter grass species will be chosen for wetland areas.
  - If not appropriate to the surrounding habitat, wildflowers will not be included in the seed mix.
  - Under no circumstances will invasive plant species be used in any erosion control measures.
- Vegetation will be planted within 2 years following project completion.
- Design of the landscaping plan will maximize the use of planting zones that do not need irrigation, such as seeding with a native grassland and wildflower meadow mix, which reduces or eliminates the need for a permanent irrigation system.
- If an irrigation system is required, an irrigation and maintenance program will be implemented during the plant establishment period and carried on, as needed, to ensure plant survival. Areas that are irrigated will use a smart watering system that evaluates the existing site conditions and plant material against weather conditions to avoid overwatering of such areas. To avoid undue water flows, the irrigation system will be managed in such a manner that any broken spray heads, pipes, or other components are fixed within 1–2 days, or the zone or system will be shut down until it can be repaired.
- All measures prescribed above to screen facilities will not act to degrade or eliminate scenic vistas or be designed in a manner that negatively affects views from scenic roadways.
- These measures will not be implemented where implementation would constitute an adverse effect on sensitive habitats or sensitive species.

Implementation of this measure will reduce the effects on local visual quality from introduction of the water conveyance facilities.

**Responsible Parties:** The landscaping plan will be developed by a certified landscape architect who reports to DWR and will incorporate the best management practices described above in *Action*. DWR or an appointed design review board will be responsible for reviewing and approving the project landscaping plan and ensuring best management practices are adhered to while creating the

plan. DWR, the landscape architect, and construction contractors will be responsible for implementation of this landscape plan during construction. DWR will be responsible for monitoring of the landscape treatment sites after initial implementation.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** The project landscaping plan (as set forth by DWR's WREM No. 30a requirements) will determine landscape treatment sites. These sites will be located at and around the proposed water conveyance elements.

**Timing:** The project landscaping plan will be developed in the design phase, prior to beginning construction. Physical landscape features required by the plan will be constructed, as appropriate, during the construction phase. Implementation of the vegetation aspects of the landscaping plan will take place after construction of the water conveyance facilities is completed and the landscape sites are ready for planting. This will take place no more than 2 years following completion of construction of conveyance facilities. Monitoring of vegetation planting will continue after the initial implementation.

**Monitoring:** DWR will ensure that the project landscaping plan is implemented in accordance with the best management practices described above in *Action*. Plant species used in the landscape plan will not include any species determined by the CNPS, Cal-IPC, or ASTM International procedures (under development) to be invasive to the project area. DWR will monitor the planting to ensure no invasive species are used at any location and to ensure vegetation and physical landscape features are implemented according to the best management practices. DWR will inspect and monitor the plantings sites annually for 5 years post construction.

**Reporting Requirements:** DWR's construction monitor will report any deficiency in compliance with this mitigation measure to DWR. .

## 2.31 Mitigation Measure AES-4a, 4b, 4c, & 4d

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 17, Aesthetics			
Mitigation Measure AES-4a: Limit Construction to Daylight Hours Within 0.25 Mile of Residents	DWR and Construction Contractors	During construction	AES-4 AES-6
Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction	DWR and Construction Contractors	During construction	AES-4 AES-6
Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences	DWR and Construction Contractors	Prior to and during construction	AES-4 AES-6
AES-4d: Avoid the Use of Blue Rich White Light LED Lighting	DWR and Construction Contractors	During and after construction	AES-4 AES-6

**Mitigation Measure AES-4a: Limit Construction Outside of Daylight Hours within 0.25 Mile of Residents at the Intakes**

**Action:** To the extent feasible and within safety standards, DWR will minimize the effect of nighttime construction light and glare on residences within 0.25 miles of the intake construction sites by limiting non-tunnel related surface construction past daylight hours (which varies according to season), minimizing the use of high-wattage lighting sources to operate in the dark, and minimizing introduction of new nighttime light and glare sources in these areas.

DWR will establish a construction hotline which will enable residents to report any construction violation including construction activities outside of daylight hours.

**Responsible Parties:** DWR through the construction contractors will be responsible for location establishment and implementation and monitoring of this mitigation measure.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** This mitigation measure will apply to all construction sites within 0.25 miles of sensitive residential receptors.

**Timing:** Adherence to this mitigation measure will occur during the construction phase.

**Monitoring:** The construction contractor is responsible for ensuring construction activities do not occur before or past daylight hours. The construction monitor will perform daily site inspections to verify contractor compliance with the mitigation measure.

**Reporting Requirements:** DWR's construction monitor will report any deficiency in compliance with this mitigation measure to DWR. Any reports from residents received on the construction hotline will be reported to DWR immediately by the hotline manager.

**Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction**

**Action:** DWR will minimize fugitive light from portable lighting sources used during construction by adhering to the following practices, at a minimum.

- Project -related light and glare will be minimized to the maximum extent feasible, given safety considerations.
- Color-corrected halide lights will be used.
- Portable lights will be operated at the lowest feasible wattage and height.
- All lights will be screened and directed down toward work activities and away from the night sky and nearby residents to the maximum extent safely possible.
- The number of nighttime lights used will be minimized to the greatest extent possible.

Implementation of this measure will reduce—to the extent feasible as governed by site-specific safety requirements—the overall amount of new daytime and nighttime light and glare introduced to the project vicinity during construction.

**Responsible Parties:** The construction contractor will be responsible for implementation of this mitigation measure. DWR will ensure the construction contractor complies with the practices outlined above in *Action*.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** This mitigation measure will be applied to all portable lighting sources used during construction.

**Timing:** Adherence to the practices described above in *Action* will occur during construction.

**Monitoring:** The construction contractor will be responsible for monitoring practices to minimize fugitive light. The construction monitor will perform weekly site inspections to verify contractor compliance with this mitigation measure.

**Reporting Requirements:** DWR's construction monitor will report any deficiency in compliance with this mitigation measure to DWR. Inspection records will be recorded in the project file.

#### **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences**

**Action:** DWR will evaluate construction routes and identify portions of access routes where the use of visual barriers would minimize the introduction of new light and glare from construction truck headlights and the impact on nearby residents.

DWR will install a visual barrier along portions of access routes where screening would prevent excessive light spill toward residents from truck headlights being used during nighttime construction activities. These visual barriers will meet the following performance criteria.

- The visual barrier will be a minimum of 5 feet high and will provide a continuous surface impenetrable by light. This height may be obtained by installing a temporary structure, such as fencing (e.g., chain link with privacy slats) or a semi-permanent structure, such as a concrete barrier (e.g., a roadway median barrier or architectural concrete wall system) retrofitted with an approved visual screen, if necessary, to meet the required height.
- The visual barriers will be of a material or have a color treatment appropriate for the location and traffic safety requirements. The use of glossy materials will be avoided.

Implementation of this measure will minimize the extent of construction truck headlight glare intruding into nearby residential areas.

**Responsible Parties:** DWR will be responsible for evaluating construction routes and identifying access routes which require visual barriers. The construction contractor will be responsible for the installation of the visual barriers at the identified sites.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Portions of access routes requiring visual barriers will be determined by DWR prior to commencing construction.

**Timing:** Identification of access routes requiring visual barriers will occur in the design phase prior to construction. Installation of the visual barriers will take place during construction and prior to construction truck use of the identified access routes.

**Monitoring:** The construction contractor will be responsible for ensuring visual barriers are installed at the locations determined by DWR and that the visual barriers meet the performance criteria described above in *Action*. The construction monitor and resident engineer will perform site

inspections to verify contractor compliance with the mitigation measure and upkeep of the barriers throughout construction.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (AES-4c).

#### **Mitigation Measure AES-4d: Avoid the Use of Blue Rich White Light LED Lighting**

**Action:** DWR will install exterior LED lighting that avoids the use of blue rich white light lamps and use a correlated color temperature that is no higher than 3,000 Kelvin, consistent with the International Dark-Sky Associations Fixture Seal of Approval program (International Dark-Sky Association 2010a, 2010b, 2015). In addition, LED lights will use shielding to ensure that nuisance glare and light spill does not affect materially sensitive residential viewers. Lights will be placed at the lowest feasible height to ensure that light trespass affecting residences is limited. If needed, the height of lights will be lowered to account for the increase in lighting area provided by LED lighting. Implementation of this measure will minimize the effects of light and glare associated with blue rich white LED lighting from intruding into nearby areas.

**Responsible Parties:** DWR will incorporate this requirement into contracts for lighting purchases and installation and will be responsible for overseeing construction contractor/electrician installation of LED lighting.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Exterior lighting of all project facilities.

**Timing:** Lighting will be installed during and after construction of facilities.

**Monitoring:** DWR's construction monitor will perform inspections of all installed exterior lighting to ensure compliance with this mitigation measure.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (AES-4d). DWR's construction monitor will report to DWR once inspections are complete any deficiency in compliance with this mitigation measure. The construction monitor's inspections will be recorded in the project log.

## **2.32 Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites**

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 18, Cultural Resources, of Draft EIR/S			



CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

DWR, appropriate federal agencies

Prior to and during construction

CUL-1

**Action:** Prior to ground-disturbing construction, DWR will implement treatment for identified and register eligible archaeological sites affected by Alternative 4A construction.

### ***Basis for Selection of Treatment***

Identified archaeological resources occur in the footprint of large features that would be constructed under this alternative. Because they occur within the footprint of these features, avoidance may not be feasible. These objectives include protection of other sensitive environmental resources where possible. Because of the density and location of other sensitive environmental resources such as natural communities and habitats, relocation of proposed facilities necessary to ensure all historical resources are preserved in places is unlikely to be feasible. Furthermore, the large, linear, nature of proposed conveyance facilities would result in overlap with cultural resources across almost any potential alignment because of the manner in which cultural resources are distributed in the study area. These same facilities will require ongoing maintenance and operational activities that would likely be inconsistent with dedicated conservation easements or other land management methods designed to preserve existing resources in place. For these reasons, preservation of all potentially affected archaeological sites through capping with soil or incorporation into conservation easements or green space is not likely to be feasible. Accordingly, data recovery is proposed to retrieve the scientifically important material that remains in these deposits. This data recovery excavation will conform to the following standards that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 68.

- DWR will retain a qualified archaeological consultant to conduct data recovery excavations necessary to retrieve material that would otherwise be lost (material with scientifically important data associated with the significance of the resource). Qualified archaeological consultant here means a consultant with demonstrated experience conducting effective data recovery excavations at the kinds of sites subject to treatment, including qualification under the Secretary of the Interior's Professional Qualification Standards (36 CFR 61).
- DWR will prepare, and deposit with the relevant information center of the California Historic Records Information System (CHRIS), a data recovery plan prior to conducting these excavations, as required under State CEQA Guidelines Section 15126.4(b)(3)(C). The plan will provide a literature review of recent regional archaeological research and a summary of regional research questions. The plan will incorporate the methods prescribed above and include a more detailed description of the sampling and excavation methods that are appropriate for the regional research questions. The plan will not disclose the location of the resources subject to treatment in a manner that would allow their location by the public and inadvertent damage.
- Data recovery excavations will remove a sample of the affected portion of the deposit to retrieve scientifically important material. Excavation will be conducted in representative levels, and material removed will be divided and screened through a combination of 1/4" and 1/8" mesh screen, so as to capture both the gross cultural constituents and the finer material that can only be captured in fine mesh. Excavation will be conducted in 10-centimeter levels so that the horizontal association of different cultural materials is recorded. Removed material will be

segregated by type and bagged with labels noting their horizontal and vertical location relative to an established datum point. The datum point will be recorded in the field with GPS to at least 10-centimeter horizontal and vertical accuracy. If, in the course of data recovery excavations, it is determined that, contrary to available evidence, the resource lacks integrity, data recovery excavations will cease.

- Faunal material (animal bone) will be segregated and studied by a qualified faunal analyst to identify the species pursued, relative abundance and diversity of different species present, and the manner in which the prey were processed by the prehistoric occupants.
- Obsidian glass will be retrieved and studied through both X-ray fluorescence (a method that allows the source of the obsidian to be identified) and obsidian hydration analysis (a method that allows approximate determination of the time when the material was subject to human modification).
- Soil samples will be retrieved, with their horizontal and vertical location recorded, for flotation analysis (a method of separating light organic material such as fine plant remains from the deposit, in order to identify plant species pursued by prehistoric populations).
- Because some of the resources subject to treatment contain human remains, provisions for such remains are necessary. If human remains are discovered in these deposits during data recovery, the county coroner will be contacted as required in California Health and Safety Code Section 7050.5. If the coroner confirms the remains are of prehistoric origin, the Native American Heritage Commission (NAHC) will be contacted and given the opportunity to identify a most likely descendent (MLD). The MLD will be given the opportunity to reinter the remains with appropriate dignity. If the NAHC fails to identify the MLD or if the parties cannot reach agreement as to how to reinter the remains as described in California PRC Section 5097.98(e), the landowner will reinter the remains at a location not subject to further disturbance. DWR will ensure the protections prescribed in California PRC Section 5097.98(e), are performed, such as the use of conservation easements and recording of the location with whichever county in which the remains are found as well as the relevant information center of the CHRIS and the NAHC.
- After completion of data recovery excavations DWR and appropriate federal agencies will prepare a data recovery report synthesizing the results of data recovery and associated studies and analysis. The consultant or staff archaeologists will synthesize the results of these studies and summarize the results relative to regional research questions in the data recovery report. The report will be filed with the relevant information center of the CHRIS. DWR and appropriate federal agencies will also store the recovered material at an appropriate facility for curation. Relevant federal curation standards such as 36 CFR 79 will be followed where applicable.
- Construction phase monitoring and resource protection: During construction on or near the resource, DWR and appropriate federal agencies will retain a qualified archaeologist (a person knowledgeable in the identification of the kind of resources known to occur), to observe excavations over any remaining portions of the deposit that are sensitive for buried human remains or which may contain other significant buried archaeological material that could be inadvertently damaged. If human remains are discovered the archaeologist will direct compliance with the requirements of California Health and Safety Code Section 7050.5 and California PRC Section 5097.98 and the relevant federal agency with responsibility for Section 106 will be contacted. In addition DWR and the appropriate federal agencies will use fencing, flagging, or other appropriate means to exclude unnecessary disturbance and activity from sensitive resources during construction.

The U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the project. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

**Responsible Parties:** DWR will retain a qualified archaeological consultant and a qualified faunal analyst to plan, monitor construction, and conduct data recovery excavations necessary to retrieve material that would otherwise be lost (material with scientifically important data associated with the significance of the resource).

DWR and appropriate federal agencies will prepare a data recovery report to be filed with the relevant information center of the CHRIS and will store recovered material at an appropriate facility for curation.

**Regulating/Permitting Agencies:** The data recovery excavation will conform to the following standards that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 68.

If human remains are discovered the archaeologist will direct compliance with the requirements of California Health and Safety Code Section 7050.5 and California PRC Section 5097.98 and the relevant federal agency with responsibility for Section 106 will be contacted.

**Location:** Identified archaeological resources occur in the footprint of large features that would be constructed under this alternative.

**Timing:** Prior to conducting data recovery excavations, DWR will prepare, and deposit with the relevant information center of the CHRIS, a data recovery plan. Prior to ground-disturbing construction, DWR will implement treatment for identified and register eligible archaeological sites affected by Alternative 4A construction. During construction on or near the resource, DWR and appropriate federal agencies will retain a qualified archaeologist (a person knowledgeable in the identification of the kind of resources known to occur) to observe excavations over any remaining portions of the deposit that are sensitive for buried human remains or which may contain other significant buried archaeological material that could be inadvertently damaged.

**Monitoring:** The qualified archaeologist will verify treatments and observe construction in sites sensitive to archaeological resource disruption, in accordance with the actions described above.

**Reporting Requirements:** The archaeologist will report to DWR on the quantity and nature of archaeological sites affected by construction and on construction contractor compliance with measures needed to protect archaeological resources. After completion of data recovery excavations, DWR and appropriate federal agencies will prepare a data recovery report synthesizing the results of data recovery and associated studies and analysis. The data recovery report will be provided to the CHRIS, in particular the Northwest Information Center and the North Central Information Center, which cover the counties that are included in the California Water Fix project.

## 2.33 Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 18, Cultural Resources			
CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources	DWR, cultural resources specialists, appropriate federal lead agencies	Prior to and during construction	CUL-2

**Action:** Prior to ground-disturbing construction, DWR will implement the following mitigation measures.

- Because DWR and federal agencies could not feasibly access the majority of the footprint for this alternative, a cultural resource inventory has not been completed for the entire footprint. Prior to ground-disturbing construction, DWR will ensure that an inventory and evaluation report for cultural resources is completed. The inventory will cover the federal Areas of Potential Effect (APE) for relevant undertakings.
- The scope of the inventory will include the entire area where effects may occur. Such effects consist of direct disturbance through excavation or indirect damage through vibration or changes to the setting, where the setting may be relevant for archaeological resources.
- The work will be led or supervised by cultural resource specialists that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 61.
- Inventory methods will include pedestrian surveys and other any other appropriate sampling methods identified by DWR and the federal lead agencies.
- Identified resources will be mapped and described on forms provided by the California State Parks forms ("DPR" forms). Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- For all identified resources DWR and appropriate federal agencies will evaluate the resources to determine if they are any of the following.
  - Historical resources (State CEQA Guidelines Section 15064.5[a])
  - Unique archaeological resources under CEQA (California PRC Section 21083.2[g])
  - Historic properties (36 CFR 60.4)
  - Eligible for local registers
- The recorded resources and the resource evaluations will be summarized in an inventory report. In the inventory report DWR and appropriate federal agencies will also determine if individual resources qualifying as unique archaeological sites, historical resources, or historic properties will require mitigation to the extent feasible, as described below. DWR will make such a determination if the project would involve any of the following consequences.
  - Demolish or materially alter the qualities that make the resource eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[b][2][A], [C]).

- Demolish or materially alter the qualities that justify the inclusion of the resource on a local register or its identification in an historical resources survey meeting the requirements of California PRC Section 5024.1(g), unless DWR establishes by a preponderance of evidence that the resource is not historically or culturally significant (State CEQA Guidelines Section 15064.5[b][2][B]).
- Alter, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 CFR 800.5[a][1]).
- Demolish or materially impair the qualities that allow a resource to qualify as a unique archaeological site (California PRC Section 21083.2).
- For all resources qualifying as unique archaeological resources, historical resources, or historic properties that would be subject to significant effects, DWR will develop and implement treatment. Such treatment will consist of the following, in order of priority.
  - It should be noted that this order of priority applies to mitigation on historical resources performed to satisfy CEQA. Relevant federal agencies with management responsibilities for cultural resources will implement mitigation for adverse effects to satisfy Section 106 of the NHPA, which does not specify this order of priority.
  - Preservation in place where feasible, in light of costs, logistics, technological, and environmental considerations, and the extent to which avoidance is consistent with the objectives of the project, through methods such as redesign of relevant facilities to avoid destruction or damage to eligible cultural resources, capping resources with fill, or deeding resources into conservation easements.
  - Review and study of existing collections previously retrieved from affected resources, where feasible, in lieu of data recovery excavations.
  - Data recovery excavations that retrieve the information that makes the resource eligible for CRHR or NRHP listing, or that qualifies the site as a unique archaeological resource. If data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, will be prepared and adopted prior to any excavation being undertaken. Such studies will be deposited with the relevant information center of the CHRIS. Excavation as mitigation will be restricted to those parts of the resource that would be damaged or destroyed by the project. If, in the course of data recovery excavations, it is determined that contrary to available evidence, the resource lacks integrity, data recovery excavations will cease. The data recovery plan will specify the basis for the significance of the resource and methods for retrieving the consequential information from the site. After completion of excavation DWR will retain a qualified archaeological consultant to synthesize the findings into a data recovery report describing the findings and will deposit the report at the relevant information center of the CHRIS.
- The treatment plan, prepared consistent with the Programmatic Agreement will identify treatment methods that are proposed by the Lead Agencies and other public entities. The plan will also specify the basis for selecting a particular mitigation measure.
- For archaeological sites that qualify as historical resources, the DWR will consider preservation in place as the preferred treatment where feasible, in light of costs, logistics, technological, and

environmental considerations and the extent to which avoidance is consistent with the objectives of the project

- If preservation in place of archaeological sites that qualify as historical resources or unique archaeological resources is not feasible in light of costs, logistics, technological considerations, the location of the find, and the extent to which preservation of the find is consistent or inconsistent with the design and objectives of the project, the DWR will include a discussion in the treatment plan describing why the selected mitigation serves the interests protected by CEQA better than preservation in place.
- Construction phase monitoring: During construction on or near resources sensitive for human remains or archaeological resources, DWR will retain a qualified archaeologist to observe excavations over any remaining portions of the deposit that are sensitive for buried deposits or human remains. If human remains are discovered the archaeologist will direct compliance with the requirements of California Health and Safety Code Section 7050.5 and California PRC Section 5097.98 and the relevant federal agency with responsibility for Section 106 will be contacted. If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]).

The USFWS, NMFS, and the USACE are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the project. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

**Responsible Parties:** Prior to ground-disturbing construction, DWR will ensure that an inventory and evaluation report for cultural resources is completed. The work will be led or supervised by cultural resource specialists that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 61. DWR and federal lead agencies will identify appropriate sampling methods in addition to inventory methods, including pedestrian surveys. DWR, Reclamation, USFWS, NMFS, and the USACE will evaluate the resources to determine if they are historical resources, unique archaeological resources under CEQA, historic properties, or eligible for local registers, and will determine if individual resources will require mitigation described above. For qualifying resources, DWR will develop and implement treatment, described above.

During construction on or near resources sensitive for human remains or archaeological resources, DWR will retain a qualified archaeologist to observe excavations over any remaining portions of the deposit that are sensitive for buried deposits or human remains.

**Regulating/Permitting Agencies:** If human remains are discovered, the archaeologist will direct compliance with the requirements of California Health and Safety Code Section 7050.5 and California PRC Section 5097.98 and the relevant federal agency with responsibility for Section 106 will be contacted. If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA).

**Location:** The footprint of features that would be constructed under this alternative.

**Timing:** Prior to ground-disturbing construction, DWR will implement the above mitigation measures. During construction on or near resources sensitive for human remains or archaeological resources, DWR will retain a qualified archaeologist to observe excavations.

**Monitoring:** During construction on or near resources sensitive for human remains or archaeological resources, DWR will retain a qualified archaeologist to observe excavations. The qualified archaeologist to review the inventory and evaluation report, oversee treatment, and review compliance with the treatment plan prior to construction.

**Reporting Requirements:** The qualified archaeologist will report to DWR with findings regarding the inventory and evaluation report, and report to DWR on the execution of the treatment plan and construction contractor compliance with the plan. DWR will ensure that an inventory and evaluation report for cultural resources is completed. The inventory will cover the federal area of potential effect (APE) for relevant undertakings. Identified resources will be mapped and described on forms provided by the California State Parks forms ("DPR" forms). Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally. The inventory report contents are listed under *Action* above. The inventory report will be provided to the CHRIS, in particular the Northwest Information Center and the North Central Information Center, which cover the counties that are included in the California WaterFix project.

## 2.34 Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 18, Cultural Resources			
Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring	DWR, archaeological monitor, qualified archaeologist, DWR cultural-resources staff, DWR contractors, appropriate federal lead agencies	Prior to and during construction	CUL-3

**Action:** Prior to ground-disturbing construction, DWR will include a cultural resources discovery plan in the contract conditions of the construction contractor, incorporating the following actions to be taken in the event of the inadvertent discovery of cultural resources.

- An archaeological monitor will be present to observe construction at geographic locations that are sensitive for unidentified cultural resources. Such locations consist of construction near identified sites (within a 100-foot radius around the known boundaries of identified resources), and where ground-disturbing construction will occur within 500 feet of major water features.
- In the event of an archaeological resources discovery, work will cease in the immediate vicinity of the find (typically 100-feet), based on the direction of the archaeological monitor or the

apparent distribution of cultural resources if no monitor is present. A qualified archaeologist will assess the significance of the find and make recommendations for further evaluation and treatment as necessary.

- Discovered resources will be mapped and described on forms provided by the DPR. Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- Evaluation and treatment will follow the standards and order of priority described above for Mitigation Measure CUL-2. After receiving recommendations from the qualified archaeologist, DWR, USFWS, NMFS, and USACE will jointly determine the feasibility of such recommendations, and particularly any recommended avoidance measures, in light of factors such as costs, logistics, technological, and environmental considerations and the extent to which avoidance is consistent with the objectives of the project.
- If human remains are discovered as part of a larger cultural deposit, DWR and the contractors will coordinate with the county coroner and Native American Heritage Commission to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98.
- If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]), as defined below under Mitigation Measure CUL-4.
- DWR and appropriate federal agencies will provide pre-construction training of all construction personnel engaged in construction that has the potential to affect archaeological resources. This training will provide instruction on how to identify resources in the field and appropriate measures to be taken if a discovery or potential discovery occurs.

DWR will include a list of DWR cultural-resources staff that can respond to cultural resource discoveries and provide management direction following discoveries in the construction training materials, and will also provide this list as well as these discovery requirements to the supervisory field staff for the construction workers.

The U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the project. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

**Responsible Parties:** Prior to ground-disturbing construction, DWR will include a cultural resources discovery plan in the contract conditions of the construction contractor, incorporating the actions listed in *Action* above to be taken in the event of the inadvertent discovery of cultural resources. An archaeological monitor will be present to observe construction at geographic locations that are sensitive for unidentified cultural resources. In the event of a find, a qualified archaeologist will assess the significance of the find and make recommendations for further



evaluation and treatment as necessary. If human remains are discovered as part of a larger cultural deposit, DWR and the contractors will coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98. DWR and appropriate federal agencies will provide pre-construction training of all construction personnel engaged in construction that has the potential to affect archaeological resources. DWR will include a list of DWR cultural-resources staff that can respond to cultural resource discoveries and provide management direction following discoveries in the construction training materials, and will also provide this list as well as these discovery requirements to the supervisory field staff for the construction workers.

**Regulating/Permitting Agencies:** If human remains are discovered as part of a larger cultural deposit, DWR and the contractors will coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98. If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA).

**Location:** The footprint of features that would be constructed under this alternative.

**Timing:** Prior to ground-disturbing construction, DWR will include a cultural resources discovery plan in the contract conditions of the construction contractor, incorporating the actions listed in *Action* above to be taken in the event of the inadvertent discovery of cultural resources. During construction, an archaeological monitor will be present to observe construction at geographic locations sensitive for unidentified cultural resources.

**Monitoring:** DWR's archaeological monitor will perform inspections as needed to ensure compliance with this mitigation measure and the elements of the construction contract related to the actions above.

**Reporting Requirements:** In the event of a find, a qualified archaeologist will assess the significance of the find and make recommendations for further evaluation and treatment as necessary. The archaeological monitor will report to DWR on the inspection results. Any finds will be recorded and the records provided to the CHRIS, in particular the Northwest Information Center and the North Central Information Center, which cover the counties that are included in the California WaterFix project.

## 2.35 Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 18, Cultural Resources			
Mitigation Measure CUL-4: Follow State and Federal Law Governing Human	DWR and Construction Contractors, country	During construction	CUL-4

Remains if Such Resources Are Discovered during Construction	coroner and NAHC if necessary
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**Action:** If human remains are discovered as part a larger cultural deposit, DWR and the construction contractors will coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98. The provisions of these state laws apply unless discoveries occur on land owned or controlled by the federal government. For discoveries on federal land the bulleted procedures for NAGPRA, provided below will be followed. Compliance with state law for discoveries occurring on private or state lands requires the following steps.

- Notification of the county coroner so the coroner may determine if an investigation regarding the cause of death is required. If the coroner determines that the remains are of prehistoric Native American origin, the coroner will notify the NAHC.
- Upon notification the NAHC will identify the MLD, and the MLD will be given the opportunity to reinter the remains with appropriate dignity. If the NAHC fails to identify the MLD or if the parties cannot reach agreement as to how to reinter the remains as described in California PRC Section 5097.98(e), DWR will reinter the remains at a location not subject to further disturbance. DWR will ensure the protections prescribed in California PRC Section 5097.98(e), are performed, such as the use of conservation easements and recording of the location with the relevant county and information center of the CHRIS.

If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]):

- Where the lineal descendants can be found, the lineal descendants own the remains.
- Where the lineal descendants cannot be found, the remains belong to the Indian tribe on whose land the remains were found.
- If the remains are discovered on other lands owned or controlled by the federal government and the lineal descendants cannot be determined, the remains belong to the Indian tribe that is culturally affiliated with the remains, or the tribe that aboriginally occupied the land where the remains were discovered.
- “Indian Tribe” here means federally recognized tribes identified in the list of such tribes published by the Bureau of Indian Affairs in the *Federal Register* as well as in the tribal directory compiled by the Bureau of Indian Affairs (BIA).

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the project. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

**Responsible Parties:** If human remains are discovered as part a larger cultural deposit, DWR and the construction contractors will coordinate with the county coroner and NAHC to make the

determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98. If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA).

**Regulating/Permitting Agencies:** If human remains are discovered as part a larger cultural deposit, DWR and the construction contractors will coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98. If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA).

**Location:** The footprint of features that would be constructed under this alternative.

**Timing:** As part of MM CUL-3, during construction an archaeological monitor will be present to observe construction at geographic locations sensitive for unidentified cultural resources.

**Monitoring:** DWR will provide an archaeological monitor to observe construction at geographic locations that are sensitive for unidentified cultural resources. The archaeological monitor will have the authority to order the cessation of work immediately. The archaeological monitor will oversee compliance with the above actions in the case human remains are discovered.

**Reporting Requirements:** The archaeological monitor will notify DWR as soon as possible if human remains are discovered. The archaeological monitor will report to DWR about compliance with applicable federal and state law regarding the disposal of human remains. DWR will ensure the protections prescribed in California PRC Section 5097.98(e), are performed, such as the use of conservation easements and recording of the location with the relevant county and information center of the CHRIS.

## 2.36 Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 18, Cultural Resources			
Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan	DWR, individuals who meet the Secretary of the Interior's professional qualifications and have demonstrable experience conducting the following recommended measures, appropriate federal agencies, architectural historian, relevant parties (including but not limited to SHPO, ACHP, local historical	Prior to and during construction	CUL-5

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societies, local preservation and  
community organizations)

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**Action:** All mitigation will be undertaken by individuals who meet the Secretary of the Interior's professional qualifications and have demonstrable experience conducting the following recommended measures. In preparation of the built environment treatment measures relevant parties will be consulted. Such parties may include but are not limited to the State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), local historical societies, and other interested parties such as local preservation and community organizations. DWR will perform the following measures as part of mitigation and monitoring for compliance with CEQA. Appropriate federal agencies will perform these measures as part of their management responsibilities performed to satisfy Section 106 of the NHPA.

A built environment treatment plan (BETP) will be prepared by an architectural historian with demonstrated experience preparing treatment for similar kinds of resources, and reviewed by relevant parties prior to any demolition or ground-disturbing activity for all built-environment resources subject to adverse effects or significant impacts. Recommended property specific mitigation is identified in Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*, Tables 18B-17 through 18B-31 of the FEIR/FEIS and will be implemented in accordance with the specifics developed in the BETP.

The following protective measures and monitoring protocols will be implemented for historic resources in close proximity to the project but that are not anticipated to be directly affected by demolition or construction but which may be subject to direct effects such as vibration or inadvertent damage activities:

- Historic Structures Reports (HSR) will be prepared for buildings and structures adjacent to the project for which detailed information is required to develop protection measures. These will be done for buildings and structures that appear to be in poor condition and, therefore, potentially sensitive to construction-related activities such as vibration. Preconstruction stabilization or temporary removal of these buildings may be necessary.
- Preconstruction condition assessments will be prepared for buildings and structures adjacent to the project that are stable, but could be unintentionally damaged during construction. Should there be any question as to whether or not the project caused damage, these condition assessments will provide confirmation of the preconstruction condition.
- Precautions to protect built resources from construction vehicles, debris and dust may include fencing or debris meshing. Temporary mothballing, and fire and intrusion protection may be needed if the buildings are unoccupied during construction.
- Protective measures will be field checked as needed during construction by a qualified architectural historian with demonstrated experience conducting monitoring of this nature. Vibration monitoring may be required for buildings determined to be susceptible to vibration damage that are in close proximity to construction activities or machinery that cause vibration.
- These measures are designed to avoid direct effects such as vibration that may result in structural damage or inadvertent direct effects such as demolition.
- Redesign of relevant facilities will be used to avoid destruction or damage where feasible.

For built resources that will be directly and adversely impacted, the BETP will specify resource-specific treatment measures such as, but not limited to the following examples of treatments used to minimize effects on built-environment resources:

- Historic American Building Survey (HABS) documentation will be prepared for CRHR and NRHP-eligible historic buildings and structures that will be demolished (National Park Service 2000). These reports will include written and photographic documentation of the significant and character-defining features of these properties. These reports will minimize the adverse effect by capturing and preserving a description of the significant information and characteristics associated with the resource.
- In recent years, the National Park Service and National Archives have issued directives indicating that they will not accept formal submissions under the HABS program unless the resource being documented is a rare, unusual, or exceptionally high-quality example of its type, due to the huge volume of submissions generated by environmental mitigation requirements. The BETP will indicate whether the HABS documentation will be formally submitted to the National Park Service for review and approval, based on a consideration of the rarity or caliber of the resource being mitigated, or instead will be prepared informally for distribution to local repositories or for re-use for interpretive or educational programs.
- For formal HABS documentation, reports are subject to review and approval by the National Park Service. Following approval, DWR will produce sufficient copies for distribution to repositories identified in the BETP, including the Library of Congress, the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties. Distribution will further enhance the mitigation of the adverse effect because it will ensure that the significance is retained and conveyed to a wide audience.
- For informal HABS documentation, report contents may be prepared in high-resolution digital format, rather than being produced to the high archival standards required by the National Park Service for formal submissions. DWR will produce sufficient copies for distribution to repositories identified in the BETP, which may include the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties.
- As applicable, Historic American Landscape Survey (HALS) records and Historic American Engineering Record (HAER) documents will be prepared for historic water-associated resources (National Park Service 2005). The levees and other CRHR and NRHP-eligible linear historic features will be recorded following HAER guidelines. Additionally the settings will be recorded following HALS guidelines. These reports will include written and photographic documentation of the significant and character-defining features of these properties. The HALS and HAER reports will minimize the adverse effect by capturing and retaining a description of the significant engineering and design information associated with the resource.
- In recent years, the National Park Service and National Archives have issued directives indicating that they will not accept formal submissions under the HALS and HAER programs unless the resource being documented is a rare, unusual, or exceptionally high-quality example of its type, due to the huge volume of submissions generated by environmental mitigation requirements. The BETP will indicate whether the HALS or HAER documentation will be formally submitted to the National Park Service for review and approval, based on a consideration of the rarity or caliber of the resource being mitigated, or instead will be prepared

informally for distribution to local repositories or for re-use for interpretive or educational programs.

- Formal HALS/HAER submissions are subject to review and approval by the National Park Service. Following approval, DWR will produce sufficient copies for distribution to repositories identified in the BETP, including the Library of Congress, the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties. Distribution will further enhance the mitigation of the adverse effect because it will ensure that the significance is retained and conveyed to a wide audience.
- For informal HALS/HAER documentation, report contents may be prepared in high-resolution digital format, rather than being produced to the high archival standards required by the National Park Service for formal submissions. DWR will produce sufficient copies for distribution to repositories identified in the BETP, which may include the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties.
- Preparation of interpretive or educational media such as displays in public spaces, print materials, or websites. Interpretive and educational media may incorporate written, photographic, and archival documentation, such as those compiled for informal HABS/HAER/HALS reports), oral history interviews, video, or animation to tell the story of the heritage represented by the impacted resource. Interpretive media is an appropriate mitigation for resources that are CRHR- or NRHP-eligible because they are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage or that are associated with persons important in our past.
- Salvage of materials will be performed to the extent feasible to enable the restoration of similar buildings, structures, or water-conveyance features outside of the area of direct impact. Salvage will further minimize adverse effects by using salvaged materials to ensure that similar resources are restored and maintained in manner that will ensure the significance of the resource is preserved.
- Relocation of historic buildings that would otherwise be demolished.
- Following the Secretary of the Interior's standards to restore built resources outside of the area of direct effect that are of the same type as resources that will be demolished by project construction.
- Other appropriate treatment methods that are identified in relation to particular resources that are affected.

The USFWS, NMFS, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the Plan Area. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

**Responsible Parties:** All mitigation will be undertaken by individuals who meet the Secretary of the Interior's professional qualifications and have demonstrable experience conducting the following recommended measures. In preparation of the built environment treatment measures,

relevant parties will be consulted. Such parties may include, but are not limited to, the SHPO, the ACHP, local historical societies, and other interested parties such as local preservation and community organizations. DWR will perform the above measures, listed in *Action*, as part of mitigation and monitoring for compliance with CEQA. Appropriate federal agencies will perform these measures as part of their management responsibilities performed to satisfy Section 106 of the NHPA.

A BETP will be prepared by an architectural historian with demonstrated experience preparing treatment for similar kinds of resources, and reviewed by relevant parties prior to any demolition or ground-disturbing activity for all built-environment resources subject to adverse effects or significant impacts.

Protective measures will be field checked as needed during construction by a qualified architectural historian with demonstrated experience conducting monitoring of this nature.

**Regulating/Permitting Agencies:** The Reclamation, USFWS, NFMS, and the USACE.

**Location:** The specific nature and location of the impact mechanism for each affected resource is described in the FEIR/FEIS Appendix 18B Table 18B-9.

**Timing:** Prior to construction, consultation with relevant parties and preparation of the Built Environment Treatment Plan will happen. During construction, the BETP will be implemented.

**Monitoring:** The architectural historian will seek affirmation of the BETP by relevant parties identified above.

**Reporting Requirements:** The architectural historian will deliver the BETP to DWR along with a summary of analytical methods used to develop the plan and the reviews by relevant parties identified above. Historic Structures Reports (HSR) will be prepared for buildings and structures adjacent to the project for which detailed information is required to develop protection measures. Preconstruction condition assessments will be prepared for buildings and structures adjacent to the project that are stable, but could be unintentionally damaged during construction. Historic American Building Survey (HABS) documentation will be prepared for CRHR and NRHP-eligible historic buildings and structures that will be demolished (National Park Service 2000). As applicable, Historic American Landscape Survey (HALS) records and Historic American Engineering Record (HAER) documents will be prepared for historic water-associated resources (National Park Service 2005). Preparation of interpretive or educational media such as displays in public spaces, print materials, or websites will be done.

Following approval, DWR will produce sufficient copies for distribution to repositories identified in the BETP, including the Library of Congress, the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties.

The HSR, HABS, HALS, and HAER will be provided to the CHRIS, in particular the Northwest Information Center and the North Central Information Center, which cover the counties that are included in the California WaterFix project.

## 2.37 Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 18, Cultural Resources			
Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts	DWR, architectural historians	Prior to and during construction	CUL-6

**Action:** Because DWR does not have legal access to the majority of the footprint for this alternative, a built resources inventory has not been completed for the entire footprint for this alternative. Prior to construction, DWR will ensure that an inventory and evaluation report is completed within all areas where effects on built resources may occur. This subsequent survey will be conducted in a manner consistent with the May–June 2012 survey.

- The scope of the inventory will include the entire area where effects may occur that were inaccessible or partially inaccessible in the first survey efforts. Such effects consist of direct disturbance, damage through vibration, or changes to the setting.
- The work will be led or supervised by architectural historians that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 61.
- Inventory methods and evaluation will include pedestrian surveys, photographic documentation, historical research using both primary and secondary sources, and interviews and oral histories.
- Newly identified resources will be mapped and described on forms provided by the DPR. Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- For all identified resources, DWR will evaluate the resources to determine if they are any of the following.
  - Historical resources (State CEQA Guidelines Section 15064.5[a])
  - Significant historic resources under CEQA (California PRC Section 21084.1)
  - Historic properties (36 CFR 60.4)
  - Eligible for local registers

The recorded resources and the resource evaluations will be summarized in an inventory report. In the inventory report, DWR will also determine if individual resources qualifying as historical



resources or historic properties will be subject to significant effects. DWR will make such a finding if the project would result in the following.

- Demolish or materially alter the qualities that make the resource eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).
- Demolish or materially alter the qualities that justify the inclusion of the resource on a local register or its identification in an historical resources survey meeting the requirements of California PRC Section 5024.1(g), unless DWR establishes by a preponderance of evidence that the resource is not historically or culturally significant (State CEQA Guidelines Section 15064.5[b][2][B]).
- Alter, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 CFR 800.5[a][1]).
- Cause a substantial adverse change in the significance of an historical resource (California PRC Section 21084.1).

Where built-environment resources that are listed or qualify for listing in the CRHR or NRHP, or that have been designated as locally significant, or are otherwise identified by DWR as historical resources will be subject to significant effects, DWR will prepare a BETP. The treatment plan will provide detailed descriptions of treatment measures that will be implemented to avoid, protect, minimize, and mitigate adverse effects on historic properties in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68) and the National Park Service's Guidelines for the Treatment of Cultural Landscapes. The treatment plan will describe work to be done prior to, during, and after construction.

- Where feasible, in light of costs, logistics, technological and environmental considerations, and the extent to which avoidance is consistent with the objectives of the project, DWR will first seek to avoid demolition or materially altering the historical resource by avoidance measures, such as the following.
- Construction condition assessments or HSRs of properties adjacent to construction to determine if these properties are at risk of being damaged.
- Redesign of relevant facilities to avoid destruction or damage.
- Determination of tolerable levels of construction vibration
- Stabilization design and implementation to ensure fragile built resources are not damaged by construction activities
- Temporarily moving built resources, or other measures determined appropriate.
- If avoidance is not feasible, DWR will implement treatment measures such as, but not limited to the following examples of treatments used to minimize effects on built-environment resources.
- Redesign of relevant facilities to minimize the scale or extent of damage to eligible or listed built resources.
- Design standards to minimize the visual impact and to ensure context-appropriate design.
- Complete documentation in accordance with HABS/HAER/HALS programs, including written and photographic documentation of the significant qualities of the CRHR and NRHP listed and determined eligible districts or individually eligible resources (where resources cannot be avoided).

- Relocation of historic buildings that would otherwise be demolished.
- Following the Secretary of the Interior’s standards to restore built resources outside of the area of direct effect that are of the same type as resources that will be demolished by the project.
- Other appropriate treatment methods that are identified in relation to particular resources that are affected.

The USFWS, NMFS, and the USACE are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the project. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

**Responsible Parties:** Prior to construction, the DWR will ensure that an inventory and evaluation report is completed within all areas where effects on built resources may occur.

The work will be led or supervised by architectural historians that meet the Secretary of the Department of the Interior’s professional qualification standards provided in 36 CFR 61.

Where built-environment resources that are listed or qualify for listing in the CRHR or NRHP, or that have been designated as locally significant, or are otherwise identified by DWR as historical resources will be subject to significant effects, DWR will prepare a Built Environment Treatment Plan (BETP).

**Regulating/Permitting Agencies:** The Reclamation, USFWS, NMFS, and the USACE.

**Location:** The scope of the inventory will include the entire area where effects may occur that were inaccessible or partially inaccessible in the first survey efforts in the project footprint.

**Timing:** Prior to construction, DWR will ensure that an inventory and evaluation report is completed within all areas where effects on built resources may occur.

**Monitoring:** DWR will deploy a survey team to ensure that an inventory and evaluation report is completed within all areas where effects on built resources may occur in compliance with this mitigation measure. DWR will retain an architectural historian to review the reports and plans described in the action above.

**Reporting Requirements:** The architectural historian will report to DWR about the suitability of the inventory and evaluation reports and the built environment treatment plan. The recorded resources and the resource evaluations will be summarized in an inventory report.

Where built-environment resources that are listed or qualify for listing in the CRHR or NRHP, or that have been designated as locally significant, or are otherwise identified by DWR as historical resources will be subject to significant effects, DWR will prepare a BETP. The BETP report will be provided to the CHRIS, in particular the Northwest Information Center and the North Central Information Center, which cover the counties that are included in the California WaterFix project.

## 2.38 Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource

# Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Environmental Commitments 3, 4, 6-12, 15, and 16

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 18, Cultural Resources			
Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Environmental Commitments 3, 4, 6-12, 15, and 16	DWR	Prior to and during construction	CUL-7

**Action:** As part of the design process for all Environmental Commitments other than water conveyance construction that could involve adverse effects on cultural resources within the meaning of NEPA, or significant impacts on cultural resources within the meaning of CEQA, DWR will conduct additional site-specific cultural resource studies and develop site-specific strategies for addressing impacts on cultural resources. The cultural resource studies will include the following steps.

- Record searches at the relevant information centers of the CHRIS to retrieve records of identified resources. Inventories will consist of surveys using both historical and map research as well as field-inspection. Evaluation will consist of assessment of identified resources to determine if they have both significance and integrity sufficient to qualify for the CRHR, and NRHP, as well as any relevant local registers.
- Cultural resource inventories and evaluations that identify archaeological resources and built-environment resources.
- Correspondence or discussion with the Native American contacts on file with the NAHC and relevant tribes from the list of relevant federally recognized tribes that qualify as *Indian tribes*, as used in 36 CFR 800.16(m), maintained by the BIA, in order to identify resources that may be known to the Native American community, and to incorporate their preferences for treatment and management.
- Resource-specific evaluations that apply the criteria to determine if the identified resources qualify as historical resources (State CEQA Guidelines Section 15064.5[a]) or unique archaeological resources under CEQA (California PRC Section 21083.2[g]), historic properties (36 CFR 60.4), or are eligible for local registers.
- Resource-specific treatment for historical resources, unique archaeological resources, and historic properties that would be materially impaired as defined in CEQA (State CEQA Guidelines Section 15064.5[b][1]) or adversely affected, as defined in the Section 106 regulations (36 CFR 800.5[a][1]).
- Treatment and mitigation will include the following elements and steps.

- 1 • Treatment for archaeological resources qualifying as historical resources that are subject to  
2 significant effects will follow the order of preference described in State CEQA Guidelines Section  
3 15126.4[b][3].
- 4 • Treatment for unique archaeological resources subject to significant effects will conform to the  
5 mitigation prescribed under CEQA (California PRC Section 21083.2[b])
- 6 • Treatment for historic properties subject to adverse effects will seek to avoid or minimize the  
7 consequences of the project that would diminish the characteristics that make the historic  
8 property eligible for inclusion in the NRHP.
- 9 • Treatment plans or mitigation measures in environmental documents will include monitoring  
10 and discovery plans that provide for observation of construction to avoid inadvertent effects on  
11 previously unidentified human remains and cultural resources, to the extent feasible.
- 12 • Treatment plans or mitigation measures in environmental documents will also include the  
13 notification and consultation provisions required for discoveries of human remains provided in  
14 California Health and Safety Code Section 7050.5 and California PRC Section 5097.98.
- 15 • If Native American human remains are discovered on federal land, work in the immediate  
16 vicinity will cease and DWR will contact the relevant representative of the federal agency where  
17 the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After  
18 notification from the relevant agency representative and treatment of the remains as required  
19 under NAGPRA, work may continue. Disposition of the remains will follow the ownership  
20 priority described in NAGPRA (25 USC Section 3002[a]).
- 21 • For federal agency undertakings, management will be coordinated through a PA and  
22 memoranda of agreement, as described in 18.2.1.3, *Compliance with Section 106 of the National*  
23 *Historic Preservation Act* of the FEIR/FEIS.

24 The USFWS, NMFS, and the USACE are entering into a Programmatic Agreement with the California  
25 State Historic Preservation Officer for the implementation of NHPA Section 106 for their  
26 undertakings associated with the project. The effects of Federal undertakings (actions) on historic  
27 properties (eligible for or listed on the National Register of Historic Places) will be taken into  
28 account through the implementation of this programmatic agreement.

29 **Responsible Parties:** DWR will conduct site-specific cultural resource studies and develop site-  
30 specific mitigation strategies as part of the design process for all Environmental Commitments listed  
31 in Mitigation Measure CUL-7.

32 **Regulating/Permitting Agencies:** If Native American human remains are discovered on federal  
33 land, work in the immediate vicinity will cease and DWR will contact the relevant representative of  
34 the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d)  
35 (NAGPRA).

36 **Location:** Sites for all Environmental Commitments listed in Mitigation Measure CUL-7.

37 **Timing:** Surveys will be conducted prior to construction. Monitoring, treatment, and mitigation will  
38 occur during construction.

39 **Monitoring:** DWR will appoint a coordinator to review DWR and its construction contractor  
40 compliance with the actions described above and oversee necessary communications with  
41 appropriate outside agencies, entities, or individuals

**Reporting Requirements:** The recorded resources and the resource evaluations will be summarized in an inventory report. The coordinator will report to DWR on compliance with developed treatments or plans and coordination with outside agencies, entities, or individuals. The inventory report will be provided to the CHRIS, in particular the Northwest Information Center and the North Central Information Center, which cover the counties that are included in the California WaterFix project. .

## 2.39 Mitigation Measure TRANS-1a, 1b, & 1c

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
<b>Chapter 19, Transportation</b>			
TRANS-1a: Implement site-specific construction traffic management plan	DWR through construction contractors	Prior to, during, after construction	Impact LU-3, REC-2, REC-3, TRANS-1, TRANS-5, TRANS-6, TRANS-7, TRANS-10, HAZ-1, HAZ-7
TRANS-1b: Limit hours or amount of construction activity on congested roadway segments	DWR through construction contractors	Prior to and during construction	Impact LU-3, REC-2, TRANS-1, TRANS-6, TRANS-10
TRANS-1c: Make good faith efforts to enter into mitigation agreements to enhance capacity of congested roadway segments	DWR through construction contractors	Prior to construction	Impact REC-2, TRANS-1, TRANS-3, TRANS-6, TRANS-10

### Mitigation Measure TRANS-1a: Implement Site-Specific Construction Traffic Management Plan

**Action:** Prior to construction, DWR will be responsible for project management and shall contract with one or more construction management firms to assist in ensuring that construction contractors' crews and schedules are coordinated and that the plans and specifications are being followed. DWR will also ensure development of site-specific construction traffic management plans (TMPs) that address the specific steps to be taken before, during, and after construction to minimize traffic impacts, including the mitigation measures and environmental commitments identified in this EIR/EIS. This will include potential expansion of the study area identified in this EIR/EIS to capture all potentially significantly affected roadway segments.

DWR will be responsible for developing the TMPs in coordination with the applicable jurisdictions, including the following.

- Caltrans for state and federal facilities;
- local agencies for local roads, including emergency responders;
- transit providers;
- rail operators;
- the U.S. Coast Guard;
- city and county parks departments; and
- the California Department of Parks and Recreation (DPR)

DWR will also ensure that the TMPs are implemented prior to beginning construction at a site, including in-water construction sites. If necessary to minimize unexpected operational impacts or delays experienced during real-time construction, DWR will also be responsible for modifying the traffic management plan to reduce these effects. With the goal of minimizing construction traffic related effects on wildlife and in light of local community traffic interests, DWR will facilitate discussions in the development of the TMP to address methods for minimizing truck traffic impacts in ways that do not create local traffic hazards. Each TMP will address the following, as needed and appropriate after coordination with the entities listed above. Implementation of this measure will ensure operational traffic impacts and delays experienced during construction will be minimized to the greatest extent feasible.

- Signage warning of roadway surface conditions such as loose gravel, steel plates or similar conditions that could be hazardous to road cycling activity on roadways open to bicycle traffic.
- Signage and barricades to be used around the work sites.
- In-water work areas will be indicated by buoys, signage, or other effective means to warn boaters of their presence and restrict access. Warning devices and signage (e.g., “boats keep out” or “no wake zone” labeled buoys) will be in compliance with the U.S. Coast Guard Private Aid to Navigation requirements (U.S. Coast Guard 2012) and effective during non-daylight hours and periods of dense fog.
- Use of flag people or temporary traffic signals/signage as necessary to slow or detour traffic.
- Notifications for the public, emergency providers, cycling organizations, bike shops, and schools, the U.S. Coast Guard, boating organizations, marinas, city and county parks departments, and DPR, where applicable, describing construction activities that could affect transportation and water navigation.
- Outreach (via public meetings and/or flyers and other advertisements)
- Procedures for construction area evacuation in the case of an emergency declared by county or other local authorities.
- Alternate access routes via detours and bridges to maintain continual circulation for local travelers in and around construction zones, including bicycle riders, pedestrians, and boaters, where applicable.
- Description of construction staging areas, material delivery routes, and specification of construction vehicle travel hour limits.
- Notifications to commercial and leisure boating community of proposed barge operations in the waterways, including posting notices at Delta marinas and public launch ramps. This information will provide details regarding construction site location(s), construction schedules, and identification of no-wake zone, speed restricted zones, and/or detours, where applicable.
- No-wake zone and speed-restrictions will be established as part of development of the site-specific plans and will be determined to protect the safety of construction workers and recreationists.
- Designation of areas where nighttime construction will occur.
- To the extent feasible, position construction lighting to reduce glare to nighttime drivers.

- Plans to relocate school bus drop-off and pick-up locations if they will be affected during construction.
- Scheduling for oversized material deliveries to the work site and haul routes.
- Provisions that direct haulers are to pull over in the event of an emergency. If an emergency vehicle is approaching on a narrow two-way roadway, specify measures to ensure that appropriate maneuvers will be conducted by the construction vehicles to allow continual access for the emergency vehicles at the time of an emergency.
- Control for any temporary road closure, detour, or other disruption to traffic circulation, including any temporary partial water channel closures.
- Designated offsite vehicle staging and parking areas.
- Posted information for contact in case of emergency or complaint.
- Daily construction time windows during which construction is restricted or rail operations would need to be suspended for any activity within railroad rights of way.
- Coordination with rail providers (BNSF Railway, Amtrak, and UPRR) to develop alternative interim transportation modes (e.g., trucks or buses) that could be used to provide freight and/or passenger service during any longer term railroad closures.
- Coordination with transit providers (SCT, Tri-Delta, Rio Vista, and Greyhound Bus Lines) to develop daily construction time windows during which transit operations would not be either detoured or significantly slowed.
- Routinely post information to the 511.org website regarding construction delays and detours.
- Other actions to be identified and developed as may be needed by the construction manager/resident engineer to ensure that temporary impacts on transportation facilities are minimized.
- For construction-related traffic implement maximum 45 mph speed limit on Hood Franklin Road west of Interstate 5. Include signage: "Caution: entering sensitive wildlife area."
- Further reduce speed limit in both directions to 35 mph for construction-related vehicles from ½ mile west of Interstate 5 to 1 mile west of Interstate 5. Add sign at Visitor Center entrance stating that facilities are for SLNWR visitors only.
- Add a right hand turn lane on Hood Franklin Road at the entrance of the Stone Lakes Visitor Center.
- For construction-related traffic, reduce speed limit to 35 mph on Lambert Road from 1 ½ miles west of Interstate 5 to 2 ¼ miles west of Interstate 5. Include signage: "Caution: entering sensitive wildlife area."
- In consultation with Caltrans and local transportation agencies, schedule construction traffic to minimize impacts to local community events (e.g., Pear Fair, holidays).
- Schedule construction traffic to minimize impacts to agricultural transportation operations between agricultural areas and processing or marketing facilities during harvest season.

As additional mitigation to minimize delays to transit vehicles due to projected traffic congestion and to encourage use of alternative modes of travel, including transit, DWR is required to develop a Transportation Demand Management (TDM) program for construction contractor's crews to reduce

the number of project trips. The program shall include and implement any combination of measures that would reduce the project's trips and associated parking demand. The measures include:

- Promote ride sharing programs by methods that may include designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading and waiting areas for ride sharing vehicles.
- Provide public transit incentives such as fully-subsidized or low-cost monthly transit passes.
- Provide shuttle service and/or funding for a shuttle for residents that are outside of walking distance from a transit line.
- Offering a parking cash out program.
- The plan also includes more passive measures to further reduce trips:
- Addition of pedestrian and bicycle facilities;
- Provision of carpool/vanpool/ride-matching services;
- Provision of transportation information for contractors;
- Provision of a transportation information center.

**Responsible Parties:** DWR and its construction contractors will be responsible for development of TMPs, implementation of TMPs prior to beginning construction at a site, and any modification of TMPs to reduce effects of operational impacts or delays experienced during real-time construction.

TMPs will be developed in consultation with Caltrans for state and federal facilities, local agencies for local roads, transit providers, rail operators, commercial barge operators, the U.S. Coast Guard, boating organizations, marinas, city and county park departments, the CA Department of Parks and Recreation, and the Department of Boating and Waterways.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** A site-specific construction TMP will be created for construction locations with the potential to significantly affect roadway segments or other transportation corridors.

The study area identified in the EIR/EIS has the potential for expansion in order to capture all potentially significantly affected roadway segments. Additionally, a TMP would be created for any waterways that could be significantly impacted by construction of the project, specifically the M-5 corridor, the M-580 corridor, and affected San Joaquin/Sacramento Delta waterways.

**Timing:** Development and implementation of site-specific construction TMPs will occur prior to construction being initiated. Modification of the TMPs will occur as needed to reduce effects of operational impacts or delays experienced during real-time construction. Some actions may need to be taken after construction in order to accommodate for new construction.

**Monitoring:** This mitigation measure will be included in the construction contractor's specifications. DWR will approve the contractor's TMP. TMPs will be developed in consultation with Caltrans for state and federal facilities, local agencies for local roads, transit providers, rail operators, commercial barge operators, the U.S. Coast Guard, boating organizations, marinas, city and county park departments, the CA Department of Parks and Recreation, and the Department of Boating and Waterways.



During construction, those TMP elements that are part of the main contract or Encroachment Permit, for example, transit activities and public awareness campaigns, will be under the direction of their respective contract managers.

**Reporting Requirements:** Field personnel will observe traffic conditions and report to the TMP Manager. The TMP Manager will, in turn, report to the TMC who will oversee coordination and management of traffic and incident information dissemination.

#### **Mitigation Measure TRANS-1b: Limit Hours or Amount of Construction Activity on Congested Roadway Segments**

**Action:** Where feasible, DWR would limit construction activity to fit within available reserve capacity or shift construction activity to hours with more reserve capacity so as to achieve acceptable LOS conditions based on roadway location (Chapter 19, *Transportation*, Table 19-9, of the FEIR/FEIS). Feasibility will be based on factors like reserve capacity on roadways, timing of deliveries and staging of construction.

Potential mitigation measure would be to minimize construction traffic activity during typical morning and evening commute time periods. This can be accomplished through a combination of scheduling and routing requirements.

DWR will include in the bid specifications a requirement that the contractor submit a proposal for a process for determining when the hours of construction can feasibly be limited to avoid operational deficiencies on identified roadway segments as specified in Table 19-9 of the FEIR/FEIS. DWR will ensure that this process is adhered to throughout the project construction period.

**Responsible Parties:** DWR and its construction contractors.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Roadway segments specified in Table 19-9 of the FEIR/FEIS.

**Timing:** Inclusion of bid specification requirements will occur in the contracting phase for each construction site. Development of proposals for a process for limiting amount of construction activity on congested roadway segments will occur prior to construction being initiated. Implementation of proposals will occur during construction.

**Monitoring:** Monitoring will be site-specific and included in the proposal developed by the Construction Management Firm. DWR will review and approve monitoring proposed by the Construction Management Firm to verify that the hours of construction activity and the amount of construction activity for the 38 roadway segments identified in Table 19-9 achieve acceptable LOS conditions based on roadway location. Monitoring activities will be verified by the construction monitor.

**Reporting Requirements:** Reporting requirement for the Construction Management Firm will be determined in the proposal developed by the Construction Management Firm. The reports, once determined, will be delivered to DWR. DWR will review and approve reporting requirements proposed by the Construction Management Firm.

#### **Mitigation Measure TRANS-1c: Make Good Faith Efforts to Enter into Mitigation Agreements to Enhance Capacity of Congested Roadway Segments**

**Action:** Prior to commencement of construction activities substantially affecting transportation facilities, DWR will make a good faith effort to enter into mitigation agreements with affected state, regional, or local agencies (“affected agencies”) to verify the location, extent, timing, and fair share cost to be paid for reducing congestion to the identified roadway segments specified in Table 19-9 of the FEIR/FEIS.

Implementation of this measure is intended to provide funding from DWR sufficient to provide its fair share of the cost of reducing congestion so that traffic operating conditions (i.e., LOS) on study area roadways do not operate at a level of service or delay that is worse than the pre-project conditions (to the extent feasible in light of costs, logistics, and other factors). DWR will include in the bid specifications requirements that the contractor(s) ensure that all enhancements are conducted in compliance with applicable standards of affected agencies and with any applicable mitigation agreements, as described below.

In attempting in good faith to enter into mitigation agreements with affected agencies, DWR will be guided by the following principles. DWR will be responsible for their fair share costs of all feasible temporary congestion reducing programs and improvements jointly determined by DWR and the affected agencies to be necessary, feasible, and available to reduce the severity of the project’s temporary significant construction-related transportation impacts. Fair share calculations will account not only for traffic levels as they existed at the time of the public release of the Draft EIR/EIS, but also for “background growth” between that time frame and the commencement of construction activities, as well as any probable future projects in the affected agency or neighboring agencies that will likely contribute to the need for, and directly benefit from, temporary congestion reduction.

The DWR's contribution toward such improvements shall take any, or some combination, of the following forms:

1. Construction of improvements, which may be subject to fee credits and/or reimbursement, coordinated by the affected agency, from other fee-paying development projects if available with respect to improvements that would also benefit such fee-paying development projects;
2. The payment of impact fees to the affected agency in amounts that constitute DWR's fair share contributions to the construction of the required improvements, consistent with the affected agency's Capital Improvement Program ("CIP") or other funding program that meets the definition of a "reasonable plan for mitigation" under CEQA case law (i.e., a plan that ensures that (i) the fees collected from DWR will be used for their intended purposes, and (ii) the improvements will actually be built within a reasonable period of time);
3. The payment of adopted regional impact fees that would provide funding for transportation facilities that are affected by multiple agencies, except where DWR's payments of other fees or construction of improvements within the affected agency will create credit against the payment of regional impact fees;
4. The payment of impact fees to the affected agency in amounts that constitute DWR's fair share contributions to the construction of improvements within other agencies and not the affected agency, which payments to the affected agency and transmittal of fees to other agency would occur through one or more enforceable agreements, provided that for each required improvement there is a reasonable plan for mitigation that ensures that (i) the fees collected from DWR will be used for their intended purposes, and (ii) the improvements will actually be built within a reasonable period of time; and/or
5. The payment of impact fees to the Caltrans in amounts that constitute DWR's fair share contributions to the construction of improvements on federal or state highways or freeways needed in part because of the project, to be made available to Caltrans if and when Caltrans, DWR, and any other the affected agency enter into an enforceable agreement consistent with state law, provided that, for each required improvement, Caltrans has a reasonable mitigation plan that ensures that (i) the fees collected from DWR will be used for their intended purposes, and (ii) the improvements will actually be built within a reasonable period of time.

In order to obtain the most fair, accurate, and up-to-date calculations of DWR's fair share of the costs of required improvements, the agreement(s) reached between DWR and the affected agency or agencies will also provide for the following: (i) that the traffic models to be used be mutually acceptable to both DWR and the affected agency or agencies; and (ii) that the calculations account for (A) newly approved projects cumulatively that contribute to transportation-related impacts and that therefore should contribute to the funding of necessary improvements, and (B) up-to-date cost calculations for the construction of needed improvements based on recent changes in the costs of materials, labor, and other inputs.

**Responsible Parties:** DWR and its construction contractors. TMPs will be developed in consultation with Caltrans for state and federal facilities, local agencies for local roads, transit providers, rail operators, commercial barge operators, the U.S. Coast Guard, boating organizations, marinas, city and county park departments, the CA Department of Parks and Recreation, and the Department of Boating and Waterways

**Regulating/Permitting Agencies:** N/A for this mitigation measure

**Location:** Roadway segments specified in Table 19-9 and other transportation facilities where significant impacts may occur even after applying Mitigation Measures TRANS-1a and TRANS-1b.

**Timing:** After Notice of Determination (NOD) – CEQA or Record of Decision (ROD) – NEPA, DWR will begin consultation with the following affected agencies as shown in Table 19-9 of the FEIR/FEIS with the goal of entering into mitigation agreements in advance of construction activities substantially affecting transportation facilities.

**Monitoring:** DWR will monitor the status of good faith negotiations. In the event that agreements cannot be reached prior to construction, DWR may terminate its efforts to enter into such agreements.

**Reporting Requirements:** In the event an agreement is not reached between DWR and the affected agencies, DWR will document the methods of consultation and major issues preventing agreement between DWR and the affected agencies.

## 2.40 Mitigation Measure TRANS-2a, 2b, & 2c

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 19, Transportation			
TRANS-2a: Prohibit Construction Activity on Physically Deficient Roadway Segments	DWR and Construction Contractors	Prior to and during construction	Impact TRANS-2
TRANS-2b: Limit Construction Activity on Physically Deficient Roadway Segments	DWR and Construction Contractors	Prior to and during construction	Impact TRANS-2
TRANS-2c: Improve Physical Condition of Affected Roadway Segments as Stipulated in Mitigation Agreements or Encroachment Permits	DWR and Construction Contractors	Prior to and during construction	Impact TRANS-2

### Mitigation Measure TRANS-2a: Prohibit Construction Activity on Physically Deficient Roadway Segments

**Action:** DWR will include in the bid specifications prohibitions against construction traffic from using roadway segments with pavement conditions below the thresholds identified in this study [i.e., an International Roughness Index (IRI) rating greater than 170 or a Pavement Condition Index (PCI) rating worse than 55], to the extent feasible. Implementation of this measure would prohibit all construction traffic on the 46 of the 116 roadway segments that were determined to be physically deficient as listed in Table 19-26 of the FEIR/FEIS, if feasible. Implementation of Trans-2a would require routing of construction traffic to use the remaining 70 roadway segments that meet pavement conditions thresholds. It should be noted that this may require construction traffic to make circuitous travel routes and/or be unable to access project construction sites.

Therefore, in the event that TRANS-2a is not feasible, TRANS-2b will be implemented. Implementation of Trans-2b would require limiting the total number and/or weight of construction traffic using the 46 roadway segments that do not meet pavement conditions thresholds.

**Responsible Parties:** DWR will be responsible for inclusion of bid specifications prohibiting construction traffic on physically deficient roadway segments. Such specifications shall state that,

where potential contractors believe that prohibiting construction traffic on particular roadway segments is infeasible, the contractors should identify any such segments and explain why avoiding those segments would be infeasible. Construction contractors will be responsible for ensuring construction traffic does not use the prohibited roadway segments, except where DWR has determined, with input from construction contractors, that it is infeasible to avoid the use of particular roadway segments.

**Regulating/Permitting Agencies:** N/A for this mitigation measure

**Location:** Construction traffic will be prohibited, to the extent feasible, on the physically deficient roadway segments in Table 19-26 of the FEIR/FEIS.

**Timing:** Incorporation of these bid specifications would occur prior to issuing contracts to the construction contractors. Prior to construction, these prohibitions will be incorporated in the Traffic Management Plan (TMP). For more detail on the TMP see Mitigation Measure TRANS-1a. During construction the prohibition of use of deficient roadways will be abided by construction contractors.

**Monitoring:** The construction contractor's Transportation Management Center (TMC), Construction Manager/Resident Engineer, field personnel, and TMP Manager will all be responsible for ensuring the prohibited roadways are not used by construction vehicles. Alternative route strategies will be established in the TMP. For more information on these personnel and detail on alternative routes, please see Mitigation Measure TRANS-1a.

**Reporting Requirements:** Field personnel and the Construction Manager/Resident Engineer will observe road usage and report to the TMP Manager. The TMP Manager will, in turn, report to the TMC who will oversee coordination and management of construction vehicles.

## **Mitigation Measure TRANS-2b: Limit Construction Activity on Physically Deficient Roadway Segments**

**Action:** If complete avoidance of physically deficient roadway segments as described in Mitigation Measure TRANS-2a is not feasible, construction activity will be limited to the extent possible on the deficient roadways identified in Table 19-26 of the FEIR/FEIS. Implementation of TRANS-2b would require limiting the total number and/or weight of construction traffic using the 46 roadway segments that do not meet pavement conditions thresholds.

Implementation of TRANS-2b will reduce continuing deterioration of pavement conditions on the most damaged roadways in the study area. DWR will include in the bid specifications requirements that limit the amount of construction traffic on roadway segments with pavement conditions below the thresholds identified in this study (i.e., an IRI rating greater than 170 or a PCI rating worse than 55), if feasible. If use of physically deficient roadways cannot be avoided or limited as specified in Mitigation Measures TRANS-2a and TRANS-2b, Mitigation Measure 2c will be implemented. Trucks would be prohibited and construction traffic would be limited to passenger vehicles on travel routes with pavement conditions worse than the thresholds identified in this study (i.e., an IRI rating greater than 170 or a PCI rating worse than 55).

**Responsible Parties:** DWR will be responsible for inclusion of bid specifications limiting construction traffic on physically deficient roadway segments. Such specifications shall state that, where potential contractors believe that limiting construction traffic on particular roadway segments is infeasible, the contractors should identify any such segments and explain why limiting construction traffic on those segments would be infeasible. Construction contractors will be

responsible for ensuring trucks do not use the identified roadways segments and construction traffic is limited to passenger vehicles on travel routes, except where DWR has determined, with input from construction contractors, that it is infeasible to avoid the use of particular roadway segments.

**Regulating/Permitting Agencies:** N/A for this mitigation measure

**Location:** Construction traffic will be limited to passenger vehicles on travel routes on the physically deficient roadways segments identified in Table 19-26 of the FEIR/FEIS.

**Timing:** Incorporation of these bid specifications would occur prior to issuing contracts to the construction contractors. Prior to construction, these limitations will be incorporated in the TMP. For more detail on the TMP see Mitigation Measure TRANS-1a. During construction the limitations of use of deficient roadways will be abided by Construction Contractors.

**Monitoring:** The construction contractor's Transportation Management Center (TMC), Construction Manager/Resident Engineer, field personnel, construction contractor, and TMP Manager will all be responsible for ensuring the identified roadway segments in Table 19-26 of the FEIR/FEIS are used only by passenger vehicles on travel routes. Alternative route strategies for other construction vehicles will be established in the TMP. For more information on these personnel please see Mitigation Measure TRANS-1a.

**Reporting Requirements:** Field personnel and the Construction Manager/Resident Engineer will observe road usage and report to the TMP Manager. The TMP Manager will, in turn, report to the TMC who will oversee coordination and management of construction vehicles.

## **Mitigation Measure TRANS-2c: Improve Physical Condition of Affected Roadway Segments as Stipulated in Mitigation Agreements or Encroachment Permits**

**Action:** If use of physically deficient roadways cannot be avoided or limited as specified in Mitigation Measures TRANS-2a and TRANS-2b, it may be necessary to improve the deficient roadways identified in Table 219-26 of the FEIR/FEIS or make other necessary infrastructure improvements, if any, before construction to make them suitable for use during construction. Additionally, all affected roadways would be returned to preconstruction condition or better following construction. Implementation of this measure will ensure that construction activities will not worsen pavement or levee conditions, relative to Existing Conditions.

Prior to construction, DWR will make a good faith effort to enter into mitigation agreements with or to obtain encroachment permits from affected agencies to verify what the location, extent, timing, and fair share cost to be paid by DWR for any necessary pre- and post-construction physical improvements. The fair share amount would be either the cost to return the affected roadway segment to its preconstruction condition or a contribution to programmed planned improvements. Repairs may be preventive or rehabilitative and occur before or after construction and may include overlays, other surface treatments, or roadway reconstruction. The flood protection benefits of roadways will also be considered in developing and implementing activities pursuant to this measure.

Pre-construction analyses of existing pavement conditions will be conducted just prior to starting construction for any proposed construction traffic travel routes. The preconstruction pavement analysis will establish the baseline for required improvements and will be based on the PCI or IRI methodologies described in this EIR/EIS or an equivalent method as agreed to by DWR and the

affected agencies. Relevant flood protection agencies will also be consulted during the design of roadway improvements.

DWR will include in the bid specifications stipulations that require the contractor(s) to conduct the pre-construction pavement analysis and conduct all improvements in compliance with applicable standards of affected agencies, as stipulated in the mitigation agreements or encroachment permits.

Monitoring programs needed during construction will be evaluated during design. Construction contracts will include prescriptive specification requirements for monitoring levees to ensure that structural integrity and flood protection capacity are maintained. These requirements will be consistent with common industry standards such as those found in Chapter 9, *Geology and Seismicity*, Section 9.2

It is not anticipated that project construction could cause the need for major transportation infrastructure improvements, such as the need to upgrade or repair existing bridges or the need to construct new highway interchanges. To the extent that construction activities could cause the need for such major transportation infrastructure improvements, DWR retain the flexibility to seek alternative means of transporting people, equipment, and materials to construction sites, such as via barges, to avoid the need for such major infrastructure improvements, if any.

**Responsible Parties:** DWR will be responsible for making a good faith effort to enter into mitigation agreements with, or obtaining encroachment permits from the following affected agencies as shown in Table 19-26 of the FEIR/FEIS with the goal of entering into mitigation agreements within nine months of initiation of contact by DWR to improve the physical condition of the following affected roadway segments:

- Contra Costa County – Old SR 4 and Byron Highway
- Caltrans – Headquarters, District 3 (Sacramento), District 4 (Oakland) and District 10 (Stockton)
- City of Oakley – Main Street (Old SR 4)
- City of Sacramento – Pocket Road
- Sacramento County –Hood Franklin Road, Lambert Road, Franklin Boulevard, Sutter Slough Bridge Road, River Road
- San Joaquin County – Walnut Grove Road
- City of Tracy – Tracy Boulevard
- City of West Sacramento –Jefferson Boulevard
- Yolo County – River Road and Courtland Road

In addition, DWR will include bid specification stipulations that require the contractor(s) to conduct the pre-construction pavement analysis and all improvements as agreed upon with the affected agencies. Construction contractors will be responsible for conducting the pre-construction pavement analysis as well as all improvement required for compliance with the previously mentioned mitigation agreements or encroachment permits. Pre-construction pavement analysis will be completed in consultation with Caltrans for state and federal facilities, local agencies for local roads, transit providers, rail operators, commercial barge operators, the U.S. Coast Guard, boating organizations, marinas, city and county park departments, the CA Department of Parks and Recreation, and the Department of Boating and Waterways.

**Regulating/Permitting Agencies:** N/A for this mitigation measure

**Location:** Road improvements or other infrastructure improvements may be necessary to improve the deficient roadways in Table 19-26 of the FEIR/FEIS.

**Timing:** DWR will make a good faith effort to finalize mitigation agreements with the above Responsible Parties within nine months of initiation of contact by DWR. Mitigation agreements and encroachment permits from the affected agencies will be obtained prior to construction bidding and the applicable standards and improvements stipulated in the mitigation agreements and encroachment permits will be incorporated into bid specifications for construction contractors. Prior to construction, the construction contractors will conduct pre-construction analysis of existing pavement conditions. In the event that agreements cannot be reached prior to construction, DWR may terminate its efforts to enter into such agreements.

**Monitoring:** The standards and improvements required will be incorporated into the contract(s) with the construction contractor and it will be the responsibility of the construction contractor to ensure standards and improvements are implemented in accordance with the construction contract. DWR and affected agencies will perform regular site-visits to ensure these actions are taking place.

**Reporting Requirements:** The Construction Manager/Resident Engineer will be responsible for reporting on the progress of the standards and improvements included in the construction contract to DWR.

## 2.41 Mitigation Measures UT-6a, 6b, & 6c

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
Chapter 20, Public Services and Utilities			
UT-6a: Verify locations of utility infrastructure	DWR and Construction Contractors	Prior to construction	Impact UT-6, UT-8, HAZ-1, HAZ-7
UT-6b: Relocate utility infrastructure in a way that avoids or minimizes any effect on operational reliability	DWR	Prior to and during construction	Impact UT-6, UT-8, HAZ-7
UT-6c: Relocate utility infrastructure in a way that avoids or minimizes any effect on worker and public health and safety	DWR and Construction Contractors	Prior to and during construction	Impact UT-6, UT-8, HAZ-1

### Mitigation Measure UT-6a: Verify locations of utility infrastructure

**Action:** Before beginning construction, DWR will confirm utility/infrastructure locations through consultation with utility service providers, preconstruction field surveys, and services such as Underground Service Alert. The DWR will find the exact location of underground utilities by safe and acceptable means, including use of hand and modern techniques as well as customary types of equipment. Information regarding the size, color, and location of existing utilities must be confirmed before construction activities begin. DWR will confirm the specific location of all high priority utilities (i.e., pipelines carrying petroleum products, oxygen, chlorine, toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter, or with normal operating measures,



greater than 60 pounds per square inch gauge; and underground electric supply lines, conductors, or cables that have a potential to ground more than 300 volts that do not have effectively grounded sheaths) and such locations will be highlighted on all construction drawings.

The contract specifications will require that the contractor provide weekly updates on planned excavation for the upcoming week and identify when construction will occur near a high priority utility. On days when this work will occur, construction managers will attend tailgate meetings with contractor staff to review all measures—those identified in the Mitigation Monitoring and Reporting Program and in the construction specifications—regarding such excavations. The contractor's designated health and safety officer will specify a safe distance to work near high-pressure gas lines, and excavation closer to the pipeline will not be authorized until the designated health and safety officer confirms and documents in the construction records that: (1) the line was appropriately located in the field by the utility owner using as-built drawings and a pipeline-locating device, and (2) the location was verified by hand by the construction contractor. The designated health and safety officer will provide written confirmation to DWR that the line has been adequately located, and excavation will not start until this confirmation has been received by DWR.

**Responsible Parties:** DWR will be responsible for will confirming utility/infrastructure locations through consultation with utility service providers, preconstruction field surveys, and services such as Underground Service Alert. Construction contractors will be responsible for implementing avoidance measures and notifying DWR when utility infrastructure has been located.

**Regulating/Permitting Agencies:** The locations of utility infrastructure will be determined and permitted in coordination with the three utility providers: Pacific Gas and Electric Company, Western Area Power Administration, and Sacramento Municipal Utility District. Additional agency coordination and permitting (e.g., DFW) may be needed if undergrounding of the lines will impact surface features.

**Location:** Utility/infrastructure locations will be determined, in coordination with utility providers, after final design of the project is complete.

**Timing:** Upon completion of draft final designs, DWR will begin consultation with Pacific Gas and Electric Company, Western Area Power Administration, and Sacramento Municipal Utility District to identify the size, color, and location of existing utilities. Upon completion of final design, DWR will confirm all utilities have been identified, and, if not, re-initiate consultation with the utility providers to identify any utilities within the final design area. Information regarding the size, color, and location of existing utilities must be finalized and confirmed with the utility providers before construction activities begin. During construction the construction contractors will implement measures to avoid utility/infrastructure.

**Monitoring:** DWR will consult with utility service providers and cross check preconstruction field surveys to confirm exact location of underground utilities. DWR will perform regular site inspections to verify contractor compliance and retain inspection records in the project file.

**Reporting Requirements:** Construction contractors will provide weekly updates on planned excavation for the upcoming week and identify when construction will occur near a high priority utility. The designated health and safety officer will provide written confirmation to DWR that the line has been adequately located, and excavation will not start until this confirmation has been received by DWR.

**Mitigation Measure UT-6b: Relocate utility infrastructure in a way that avoids or minimizes any effect on operational reliability**

**Action:** In places where utility lines would be relocated, existing corridors will be utilized to the greatest extent possible, in the following order of priority: (1) existing utility corridors; (2) highway and railroad corridors; (3) recreation trails, with limitations; and (4) new corridors.

New poles or towers will be erected and cable-pulled prior to being connected to existing systems. Natural gas pipeline relocation will be constructed by one of several methods including cut-and-cover, trenching, or placement on at-grade saddles. Active natural gas wells in the proposed water conveyance facilities area will be abandoned to a depth below the tunnel.

Decisions regarding agricultural irrigation and drainage ditches will be made based on site-specific conditions. Planned measures shall include one or more of the following.

- New or modified irrigation pumping plants.
- Extended delivery pipes.
- New or modified drainage ditches.
- New or modified drainage pumping plants.

Any utility relocation will be coordinated with all appropriate utility providers and local agencies to integrate with other construction projects and minimize disturbance to communities, as required by California Water Code §11590. DWR will notify the public in advance of any relocation that is anticipated to disrupt utility service. DWR will contact utility owners if construction causes any damage and promptly reconnect disconnected cables and lines with approval of the owners.

**Responsible Parties:** DWR will be responsible for coordination with all appropriate utility providers and local agencies to determine which utility lines will be relocated and the location of the relocated utility lines.

**Regulating/Permitting Agencies:** The locations of utility infrastructure will be determined and permitted in coordination with the three utility providers: Pacific Gas and Electric Company, Western Area Power Administration, and Sacramento Municipal Utility District. Additional agency coordination and permitting (e.g., DFW) may be needed if undergrounding of the lines will impact surface features. .

**Location:** Utility infrastructure which will need to be relocated as well as location will be determined after final design.

**Timing:** Upon completion of draft final designs, DWR will begin consultation with Pacific Gas and Electric Company, Western Area Power Administration, and Sacramento Municipal Utility District to identify the size, color, and location of existing utilities. Upon completion of final design, DWR will confirm all utilities have been identified, and, if not, re-initiate consultation with the utility providers to identify any utilities within the final design area. Information regarding the size, color, and location of existing utilities must be finalized and confirmed with the utility providers before construction activities begin. Relocation of utilities will begin prior to construction and continue through the construction period as needed.

**Monitoring:** DWR will ensure coordination with appropriate utility providers and local agencies takes place prior to construction. Construction monitors will perform regular site inspections to verify contractor compliance and retain inspection records in the project file.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (UT-6b). Construction contractors will report to DWR on a regular basis on implementation of plans for relocation of utilities. Construction monitors will report to DWR any deficiencies in compliance with this mitigation measure by the construction contractor.

**Mitigation Measure UT-6c: Relocate utility infrastructure in a way that avoids or minimizes any effect on worker and public health and safety**

**Action:** While any excavation is open, DWR will protect, support, or remove underground utilities as necessary to safeguard employees. DWR and/or construction contractors will notify local fire departments if a gas utility is damaged causing a leak or suspected leak, or if damage to a utility results in a threat to public safety.

**Responsible Parties:** DWR will be responsible for identifying underground utilities which need to be protected, supported, or removed and implementing the required action.

**Regulating/Permitting Agencies:** No regulating or permitting agencies will be involved in this Mitigation Measure.

**Location:** Underground utilities which will need to be protected, supported, or relocated will be determined after final design.

**Timing:** Utility relocation and location will be determined prior to beginning construction activities. Relocation of utilities will begin prior to construction and continue through the construction period as needed.

**Monitoring:** DWR will ensure coordination with appropriate utility providers and local agencies takes place prior to construction. DWR will perform site inspections to verify contractor compliance and retain inspection records in the project file. Construction contractors will monitor the site daily to ensure no damage occurs to utilities. If a utility is damaged which causes a threat to worker and public health and safety, construction contractors will notify DWR and the local fire departments.

**Reporting Requirements:** In the event a utility is damaged which causes a threat to worker and public health and safety, construction contractors will notify DWR and the local fire departments immediately. Construction contractors will report to DWR on a regular basis on implementation of plans for relocation of utilities. Construction monitors will report to DWR any deficiencies in compliance with this mitigation measure by the construction contractor

## 2.43 Mitigation Measures AQ-1a & 1b

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
Chapter 22, Air Quality and Greenhouse Gases			
AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the Sacramento Federal Nonattainment Area (SFNA) to Net Zero (0) for Emissions in Excess of General Conformity De Minimis Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants	DWR, SMAQMD, and Construction contractors	Prior to construction	Impact AQ-1, AQ-20
AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity De Minimis Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants	DWR, SMAQMD, and Construction contractors	Prior to construction	Impact AQ-1, AQ-20

### **Mitigation Measure AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the Sacramento Federal Nonattainment Area (SFNA) to Net Zero (0) for Emissions in Excess of General Conformity De Minimis Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants<sup>5</sup>**

**Action:** DWR will reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with the project within the Sacramento Federal Nonattainment Area (SFNA) through the creation of offsetting reductions of emissions. The preferred means of undertaking such offsite mitigation will be through a partnership with the Sacramento Metropolitan Air Quality Management District (SMAQMD) involving the payment of offsite mitigation fees. Criteria pollutants in excess of the federal de minimis thresholds will be reduced to net zero (0) (see Table 22-9 in Chapter 22, *Air Quality and Greenhouse Gases*). Criteria pollutants not in excess of the de minimis thresholds, but above any applicable air pollution control or air quality management district CEQA thresholds<sup>6</sup> will be reduced to quantities below the numeric thresholds (see Table 22-8 in Chapter 22, *Air Quality and Greenhouse Gases*).<sup>7</sup>

<sup>5</sup> In the title of this mitigation measure, the phrase “for other pollutants” is intended to apply to other alternatives, where associated impacts to other pollutants may exceed thresholds other than NO<sub>x</sub>.

<sup>6</sup> For example, NO<sub>x</sub> emissions in a certain year may exceed BAAQMD’s 54 pound per day CEQA threshold, but not the 100 ton annual *de minimis* threshold. According to Appendix G of the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make determinations regarding the significance of an impact.

<sup>7</sup> For example, emissions of NO<sub>x</sub> generated by Alternative 1A both exceed the federal *de minimis* threshold for the SVAB and the SMAQMD’s CEQA threshold. NO<sub>x</sub> emissions must therefore be reduced to net zero (0).

DWR will undertake in good faith an effort to enter into a development mitigation contract with SMAQMD in order to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with project. The preferred source of emissions reductions for NOX, PM, and ROG will be through contributions to SMAQMD's Heavy-Duty Low-Emission Vehicle Incentive Program (HDLEVIP). The HDLEVIP is designed to reduce NOX, PM, and ROG from on- and offroad sources. The program is managed and implemented by SMAQMD on behalf of all air districts within the SFNA, including the Yolo Solano Air Quality Management District (YSAQMD).

SMAQMD's incentive programs are a means of funding projects and programs capable of achieving emissions reductions. The payment fee is based on the average cost to achieve one ton per day (tpd) of reductions based on the average cost for reductions over the previous year. Onroad reductions averaged (nominally) \$44 million (NOX only) and off-road reductions averaged \$36 million (NOX only) over the previous year, thus working out to approximately \$40 million per one tpd of reductions. This rate roughly correlates to the average cost effectiveness of the Carl Moyer Incentive Program.

If DWR is successful in reaching what it regards as a satisfactory agreement with SMAQMD, DWR will enter into mitigation contracts with SMAQMD to reduce NOX, PM, or ROG (as appropriate) emissions to the required levels. Such reductions may occur within the SMAQMD and/or within another air district within the SFNA. The required levels are:

- For emissions in excess of the federal *de minimis* threshold: **net zero (0)** (see Table 22-9).
- For emissions not in excess of *de minimis* thresholds but above the appropriate SMAQMD standards: **below the appropriate CEQA threshold levels** (see Table 22-8.)

Implementation of this mitigation would require DWR to adopt the following specific responsibilities.

- Consult with the SMAQMD in good faith with the intention of entering into a mitigation contract with SMAQMD for the HDLEVIP. For state implementation plan (SIP) purposes, the necessary reductions must be achieved (contracted and delivered) by the applicable year in question (i.e., emissions generated in year 2016 would need to be reduced offsite in 2016). Funding would need to be received prior to contracting with participants and should allow sufficient time to receive and process applications to ensure offsite reduction projects are funded and implemented prior to commencement of project activities being reduced. This would roughly equate to the equivalent of two years prior to the required mitigation; additional lead time may be necessary depending on the level of offsite emission reductions required for a specific year. In negotiating the terms of the mitigation contract, DWR and SMAQMD should seek clarification and agreement on SMAQMD responsibilities, including the following.
  - Identification of appropriate offsite mitigation fees required for the project
  - Timing required for obtaining necessary offsite emission credits.
  - Processing of mitigation fees paid by DWR.
  - Verification of emissions inventories submitted by DWR.
  - Verification that offsite fees are applied to appropriate mitigation programs within the SFNA.
- Quantify mitigation fees required to satisfy the appropriate reductions. As noted above, the payment fees may vary by year and are sensitive to the number of projects requiring reductions

within the SFNA. The schedule in which payments are provided to SMAQMD also influences overall cost. For example, a higher rate on a per-tonnage basis will be required for project elements that need accelerated equipment turn-over to achieve near-term reductions, whereas project elements that are established to contract to achieve far-term reductions will likely pay a lower rate on a per-tonnage basis.

- Develop a compliance program to calculate emissions and collect fees from the construction contractors for payment to SMAQMD. The program will require, as a standard or specification of their construction contracts with DWR, that construction contractors identify construction emissions and their share of required offsite fees, if applicable. Based on the emissions estimates, DWR will collect fees from the individual construction contractors (as applicable) for payment to SMAQMD. Construction contractors will have the discretion to reduce their construction emissions to the lowest possible level through additional onsite mitigation, as the greater the emissions reductions that can be achieved by onsite mitigation, the lower the required offsite fee. Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, additional electrification or alternative fuels, engine-retrofit technology, and/or after-treatment products. All control strategies must be verified by SMAQMD.
- Conduct daily and annual emissions monitoring to ensure onsite emissions reductions are achieved and no additional mitigation payments are required. Excess offsite funds can be carried from previous to subsequent years in the event that additional reductions are achieved by onsite mitigation. At the end of the project, if it is determined that excess offset funds remain (outstanding contracts and administration over the final years of the contracts will be taken into consideration), SMAQMD and DWR will determine the disposition of final funds (e.g., additional emission reduction projects to offset underperforming contracts, return of funds to DWR, etc.).

If a sufficient number of emissions reduction projects are not identified to meet the required performance standard, DWR will coordinate with SMAQMD to ensure the performance standards of achieving net zero (0) for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and of achieving quantities below applicable CEQA thresholds for other pollutants not in excess of the *de minimis* thresholds but above CEQA thresholds are met.

**Responsible Parties:** DWR will be responsible for approaching SMAQMD with the intention of entering into a development mitigation contract with SMAQMD in order to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with the project within the SFNA.

**Regulating/Permitting Agencies:** Implementation will be in compliance with applicable SMAQMD regulations as outlined in Rule 107 of the SMAQMD's Rules and Regulations.

**Location:** Emissions generated onsite will be offset through offsite reduction projects within SFNA. These locations will be determined approximately two years in advance of the onsite emissions generation to allow sufficient time for funding and implementation procedures.

**Timing:** DWR will contact SMAQMD as soon as practical during project design to begin development of mitigation contracts. Should DWR be unable to enter into what they regard as a satisfactory agreement with SMAQMD within six months of contact, DWR will implement Mitigation Measure AQ-1b. Any necessary capacity-enhancing improvements will be completed prior to commencing the construction activity requiring emissions offsets.

**Monitoring:** DWR will conduct daily and annual emissions monitoring to ensure onsite emissions reductions are achieved and no additional mitigation payments are required. If an agreement is reached, SMAQMD will be responsible for verifying emissions inventories submitted by DWR and verifying that offsite fees are applied to appropriate mitigation programs within the SFNA.

**Reporting Requirements:** DWR will be responsible for reporting the daily and annual monitoring emission reduction results to SMAQMD. In the event an agreement is not reached between DWR and the affected agencies, DWR will document the methods of consultation and major issues preventing agreement between DWR and the affected agencies. A copy of this documentation will be delivered to SMAQMD.

**Mitigation Measure AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity De Minimis Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants**

**Action:** Should DWR be unable to enter into what they regard as a satisfactory agreement with SMAQMD as contemplated by Mitigation Measure AQ-1a, or should DWR enter into an agreement with SMAQMD but find themselves unable to meet the performance standards set forth in Mitigation Measure AQ-1a, DWR will develop an alternative or complementary offsite mitigation program to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with the project. The offsite mitigation program will offset criteria pollutant emissions to the required levels identified in Mitigation Measure AQ-1a. Accordingly, the program will ensure that the project does not contribute to or worsen existing air quality exceedances. Whether this program will address emissions beyond NO<sub>x</sub>, PM, or ROG, will turn on whether DWR has achieved sufficient reductions of those pollutants pursuant to Mitigation Measure AQ-1a.

The offsite mitigation program will establish a program to fund emission reduction projects through grants and similar mechanisms. All projects must provide contemporaneous (occur in the same calendar year as the emission increases) and localized (i.e., within the SFNA) emissions benefit to the area of effect. DWR may identify emissions reduction projects through consultation with SMAQMD, other air districts within the SFNA, and Air Resources Board (ARB), as needed. Potential projects could include, but are not limited to the following.

- Alternative fuel, low-emission school buses, transit buses, and other vehicles.
- Diesel engine retrofits and repowers.
- Locomotive retrofits and repowers.
- Electric vehicle or lawn equipment rebates.
- Electric vehicle charging stations and plug-ins.
- Video-teleconferencing systems for local businesses.
- Telecommuting start-up costs for local businesses.

As part of its alternative or complementary offsite mitigation program, DWR will develop pollutant-specific formulas to monetize, calculate, and achieve emissions reductions in a cost-effective manner. Construction contractors, as a standard specification of their construction contracts with DWR, will identify construction emissions and their share of required offset fees. DWR will verify the emissions estimates submitted by the construction contractors and calculate the required fees.

Construction contractors (as applicable) will be required to surrender required fees to DWR prior to the start of construction. Construction contractors will have the discretion to reduce their construction emissions to the lowest possible level through additional onsite mitigation, as the greater the emissions reductions that can be achieved by onsite mitigation, the lower the required offset fee. Acceptable options for reducing emissions may include, but are not limited to, the use of late-model engines, low-emission diesel products, additional electrification or alternative fuels, engine-retrofit technology, and/or after-treatment products. All control strategies must be verified by SMAQMD, the air resources board (ARB), any relevant air pollution control or air quality management district within the SFNA, or by a qualified air quality expert employed by or retained by DWR.

The offsite fee, grant, or other mechanism will be calculated or formulated based on the actual cost of pollutant reductions. No collected offset fees will be used to cover administrative costs; offset fees or other payments are strictly limited to procurement of offsite emission reductions. Fees or other payments collected by DWR will be allocated to emissions reductions projects in a grant-like manner. DWR will document the fee schedule basis, such as consistency with the ARB's Carl Moyer Program cost-effectiveness limits and capital recovery factors.

DWR will conduct annual reporting to verify and document that emissions reductions projects achieve a 1:1 reduction with construction emissions to ensure claimed offsets meet the required performance standard. All offsite reductions must be quantifiable, verifiable, enforceable, and satisfy the basic criterion of additionally (i.e., the reductions would not happen without the financial support of purchased offset credits). Annual reports will include, at a minimum the following components.

- Total amount of offset fees received.
- Total fees distributed to offsite projects.
- Total fees remaining.
- Projects funded and associated pollutant reductions realized.
- Total emission reductions realized.
- Total emissions reductions remaining to satisfy the requirements of Mitigation Measure AQ-1b.
- Overall cost-effectiveness of the projects funded.

If a sufficient number of emissions reduction projects are not identified to meet the required performance standard, DWR will consult with SMAQMD, the ARB, any relevant air pollution control or air quality management district within the SFNA, or a qualified air quality expert employed by or retained by DWR to ensure conformity is met through some other means of achieving the performance standards of achieving net zero (0) for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and of achieving quantities below applicable CEQA thresholds for other pollutants.

**Responsible Parties:** DWR will be responsible for developing an alternative or complementary offsite mitigation program to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with the project. Construction contractors will be responsible for identifying construction emissions and their share of required offset fees. DWR will be responsible for verifying the emissions estimates submitted by the construction contractors and



calculate the required fees. Construction contractors (as applicable) will be required to surrender required fees to DWR prior to the start of construction.

**Regulating/Permitting Agencies:** Strategies used by construction contractors to reduce onsite emissions must be verified by SMAQMD, the ARB, any relevant air pollution control or air quality management district within the SFNA, or by a qualified air quality expert employed by or retained by DWR.

**Location:** Emissions generated onsite will be offset through offsite reduction projects within SFNA.

**Timing:** DWR will develop and implement an Alternative or Complementary mitigation program as outlined in AQ-1b a minimum of three months in advance of project specific emissions generation if an agreement cannot be reached under AQ-1a.

**Monitoring:** DWR will verify the emissions estimates submitted by the construction contractors and calculate the required fees. DWR will conduct annual reporting to verify and document that emissions reductions projects achieve a 1:1 reduction with construction emissions to ensure claimed offsets meet the required performance standard.

**Reporting Requirements:** DWR will be responsible for conducting annual reporting to SMAQMD and documenting the fee schedule basis. Annual reports will include, at a minimum, the total amount of offset fees received, total fees distributed to offsite projects, total fees remaining, projects funded and associated pollutant reductions realized, total emission reductions realized, total emissions reductions remaining to satisfy the requirements of Mitigation Measure AQ-1b, and the overall cost-effectiveness of the projects funded.

## 2.44 Mitigation Measure AQ-3a & 3b

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 22, Air Quality and Greenhouse Gas			
AQ-3a: Mitigate and offset construction-generated criteria pollutant emissions within BAAQMD/SFBAAB to net zero (0) for emissions in excess of General Conformity de minimis thresholds (where applicable) and to quantities below applicable BAAQMD CEQA thresholds for other pollutants	DWR and BAAQMD	Prior to construction	Impact AQ-3, AQ-20

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
AQ-3b: Develop an alternative or complementary off-site mitigation program to mitigate and offset construction-generated criteria pollutant emissions within the BAAQMD/SFBAAB to net zero (0) for emissions in excess of General Conformity <i>de minimis</i> thresholds (where applicable) and to quantities below applicable BAAQMD CEQA thresholds for other pollutants	DWR and BAAQMD	Prior to construction	Impact AQ-3, AQ-20

**Mitigation Measure AQ-3a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants<sup>8</sup>**

**Action:** DWR will reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with Alternative 4A within the Bay Area Air Quality Management District (BAAQMD) through the creation of offsetting reductions of emissions occurring within the SFBAAB. The preferred means of undertaking such offsite mitigation will be through a partnership with the BAAQMD involving the payment of offsite mitigation fees. Criteria pollutants in excess of the federal *de minimis* thresholds will be reduced to net zero (0) (see Table 22-9 of Chapter 22, *Air Quality and Greenhouse Gas*). Criteria pollutants not in excess of the *de minimis* thresholds, but above any applicable air pollution control or air quality management district CEQA thresholds<sup>9</sup> will be reduced to quantities below the numeric thresholds (see Table 22-8 of Chapter 22, *Air Quality and Greenhouse Gas*).

DWR will undertake in good faith an effort to enter into a development mitigation contract with BAAQMD in order to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with the project within the BAAQMD. The preferred source of emissions reductions for NO<sub>x</sub>, ROG, and PM will be through contributions to BAAQMD's Carl Moyer Program and/or other BAAQMD incentive programs (e.g., TFCA).

If DWR is successful in reaching what it regards as a satisfactory agreement with BAAQMD, DWR will enter into mitigation contracts with BAAQMD to reduce NO<sub>x</sub>, PM, or ROG (as appropriate) emissions to the required levels. Such reductions may occur within the SFBAAB. The required levels are:

- For emissions in excess of the federal *de minimis* threshold: **net zero (0)** (see Table 22-9).
- For emissions not in excess of *de minimis* thresholds but above the appropriate BAAQMD standards: **below the appropriate CEQA threshold levels** (see Table 22-8).

<sup>8</sup> In the title of this mitigation measure, the phrase "for other pollutants" is intended to apply to other alternatives, where associated impacts to other pollutants may exceed thresholds other than NO<sub>x</sub>.

<sup>9</sup> For example, NO<sub>x</sub> emissions in a certain year may exceed BAAQMD's 54 pound per day CEQA threshold, but not the 100 ton annual *de minimis* threshold. According to Appendix G of the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make determinations regarding the significance of an impact.

Implementation of this mitigation would require DWR adopt the following specific responsibilities.

- Consult with the BAAQMD in good faith with the intention of entering into a mitigation contract with BAAQMD for the Carl Moyer Program and/or other BAAQMD emission reduction incentive program. For SIP purposes, the necessary reductions must be achieved (contracted and delivered) by the applicable year in question (i.e., emissions generated in year 2016 would need to be reduced offsite in 2016). Funding would need to be received prior to contracting with participants and should allow sufficient time to receive and process applications to ensure offsite reduction projects are funded and implemented prior to commencement of project activities being reduced. In negotiating the terms of the mitigation contract, DWR and BAAQMD should seek clarification and agreement on BAAQMD responsibilities, including the following.
  - Identification of appropriate offsite mitigation fees required for the project.
  - Timing required for obtaining necessary offsite emission credits.
  - Processing of mitigation fees paid by DWR.
  - Verification of emissions inventories submitted by DWR.
  - Verification that offsite fees are applied to appropriate mitigation programs within the SFBAAB.
- Quantify mitigation fees required to satisfy the appropriate reductions. Funding for the emission reduction projects will be provided in an amount up to the emission reduction project cost-effectiveness limit set by for the Carl Moyer Program during the year that the emissions from construction are emitted. (The current emissions limit is \$17,720 / weighted ton of criteria pollutants  $[NO_x + ROG + (20 \cdot PM)]$ ). An administrative fee of 5% would be paid by DWR to the BAAQMD to implement the program. The funding would be used to fund projects eligible for funding under the Carl Moyer Program guidelines or other BAAQMD emission reduction incentive program meeting the same cost-effectiveness threshold that are real, surplus, quantifiable, and enforceable.
- Develop a compliance program to calculate emissions and collect fees from the construction contractors for payment to BAAQMD. The program will require, as a standard or specification of their construction contracts with DWR, that construction contractors identify construction emissions and their share of required offsite fees, if applicable. Based on the emissions estimates, DWR will collect fees from the individual construction contractors (as applicable) for payment to BAAQMD. Construction contractors will have the discretion to reduce their construction emissions to the lowest possible level through additional onsite mitigation, as the greater the emissions reductions that can be achieved by onsite mitigation, the lower the required offsite fee. Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, additional electrification or alternative fuels, engine-retrofit technology, and/or after-treatment products. All control strategies must be verified by BAAQMD.
- Conduct daily and annual emissions monitoring to ensure onsite emissions reductions are achieved and no additional mitigation payments are required. Excess offsite funds can be carried from previous to subsequent years in the event that additional reductions are achieved by onsite mitigation. At the end of the project, if it is determined that excess offset funds remain (outstanding contracts and administration over the final years of the contracts will be taken into

consideration), BAAQMD and DWR will determine the disposition of final funds (e.g., additional emission reduction projects to offset underperforming contracts, return of funds to DWR, etc.).

If a sufficient number of emissions reduction projects are not identified to meet the required performance standard, the DWR will coordinate with BAAQMD to ensure the performance standards of achieving net zero (0) for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and of achieving quantities below applicable BAAQMD CEQA thresholds for other pollutants not in excess of the *de minimis* thresholds but above BAAQMD CEQA thresholds are met.

**Responsible Parties:** DWR will be responsible for approaching BAAQMD with the intention of entering into a development mitigation contract with BAAQMD in order to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with the project within the SFBAAB.

**Regulating/Permitting Agencies:** BAAQMD

**Location:** N/A for this mitigation measure

**Timing:** DWR will contact BAAQMD as soon as practical during project design to begin development of mitigation contracts. Should DWR be unable to enter into what it regards as a satisfactory agreement with BAAQMD within six months of contact, DWR may terminate its efforts to enter into an agreement and implement Mitigation Measure AQ-3b.

**Monitoring:** Monitoring as a part of this mitigation measure will be determined through DWR's agreement with BAAQMD. It may include daily and annual emissions monitoring to ensure onsite emissions reductions are achieved and no additional mitigation payments are required. Agreement(s) will be reached between DWR and BAAQMD. Any necessary capacity-enhancing improvements will be completed prior to commencing the construction activity requiring emissions offsets.

**Reporting Requirements:** Reporting requirements will be determined through DWR's agreement with BAAQMD. In the event an agreement is not reached between DWR and the affected agencies, DWR will document the methods of consultation and major issues preventing agreement between DWR and the affected agencies. A copy of this documentation will be delivered to BAAQMD.

**Mitigation Measure AQ-3b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity De Minimis Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants**

**Action:** Should DWR be unable to enter into what they regard as a satisfactory agreement with BAAQMD as contemplated by Mitigation Measure AQ-3a, or should DWR enter into an agreement with BAAQMD but find themselves unable to meet the performance standards set forth in Mitigation Measure AQ-3a, DWR will develop an alternative or complementary offsite mitigation program to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with Alternative 4A. The offsite mitigation program will offset criteria pollutant emissions to the required levels identified in Mitigation Measure AQ-3a. Accordingly, the program will ensure that the project does not contribute to or worsen existing air quality exceedances. Whether this program will address emissions beyond NO<sub>x</sub>, PM, or ROG, will turn on whether DWR has achieved sufficient reductions of those pollutants pursuant to Mitigation Measure AQ-3a.

The offsite mitigation program will establish a program to fund emission reduction projects through grants and similar mechanisms. All projects must provide contemporaneous (occur in the same calendar year as the emission increases) and localized (i.e., within the SFBAAB) emissions benefit to the area of effect. DWR may identify emissions reduction projects through consultation with BAAQMD and ARB, as needed. Potential projects could include, but are not limited to the following.

- Alternative fuel, low-emission school buses, transit buses, and other vehicles.
- Diesel engine retrofits and repowers.
- Locomotive retrofits and repowers.
- Electric vehicle or lawn equipment rebates.
- Electric vehicle charging stations and plug-ins.
- Video-teleconferencing systems for local businesses.
- Telecommuting start-up costs for local businesses.

As part of its alternative or complementary offsite mitigation program, DWR will develop pollutant-specific formulas to monetize, calculate, and achieve emissions reductions in a cost-effective manner. Construction contractors, as a standard specification of their construction contracts with DWR, will identify construction emissions and their share of required offset fees. DWR will verify the emissions estimates submitted by the construction contractors and calculate the required fees. Construction contractors (as applicable) will be required to surrender required fees to DWR prior to the start of construction. Construction contractors will have the discretion to reduce their construction emissions to the lowest possible level through additional onsite mitigation, as the greater the emissions reductions that can be achieved by onsite mitigation, the lower the required offset fee. Acceptable options for reducing emissions may include, but are not limited to, the use of late-model engines, low-emission diesel products, additional electrification or alternative fuels, engine-retrofit technology, and/or after-treatment products. All control strategies must be verified by BAAQMD, the ARB, or by a qualified air quality expert employed by or retained by DWR.

The offsite fee, grant, or other mechanism will be calculated or formulated based on the actual cost of pollutant reductions. No collected offset fees will be used to cover administrative costs; offset fees or other payments are strictly limited to procurement of offsite emission reductions. Fees or other payments collected by DWR will be allocated to emissions reductions projects in a grant-like manner. DWR will document the fee schedule basis, such as consistency with the ARB's Carl Moyer Program cost-effectiveness limits and capital recovery factors.

DWR will conduct annual reporting to verify and document that emissions reductions projects achieve a 1:1 reduction with construction emissions to ensure claimed offsets meet the required performance standard. All offsite reductions must be quantifiable, verifiable, enforceable, and satisfy the basic criterion of additionally (i.e., the reductions would not happen without the financial support of purchased offset credits). Annual reports will include, at a minimum the following components.

- Total amount of offset fees received.
- Total fees distributed to offsite projects.
- Total fees remaining.
- Projects funded and associated pollutant reductions realized.

- Total emission reductions realized.
- Total emissions reductions remaining to satisfy the requirements of Mitigation Measure AQ-3b.
- Overall cost-effectiveness of the projects funded.

If a sufficient number of emissions reduction projects are not identified to meet the required performance standard, DWR will consult with BAAQMD, the ARB, or a qualified air quality expert employed by or retained by DWR to ensure conformity is met through some other means of achieving the performance standards of achieving net zero (0) for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and of achieving quantities below applicable BAAQMD CEQA thresholds for other pollutants.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** BAAQMD

**Location:** N/A for this mitigation measure.

**Timing:** Mitigation Measure AQ-3b will be initiated in the event an agreement cannot be reached through Mitigation Measure AQ-3a. Mitigation Measure AQ-3b will be completed within six months of the determination by DWR that an agreement cannot be reached under AQ-3a, which will be a maximum of six months from initiation of contact, unless DWR, in its discretion, determines that more time is available without creating any delays in its construction schedule.

**Monitoring:** DWR will verify the emissions estimates submitted by the construction contractors and calculate the required fees. DWR will conduct annual reporting to verify and document that emissions reductions projects achieve a 1:1 reduction with construction emissions to ensure claimed offsets meet the required performance standard.

**Reporting Requirements:** DWR will be responsible for conducting annual reporting to BAAQMD and documenting the fee schedule basis. Annual reports will include, at a minimum, the total amount of offset fees received, total fees distributed to offsite projects, total fees remaining, projects funded and associated pollutant reductions realized, total emission reductions realized, total emissions reductions remaining to satisfy the requirements of Mitigation Measure AQ-3b, and the overall cost-effectiveness of the projects funded.

If the required performance standard is not met DWR will consult with BAAQMD, the ARB, or a qualified air quality expert employed by or retained by DWR to ensure conformity is met through some other means of achieving the performance standards of achieving net zero (0) for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and of achieving quantities below applicable BAAQMD CEQA thresholds for other pollutants.

## 2.46 Mitigation Measure AQ-4a & 4b

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 22, Air Quality and Greenhouse Gas			
AQ-4a: Mitigate and offset construction-generated criteria pollutant emissions within SJVAPCD/SJVAB to net zero (0) for emissions in excess of General Conformity <i>de minimis</i> thresholds (where applicable) and to quantities below applicable SJVAPCD CEQA thresholds for other pollutants	DWR and SJVAPCD	Prior to construction	Impact AQ-4, AQ-20
AQ-4b: Develop an alternative or complementary off-site mitigation program to mitigate and offset construction-generated criteria pollutant emissions within the SJVAPCD/SJVAB to net zero (0) for emissions in excess of General Conformity <i>de minimis</i> thresholds (where applicable) and to quantities below applicable SJVAPCD CEQA thresholds for other pollutants	DWR and SJVAPCD	Prior to construction	Impact AQ-4, AQ-20

### **Mitigation Measure AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants<sup>10</sup>**

**Action:** DWR will reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with Alternative 4A within the San Joaquin Valley Air Pollution Control District (SJVAPCD) through the creation of offsetting reductions of emissions occurring within the SJVAB. The preferred means of undertaking such offsite mitigation will be through a partnership with the SJVAPCD involving the payment of offsite mitigation fees. Criteria pollutants in excess of the federal *de minimis* thresholds will be reduced to net zero (0) (see Table 22-9). Criteria pollutants not in excess of the *de minimis* thresholds, but above any applicable air pollution control or air quality management district CEQA thresholds<sup>11</sup> will be reduced to quantities below the numeric thresholds (see Table 22-8).<sup>12</sup>

DWR will undertake in good faith an effort to enter into a development mitigation contract with SJVAPCD in order to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with the project within the SJVAPCD. The preferred source of emissions reductions for NO<sub>x</sub>, PM, and ROG will be through contributions to SJVAPCD's VERA. The VERA is implemented through the District Incentive Programs and is a measure to reduce project impacts under CEQA. The current VERA payment fee for construction emissions is \$9,350 per ton of

<sup>10</sup> In the title of this mitigation measure, the phrase "for other pollutants" is intended to apply to other alternatives, where associated impacts to other pollutants may exceed thresholds other than NO<sub>x</sub>.

<sup>11</sup> For example, PM<sub>10</sub> emissions in a certain year may exceed SJVAPCD's 15 ton annual CEQA threshold, but not the 100 ton annual *de minimis* threshold. According to Appendix G of the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make determinations regarding the significance of an impact.

<sup>12</sup> For example, emissions of NO<sub>x</sub> generated by Alternative 1A both exceed the federal *de minimis* threshold for the SJVAB and the SJVAPCD's CEQA threshold. NO<sub>x</sub> emissions must therefore be reduced to net zero (0).

NOX and \$9,011 per ton of PM10. This is an estimated cost and may change in the future (e.g., future year payment fees for NOX could be in excess of the current price of \$9,350) and are sensitive to the number and type of projects requiring emission reductions within the same air basin (Siong pers. comm. 2012).

If DWR is successful in reaching what it regards as a satisfactory agreement with SJVAPCD, DWR will enter into mitigation contracts with SJVAPCD to reduce NOX, PM, or ROG (as appropriate) emissions to the required levels. Such reductions must occur within the SJVAB. The required levels are:

- For emissions in excess of the federal *de minimis* threshold: **net zero (0)**.
- For emissions not in excess of *de minimis* thresholds but above the SJVAPCD's standards: **below the appropriate CEQA threshold levels**.

Implementation of this measure would require DWR to adopt the following specific responsibilities.

- Consult with the SJVAPCD in good faith with the intention of entering into a mitigation contract with SJVAPCD for the VERA. For SIP purposes, the necessary reductions must be achieved (contracted and delivered) by the applicable year in question (i.e., emissions generated in year 2016 would need to be reduced offsite in 2016). Funding would need to be received prior to contracting with participants and should allow sufficient time to receive and process applications to ensure offsite reduction projects are funded and implemented prior to commencement of project activities being reduced. This would roughly equate to the equivalent of two months (2) prior to groundbreaking; additional lead time may be necessary depending on the level of offsite emission reductions required for a specific year. In negotiating the terms of the mitigation contract, DWR and SJVAPCD should seek clarification and agreement on SJVAPCD responsibilities, including the following.
  - Identification of appropriate offsite mitigation fees required for the project.
  - Processing of mitigation fees paid by DWR.
  - Verification of emissions inventories submitted by DWR
  - Verification that offsite fees are applied to appropriate mitigation programs within the SJVAB.
- Quantify mitigation fees required to satisfy the appropriate reductions. An administrative fee of 4% would be paid by DWR to the SJVAPCD to implement the program. As noted above, the payment fees may vary by year and are sensitive to the number of projects requiring reductions within the SJVAB.
- Develop a compliance program to calculate emissions and collect fees from the construction contractors for payment to SJVAPCD. The program will require, as a standard or specification of their construction contracts with DWR, that construction contractors identify construction emissions and their share of required offsite fees, if applicable. Based on the emissions estimates, DWR will collect fees from the individual construction contractors (as applicable) for payment to SJVAPCD. Construction contractors will have the discretion to reduce their construction emissions to the lowest possible level through additional onsite mitigation, as the greater the emissions reductions that can be achieved by onsite mitigation, the lower the required offsite fee. Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, additional electrification or alternative fuels, engine-



retrofit technology, and/or after-treatment products. All control strategies must be verified by SJVAPCD.

- Conduct daily and annual emissions monitoring to ensure onsite emissions reductions are achieved and no additional mitigation payments are required. Excess offsite funds can be carried from previous to subsequent years in the event that additional reductions are achieved by onsite mitigation. At the end of the project, if it is determined that excess offset funds remain (outstanding contracts and administration over the final years of the contracts will be taken into consideration), SJVAPCD and DWR will determine the disposition of final funds (e.g., additional emission reduction projects to offset underperforming contracts, return of funds to DWR, etc.).

If a sufficient number of emissions reduction projects are not identified to meet the required performance standard, DWR will coordinate with SJVAPCD to ensure the performance standards of achieving net zero (0) for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and of achieving quantities below applicable SJVAPCD CEQA thresholds for other pollutants not in excess of the *de minimis* thresholds but above SJVAPCD CEQA thresholds are met.

**Responsible Parties:** DWR will be responsible for approaching SJVAPCD with the intention of entering into a development mitigation contract with SJVAPCD in order to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with the project within the SJVAB.

**Regulating/Permitting Agencies:** SJVAPCD

**Location:** Emissions generated onsite will be offset through offsite reduction projects within SJVAB. These locations will be determined approximately two years in advance of the onsite emissions generation to allow sufficient time for funding and implementation procedures.

**Timing:** DWR will contact SMAQMD as soon as practical during project design to begin development of mitigation contracts. Should DWR be unable to enter into what they regard as a satisfactory agreement with SMAQMD within six months of contact, DWR may terminate its efforts to enter into an agreement and implement Mitigation Measure AQ-4b.

**Monitoring:** DWR will conduct daily and annual emissions monitoring to ensure onsite emissions reductions are achieved and no additional mitigation payments are required. SJVAPCD will be responsible for verifying emissions inventories submitted by DWR and verifying that offsite fees are applied to appropriate mitigation programs within the SJVAB. Agreement(s) will be reached between DWR and SJVAPCD. Any necessary capacity-enhancing improvements will be completed prior to commencing the construction activity requiring emissions offsets.

**Reporting Requirements:** DWR will be responsible for reporting the daily and annual monitoring emission reduction results to SJVAPCD. In the event an agreement is not reached between DWR and the affected agencies, DWR will document the methods of consultation and major issues preventing agreement between DWR and the affected agencies. A copy of this documentation will be delivered to SJVAPCD.

**Mitigation Measure AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity De Minimis**

## Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants

**Action:** Should DWR be unable to enter into what they regard as a satisfactory agreement with SJVAPCD as contemplated by Mitigation Measure AQ-4a, or should DWR enter into an agreement with SJVAPCD but find themselves unable to meet the performance standards set forth in Mitigation Measure AQ-4a, DWR will develop an alternative or complementary offsite mitigation program to reduce criteria pollutant emissions generated by the construction of the water conveyance facilities associated with Alternative 4A. The offsite mitigation program will offset criteria pollutant emissions to the required levels identified in Mitigation Measure AQ-4a. Accordingly, the program will ensure that the project does not contribute to or worsen existing air quality exceedances. Whether this program will address emissions beyond NO<sub>x</sub>, PM, or ROG, will turn on whether DWR has achieved sufficient reductions of those pollutants pursuant to Mitigation Measure AQ-4a.

The offsite mitigation program will establish a program to fund emission reduction projects through grants and similar mechanisms. All projects must provide contemporaneous (occur in the same calendar year as the emission increases) and localized (i.e., within the SJVAB) emissions benefit to the area of effect. DWR may identify emissions reduction projects through consultation with SJVAPCD and ARB, as needed. Potential projects could include, but are not limited to the following.

- Alternative fuel, low-emission school buses, transit buses, and other vehicles.
- Diesel engine retrofits and repowers.
- Locomotive retrofits and repowers.
- Electric vehicle or lawn equipment rebates.
- Electric vehicle charging stations and plug-ins.
- Video-teleconferencing systems for local businesses.
- Telecommuting start-up costs for local businesses.

As part of its alternative or complementary offsite mitigation program, DWR will develop pollutant-specific formulas to monetize, calculate, and achieve emissions reductions in a cost-effective manner. Construction contractors, as a standard specification of their construction contracts with DWR, will identify construction emissions and their share of required offset fees. DWR will verify the emissions estimates submitted by the construction contractors and calculate the required fees. Construction contractors (as applicable) will be required to surrender required fees to DWR prior to the start of construction. Construction contractors will have the discretion to reduce their construction emissions to the lowest possible level through additional onsite mitigation, as the greater the emissions reductions that can be achieved by onsite mitigation, the lower the required offset fee. Acceptable options for reducing emissions may include, but are not limited to, the use of late-model engines, low-emission diesel products, additional electrification or alternative fuels, engine-retrofit technology, and/or after-treatment products. All control strategies must be verified by SJVAPCD, the ARB, or by a qualified air quality expert employed by or retained by DWR.

The offsite fee, grant, or other mechanism will be calculated or formulated based on the actual cost of pollutant reductions. No collected offset fees will be used to cover administrative costs; offset fees or other payments are strictly limited to procurement of offsite emission reductions. Fees or other payments collected by DWR will be allocated to emissions reductions projects in a grant-like

manner. DWR will document the fee schedule basis, such as consistency with the ARB's Carl Moyer Program cost-effectiveness limits and capital recovery factors.

DWR will conduct annual reporting to verify and document that emissions reductions projects achieve a 1:1 reduction with construction emissions to ensure claimed offsets meet the required performance standard. All offsite reductions must be quantifiable, verifiable, enforceable, and satisfy the basic criterion of additionally (i.e., the reductions would not happen without the financial support of purchased offset credits). Annual reports will include, at a minimum the following components.

- Total amount of offset fees received.
- Total fees distributed to offsite projects.
- Total fees remaining.
- Projects funded and associated pollutant reductions realized.
- Total emission reductions realized.
- Total emissions reductions remaining to satisfy the requirements of Mitigation Measure AQ-4b.
- Overall cost-effectiveness of the projects funded.

If a sufficient number of emissions reduction projects are not identified to meet the required performance standard, DWR will consult with SJVAPCD, the ARB, or a qualified air quality expert employed by or retained by DWR to ensure conformity is met through some other means of achieving the performance standards of achieving net zero (0) for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and of achieving quantities below applicable SJVAPCD CEQA thresholds for other pollutants.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** SJVAPCD

**Location:** N/A for this mitigation measure.

**Timing:** Mitigation Measure AQ-4b will be initiated in the event an agreement cannot be reached through Mitigation Measure AQ-4a. Mitigation Measure AQ-4b will be completed within six months of the determination by DWR that an agreement cannot be reached under AQ-4a, which will be a maximum of six months from initiation of contact, unless DWR, in its discretion, determines that more time is available without creating any delays in its construction schedule.

**Monitoring:** DWR will verify the emissions estimates submitted by the construction contractors and calculate the required fees. DWR will conduct annual reporting to verify and document that emissions reductions projects achieve a 1:1 reduction with construction emissions to ensure claimed offsets meet the required performance standard.

**Reporting Requirements:** DWR will be responsible for conducting annual reporting to SJVAPCD and documenting the fee schedule basis. Annual reports will include, at a minimum, the total amount of offset fees received, total fees distributed to offsite projects, total fees remaining, projects funded and associated pollutant reductions realized, total emission reductions realized, total emissions reductions remaining to satisfy the requirements of Mitigation Measure AQ-4b, and the overall cost-effectiveness of the projects funded.

If the required performance standard is not met DWR will consult with SJVAPCD, or a qualified air quality expert employed by or retained by DWR to ensure conformity is met through some other means of achieving the performance standards of achieving net zero (0) for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and of achieving quantities below applicable SJVAPCD CEQA thresholds for other pollutants.

## 2.47 Mitigation Measure AQ-9: Implement Measures to Reduce Re-Entrained Road Dust and Receptor Exposure to PM2.5 and PM10

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
Chapter 22, Air Quality and Greenhouse Gases			
AQ-9: Implement Measures to Reduce Re-Entrained Road Dust and Receptor Exposure to PM2.5 and PM10	DWR	During construction	Impact AQ-9

**Action:** The project sponsor (DWR) shall employ a tiered approach to reduce re-entrained road dust and receptor exposure to Particulate Matter (PM) 2.5 and PM10. The approach shall be taken in the following way:

- PM10 that could exceed the threshold at sensitive receptors will be further reduced by applying dust suppressants (Pennzsuppress);
- If additional dust suppressants eliminate the issue at all receptors, no further mitigation is needed; if not, DWR will offer temporary relocation of the affected residents; if that is accepted no additional mitigation is required; if relocation is not accepted then;
- DWR will pave portions of the work sites until all exceedances are eliminated and impacts are determined to be less than significant.

**Responsible Parties:** DWR will be responsible for reducing re-entrained road dust and receptor exposure to PM2.5 and PM10 through implementation of the measures outlined above in *Action*.

**Regulating/Permitting Agencies:** No regulating or permitting agencies will be involved in this Mitigation Measure.

**Location:** At all affected residential receptor sites.

**Timing:** During construction.

**Monitoring:** DWR will deploy qualified monitors to the construction sites to monitor PM2.5 and PM10 levels at sensitive receptor locations daily during construction. Measured PM2.5 and PM10 concentrations will be compared to SMAQMD's daily thresholds to determine if the dust suppressants eliminate potentially significant impacts at affected receptor locations. If, after a five-day monitoring period, emissions of either PM2.5 or PM10 exceed SMAQMD, DWR will offer temporary relocation assistance to affected receptor(s). Within seven days upon rejection of a relocation offer, DWR will initiate paving portions of the work site within 1,000 feet of the affected receptor(s). After paving is complete, DWR will continue to monitor PM10 and PM2.5

concentrations at affected receptor locations to confirm emissions do not exceed SMAQMD thresholds

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Mitigation Measure (AQ-9).

## 2.48 Mitigation Measure AQ-21: Develop and Implement a GHG Mitigation Program to Reduce Construction Related GHG Emissions to Net Zero (0)

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
Chapter 22, Air Quality and Greenhouse Gases			
AQ-21: Develop and Implement a GHG Mitigation Program to Reduce Construction Related GHG Emissions to Net Zero (0)	DWR	Prior to and during construction	Impact AQ-21

**Action:** DWR will develop a GHG Mitigation Program prior to the commencement of any construction or other physical activities associated with construction of the water conveyance facilities that would generate GHG emissions. The GHG Mitigation Program will consist of feasible options that, taken together, will reduce construction-related GHG emissions to net zero (0) (i.e., emissions will be reduced to the maximum extent feasible and any remaining emissions from the project will be offset elsewhere by emissions reductions of equal amount). DWR will determine the nature and form of the components of the GHG Mitigation Program after consultation with the following agencies, as applicable: (i) Study area air districts (Bay Area Air Quality Management District (BAAQMD), Sacramento Municipal Air Quality Management District (SMAQMD), San Joaquin Valley Air Pollution Control District (SJVAPCD), and Yolo Solano Air Quality Management District (YSAQMD)), (ii) California Air Resources Board, (iii) U.S. Environmental Protection Agency, and (iv) California Energy Commission.

Specific strategies that could be used in formulating the GHG Mitigation Program are summarized below. The identified strategies will produce GHG reductions across a broad range of emissions sectors throughout the state. The strategies are divided into seven categories based on their application. Potential GHG emissions reductions that could be achieved by each measure are identified. It is theoretically possible that many of the strategies discussed below could independently achieve a net-zero GHG footprint for the project construction activities. Various combinations of measure strategies could also be pursued to optimize total costs or community co-benefits. DWR will be responsible for determining the overall mix of strategies necessary to ensure the performance standard to mitigate the adverse GHG construction impacts is met.

DWR will develop a mechanism for quantifying, funding, implementing, and verifying emissions reductions associated with the selected strategies. DWR will also conduct annual reporting to verify and document that selected strategies achieve sufficient emissions reductions to offset construction-

related emissions to net zero. All selected strategies must be quantifiable, verifiable, enforceable, and satisfy the basic criterion of additionality (i.e., the reductions would not happen without the financial support of purchased offset credits or other mitigation strategies). Annual reports will include, at a minimum, the following components.

- Calculated or measured emissions from construction activities over the reporting year.
- Projects selected for funding during the reporting year.
- Total funds distributed to selected projects during the reporting year.
- Cumulative funds distributed since program inception.
- Emissions reductions achieved during the reporting year.
- Cumulative reductions since program inception.
- Total emissions reductions remaining to satisfy the requirements of Mitigation Measure AQ-21.

### ***GHG Emissions Reduction Strategies to Consider in Formulating a GHG Mitigation Program***

This section summarizes GHG reduction strategies that will be considered in formulating a GHG mitigation program. Quantitative information on the potential capacity of each strategy is provided in Appendix 22A, *Air Quality Analysis Methods*. These estimates are based on general construction activity information, the size and trading volume of existing carbon offset markets, and available alternative energy resources (e.g., biomass, renewable energy) available to the project as potential mitigation strategies. Emissions reductions quantified for each strategy should be seen as high-level screening values that illustrate a rough order of magnitude for the expected level of emissions reductions or offsets. Moreover, the mitigation strategies should be viewed not as individual strategies, but rather as a suite of strategies. If one strategy, when investigated in greater detail prior to implementation, cannot deliver as high a level of emissions reduction or offset as initially estimated, other strategies will be implemented to ensure achievement of the performance standard of zero net GHG emissions from the project.

- Renewable Energy Purchase Agreement
  - **Strategy-1: Renewable Energy Purchase Agreement:** Enter into a power purchase agreement, where feasible, with utilities which provide electricity service within the Study area to purchase construction electricity from renewable sources. Renewable sources must be zero emissions energy sources (e.g., wind, solar, hydro) and may not be accounted to utility RPS goals.
- Additional Onsite Mitigation
  - **Strategy-2: Engine Electrification:** DWR has identified all feasible electrification requirements as environmental commitments. It is anticipated that additional technology will be available by the time construction starts that will enable further electrification. This strategy would take advantage of new technologies as they become available and will engage the maximum level of engine electrification feasible for onsite heavy-duty equipment.
  - **Strategy-3: Low Carbon Concrete:** Require concrete components to be constructed out of concrete with up to 70% replacement of cement with supplementary cementitious materials

(SCM) with lower embodied energy and associated GHG emissions.<sup>13</sup> Implementation of this strategy would require structural testing to ensure the concrete meet required strategy strength, durability, workability, and rigidity standards. If new materials with lower embodied energy or superior workability are developed between the writing of this measure and project commencement, DWR will investigate use of those materials in place of SCM.

- **Strategy-4: Renewable Diesel and/or Bio-diesel:** Require use of renewable diesel sometimes also called “green diesel” and or bio-diesel fuels for operation of all diesel equipment. If new technologies or fuels with lower emissions rates are developed between the writing of this measure and project commencement, those advanced technologies or fuels could be incorporated into this measure.
- **Energy Efficiency Retrofits and Rooftop Renewable Energy**
  - **Strategy-5: Residential Energy Efficiency Improvements:** Develop a residential energy retrofit package in conjunction with local utility providers to achieve reductions in natural gas and electricity usage. The retrofit package should include, at a minimum, the following improvements.
    - Replacement of interior high use incandescent lamps with compact florescent lamps (CFLs) or Light Emitting Diodes (LED).
    - Installation of programmable thermostats.
    - Replacement of windows with double-pane or triple-pane solar-control low-E argon gas filled wood frame windows.
    - Identification and sealing of dust and air leaks.
    - Replacement of electric clothes dryers with natural gas dryers.
    - Replacement of natural gas furnaces with Energy Star labeled models.
    - Installation of insulation.
    - This measure is inherently scalable (i.e., the total number of houses retrofit is likely limited by funds rather than the availability of housing stock).
  - **Strategy-6: Commercial Energy Efficiency Improvements:** Develop a commercial energy retrocommissioning package in conjunction with local utility providers to improve building-wide energy efficiency by at least 15%, relative to current energy consumption levels. This measure is inherently scalable.
  - **Strategy-7: Residential Rooftop Solar:** Develop a residential rooftop solar installation program in conjunction with local utility providers. The installation program will allow homeowners to install solar photovoltaic systems at zero or minimal up-front cost. All projects installed under this measure must be designed for high performance (e.g., optimal full-sun location, solar orientation) and additive to utility RPS goals. This measure is inherently scalable.

<sup>13</sup> SCM are often incorporated in concrete mix to reduce cement contents, improve workability, increase strength, and enhance durability. Although SCM can improve the strength of resulting structures, proper testing is required ensure the cement meets technical specifications for strength and rigidity.

- **Strategy-8: Commercial Rooftop Solar:** Develop a commercial rooftop solar installation program in conjunction with local utility providers. The installation program will allow business owners to install solar photovoltaic systems at zero or minimal up-front cost. All projects installed under this measure must be designed for high performance (e.g., optimal full-sun location, solar orientation) and additive to utility RPS goals. This measure is inherently scalable.
- Carbon Offsets
- **Strategy-9: Purchase Carbon Offsets:** In partnership with offset providers, purchase carbon offsets. Offset protocols and validation could tier off existing standards (e.g., Climate Registry Programs) or could be developed independently, provided such protocols satisfy basic criterion of additionally (i.e., the reductions would not happen without the financial support of purchased offset credits). ARB has established a Cap and Trade registry that identifies qualified providers and AB 32 projects. It is estimated that between 2012 and 2020, 2.5 billion allowances will be made available within the state (Legislative Analyst's Office 2012). The national and international carbon markets are likely greater. Potential offset programs could include the following.
  - AB 32 U.S. Forest and Urban Forest Project Resources
  - AB 32 Livestock Projects
  - AB 32 Ozone Depleting Substances Projects
  - AB 32 Urban Forest Projects
  - Other-California Based Offsets
  - United States Based Offsets
  - International Offsets (e.g., clean development mechanisms)
  - This measure is inherently scalable based on the volume of offsets purchased.
- Biomass Digestion and Conversion
  - **Strategy-10: Development of Biomass Waste Digestion and Conversion Facilities:** Provide financing for facility development either through long term power purchase agreements or up front project financing. Projects will be awarded based on competitive bidding process and chosen for GHG sequestration and other environmental benefits to project area. Projects will provide a range of final products: electricity generation, Compressed Natural Gas for transportation fuels, and pipeline quality biomethane.
  - **Strategy-11: Agriculture Waste Conversion Development:** Fund the re-commissioning of thermal chemical conversion facilities to process collected agricultural biomass residues. Project funding will include better resource modeling and provide incentives to farmers in the project area to deliver agricultural wastes to existing facilities.
- Increase Renewable Energy Purchases to Operate the State Water Project
  - **Strategy-12: Temporarily Increase Renewable Energy Purchases for Operations:** Temporarily increase renewable energy purchases under the Renewable Energy Procurement Plan to offset project construction emissions. DWR as part of its CAP is implementing a Renewable Energy Procurement Plan. This plan identifies the quantity of



additional renewable electricity resources that DWR will purchase in each year between 2010 and 2050 to achieve the GHG emissions reduction goals laid out in the CAP.

- **Land Use Change and Sequestration**

- **Strategy-13: Tidal Wetland Inundation:** Expand the number of subsidence reversal and/or carbon sequestration projects currently being undertaken by DWR on Sherman and Twitchell Islands. Existing research at the Twitchell Wetlands Research Facility demonstrates that wetland restoration can sequester 25 tons of carbon per acre per year. Measure funding could be used to finance permanent wetlands for waterfowl or rice cultivation, creating co-benefits for wildlife and local farmers.

**Responsible Parties:** DWR will develop a GHG Mitigation Program and determine the nature and form of the components of the GHG Mitigation Program after consultation with the regulating/permitting agencies. DWR will be responsible for determining the overall mix of strategies necessary to ensure the performance standard to mitigate the adverse GHG construction impacts is met. In formulating the GHG Mitigation Program, DWR shall consult with the following agencies, as applicable: BAAQMD, SMAQMD, SJVAPCD, YSAQMD, ARB, US EPA, and the California Energy Commission.

**Regulating/Permitting Agencies:** Depending on the composition of the GHG offsets in the GHG Mitigation Program, DWR may require approvals or cooperation from the Study area air districts (BAAQMD, SMAQMD, SJVAPCD, and YSAQMD), California Air Resources Board, U.S. Environmental Protection Agency, and/or California Energy Commission.

**Location:** The strategies and implementation of the GHG Mitigation Program would be applied at all construction sites.

**Timing:** Before and during construction. DWR will prepare a GHG Mitigation Plan prior to the commencement of construction and strategies to reduce construction-related GHG emissions to net zero (0) will be implemented during construction, as needed.

**Monitoring:** DWR will develop a mechanism for quantifying, funding, implementing, and verifying emissions reductions associated with the selected strategies. This will be included in the GHG Mitigation Program which will be developed prior to beginning construction.

**Reporting Requirements:** DWR will conduct annual reporting to verify and document that selected strategies achieve sufficient emissions reductions to offset construction-related emissions to net zero. Reports will include, at a minimum, calculated or measured emissions from construction activities over the reporting year, projects selected for funding during the reporting year, total funds distributed to selected projects during the reporting year, cumulative funds distributed since program inception, emissions reductions achieved during the reporting year, cumulative reductions since program inception, and total emissions reductions remaining to satisfy the requirements of Mitigation Measure AQ-21.

## 2.49 Mitigation Measure AQ-24: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Environmental Commitments and Associated Project Activities

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
Chapter 22, Air Quality and Greenhouse Gases			
AQ-24: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Environmental Commitments and Associated Project Activities	DWR	Prior to and during construction	Impact AQ-24, AQ-25, AQ-27

**Action:** DWR will develop an Air Quality Mitigation Plan (AQMP) prior to the commencement of any construction, operational, or other physical activities associated with Environmental Commitments 3, 4, and 6-11 that would involve adverse effects to air quality. The AQMP will be incorporated into the project design for all project activities. DWR will ensure that the following measures are implemented to reduce local and regional air quality impacts. Not all measures listed below may be feasible or applicable to each Environmental Commitment. Rather, these measures serve as an overlying mitigation framework to be used for specific environmental commitments. The applicability of measures listed below may also vary based on the lead agency, location, timing, available technology, and nature of each environmental commitment.

- Implement basic and enhanced dust control measures recommended by local air districts in the project-area. Applicable control measures may include, but are not limited to, watering exposed surfaces, suspended project activities during high winds, and planting vegetation cover in disturbed areas.
- Require construction equipment be kept in proper working condition according to manufacturer's specifications.
- Ensure emissions from all off-road diesel-powered equipment used to construct the project do not exceed applicable air district rules and regulations (e.g., nuisance rules, opacity restrictions).
- Reduce idling time by either shutting equipment off when not in use or limiting the time of idling to less than required by the current statewide idling restriction.
- Reduce criteria pollutant exhaust emissions by requiring the latest emissions control technologies. Applicable control measures may include, but are not limited to, engine retrofits, alternative fuels, electrification, and add-on technologies (e.g., DPF).
- Undertake in good faith an effort to enter into a development mitigation contract with the local air district to offset criteria pollutant emissions below applicable air district thresholds through the payment of mitigation fees.

Implementation of this measure will reduce criteria pollutant emissions generated by construction, operational, or other physical activities associated with Environmental Commitments 3, 4, and 6-11. The applicability of measures listed above may vary based on the lead agency, location, timing, available technology, and nature of each environmental commitment. If the above measures do not contribute to emissions reductions, guidelines will be developed to ensure that criteria pollutants generated during construction and project operations are reduced to the maximum extent practicable.

**Responsible Parties:** DWR will be responsible for developing an AQMP prior to commencement of any construction, operational, or other physical activities associated with Environmental Commitments that would involve adverse effects to air quality. In developing the AQMP, DWR shall attempt in good faith to enter into development mitigation contracts with the local air district with jurisdiction over the geographic area in question (e.g., Bay Area Air Quality Management District, Sacramento Municipal Air Quality Management District, San Joaquin Valley Air Pollution Control District, or Yolo Solano Air Quality Management District).

**Regulating/Permitting Agencies:** DWR will be responsible for implementing and monitoring the AQMP.

**Location:** Mitigation Measure AQ-24 will be applied onsite, for all construction, operational, or other physical activities associated with Environmental Commitments 3, 4, and 6-11.

**Timing:** Prior to and during construction. The AQMP will be developed prior to the start of construction and will be implemented during construction.

**Monitoring:** DWR will review the AQMP periodically during its development to ensure the measures listed above under *Action* are included as appropriate for each Environmental Commitment. DWR will be responsible for ensuring that the AQMP measures are implemented to reduce local and regional air quality impacts.

**Reporting Requirements:** The AQMP will be submitted to the appropriate air district for review and comment prior to construction activities.

## 2.50 Mitigation Measure AQ-25: Prepare a Project-Level Health Risk Assessment to Reduce Potential Health Risks from Exposure to Localized DPM and PM Concentrations from Implementation of Environmental Commitments 3, 4, 6-11.

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impacts
Chapter 22, Air Quality and Greenhouse Gases			
AQ-25: Prepare a Project-Level Health Risk Assessment to Reduce Potential Health Risks from Exposure to Localized DPM and PM Concentrations	DWR	Prior to construction	Impact AQ-25

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from Implementation of Environmental  
Commitments 3,4, 6-11.

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**Action:** The design process for all Environmental Commitments will perform a detailed health risk assessment (HRA) if sensitive receptors are located within 0.50 mile of project activities. The half-mile buffer represents the furthest distance at which Plan Area air districts recommend performing a HRA as pollutant concentrations dissipate as a function of distance from the emissions source. The site-specific HRA will evaluate potential health risks to nearby sensitive receptors from exposure to DPM and PM (as recommended by the local air district's CEQA Guidelines) and ensure that impacts are below applicable air district health risk thresholds. If the HRA identifies health risks in excess of applicable air district health risk thresholds, additional measures and/or site design changes will be incorporated into the site-specific environmental review to ensure health risks are reduced below applicable air district health risk thresholds. Examples of potential additional measures include, but are not limited to, use aftermarket equipment controls (e.g., diesel particulate filters), alternative fuels, and advanced engine technologies (e.g., Tier 4 engines), as well as construction of vegetative buffers and receptor relocation.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** Study area air districts (BAAQMD, SMAQMD, SJVAPCD, and YSAQMD).

**Location:** The HRA will be performed for areas that include sensitive receptors within 0.50 mile of project activities.

**Timing:** Prior to construction. An HRA will be performed during the design process.

**Monitoring:** DWR will monitor development of a detailed HRA if sensitive receptors are located within 0.50 mile of project activities. DWR will be responsible for implementing additional mitigation and/or site design changes into the project design to ensure health risks are reduced below applicable air district health risk thresholds.

**Reporting Requirements:** DWR will document completion of the HRA.

## 2.51 Mitigation Measure AQ-27: Prepare a Land Use Sequestration Analysis to Quantify and Mitigate (as Needed) GHG Flux Associated with Environmental Commitments and Associated Project Activities

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impacts
Chapter 22, Air Quality and Greenhouse Gases			
AQ-27: Prepare a Land Use Sequestration Analysis to Quantify and Mitigate (as Needed) GHG Flux Associated	DWR	Prior to construction	Impact AQ-27

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with Environmental Commitments and Associated  
Project Activities

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**Action:** DWR will prepare a land use sequestration analysis to evaluate GHG flux associated with implementation of Environmental Commitments 3, 4, and 6-11. The land use analysis will evaluate the one-time carbon storage loss associated with vegetation removal, soil carbon content, and existing and future with project GHG flux. In the event that the land use analysis demonstrates a net positive GHG flux, feasible strategies to reduce GHG emissions will be undertaken. To the extent feasible, mitigation will require project design changes so that land uses that serve as carbon sinks (i.e., result in net decreases in carbon) are not replaced with other uses that are sources (i.e., result in net increases in carbon) of GHG emissions.

**Responsible Parties:** DWR will be responsible for preparing a land use sequestration analysis to evaluate GHG flux associated with implementation of Environmental Commitments 3, 4, and 6-11.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** The land use sequestration analysis would be applied at all construction sites.

**Timing:** Prior to construction. DWR will prepare the analysis prior to construction of Environmental Commitments 3, 4, and 6-11.

**Monitoring:** DWR will review the land use sequestration analysis to ensure compliance with this mitigation measure.

**Reporting Requirements:** The land use sequestration analysis will be documented in a technical memorandum, which will be available for public and air district review and comment.

## 2.52 Mitigation Measures NOI-1a & 1b

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 23, NOISE			
NOI-1a: Employ noise-reducing construction practices during construction	DWR and Construction Contractors	During construction	Impact REC-2, REC-4, NOI-1, NOI-4
NOI-1b: Prior to construction, initiate a complaint/response tracking program	DWR	Prior to construction	Impact REC-2, REC-4, NOI-1, NOI-4

### Mitigation Measure NOI-1a: Employ noise-reducing construction practices during construction

**Action:** During construction, DWR will employ best practices to reduce construction noise at noise-sensitive land uses.

Best practices listed below will be applied on a case by case basis, such that construction noise levels at noise sensitive receptors do not exceed 60 dBA (one-hour Leq) during daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA (one-hour Leq) during nighttime hours (10:00 p.m. to 7:00 a.m.) measured at noise sensitive receptors. Some construction activities that are required to occur during night time hours, such as activities at tunnel boring launch pads and tunnel shaft locations would not be subject to these construction time limitations.

Measures that may be used to limit construction noise include the following:

- Limiting above-ground noise-generating construction operations to the hours between 7 a.m. and 7 p.m. except as limited above, at certain locations.
- Prohibiting gasoline or diesel engines from having unmuffled exhaust.
- Requiring that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.
- Preventing excessive noise by shutting down idle vehicles or equipment.
- Using noise-reducing enclosures around noise-generating equipment.
- Selecting haul routes that affect the fewest number of people.
- Constructing barriers between noise sources and noise-sensitive land uses as determined appropriate by the construction contractor or take advantage of existing barrier features (e.g., terrain, structures) to block sound transmission to noise-sensitive land uses. For a barrier to be feasible, it must provide at least 5 dB of noise reduction and obstruct the line of sight between the noise-sensitive land use(s) and noise emitting components of on-site construction equipment.

**Responsible Parties:** DWR and contractors hired to construct any conveyance components of the project

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Noise sensitive land use sites.

**Timing:** For the duration of construction activities determined to generate excessive noise at sensitive receptor locations.

**Monitoring:** DWR will designate a noise disturbance coordinator to periodically measure sound pressure around and near the construction site, with preferences for periods of high construction activity and noise-sensitive land use sites.

**Reporting Requirements:** The noise disturbance coordinator will make a weekly report to DWR including the sound pressures measured since the last report, the location of the measurement, and the actions taken to minimize noise disturbance.

#### **Mitigation Measure NOI-1b: Prior to construction, initiate a complaint/response tracking program**

**Action:** Prior to construction, DWR will make a construction schedule available to residents living in the vicinity of the construction areas before construction begins, and designate a noise disturbance coordinator. The coordinator will be responsible for responding to complaints regarding construction noise, will determine the cause of the complaint, and will ensure that reasonable measures are implemented to correct the problem when feasible. A contact telephone number for the noise disturbance coordinator will be conspicuously posted on construction site fences and will be included in the notification of the construction schedule.

Achievable noise reduction varies by measure. Shutting off a piece of equipment would eliminate its contribution to ambient noise. Noise barriers and enclosures would provide noise reduction within

the discrete area shielding noise from surrounding noise sensitive receptors. Barriers can provide 5 to 15 dB of noise reduction depending configuration relative to surrounding terrain. Although implementation of these measures will reduce the impact, it is not anticipated that feasible measures will be available in all situations to reduce construction noise to levels below the applicable thresholds. This impact would therefore be significant and unavoidable.

**Responsible Parties:** DWR and designated noise disturbance coordinator

**Regulating/Permitting Agencies:** N/A for this mitigation measure

**Location:** Near construction sites

**Timing:** For the duration of construction activities determined to generate excessive noise at sensitive receptor locations.

**Monitoring:** The noise disturbance coordinator will record all complaints and corresponding responses to residents living in the vicinity or the construction areas. DWR will review these records on weekly basis and assess on a site-by-site basis any modifications required to noise minimization measures.

**Reporting Requirements:** The noise disturbance coordinator will make a weekly report to DWR describing noise complaints received since the last report and any measures taken in response to complaints.

## 2.53 Mitigation Measure NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 23, Noise			
NOI-2: Employ Vibration-Reducing Construction Practices during Construction of Water Conveyance Facilities	DWR	During construction	Impact NOI-2

**Action:** During construction, DWR will implement vibration-reducing construction practices such that vibration from pile driving does not exceed 0.2 in/sec PPV at nearby residences.

The DWR will ensure that the following measures are implemented to reduce adverse effects and/or significant effects as described above if the measures are applicable and feasible. Not all measures listed below may be feasible. Rather, these measures serve as an overlying mitigation framework to be used for specific construction practices. The applicability of measures listed below would vary based on the location, timing, nature, and feasibility of each activity.

- Locating equipment as far as practical from vibration-sensitive (and noise-sensitive) land uses (at least 100 feet)

- Use of alternative pile driving methods such as vibratory driving, hydraulic press-in driving, or use of pre-drilled pile holes.

Depending on the equipment selected, the measures identified above can reduce vibration from pile driving to below 0.2 in/sec PPV at nearby residences. The specific noise reduction cannot be currently quantified since the actual equipment to be used is unknown and that the contractor may have alternative ways to achieve the performance limit. If the above measures are determined feasible, DWR will retain a qualified acoustical consultant or engineering firm to conduct vibration monitoring at potentially affected buildings to measure the actual vibration levels during construction and ensure vibration from pile driving does not exceed 0.2 in/sec PPV.

For cases where the above measures are not feasible, the resident or property owner will be notified in writing prior to construction activity that construction may occur within 100 feet of their building. A representative for the DWR will inspect the potentially affected buildings prior to construction to inventory existing cracks in paint, plaster, concrete, and other building elements. DWR will retain a qualified acoustical consultant or engineering firm to conduct vibration monitoring at potentially affected buildings to measure the actual vibration levels during construction. Following completion of construction, a representative for the DWR will conduct a second inspection to inventory changes in existing cracks and new cracks or damage, if any, that occurred as a result of construction-induced vibration. If new damage is found, then the DWR will promptly arrange to have the damage repaired, or will reimburse the property owner for appropriate repairs.

In addition, if construction activity is required within 100 feet of residences or other vibration-sensitive buildings, a designated complaint coordinator will be responsible for handling and responding to any complaints received during such periods of construction. A reporting program will be required that documents complaints received, actions taken, and the effectiveness of these actions in resolving disputes.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** At water conveyance facility construction sites.

**Timing:** Potential effects associated with construction activities would be temporary, which, for the purposes of this mitigation measure, is defined as the 14-year construction period for the modified pipeline tunnel option (including the preferred alternative).

**Monitoring:** DWR will retain a qualified acoustical consultant or engineering firm to determine the feasibility of the mitigation framework and perform inspections during construction to verify compliance with the mitigation framework. If the designated complaint coordinator determines, or if the reporting program for construction activity within 100 feet of residences or other vibration-sensitive buildings described above in *Action* reveals these actions are ineffective in reducing vibrations from construction, the affected residents<sup>14</sup> shall be offered short-term relocation assistance for the duration of the vibration-inducing construction.

**Reporting Requirements:** The acoustical consultant or engineering firm will report to DWR on the feasibility of the mitigation framework and on the results of vibration measurements at affected

<sup>14</sup> Permanent residents or tenants of rental dwelling units.



buildings and on construction contractor compliance with the mitigation framework. The designated complaint coordinator will be responsible for handling and responding to any complaints received during such periods of construction and documenting complaints received, actions taken, and the effectiveness of these actions in resolving disputes. In the event the complaint coordinator receives a complaint from residences within 100 feet of construction, the complaint coordinator will report these complaints to DWR as well as deploy a qualified acoustical consultant or engineering firm to conduct vibration monitoring at potentially affected buildings to measure the actual vibration levels during construction and ensure vibration from pile driving does not exceed 0.2 in/sec PPV. If vibration levels are found to be in excess of 0.2 in/sec PPV, DWR will, if feasible, initiate implementation of appropriate measures to further minimize construction vibration. If no measures are feasible to further minimize construction vibration, DWR will inform the residents of this matter and record the actions taken with the complaint coordinator. DWR will conduct a second inspection to inventory changes in existing cracks and new cracks or damage, if any, that occurred as a result of construction-induced vibration. If new damage is found, then the DWR will promptly arrange to have the damage repaired, or will reimburse the property owner for the documented costs of appropriate repairs.

## 2.54 Mitigation Measure NOI-3: Design and Construct Pumping Plant Facilities Such that Operational Noise Does Not Exceed 50 dBA (One-Hour $L_{eq}$ ) during Daytime Hours (7:00 A.M. to 10:00 P.M.) or 45 dBA (One-Hour $L_{eq}$ ) during Nighttime Hours (10:00 P.M. to 7:00 A.M.) or the Applicable Local Noise Standard (Whichever Is Less) at the property line of Nearby Noise Sensitive Land Uses

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 23, Noise			
NOI-3: Design and Construct Pumping Plant Facilities Such That Operational Noise Does Not Exceed 50 dBA (One-Hour $L_{eq}$ ) during Daytime Hours (7:00 A.M. to 10:00 P.M.) or 45 dBA (One-Hour $L_{eq}$ ) during Nighttime Hours (10:00 P.M. to 7:00 A.M.) or the Applicable Local Noise Standard (Whichever Is Less) at the property line of Nearby Noise Sensitive Land Uses	DWR	Prior to, during, and after construction	Impact NOI-3

**Action:** DWR will retain a qualified acoustical consultant to design acoustical treatments for the intake facilities and other pumping plant facilities. Implementation of this measure will ensure that operational noise levels, as applicable, do not exceed 50 dBA (one-hour  $L_{eq}$ ) during daytime hours (7:00 a.m. to 10:00 p.m.) or 45 dBA (one-hour  $L_{eq}$ ) during nighttime hours (10:00 p.m. to 7:00 a.m.)

or the applicable local noise standard (whichever is less) at nearby noise-sensitive land uses.

Measures that can be implemented to achieve this include but are not limited to:

- enclosing all pumps, motors, and other noise-generating equipment in solid wall structures;
- limiting openings in the enclosing structure and installing acoustic ventilation louvers where ventilation openings are required,
- installing acoustic access doors and wall panels,
- using low-noise motors (if available and feasible),
- using low noise transformers (if available and feasible),
- placing sound barriers (earth berms or constructed barriers) around noise sources

Verification noise monitoring will be conducted at each operational intake or the pumping plant location to confirm that acoustical treatments reduce operational noise to comply with the applicable noise standard. If noise is not in compliance with the applicable standard, DWR will implement additional necessary treatments until compliance is achieved.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Intake facilities and other pumping plant facilities

**Timing:** Prior to, during, and after construction

**Monitoring:** Verification noise monitoring will be conducted at each operational intake or the pumping plant location to confirm that acoustical treatments reduce operational noise to comply with the applicable noise standard.

**Reporting Requirements:** The acoustical consultant will report to DWR on the results of the noise monitoring verification and compliance with the applicable standard until compliance is achieved.

## 2.55 Mitigation Measure HAZ-1a & 1b

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 24, Hazards and Hazardous Materials			
HAZ-1a: Perform Preconstruction Surveys, Including Soil and Groundwater Testing, at Known or Suspected Contaminated Areas within the Construction Footprint, and Remediate and/or Contain Contamination	DWR	Prior to construction	Impact HAZ-1, HAZ-7
HAZ-1b: Perform Pre-Demolition Surveys for Structures to Be Demolished within the Construction Footprint, Characterize Hazardous Materials and Dispose of Them in Accordance with Applicable Regulations	DWR	Prior to and during construction	Impact HAZ-1, HAZ-7

**Mitigation Measure HAZ-1a: Perform Preconstruction Surveys, Including Soil and Groundwater Testing, at Known or Suspected Contaminated Areas within the Construction Footprint, and Remediate and/or Contain Contamination**

**Action:** DWR will identify potential areas of hazardous materials and remediate and/or contain contamination in order to reduce the likelihood of hazardous materials being released into the environment. DWR will perform preconstruction hazardous waste investigations at properties to be acquired for construction associated with the project. Areas to be excavated as part of construction of (e.g., for water conveyance facilities, shaft locations, concrete batch plants, intake locations, RTM storage areas, staging areas, forebays, borrow and spoil sites, barge unloading, restoration activities, and other appurtenant facilities) where historical contamination has been identified (e.g., SOCs) or where contamination is suspected (e.g., as evidenced by soil discoloration, odors, differences in soil properties, abandoned USTs) will undergo soil and/or groundwater testing at a certified laboratory provided that existing data is not available to characterize the nature and concentration of the contamination. Where concentrations of hazardous constituents, such as fuel, solvents, or pesticides in soil or groundwater, exceed applicable federal or state thresholds, contaminated areas will be avoided or soil and/or groundwater removed from the contaminated area will be remediated and contained in compliance with applicable state and federal laws and regulations. If hazardous materials are encountered, consultation with the regional DTSC office will be required to establish which permit and subsequent action will be required to appropriately handle those hazardous materials. Groundwater removed with the dewatering system would be treated, as necessary, and discharged to surface waters under an NPDES permit (see Chapter 8, *Water Quality*).

Implementation of this mitigation measure will result in the avoidance, successful remediation or containment of all known or suspected contaminated areas, as applicable, within the construction footprint, which would prevent the release of hazardous materials from these areas into the environment.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** State Water Board for the NPDES coverage

**Location:** At properties to be acquired for construction of the project

**Timing:** Prior to construction

**Monitoring:** DWR will establish procedures to ensure that concentrations of hazardous constituents, if present, have been identified and treated or removed as appropriate for their concentration and in compliance with applicable state and federal laws and regulations. A DWR appointed qualified monitor will monitor the preconstruction investigations to ensure surveys are conducted according to the established procedure. The qualified monitor to monitor coordination of monitoring data with DWR to determine areas which contain hazardous materials. If hazardous materials are encountered, DWR will determine (i) whether the area can be avoided, (ii) soil and/or groundwater removed from the contaminated area can be remediated and contained in compliance with applicable state and federal laws and regulations, or (iii) if consultation with the regional DTSC office is required.

**Reporting Requirements:** The qualified monitor will be responsible for reporting monitoring data from the preconstruction surveys to DWR. In the event that a hazardous materials area cannot be avoided or removed and remediated and contained, DWR will initiate consultation with the regional DTSC office to establish which permit and subsequent action will be required. Any treatment of

groundwater removed with the dewatering system will be required to comply with the appropriate NPDES permit conditions. Where remediation or containment is necessary, the qualified monitor shall report to DWR the strategy by which affected areas will be remediated and contained in compliance with applicable state and federal laws and regulations. If hazardous materials are encountered, the monitor will file a report with DWR describing the outcome of consultation with the regional DTSC office and the strategy implemented for appropriately handling such hazardous materials. Where groundwater was removed with the dewatering system and treated, the monitor shall explain how discharge to surface waters occurred consistent with the applicable NPDES permit.

**Mitigation Measure HAZ-1b: Perform Pre-Demolition Surveys for Structures to Be Demolished within the Construction Footprint, Characterize Hazardous Materials and Dispose of Them in Accordance with Applicable Regulations**

**Action:** DWR will perform surveys and characterize and dispose of hazardous materials in order to reduce the likelihood that hazardous materials are released into the environment. Where demolition of existing structures is necessary, measures will be implemented to ensure hazards are avoided or minimized and that the release of hazardous materials, such as residual fuel in underground fuel storage tanks, or lead-based paint or asbestos-containing materials in buildings, is avoided. These measures will include the following practices.

- Perform pre-demolition surveys to identify all potentially hazardous materials, including asbestos-containing material and lead-based paint.
- Coordinate with owners of property to be acquired by DWR to help identify potentially hazardous infrastructure and/or infrastructure containing potentially hazardous materials.
- Characterize and separate hazardous materials from structures before demolition and ensure that such materials are disposed of at an approved disposal site according to applicable regulations.
- Remove underground fuel storage tanks and contents to a licensed disposal site where the tanks will be scraped and the contents disposed of in accordance with applicable regulations.
- Disposal of materials containing PCBs will comply with all applicable regulations, codes, and ordinances. Disposal of large quantities of PCB waste will occur at incinerators approved for burning of PCB-containing waste.
- Implement proper handling and disposal procedures for potentially hazardous materials, such as solvents and household or industrial-strength maintenance chemicals and cleaners in buildings to be demolished.
- As applicable, a Cal-OSHA-certified asbestos and lead-based paint contractor will prepare a site-specific asbestos and/or lead hazard control plan with recommendations for the containment of asbestos and/or lead-based paint materials during demolition activities, for appropriate disposal methods and locations, and for protective clothing and gear for abatement personnel. Site-specific asbestos abatement work would meet the requirements of both the federal Clean Air Act and Cal-OSHA (CCR Title 8, Subchapter 4, Article 4, Section 1529). If asbestos-containing materials are found, contractors licensed to conduct asbestos abatement work will be retained and will direct the abatement. In addition, the applicable Air Quality Management District(s) will be notified 10 days prior to initiation of demolition activities of asbestos-containing materials.

- Containers suspected of, or confirmed as, containing lead-based paint will be separated from other building materials during the demolition process. Separated paint will be classified as a hazardous waste if the lead content exceeds 1,000 parts per million and will be disposed of in accordance with applicable regulations.
- Sewer lines will be plugged with concrete to prevent soil and/or groundwater contamination, and the end of the lines will be flagged above ground for future location and identification.
- Gas lines will be plugged or capped and the end of the lines will be flagged above ground for future location and identification.
- The use of explosives for demolition will not be allowed for any structures that contain asbestos, lead-based paint, or any other hazardous materials in concentrations that would create a substantial hazard to the public or the environment should they become airborne as a result of blasting.
- Hazardous waste, including contaminated soil, generated at demolition sites will be handled, hauled, and disposed of at an appropriately licensed disposal facility under appropriate manifest by a licensed hazardous waste hauler.

Implementation of this measure will ensure that hazardous materials present in or associated with structures being demolished will not be released into the environment.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** Site-specific asbestos abatement work would meet the requirements of both the federal Clean Air Act and Cal-OSHA (CCR Title 8, Subchapter 4, Article 4, Section 1529). The applicable Air Quality Management District(s) will be notified 10 days prior to initiation of demolition activities of asbestos-containing materials.

**Location:** Project footprint.

**Timing:** Prior to and during construction.

**Monitoring:** DWR will establish procedures to ensure that surveys are performed and hazardous materials are characterized and disposed of in order to reduce the likelihood that hazardous materials are released into the environment. DWR will appoint a qualified monitor will monitor the pre-demolition surveys and characterization and disposal of hazardous materials. The qualified monitor will be responsible for the proper disposal and handling of hazardous materials and will ensure the practices outlined above are followed.

**Reporting Requirements:** DWR will perform surveys and characterize and dispose of hazardous materials in order to reduce the likelihood that hazardous materials are released into the environment. The qualified monitor will be responsible for reporting monitoring data from the pre-demolition surveys to DWR. In the event hazardous materials are encountered, DWR will provide proper notice to appropriate state or federal regulators, and shall explain how such hazardous materials have been handled or disposed of in accordance with applicable laws.

## 2.57 Mitigation Measure HAZ-6: Test Dewatered Solids from Solids Lagoons Prior to Reuse and/or Disposal

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 24, Hazards and Hazardous Materials			
HAZ-6: Test Dewatered Solids from Solids Lagoons Prior to Reuse and/or Disposal	DWR	During construction	Impact HAZ-6

**Action:** DWR will ensure that dewatered solids from the solids lagoons are sampled and tested/characterized at a certified laboratory prior to reuse and/or to evaluate disposal options. At minimum, the solids would be tested for hazardous characteristics (i.e., toxicity, corrosivity, ignitability, and reactivity) consistent with federal standards for identifying hazardous waste (40 CFR Part 261). All dewatered solids would be disposed of in accordance with applicable federal, state, and local regulations at a solid waste disposal facility approved for disposal of such material.

Implementation of this measure will ensure that dewatered solids do not reintroduce hazardous constituents to the environment if they are reused, and that they are disposed of properly if they do contain hazardous levels of contaminants such as persistent pesticides and mercury.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Project solids lagoons

**Timing:** During construction

**Monitoring:** DWR will appoint a qualified monitor to coordinate the sampling and testing of dewatered solids from the solids lagoons and the reuse or disposal of dewatered solids as described in the action above.

**Reporting Requirements:** The qualified monitor will be responsible for reporting monitoring data from the testing and disposal of all dewatered solids to ensure their reuse or disposal in accordance with applicable federal, state, and local regulations at a solid waste disposal facility approved for disposal of such material.

## 2.58 Mitigation Measure HAZ-8: Consult with Individual Airports and USFWS, and Relevant Regulatory Agencies

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 24, Hazards and Hazardous Materials			
HAZ-8: Consult with Individual Airports and USFWS, and Relevant Regulatory Agencies	DWR	Prior to construction	Impact HAZ-8

**Action:** The FAA requires commercial service airports to maintain a safe operation, including conducting hazard assessments for wildlife attractants within 5 miles of an airport. The hazard assessment is submitted to FAA, which determines if the airport needs to develop a Wildlife Hazard Management Plan. (15 CFR 139). The airport's Wildlife Hazard Management Plan contains measures to reduce wildlife hazards, including habitat modification (e.g., vegetation management, filling in of wetlands), wildlife control measures (e.g., harassment, trapping and removing), and use of a radar-based alert system.

DWR will consult with the individual airports and USFWS during the design process for individual restoration activities, when site-specific locations and design plans are being finalized. At that time, appropriate management plans, strategies, and protocols would be developed to reduce, minimize and/or avoid wildlife hazards on air safety. Site-specific measures will be developed once information on the design, location, and implementation of Environmental Commitments 3, 4, and 6-11 is sufficient to permit a project-level analysis.

This mitigation measure will ensure that the potential for increased bird- aircraft strikes as a result of implementing Environmental Commitments 3, 4, and 6-11 in the vicinity of airports are minimized to the greatest extent possible.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** FAA and USFWS

**Location:** Environmental Commitments 3, 4, and 6-11 activities within 5 miles of an airport.

**Timing:** Prior to construction of restoration projects.

**Monitoring:** DWR will oversee the development of the Wildlife Hazard Management Plan in coordination with individual airports and USFWS.

**Reporting Requirements:** The complete Wildlife Hazard Management Plan will be delivered to individual airports and USFWS for review.

## 2.59 Mitigation Measure MIN-5: Design Environmental Commitments 4 and 10 to Avoid Displacement of Active Natural Gas Wells to the Extent Feasible

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 26, Minerals			
MIN-5: Design Environmental Commitments 4 and 10 to Avoid Displacement of Active Natural Gas Wells to the Extent Feasible	DWR	Prior to and during construction of restoration areas	Impact MIN-5

**Action:** During final design of Environmental Commitments 4 and 10, DWR will avoid permanent inundation of or construction over active natural gas well sites where feasible to minimize the need for well abandonment or relocation.

**Responsible Parties:** DWR will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** This mitigation measure will be implemented at each project area where Environmental Commitments 4 and 10 will be carried out and active natural gas well sites are present.

**Timing:** This mitigation measure will be implemented during the design and construction phase of the restoration areas.

**Monitoring:** DWR will review final design of Environmental Commitments 4 and 10 to ensure compliance with this mitigation measure and will explore all feasible options to minimize the need for well abandonment or relocation.

**Reporting Requirements:** N/A for this mitigation measure.



## 2.60 Mitigation Measure MIN-6: Design Environmental Commitments 4 and 10 to Maintain Drilling Access to Natural Gas Fields to the Extent Feasible

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 26, Minerals			
MIN-6: Design Environmental Commitments 4 and 10 to Maintain Drilling Access to Natural Gas Fields to the Extent Feasible	DWR	Prior to and during construction of restoration areas	Impact MIN-6

**Action:** During final design of actions to offset the impacts of constructing and operating the water conveyance facilities, DWR will identify means to maintain access to natural gas fields that could be adversely affect by implementing Environmental Commitments 4 and 10 where feasible. These could include preserving non-inundated lands either over or adjacent to natural gas fields adequate in size to allow drilling to occur. These measures will ensure that drilling access to natural gas fields is maintained to the greatest extent practicable.

**Responsible Parties:** DWR will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** This mitigation measure will be implemented at each project area during the design and construction where Environmental Commitments 4 and 10 will be carried out and natural gas fields are present.

**Timing:** This mitigation measure will be implemented before and during the construction phase of the project.

**Monitoring:** DWR will review all final designs of actions to offset the impacts of construction and operating the water conveyance facilities to ensure compliance with this mitigation measure. The construction monitor will monitor implementation of the identified measures and ensure drilling access to natural gas fields are maintained to the greatest extent practicable.

**Reporting Requirements:** N/A for this mitigation measure.

## 2.61 Mitigation Measure MIN-11: Purchase Affected Aggregate Materials for Use in Project Construction

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Associated Impact
Chapter 26, Minerals			
MIN-11: Purchase Affected Aggregate Materials for Use in Project Construction	DWR	Prior to and during construction	Impact MIN-11

**Action:** Depending on the location and extent of inundation to locally important aggregate material sites in restoration efforts, DWR shall consider various mitigation strategies to mitigate significant impacts. Such strategies may include avoiding the affected sites and choosing areas that will not impact such mines, directly or indirectly, or downsizing the area to be restored and thereby reducing impacts to the affected mines to less than significant. DWR may also choose to purchase the permitted aggregate volume from mines affected by restoration for construction use to ensure available aggregate will not be lost due to construction of restoration sites. The resulting mined site(s) may then be considered for integration into the restoration design of any environmental commitment that affects the site(s). For example, the mined site(s) could be reshaped to provide aquatic or intertidal habitat of varying depths and configurations. For this latter strategy, coordination would be initiated with the affected local county overseeing SMARA regulation. Additionally, further CEQA review may be required prior to implementing the integration of mined sites into the restoration design.

**Responsible Parties:** DWR will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** The location of locally important affected aggregate material sites will be determined in the design phase.

**Timing:** This mitigation measure will be implemented prior to the construction phase of the project for avoidance or minimization strategies. For other strategies, such as purchasing the aggregate materials and/or incorporating the mine into the restoration effort, the timing may occur prior to or during the phasing of construction.

**Monitoring:** DWR will review and consider restoration designs of any environmental commitment that affects the locally important aggregate materials site(s).

**Reporting Requirements:** If applicable to the restoration site, DWR will document the consideration and selection process for integration of mined site(s) into the restoration design of any environmental commitment that affects the site. If the mined site(s) is unable to be integrated into the restoration design, DWR will document the reasons why. This documentation will be retained by DWR in the project folder.

## 2.62 Mitigation Measures PALEO-1a, 1b, 1c, & 1d

Commitment/Mitigation Measure	Responsible Party/Parties	Timing	Applicable Impacts
Chapter 27, Paleontological Resources			
PALEO-1a: Prepare a monitoring and mitigation plan for paleontological resources	DWR and Construction Contractors	Prior to and during construction	Impact PALEO-1
PALEO-1b: Review 90% design submittal and develop specific language identifying how the mitigation measures will be implemented along the alignment	DWR and Construction Contractors	Prior to and during construction	Impact PALEO-1, PALEO-2
PALEO-1c: Educate construction personnel in recognizing fossil material	DWR and Construction Contractors	Prior to construction	Impact PALEO-1, PALEO-2
PALEO-1d: Collect and preserve substantial potentially unique or significant fossil remains when encountered	DWR and Construction Contractors	During construction	Impact PALEO-1, PALEO-2

### Mitigation Measure PALEO-1a: Prepare a monitoring and mitigation plan for paleontological resources

**Action:** Before ground-breaking construction begins, DWR will retain a qualified paleontologist or geologist (as defined by the Society of Vertebrate Paleontology [SVP] Standard Procedures [Society of Vertebrate Paleontology 2010]) to develop a comprehensive Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for the project, to help avoid directly or indirectly destroying a unique or significant paleontological resource.

The PRMMP will be consistent with the SVP Standard Procedures (Society of Vertebrate Paleontology 2010) and the SVP Conditions of Receivership (Society of Vertebrate Paleontology 1996) and will require the following.

- A paleontological resources specialist (PRS) will be designated or retained for construction activities. The PRS will have paleontological resources management qualifications consistent with the description of a qualified paleontologist in the SVP Standard Procedures (Society of Vertebrate Paleontology 2010). The PRS will be responsible for implementing all aspects of the PRMMP, managing any additional paleontological monitors needed for construction activities, and serving as a qualified resource in the event of unanticipated paleontological finds. The PRS may, but need not necessarily, be the same individual who prepared the PRMMP. The PRS will be retained or designated prior to the start of ground-breaking construction. A qualified PRS is defined as a person with a M.S. or Ph.D. in paleontology, paleobiology, or geology, with strong working knowledge of local paleontology and geology, and professional expertise with paleontological procedures and techniques. The PRS may designate a paleontological monitor to be present during earth-moving activities. A paleontological monitor is defined as a person with a BS/BA in geology or paleontology and a minimum of 1 year of monitoring experience in local sedimentary rocks. Experience may be substituted for academic training on approval from the contracting agency. The PRS and paleontological monitor(s) will be notified by the Lead Agency

or Resident Engineer in advance of the start of construction activity. The PRS and paleontological monitor(s) will attend any required safety training programs.

- Preconstruction surveys (with salvage and/or protection in place, as appropriate) will be conducted in areas where construction activities would result in surface disturbance of geologic units identified as highly sensitive for paleontological resources.
- Preconstruction and construction-period coordination procedures and communications protocols will be established, including procedures to alert all construction personnel involved with earthmoving activities about the possibility of encountering fossils as set forth in Mitigation Measure PALEO-1c and communications regarding the *stop work, evaluate and treat appropriately response* in the event of a paleontological discovery, as discussed in Mitigation Measure PALEO-1d.
- All ground-disturbing activities involving highly sensitive units will be monitored by qualified monitors. Monitoring will initially be conducted full time for grading and excavation, but the PRMMP may provide for monitoring frequency in any given location to be reduced once 50% of the ground-disturbing activity in that location has been completed, if the reduction is appropriate based on the implementing PRS's professional judgment in consideration of actual site conditions. Monitoring will also be conducted throughout drilling operations. The monitoring program for tunneling operations will be developed in conjunction with the facility design and geotechnical teams, in consideration of the tunneling method selected.
- Sampling and data recovery procedures that are consistent with the SVP Standard Procedures (Society of Vertebrate Paleontology 2010) and the SVP Conditions of Receivership (Society of Vertebrate Paleontology 1996) will be established.
- A repository plan will be developed that provides for appropriate curation of recovered materials, if necessary.
- Mitigation monitoring report preparation guidelines will be established that are consistent with the SVP Standard Procedures guidelines (Society of Vertebrate Paleontology 2010). The report will include, at a minimum, discussions of effects, regulatory requirements, purpose of mitigation, regional geologic context, Plan Area stratigraphy, stratigraphic and geographic distribution of paleontological resources, field and laboratory methods and procedures, fossil recovery, and paleontological significance. The report will also include geological cross sections and stratigraphic sections depicting fossil discovery localities and excavated rock units; maps showing the activity location and vicinity, as well as geology and location of discovered fossil localities; appropriate illustrations depicting monitoring conditions, field context of collecting localities, quarry maps, and laboratory activities; and appendices including an itemized listing of catalogued fossil specimens, complete descriptions of all fossil collecting localities, an explanation of report acronyms and terms, and a signed curation agreement with an approved paleontological repository.
- Procedures for preparing, identifying, and analyzing fossil specimens and data recovered will be established, consistent with the SVP Conditions of Receivership (Society of Vertebrate Paleontology 1996 and 2010) and any specific requirements of the designated repository institution.

Implementation of this measure will ensure that unique or scientifically significant paleontological resources in the alternative footprint are systematically identified, documented, avoided or

protected from damage where feasible, or recovered and curated so they remain available for scientific study.

**Responsible Parties:** DWR will be responsible for retaining a qualified paleontologist or geologist who will draft the PRMMP as well as the Paleontological Resources Specialist (PRS) who will monitor the construction sites. Construction contractors will need to work with the PRS to establish a communication protocol to alert construction crew about encountering a fossil.

**Regulating/Permitting Agencies:** All sampling and data recovery will follow the Society of Vertebrate Paleontology (SVP) Standard Procedure Guidelines and the SVP Conditions of Receivership. However, there are no regulating/permitting agencies involved in this Mitigation Measure.

**Location:** Mitigation, as outlined in the PRMMP, will take place at all ground-breaking construction sites.

**Timing:** Prior to and during construction.

**Monitoring:** Procedures to alert all construction personnel involved with earthmoving activities about the possibility of encountering fossils as set forth in Mitigation Measure PALEO-1c and communications regarding the stop work, evaluate and treat appropriately response in the event of a paleontological discovery, as discussed in Mitigation Measure PALEO-1d will be developed. Construction contractors will alert the PRS and the Resident Engineer in the event of a fossil discovery. The PRS will follow the SVP Standard Procedure Guidelines and the SVP Conditions of Receivership. For construction activities in areas of known high potential for paleontological resources, the PRS will be present initially during 100% of the earth-moving activities. Once 50% of the construction/excavation is complete and no fossils have been discovered, the level or monitoring will be reduced to an appropriate level (as determined by the PRS). Construction/excavation in areas of low potential may be monitored by non-paleontologists. If a fossil is discovered in a low potential area, all construction activity will cease until the PRS or qualified professional paleontologist can assess the site (Society of Vertebrate Paleontology 2010). Mitigation Measure PALEO-1d describes the PRS's role and procedures for collecting and preserving fossil remains. Recommendations determined by DWR to be necessary and feasible will be implemented before construction can resume at the site where the paleontological resources were discovered.

**Reporting Requirements:** As outlined in the SVP Standard Procedures, the PRS will prepare an interim report at the close of the excavation phase at each construction site. A final report will be prepared after preparation, identification, analysis of significance, and curatorial inventory of the salvaged specimens is complete. A complete set of field notes, geologic maps, stratigraphic sections, and a list of identified specimens must be included in or accompany the final report. This report should be finalized only after all aspects of the mitigation program are completed, including preparation, identification, cataloging, and curatorial inventory. Full copies of the final report will be retained by DWR and delivered to the UCMP at the University of California Berkeley for review, input, and retention.

**Mitigation Measure PALEO-1b: Review 90% design submittal and develop specific language identifying how the mitigation measures will be implemented along the alignment**

**Action:** To help avoid directly or indirectly destroying a unique or significant paleontological resource, DWR will have a qualified individual review the 90% design submittal to finalize the identification of construction activities involving geologic units considered highly sensitive for paleontological resources. Evaluation will consider the anticipated depth of disturbance, the selected construction technique, and the geology of the alignment. This work may be carried out in conjunction with or as part of the development of the PRMMP (Mitigation Measure PALEO-1a). The evaluation may be carried out by the PRS or an individual meeting the SVP's requirements for a qualified vertebrate paleontologist (per Society of Vertebrate Paleontology 2010) and will be conducted in collaboration with the design and geotechnical teams. If the evaluation is performed by a paleontologist, it will be reviewed and verified by a California-licensed professional geologist. The purpose of this evaluation will be to develop specific language identifying how the mitigation measures will be applied to the various phases of construction along the alignment (e.g., which areas would require monitors). This language will be included in the construction documents for implementation by DWR. The language will be based on the following framework.

- One onsite paleontological monitor will likely be sufficient to handle observation of most ground-disturbing activities. However, if additional paleontological monitors are needed, the PRS will coordinate with the Resident Engineer. This communication is imperative and fundamental to the success of this PRMMP and to compliance with CEQA and NEPA.
- Whenever possible, sedimentary rocks exposed during trenching and other deep excavation work will be inspected. Ideally, this monitoring will involve inspection of fresh bedrock exposures. However, observation of some work may not be possible for safety reasons and inspection from these operations will be restricted to spoils. In this case, the monitor will inspect spoils as they are stockpiled and remove any matrix blocks containing paleontological resources. Construction personnel, namely the Resident Engineer/Lead, must communicate depths of excavated materials and their approximate location to the field monitor.
- Recording of stratigraphic data will be an ongoing aspect of excavation monitoring, to provide context for any eventual fossil discoveries. Outcrops exposed in active cuts and finished slopes will be examined and geologic features recorded on grading plans and in field notes. The goal of this work is to delimit the nature of fossiliferous unconsolidated sedimentary deposits within the Plan Area, determine their areal distribution and depositional contacts, and record any evidence of structural deformation. Standard geologic and stratigraphic data collected include lithologic descriptions (e.g., color, sorting, texture, structures, and grain size), stratigraphic relationships (e.g., bedding type, thickness, and contacts), and topographic position. Stratigraphic sections will be routinely measured, areas containing exposures of fossiliferous sedimentary rocks will be documented, and fossil localities will be recorded on measured stratigraphic sections.
- If fossils are discovered, the following procedures will be followed. The monitor or PRS will inform the Resident Engineer who will determine the appropriate course of action. For all excavations except those relating to the tunnels, mitigation will consist of one of the following: diverting, directing, or temporarily halting ground-disturbing activities in the area of discovery to allow for preliminary evaluation of potentially significant paleontological resources and to determine whether additional mitigation (i.e., collection, curation or other preservation) is required. Where excavations relate to construction of the tunnels, such measures will be

1           infeasible because the fossils will most likely have been destroyed by the tunnel boring  
2           machines before they could have been identified.

3           The significance of the discovered resources will be determined by the PRS in consultation with  
4           appropriate contractor representatives. Because of the infrequency of fossil preservation, fossils are  
5           considered to be nonrenewable resources. Because of their rarity, and because of the scientific  
6           information they provide, fossils can be highly significant records of ancient life. Given this, fossils  
7           can be considered to be of significant scientific interest if one or more of the following criteria apply.

- 8           ● Provide data on the evolutionary relationships and developmental trends among organisms,  
9           both living and extinct.
- 10          ● Provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including  
11          data important in determining the depositional history of the region and the timing of geologic  
12          events therein.
- 13          ● Provide data regarding the development of biological communities or interaction between  
14          paleobotanical and paleozoological biotas.
- 15          ● Demonstrate unusual or spectacular circumstances in the history of life.
- 16          ● Are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism,  
17          or commercial exploitation, and are not found in other geographic locations.

18          They can include fossil remains of large to very small aquatic and terrestrial vertebrates (including  
19          animal trackways), remains of plants and animals previously not represented in certain portions of  
20          the stratigraphy, and fossils that might aid stratigraphic correlations, particularly those offering data  
21          for the interpretation of tectonic events, geomorphologic evolution, paleoclimatology, and the  
22          relationships of aquatic and terrestrial species.

- 23          ● Recovery methods will vary to some degree depending on the types of fossils discovered (e.g.,  
24          invertebrate macrofossils, invertebrate microfossils, vertebrate macrofossils, vertebrate  
25          microfossils, or plant fossils). Many fossil specimens discovered during excavation monitoring  
26          are readily visible to the naked eye and large enough to be easily recognized and removed. Upon  
27          discovery of such macrofossils, the paleontological monitor will temporarily flag the discovery  
28          site for avoidance and evaluation, as described above. Actual recovery of unearthed macrofossils  
29          can involve several techniques, including immediate collection, hand quarrying, plaster-  
30          jacketing, and/or large-scale quarrying. The PRS and the contracting agency representative will  
31          evaluate the discovery and take action to protect or remove the resource within the shortest  
32          period of time possible.
- 33          ● Many significant vertebrate fossils (e.g., small mammal, bird, reptile, amphibian, or fish remains)  
34          often are too small to be readily visible in the field, but are nonetheless significant and worthy of  
35          attention. The potential discovery of microvertebrate sites is anticipated and can include sites  
36          that produce remains of large vertebrate fossils from fine-grained deposits, sites with an  
37          obvious concentration of small vertebrate fossil remains, and sites that based on lithology alone  
38          (e.g., paleosols) appear to have a potential for producing small vertebrate fossil remains.  
39          Microvertebrate sites will be sampled by collecting bulk quantities of sedimentary matrix. An  
40          adequate sample comprises approximately 12 cubic meters (6,000 lbs or 2,500 kg) of matrix for  
41          each formation, or as determined by the PRS (Society of Vertebrate Paleontology 2010). The  
42          uniqueness of the recovered fossils may dictate salvage of larger amounts. However, conditions

in the field may make it impossible to recover such large samples. To avoid construction delays, bulk matrix samples will be transported to an offsite location for processing.

- The discovery of fossil plants is possible in the Plan Area. Paleobotanical specimens typically occur in fine-grained, laminated strata (e.g., shale) and will require special recovery techniques. Large blocks (>2 feet) of sedimentary rock are hand quarried from the temporary outcrop and then split along bedding planes to reveal compressed fossil plant material (e.g., leaves, stems, and flowers). Individual slabs are then wrapped in newsprint to minimize destructive desiccation of the fossils. Specimens that are delaminating or flaking badly may need to be coated with special consolidants.
- Oriented matrix samples may be collected for paleomagnetic analysis. Such sampling will likely only be necessary in instances where long, continuous sections of stratified rocks are producing fossils from several different stratigraphic horizons or where vertebrate fossils are being collected in stratigraphic sections lacking in biochronologically useful microfossils. Likewise, it may be necessary to collect stratigraphically positioned samples of fine matrices pollen analysis or aid in addressing questions of geologic age, depositional environment, or paleoecology.
- All fossil discoveries will include the collection of stratigraphic data to delimit the nature of the fossil-bearing sedimentary rock unit, determine its areal distribution and depositional contacts, record any evidence of structural deformation, generate lithologic descriptions of fossil-bearing strata, determine stratigraphic relationships (bedding type, thickness, and contacts), and topographic position, measure stratigraphic sections, and describe taphonomic details.

Implementation of this measure will ensure that mitigation procedures are followed so that unique or scientifically significant paleontological resources in the alternative footprint are systematically identified, documented, avoided or protected from damage where feasible, or recovered and curated so they remain available for scientific study.

**Responsible Parties:** DWR will provide an evaluation and a California-licensed professional geologist if necessary to review the language. Construction Contractors will be involved in the communication plan implemented for when a fossil is found.

**Regulating/Permitting Agencies:** Evaluations and actions will follow the Society of Vertebrate Paleontology (SVP) Standard Procedure Guidelines and the SVP Conditions of Receivership. However, there are no regulating/permitting agencies involved in this Mitigation Measure.

**Location:** All ground-disturbing sites

**Timing:** Prior to and during construction.

**Monitoring:** Pre-construction evaluation will consider the anticipated depth of disturbance, the selected construction technique, and the geology of the alignment. This evaluation will be used to develop specific language identifying how the mitigation measures will be applied to the various phases of construction along the alignment. DWR will monitor the development of this language and inclusion in construction documents. During construction DWR will perform site inspections to verify contractor compliance. The monitoring activities of the PRS will be further outlined in the PRMMP developed in Mitigation Measure PALEO-1a.

**Reporting Requirements:** Language developed will be included in the construction documents for implementation by DWR and its construction contractors. The PRMMP developed in Mitigation Measure PALEO-1a and in conjunction with this Mitigation Measure will determine specific



reporting requirements on a site by site basis. Full copies of the final report will be retained by DWR and delivered to the UCMP at the University of California Berkeley for review, input, and retention.

### **Mitigation Measure PALEO-1c: Educate construction personnel in recognizing fossil material**

**Action:** In order to reduce the likelihood of directly or indirectly destroying a unique or significant paleontological resource, DWR will require that all construction personnel receive training provided by a qualified paleontologist experienced in teaching non-specialists, to ensure that they can recognize fossil materials in the event any are discovered during construction. Training will include information on the possibility of encountering fossils during construction, the types of fossils likely to be seen and how to recognize them, and proper procedures in the event fossils are encountered. All field management and supervisory personnel and construction workers involved with ground-disturbing activities will be required to take this training prior to beginning work. Training materials will include an informational brochure that provides contacts and summarizes procedures in the event paleontological resources are encountered.

Implementation of this measure will ensure that unique or scientifically significant paleontological resources have a high likelihood of being identified during construction so they can be avoided or treated appropriately.

**Responsible Parties:** DWR will provide a qualified paleontologist to conduct training. Construction contractors will participate in, and comply with required training.

**Regulating/Permitting Agencies:** No regulating/permitting agencies are involved in this Mitigation Measure.

**Location:** Training will take place in a location designated by DWR and its construction contractors.

**Timing:** The training will take place prior to construction.

**Monitoring:** A qualified scientist will train construction personnel on the correct methods of discovery and handling of a fossil. Training materials will include an informational brochure that provides contacts and summarizes procedures in the event paleontological resources are encountered. Construction contractors will ensure all construction personnel participate in the training.

**Reporting Requirements:** The construction contractors will report to DWR when all construction personnel have completed the training.

### **Mitigation Measure PALEO-1d: Collect and preserve substantial potentially unique or significant fossil remains when encountered**

**Action:** To help avoid directly or indirectly destroying a unique or significant paleontological resource, DWR will ensure that if substantial potentially unique or significant fossil remains (particularly vertebrate remains) are discovered during ground-disturbing activities, the construction crew will be directed to immediately cease work in the vicinity of the find and notify the PRS, consistent with the PRMMP described under Mitigation Measure PALEO-1a. A newly discovered resource may need to be fenced off to protect it from inadvertent intrusions by machinery or protect the location from vandalism. If extensive recovery and jacketing is needed, the area will be fenced off with temporary fencing and a 3- to 5-meter (10- to 15-foot) buffer will be included in the fenced area around the locality. If specific construction activities preclude placement

of a buffer of this width, the monitor will stake a mutually agreeable buffer prior to fencing. The PRS will evaluate the resource and prepare a mitigation plan in accordance with SVP guidelines (2010). The mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations determined by DWR to be necessary and feasible will be implemented before construction can resume at the site where the paleontological resources were discovered.

Except for the fossils destroyed by tunnel boring machines, implementation of this measure will ensure that unique or scientifically significant paleontological resources identified during construction are protected from damage or treated and documented appropriately to preserve their scientific value.

**Responsible Parties:** DWR will provide a qualified scientist monitor. Construction contractors will implement an immediate cease work plan as well as fencing off sites if necessary sites.

**Regulating/Permitting Agencies:** No regulating/permitting agencies are involved in this Mitigation Measure.

**Location:** Mitigation will be implemented, as needed, at all ground-disturbing sites with the exception of tunnel boring procedures.

**Timing:** During construction.

**Monitoring:** If a fossil is discovered it may need to be fenced off to protect it from inadvertent intrusions by machinery or protect the location from vandalism. If extensive recovery and jacketing is needed, the area will be fenced off with temporary fencing and a 3- to 5-meter (10- to 15- foot) buffer. The PRS will evaluate the resource and prepare a mitigation plan in accordance with SVP guidelines. The PRS will monitor compliance with this mitigation plan.

**Reporting Requirements:** The PRS will report to DWR the status of the collection and preservation of any potentially unique or significant fossil remains. The PRS will also prepare a final report after preparation, identification, analysis of significance, and curatorial inventory of the salvaged specimens is complete. This report will be reviewed and approved by DWR. Full copies of the final report will be retained by DWR and delivered to the UCMP at the University of California Berkeley for review, input, and retention.

## Appendix 3B Environmental Commitments

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### 3.1 Environmental Commitments from Appendix 3B

As part of the project planning and environmental assessment process, DWR will incorporate certain environmental commitments and BMPs into the proposed action alternatives to avoid or minimize potential impacts. These “environmental commitments” refer to design features, construction methods, and other BMPs that have been incorporated as part of the project description to preclude the occurrence of environmental effects that could arise without such commitments in place. These environmental commitments tend to be relatively standardized and are often already compulsory; they represent sound and proven methods that can avoid or reduce the potential effects of an action—for example, installation of sedimentation barriers and other stormwater protections during grading—in contrast to mitigation measures that would be necessary to be included as part of project approval to offset the environmental effects of the proposed action. Environmental commitments that will be incorporated in the project are described in Appendix 3B, *Environmental Commitments, AMMs, and CMs*. A number of these commitments are similar to one or more of the Avoidance and Minimization Measures described under Chapter 4, *Avoidance and Minimization Measures*. Because the AMMs have been specifically designed to avoid and minimize effects on covered species and natural communities, parallel environmental commitments have been identified in order to recognize the capacity of these practices to avoid or minimize potential impacts related to other environmental topics. Additional detail about the approach to mitigation is described in Section 4.2.5.3, *Mitigation Approaches* of the FEIR/FEIS. DWR will also coordinate planning, engineering, design and construction, operation, and maintenance phases of the Plan with the appropriate agencies.

These environmental commitments are separate and apart from those Environmental Commitments which are described in Section 5.1 which are associated with Conservation Measures, and apply to both BDCP alternatives as well as non-Habitat Conservation Plan (HCP) alternatives such as Alternative 4a which achieves compliance with federal and state endangered species laws through Section 7 of the ESA and Section 2081 of CESA, rather than through ESA Section 10 and NCCPA Section 2835.

### 3.3 Environmental Commitment: Perform Geotechnical Studies & AMM28: Geotechnical Studies

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Perform Geotechnical Studies	DWR	Prior to construction	Impact GW-3, GW-5, GEO-2, GEO-3, GEO-4, GEO-5, GEO-6, GEO-7, GEO-8, GEO-9, GEO-10, GEO-12, GEO-13, GEO-14, GEO-15, SOILS-3, SOILS-4, SOILS-8, SOILS-9
AMM28 Geotechnical Studies			

#### Commitment:

**Geotechnical Investigations:** Subsurface investigations will be performed along the water conveyance alignment and at facility locations and material borrow areas. The main issues of concern in the Delta include stability of canal embankments and levees, liquefaction of Delta soils (particularly loose, saturated sands), seepage through coarse-grained soils, settlement of embankments and structures, subsidence, and soil bearing capacity. The investigations will explore a wide variety of soil types in the Delta that include peat, sands, silts, and clays. The work to be performed will include a subsurface investigation program to provide information required to support the design and construction of the water conveyance facilities. Geotechnical investigations will be conducted to characterize existing soils and to select appropriate foundation types, lateral supports, and stabilization methods that will be implemented to ensure that the facilities are constructed to withstand design loads and to abide by applicable state and federal regulations. These investigations will build on information previously gathered in geotechnical data reports (California Department of Water Resources 2010a, 2010b, 2011, 2014) and conceptual engineering reports (California Department of Water Resources). Information to be gathered will consider common industry standards including the American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures, American Society of Testing of Materials, Division of Safety of Dams, California Department of Transportation, California Department of Water Resources, California Building Code, and U.S. Army Corps of Engineers (USACE) Design and Construction of Levees. The geotechnical investigation will also include a small-scale environmental screening to assess the presence or absence of dissolved gases to help guide tunnel ventilation and soil disposal considerations. This commitment is related to *AMM28, Geotechnical Studies*, described in in Section 3B.4.28 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS.

The spacing of soil boring and test locations likely will average about 1,000 feet along proposed canal and tunnel alignments and approximately 100 to 200 feet at intakes, pumping plants, forebays, siphons, and other hydraulic structures.

Site-specific geotechnical studies are expected to include the following, as appropriate.

- Observing, recording, collecting, and testing subsurface materials obtained during site-specific geotechnical exploration.

- Standard penetration tests (drilling and sampling), cone penetration tests, geophysical tests, and other in-situ soil tests, slug tests, aquifer/pumping tests, and trench test pits to observe, record, and evaluate subsurface conditions.
- Installing wells and monitoring groundwater elevations and soil permeability for use in assessing liquefaction and dewatering characteristics.
- Performing geotechnical laboratory testing on select samples to evaluate engineering and other properties of collected soils.
- Preparing geotechnical data reports to document observations and findings of subsurface investigations and tests.
- Preparing geotechnical baseline and/or other reports to describe expected construction conditions and provide design and construction recommendations.
- Assess liquid limit (i.e., the moisture content at which a soil passes from a solid to a liquid state) and organic material on soil samples collected during site-specific field investigations to determine site-specific geotechnical properties.

As described in Chapter 3, Section 3.6.1.10, of the FEIR/FEIS, DWR has developed a Draft Geotechnical Exploration Plan (Phase 2) for the Alternative 4 conveyance alignment (MPTO), which is also relevant to Alt 4A. The geotechnical investigation plan provides additional details regarding the rationale, investigation methods and locations, and criteria for obtaining subsurface soil information and laboratory test data (California Department of Water Resources 2014). The proposed exploration is designed as a two-part program (Phases 2a and 2b) to collect geotechnical data. The two-part program will allow refinement of the second part of the program to respond to findings from the first part. The proposed subsurface exploration will focus on geotechnical considerations of the following aspects of water conveyance facility development: engineering considerations, construction-related considerations, permitting and regulatory requirements, and seismic characterization considerations.

Data obtained from the geotechnical investigations will be used to support the development of a geological model for the selected alternative, characterize ground conditions within the water conveyance alignments and as necessary for the implementation of habitat restoration and enhancement actions, and aid in the avoidance of geologic risks associated with the construction of the water conveyance facilities. Data from these investigations, which would occur at several sites within the water conveyance construction footprint of the selected alternative, would help identify and/or inform the following.

- The types of soil avoidance or soil stabilization measures that should be implemented to ensure that the proposed facilities are constructed to withstand subsidence and settlement, soil corrosivity, and to conform to applicable state and federal standards.
- The extent and type of ground improvement that may be required to facilitate support of tunnel shafts, control groundwater at the locations of the shafts, prevent development of undesired tunnel-induced surface settlements and provide pre-defined zones for tunnel boring machine (TBM) maintenance interventions.
- The potential risk of settlement and subsequent collapse of excavations
- Additional design provisions and mitigation needed due to the potential presence of dissolved gas along the water conveyance alignments

**Settlement Monitoring and Response Program:** Localized settlement can occur during tunneling and other construction activities such as dewatering and hauling materials. Settlement above tunnels is usually in response to ground loss at the tunnel face, voids created around the tunnel during mining, and/or stress redistribution around the excavated tunnel. The magnitude of risk for ground settlement depends on the excavated diameter of the tunnel, the amount of ground cover above the tunnel, excavation methods, workmanship, details of tunnel construction, and the geotechnical properties of the ground. Settlement risk is mitigated through selection of equipment and means and methods of construction.

Based on the preliminary data regarding Delta ground conditions, it is assumed that an earth pressure balancing TBM will likely be used for tunneling. These machines rely on the excavated soil, under confinement of a cutterhead chamber, to balance earth and hydrostatic pressures. The pressure is maintained by a screw conveyor in which a soil plug provides the seal and excavated soil is removed through the screw onto the conveyor.

Should geotechnical reports indicate high settlement risk in certain areas, pre-excavation ground stabilization treatment will be performed ahead of the TBM. Utilization of an Earth Pressure Balanced TBM and implementation of a well planned and executed ground stabilization program will mitigate potential for ground settlement due to tunnel construction. Ground stabilization methods and settlement monitoring programs will be evaluated during design, with requirements for ground stabilization and settlement monitoring specified during construction. Construction contracts will include prescriptive specification requirements for settlement monitoring at sensitive features, such as levees—to ensure that tunneling, dewatering, and traffic-induced settlement remains within specified limits. These requirements will be consistent with common industry standards such as those found in Chapter 9, *Geology and Seismicity*.

**Responsible Parties:** DWR is responsible for implementation. To prevent structural failure, design-level geotechnical studies would be prepared by a geotechnical engineer licensed in the state of California during project design.

**Regulating/Permitting Agencies:** N/A for this environmental commitment.

**Location:** Subsurface investigations will be performed along the water conveyance alignment and at facility locations and material borrow areas.

**Timing:** During project design, prior to construction.

**Monitoring:** DWR will monitor implementation of this environmental commitment and AMM. DWR will deploy a geotechnical engineer licensed in the state of California to oversee a team to prepare design-level geotechnical studies and conduct the geotechnical investigations described above in *Commitment*. For geotechnical studies, this may include installing wells and monitoring groundwater elevations and soil permeability for use in assessing liquefaction and dewatering characteristics.

Ground stabilization methods and settlement monitoring programs will be evaluated by DWR during design, with requirements for ground stabilization and settlement monitoring specified during construction. DWR will ensure construction contracts will include prescriptive specification requirements for settlement monitoring at sensitive features, such as levees—to ensure that tunneling-induced settlement remains within specified limits.

**Reporting Requirements:** The geotechnical engineer will prepare geotechnical data reports to document observations and findings of subsurface investigations and tests and provide these report to DWR. The geotechnical engineer will also prepare geotechnical baseline and/or other reports to describe expected construction conditions and provide design and construction recommendations. The geotechnical report will contain site-specific evaluations of the seismic hazard affecting the project, and will identify portions of the project site containing seismic hazards. The report will also identify any known off-site seismic hazards that could adversely affect the site in the event of an earthquake and make recommendations for appropriate mitigation as required by 14 CCR 3724(a). Should geotechnical reports indicate high settlement risk in certain areas, pre-excavation ground stabilization treatment will be performed ahead of the TBM. Utilization of an Earth Pressure Balanced TBM and implementation of a well planned and executed ground stabilization program will mitigate potential for ground settlement due to tunnel construction. DWR will review and approve all geotechnical reports and implement subsequent measures as required based upon the results of these reports.

### 3.4 Environmental Commitment: Conform with Applicable Design Standards and Building Codes & AMM29: Design Standards and Building Codes

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Conform with Applicable Design Standards and Building Codes	DWR and Construction Contractors	Prior to and during construction	Impact GW-5, GEO-1, GEO-2, GEO-3, GEO-4, GEO-5, GEO-6, GEO-7, GEO-8, GEO-9, GEO-10, GEO-12, GEO-13, GEO-14, GEO-15, SOILS-3, SOILS-4, SOILS-8, SOILS-9
AMM29: Design Standards and Building Codes			

**Commitment:** DWR will ensure that the standards, guidelines, and codes listed below (or the most current applicable version at the time of implementation), which establish minimum design criteria and construction requirements for tunnels, canals, levees, pipelines, excavations and shoring, pumping stations, grading, and foundations, bridges, access roads, structures, and other facilities, will be followed by the project engineers, where applicable, in the design of project facilities and will be included as minimum standards in the construction specifications. This commitment is related to AMM29, Design Standards and Building Codes, described in Section 3B.4.29 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. Additionally, during construction, the California Occupational Safety and Health Act of 1973, as administered by California Occupational Safety and Health Administration (Cal/OSHA), will be followed as a minimum standard to protect workers. The DWR will ensure that the identified design standards are treated as the minimum standard for design and construction, unless more stringent requirements are enacted or promulgated. The minimum design and construction requirements act as performance standards for engineers and construction contractors. Because the design and construction parameters of these codes and standards are intended to reduce the potential for structural damage or risks to human health due to the geologic and seismic conditions that exist within the Plan Area and the

surrounding region, their use is considered an environmental commitment of the agencies implementing the project.

The project engineers will follow standards, guidelines, and code requirements that are legally mandated. Proposed design standards include, but may not be limited to, the following:

- American Association of State Highway and Transportation Officials Guide Specifications for LRFD (load and resistance factor) Seismic Bridge Design, 1st Edition, 2009.
- American Railway Engineering and Maintenance-of-Way Association Manual for Railway Engineering, Volume 2, Chapter 9, Seismic Design for Railway Structures, 2008.
- American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures, ASCE-7-10, 20.10
- California Building Code, 2010 (California Code of Regulations [CCR], Title 24).
- California Department of Transportation (Caltrans) Seismic Design Criteria, Version 1.6, Nov 2010.
- CCR, Title 8.
- DWR Division of Safety of Dams Guidelines for Use of the Consequence-Hazard Matrix and Selection of Ground Motion Parameters, 2002.
- DWR Division of Flood Management FloodSAFE Urban Levee Design Criteria, May 2012.
- DWR Division of Engineering State Water Project – Seismic Loading Criteria Report, September 2012.
- DWR Delta Seismic Design, June 2012.
- Federal Highway Administration Seismic Retrofitting Manual for Highways Structures, Parts 1 and 2, 2006.
- State of California Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT), Sea-Level Rise Interim Guidance Document, 2010.
- USACE (CESPK-ED-G), Geotechnical Levee Practice, SOP EDG-03, 2004.
- USACE Design and Construction of Levees, EM 1110-2-1913, 2000.
- USACE Engineering and Design, Earthquake Design and Evaluation for Civil Works Projects, ER 1110-2-1806, 1995.
- USACE Engineering and Design – Earthquake Design and Evaluation of Concrete Hydraulic Structures, EM 1110-2-6053, 2007.
- USACE Engineering and Design – General Design and Construction Considerations for Earth and Rock-Fill Dams, EM 1110-2-2300, 2004.
- USACE Engineering and Design – Response Spectra and Seismic Analysis for Concrete Hydraulic Structures, EM 1110-2-6050, 1999.
- USACE Engineering and Design – Stability Analysis of Concrete Structures, EM 1110-2-2100, 2005.
- USACE Engineering and Design – Structural Design and Evaluation of Outlet Works, EM 1110-2-2400, 2003.



- USACE Engineering and Design – Time-History Dynamic Analysis of Concrete Hydraulic Structure, EM 1110-2-6051, 2003.
- USACE Slope Stability, EM 1110-2-1902, 2003.
- USACE Engineering and Design - Settlement Analysis, EM 1110-1-1904, 1990.
- USACE Engineering and Design - Design of Pile Foundations, EM 1110-2-2906, 1991.
- U.S. Department of the Interior and U.S. Geological Survey Climate Change and Water Resources Management: A Federal Perspective, Circular 1331.

**Responsible Parties:** DWR and their construction contractors will be responsible for implementation of this environmental commitment and AMM.

**Regulating/Permitting Agencies:** Design and implementation will be in compliance with applicable standards, guidelines, and code requirements listed above.

**Location:** This environmental commitment will be implemented at each site-specific construction site for the project.

**Timing:** Implementation will occur before, and during construction.

**Monitoring:** DWR will review all project facility designs to ensure the standards, guidelines, and codes listed above are included where appropriate. DWR will ensure that the identified design standards are treated as the minimum standard for design and construction, unless more stringent requirements are enacted or promulgated. Construction monitors for each site will monitor construction operations to ensure the California Occupational Safety and Health Act of 1973, as administered by Cal/OSHA, will be followed as a minimum standard to protect workers.

**Reporting Requirements:** Project engineers will provide all draft and final project facility designs to DWR for review. Such reports shall explain how DWR has complied, or intends to comply, with the standards, guidelines, and code requirements set forth above. The construction monitors will report any deficiency in compliance by the construction contractor with the California Occupational Safety and Health Act of 1973 to DWR immediately.

## 3.6 Environmental Commitment: Electrical Power Guidelines & AMM30: Transmission Line Design and Alignment Guidelines

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Electrical Power Guidelines  <i>AMM30, Transmission Line Design and Alignment Guidelines</i>	DWR	Prior to and during construction	Impact BIO-21, BIO-68, BIO-71, BIO-173, PH-4, PH-12

**Commitment:** This commitment is related to AMM30, *Transmission Line Design and Alignment Guidelines*, described in Section 3B.4.30 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. DWR will procure design and construction of the proposed new transmission lines and appurtenances such as supports (poles and towers) and substations through electrical utility providers. DWR will specify that design and construction of power facilities be in accordance with electric and magnetic field (EMF) guidance adopted by the California Public Utility Commission, *EMF Design Guidelines for Electrical Facilities* (2006) or any comparable federal guidelines. The guidelines describe the routine magnetic field reduction measures that all regulated California electric utilities are to consider for new and upgraded transmission line and transmission substation construction. The guidelines include the following magnetic field reduction methods for new and upgraded electrical facilities.

- Increasing the distance from electrical facilities by:
  - Increasing structure height or trench depth.
  - Locating power lines closer to the centerline of the utility corridor.
- Reducing conductor (phase) spacing.
- Phasing circuits to reduce magnetic fields.

**Responsible Parties:** DWR will procure design and construction of the proposed new transmission lines and appurtenances such as supports (poles and towers) and substations through electrical utility providers.

**Regulating/Permitting Agencies:** Design and construction of power facilities be in accordance with electric and magnetic field (EMF) guidance adopted by the California Public Utility Commission or any comparable federal guidelines.

**Location:** Implementation will occur at all sites where powerlines, supports and substations are present.

**Timing:** Planning and design will occur prior to construction and implementation will occur during construction.

**Monitoring:** DWR will periodically seek confirmation from the utility provider that the design and construction of power facilities are proceeding in accordance with electric and magnetic field (EMF)

guidance adopted by the California Public Utility Commission, *EMF Design Guidelines for Electrical Facilities* (2006) or any comparable federal guidelines.

**Reporting Requirements:** DWR will retain confirmation records from the utility provider in the project file. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this environmental commitment.

### 3.7 Environmental Commitment: Electrical Power Line Support Placement & AMM30: Transmission Line Design and Alignment Guidelines

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Electrical Power Line Support Placement	DWR, Electrical Utilities	Prior to construction	Impact AG-1, AES-6
AMM30: Transmission Line Design and Alignment Guidelines			

**Commitment:** This commitment is related to AMM30, Transmission Line Design and Alignment Guidelines, described in Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. The DWR will contract with electric utilities to provide primary power to designated locations for temporary and/or permanent power. DWR will request electric utilities to design and construct power transmission lines and the locations of necessary appurtenances such as supports and substations to avoid sensitive terrestrial and aquatic habitats to the maximum extent feasible. In cases where sensitive habitat cannot be feasibly avoided, disturbance will be minimized to the greatest degree feasible. DWR will request electric utilities to design and construct power transmission lines and the locations of necessary appurtenances to minimize take and encumbrance of agricultural lands. DWR will be responsible for ensuring that disturbed areas are returned to preconstruction conditions, to the extent feasible, and property owners compensated for real property losses. This should be accomplished through an agreement with the utility provider. This should be accomplished through an agreement with the utility provider.

DWR will request electric utilities to design tower and pole placement and location of substations to avoid existing structures and improvements to the extent feasible. In cases where existing structures and improvements cannot be feasibly avoided, DWR will ensure that structures and improvements are relocated or the owner compensated for the loss and ensure that disturbed areas are returned to preconstruction conditions. Where poles or towers are to be constructed in agricultural areas, DWR will request incorporation of the following BMPs where feasible.

- Select means and methods of construction to minimize crop damage.
- Use single-pole structures instead of H-frame or other multiple-pole structures to reduce the potential for interference with farm machinery, reduce land impacts, and minimize weed encroachment issues.

- Locate lines adjacent to roads and existing property lines to reduce property take and encumbrance.
- Use transmission structures with longer spans to clear longer sections of fields or sensitive areas except in aerial spraying and seeding areas. In areas where aerial spraying and seeding are common, install markers on the shield wires above the conductors.
- Minimize the use of guy wires, and keep guy wires out of crop and hay lands. Place highly visible shield guards on guy wires in farm vehicle and equipment traffic areas.
- Locate new transmission lines along existing transmission line corridors.

**Responsible Parties:** DWR will contract with Pacific Gas and Electric Company, Western Area Power Administration, and Sacramento Municipal Utility District. DWR and the electrical utility agencies will work together to design and construct with a goal of minimizing environmental impact.

**Regulating/Permitting Agencies:** New construction of investor-owned utilities are required to obtain a permit from the CPUC for construction of certain specified infrastructure listed under Public Utilities Code sections 1001.

**Location:** Implementation will occur where all powerlines will be installed.

**Timing:** Planning and instalment of the powerlines will occur before main construction begins.

**Monitoring:** DWR will periodically seek confirmation from the utility provider that the design and construction of power facilities are proceeding in accordance with electric and magnetic field (EMF) guidance adopted by the California Public Utility Commission, *EMF Design Guidelines for Electrical Facilities* (2006) or any comparable federal guidelines.

**Reporting Requirements:** DWR will retain confirmation records from the utility provider in the project file. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this environmental commitment.

### 3.8 Environmental Commitment: Develop and Implement Stormwater Pollution Prevention Plans & AMM3: Stormwater Pollution Prevention Plan

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement Stormwater Pollution Prevention Plans	DWR and Construction Contractors	Prior to, during, and after construction	Impact GW-3, WQ-31, SOILS-1, SOILS-6, AQUA-1, AQUA-2, AQUA-7, AQUA-19, AQUA-20, AQUA-25, AQUA-37, AQUA-38, AQUA-43, AQUA-44, AQUA-55, AQUA-56, AQUA-61, AQUA-62, AQUA-73, AQUA-74, AQUA-79, AQUA-81,
AMM3: Stormwater Pollution Prevention Plan			

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
			AQUA-89, AQUA-91, AQUA-92, AQUA-97, AQUA-109, AQUA-110, AQUA-115, AQUA-127, AQUA-128, AQUA-133, AQUA-145, AQUA-146, AQUA-151, AQUA-153, AQUA-163, AQUA-164, AQUA-169, AQUA-181, AQUA-182, AQUA-187, AQUA-199, AQUA-200, AQUA-205, REC-4, REC-9, UT-4, HAZ-1, HAZ-2, HAZ-6, HAZ-7, PH-3, PH-7, PH-9, BIO-3, BIO-5, BIO-11, BIO-14, BIO-17, BIO-20, BIO-23, BIO-26, BIO-28, BIO-31, BIO-18, BIO-21, BIO-24, BIO-32, BIO-33, BIO-35, BIO-36, BIO-38, BIO-39, BIO-44, BIO-45, BIO-46, BIO-47, BIO-49, BIO-50, BIO-52, BIO-53, BIO-57, BIO-59, BIO-66, BIO-67, BIO-69, BIO-71, BIO-72, BIO-74, BIO-75, BIO-78, BIO-83, BIO-85, BIO-87, BIO-89, BIO-91, BIO-93, BIO-95, BIO-98, BIO-100, BIO-102, BIO-104, BIO-107, BIO-109, BIO-111, BIO-113, BIO-115, BIO-117, BIO-119, BIO-121, BIO-123, BIO-125, BIO-127, BIO-130, BIO-132, BIO-134, BIO-136, BIO-138, BIO-140, BIO-142, BIO-144, BIO-148, BIO-150, BIO-152, BIO-162, BIO-163, BIO-164, BIO-165, BIO-166, BIO-176, BIO-183

**Commitment:** DWR will be responsible for ensuring coverage under the Construction General Permit for Construction and Land Disturbance Activities (Construction General Permit [CGP]) (Order 2010-0014-DWQ or any more recent version) issued from the State Water Board. The CGP requires the development and implementation of a stormwater pollution prevention plan (SWPPP). This commitment is related to AMM3, Stormwater Pollution Prevention Plan, described in Section 3B.4.3 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. For the alternative selected, a series of separate but related SWPPPs will be prepared by a Qualified SWPPP Developer (QSD) and will be implemented under the supervision of a Qualified SWPPP Practitioner (QSP). As part of the procedure to gain coverage under the CGP, the QSD will determine the “Risk Level” (Levels 1, 2, or 3, or Types 1, 2, or 3 for linear underground/overhead projects) of the construction activities covered by a given SWPPP, which involves an evaluation of the site’s “Sediment Risk” and “Receiving Water Risk.” The risk is calculated separately for sediment and receiving water, with two risk categories for receiving water (low and high) and three risk categories for sediment risk (low, medium, and high). The overall project risk levels (1, 2, or 3) are then determined through a matrix, where Risk Level 1 applies to projects with low receiving water and sediment risks, Risk Level 3 for projects with high receiving water and sediment risks, and Risk Level 2 for all other combinations of sediment and receiving water risks. These project risk levels

determine the level of protection (i.e., the BMPs to be used) and monitoring that is required for the project.

Table 3-1 shows how varying sediment risk and receiving water risk combine to result in a given Risk Level for a given construction site.

**Table 3-1. Combined Risk Level Matrix**

Receiving Water Risk	Sediment Risk		
	Low	Medium	High
	Low	Level 1	Level 2
	High	Level 2	Level 3

The objectives of the SWPPPs will be to (1) identify pollutant sources associated with construction activities and operations that may affect the quality of stormwater and (2) identify, construct, and implement stormwater pollution prevention measures to reduce pollutants in stormwater discharges during and after construction. The SWPPP will be kept onsite during construction activity and operations and will be made available upon request to representatives of the San Francisco Bay and Central Valley Water Boards.

In accordance with the CGP, the SWPPP will describe site topographic, soil, and hydrologic characteristics; construction activities and schedule; construction materials to be used, including sources of imported fill material, and other potential sources of pollutants at the construction site; potential non-stormwater discharges (e.g., trench dewatering); erosion and sediment control measures; “housekeeping” BMPs to be implemented; a BMP implementation schedule; a site and BMP inspection schedule; and ongoing personnel training requirements. These provisions are intended to prevent water quality degradation related to pollutant discharge to receiving waters and to prevent or constrain changes to the pH of receiving waters. Performance standards specified in the CGP will be met by implementing stormwater pollution prevention BMPs that are tailored to specific site conditions, including the Risk Level of individual construction sites. These environmental commitments mirror the requirements to gain and maintain coverage under the CGP. DWR will ensure consultation with the appropriate Regional Water Board or State Water Board to determine the appropriate aggregation of specific construction activities, or groups of activities, to be authorized under the CGP.

It is anticipated that multiple SWPPPs will be prepared for project-related construction activities, with a given SWPPP prepared to cover a particular water conveyance component (e.g., intermediate forebay), groups of components (e.g., intakes), or construction activities associated with conservation components. The risk level will be identified for each action covered by a specific SWPPP.

The following list of BMPs are requirements common to all Risk Level sites; however, some detail is provided in “Inspection and Monitoring” on various Risk Level requirements.

- Erosion Control Measures
  - Implement effective wind erosion BMPs, such as watering, application of soil binders/tackifiers, and covering stockpiles.

- Provide effective soil cover for inactive areas and all finished slopes and utility backfill areas, such as seeding with a native seed mix, application of hydraulic mulch and bonded fiber matrices, and installation of erosion control blankets and rock slope protection.
- Sediment Control Measures
  - Prevent transport of sediment at the construction site perimeter, toe of erodible slopes, soil stockpiles, and into storm drains.
  - Capture sediment via sedimentation and stormwater detention facilities.
  - Reduce runoff velocity on exposed slopes.
  - Reduce off-site sediment tracking.
- Management Measures for Construction Materials
  - Cover and berm inactive stockpiled construction materials.
  - Store chemicals in watertight containers.
  - Minimize exposure of construction materials to stormwater.
  - Designate refueling and equipment inspection/maintenance locations.
  - Control of drift and runoff from areas treated with herbicides, pesticides, and other chemicals that may be harmful to aquatic habitats.
- Waste Management Measures
  - Prevent off-site disposal or runoff of any rinse or wash waters.
  - Implement concrete and truck washout facilities and appropriately sized storage, treatment, and disposal practices.
  - Ensure the containment of sanitation facilities (e.g., portable toilets).
  - Clean or replace sanitation facilities (as necessary) and inspect regularly for leaks/spills.
  - Cover waste disposal containers during rain events and at end of every day.
  - Protect stockpiled waste material from wind and rain.
- Construction Site Dewatering and Pipeline Testing Measures.
  - Reclaim site dewatering discharges to the extent practicable, or use for other construction purposes (e.g., land application for dust control).
  - Implement appropriate treatment and disposal of construction site dewatering from excavations to prevent discharges to surface waters, unless permitted by regulatory agencies to discharge to surface waters.
  - Dechlorinate pipeline test waters before discharging to surface waters.
- Accidental Spill Prevention and Response Measures.
  - Provide equipment and materials necessary for cleanup of accidental spills onsite.
  - Clean up accidental spills and leaks immediately and dispose of properly.
  - Ensure that there are trained spill response personnel available.

- 1       ● Non-Stormwater Management Measures
  - 2           ○ Control all non-stormwater discharges during construction.
  - 3           ○ Wash vehicles in such a manner as to prevent non-stormwater discharges to surface waters.
  - 4           ○ Clean streets in such a manner as to prevent non-stormwater discharges from reaching
  - 5           surface water.
  - 6           ○ Discontinue the application of any erodible landscape material during rain, or within 2 days
  - 7           before a forecasted rain event.
- 8       ● Inspection and Monitoring Common to all Risk Levels.
  - 9           ○ Ensure that all inspection, maintenance, repair, and sampling activities at the construction
  - 10          site will be performed or supervised by a QSP representing the discharger.
  - 11          ○ Develop and implement a written site-specific Construction Site Monitoring Program
  - 12          (CSMP).
- 13       ● Inspection, Monitoring, and Maintenance Activities Based on the Risk Level of the Construction
- 14       Site (as defined in the State Water Board CGP).
  - 15          ○ Risk Level 1 Sites:
    - 16           ● Perform weekly inspections of BMPs, and at least once each 24-hour period during
    - 17           extended storm events.
    - 18           ● At least 2 business days (48 hours) prior to each anticipated qualifying rain event (a rain
    - 19           1 event producing 0.5 inch or more of precipitation), visually inspect: (a) stormwater
    - 20           drainage areas to identify any spills, leaks, or uncontrolled pollutant sources; (b) all
    - 21           BMPs to identify whether they have been properly implemented in accordance with the
    - 22           SWPPP; and (c) stormwater storage and containment areas to detect leaks and ensure
    - 23           maintenance of adequate freeboard.
    - 24           ● Visually observe stormwater discharges at all discharge locations within two business
    - 25           days (48 hours) after each qualifying rain event and identify additional BMPs as
    - 26           necessary, and revise the SWPPP accordingly.
    - 27           ● Conduct minimum quarterly visual inspections of each drainage area for the presence of
    - 28           (or indications of prior) unauthorized and authorized non-stormwater discharges and
    - 29           their sources.
    - 30           ● Collect one or more samples of construction site effluent during any breach,
    - 31           malfunction, leakage, or spill observed within the construction site during a visual
    - 32           inspection which could result in the discharge of pollutants to surface waters that will
    - 33           not be visually detectable in stormwater.
  - 34          ○ Risk Level 2 Sites:
    - 35           ● Risk Level 2 dischargers will perform all of the same visual inspection, monitoring, and
    - 36           maintenance measure specified for Risk Level 1 dischargers.
    - 37           ● At a minimum, Risk Level 2 dischargers will collect and analyze a minimum of three
    - 38           samples per day for pH and turbidity during qualifying rain events. The CGP also
    - 39           requires the discharger to revise the SWPPP and to immediately modify existing BMPs
    - 40           and/or implement new BMPs such that subsequent discharges are below the relevant



Numeric Action Levels (NALs) specified by the CGP. It may be a violation of the CGP if the discharger fails to take corrective action to reduce the discharge below these NALs.

- Dischargers who deploy Active Treatment Systems (ATS) on their site, or a portion on their site, will collect ATS effluent samples and measurements from the discharge pipe or another location representative of the nature of the discharge.
- In the event that any effluent sample exceeds an applicable NAL, Risk Level 2 dischargers will submit all storm event sampling results to the State Water Board no later than 10 days after the conclusion of the storm event. The Regional Boards have the authority to require the submittal of an NAL Exceedance Report, which includes a description of the current BMPs associated with the effluent sample that exceeded the NAL and the proposed corrective actions taken.

○ Risk Level 3 Sites:

- Risk Level 3 dischargers will perform all of the same visual inspection, monitoring, and maintenance measure specified for Risk Level 1 and Risk Level 2 dischargers.
- In the event that a Risk Level 3 discharger exceeds a numeric effluent limitation (NEL) of the CGP (i.e., pH and turbidity), and has a direct discharge into receiving waters, the discharger will subsequently sample receiving waters for all parameter(s) monitored in the discharge. An exceedance of an NEL is considered a violation of the CGP, and the discharger must electronically submit all storm event sampling results to the State and Regional Water Boards via Stormwater Multiple Application and Report Tracking System (SMARTS) no later than 5 days after the conclusion of the storm event.<sup>15</sup>
- If disturbing 30 acres or more of the landscape and discharging directly into receiving waters, conduct a benthic macroinvertebrate bioassessment of receiving waters prior to and after commencement of construction activities to determine if significant degradation to the receiving water's biota has occurred. However, if commencement of construction is outside of an index period (i.e., the period of time during which bioassessment samples must be collected to produce results suitable for assessing the biological integrity of streams and rivers) for the site location, the discharger will participate in the State of California's Surface Water Ambient Monitoring Program.

The SWPPP will also specify the forms and records that must be uploaded to the State Water Board online SMARTS, such as quarterly non-stormwater inspection and annual compliance reports.

If the QSP determines the site is Risk Level 2 or 3, water sampling for pH and turbidity will be required and the SWPPP will specify sampling locations and schedule, sample collection and analysis procedures, and recordkeeping and reporting protocols. In accordance with the CGP numeric action level requirements, the project contractor's QSD will revise the SWPPP and modify existing BMPs or implement new BMPs when effluent monitoring indicates that daily average runoff pH is outside the range of 6.5 to 8.5 and that the daily average turbidity is greater than 250 nephelometric turbidity units (NTUs). Such BMPs may include construction of sediment traps and

<sup>15</sup> The State Water Board has suspended the applicability of Numeric Effluent Limitations (NELs) for pH and turbidity at Risk Level 3/LUP Type 3 construction sites. In addition, because receiving water monitoring is required only if the NELs are triggered, all receiving water monitoring requirements are also suspended. The Level 3/Type 3 NEL requirements are presented here assuming that such NELs will be reinstated when project construction commences.

sediment basins, use of 'Baker' or other type tanks, installation of rock slope protection, covering of active stockpiles in event of rain, constructing desilting basins, and use of ATS. The ability of other areas to withstand excessive erosion and sedimentation may be increased by applying additional mulching, bonded fiber matrices, and erosion control blankets; reseeding with a native seed mix; and installation of additional fiber rolls, silt fences, and gravel bag berms. The QSD may also specify changes in the manner and frequency of BMP inspection and maintenance activities. The determination of which BMP should be applied in a given situation is very site-specific. QSDs typically refer to the California Stormwater Quality Association's *Stormwater Best Management Practice Handbook Portal: Construction* or the similar Caltrans manual for selecting BMPs for particular site conditions.

Additionally, if a given construction component is Risk Level 3, for that component DWR will report to the State Water Board when effluent monitoring indicates that daily average runoff pH is outside the range of 6.0 to 9.0 or the daily average turbidity is greater than 500 NTUs. In the event that the turbidity NEL is exceeded, DWR may also be required to sample and report to the State Water Board pH, turbidity, and suspended sediment concentration of receiving waters for the duration of construction.

The contractor will also conduct sampling of runoff effluent when a leak, spill, or other discharge of non-visible pollutants is detected.

The CGP has specific monitoring and action level requirements for the Risk Levels, which are summarized in Table 3-2.

**Table 3-2. SWPPP Monitoring and Action Requirements**

SWPPP Requirements	Risk Level/Type		
	1	2	3
Minimum Stormwater and Non-Stormwater BMPs	✓	✓	✓
Numeric Action Levels (NAL)			
NAL for pH: 6.5–8.5 pH units		✓	✓
NAL for turbidity: 250 NTU			
Numeric Effluent Limitations (NEL)			
NEL for pH: 6–9 pH units			✓
NEL for turbidity: 500 NTU			
Visual Monitoring (weekly; before, during, after rain events; non-stormwater)	✓	✓	✓
Runoff Monitoring		✓	✓
Receiving Water Monitoring			✓
BMP = best management practices			
pH = potential hydrogen			
NTU = nephelometric turbidity unit			
Note: The State Water Board has suspended the applicability of NELs for pH and turbidity at Risk Level 3/LUP Type 3 construction sites. In addition, because receiving water monitoring is required only if the NELs are triggered, all receiving water monitoring requirements are also suspended. The Level 3/Type 3 NEL are presented here assuming that such NELs will be reinstated when project construction commences.			

The QSD preparing a SWPPP may include in the SWPPP BMPs such as preservation of existing vegetation, perimeter control, seeding, mulching, fiber roll and silt fence barriers, erosion control

blankets, protection of stockpiles, watering to control dust entrainment, rock slope protection, tracking control, equipment refueling and maintenance, concrete and solid waste management, and other measures to ensure compliance with the pH and turbidity level requirements defined by the CGP. Partly because the potential adverse effect on receiving waters depends on location of a work area relative to a waterway, the BMPs will be site-specific. For example, BMPs applied to level island-interior sites will be different than BMPs applied to water-side levee conditions. The QSD will be responsible for day-to-day implementation of the SWPPP, including BMP inspections, maintenance, water quality sampling, and reporting to the State Water Board. If the water quality sampling results indicate an exceedance of NALs and Numeric Effluent Limitations (NELs) for pH and turbidity, as described above, the QSD will modify the type and/or location of the BMPs by amending the SWPPP in order to reduce pH, turbidity, and other contaminants to acceptable levels, consistent with CGP NALs and NELs and with the water quality objectives and beneficial uses set forth in the Basin Plan.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this mitigation measure.

**Regulating/Permitting Agencies:** All SWPPPs will conform to applicable State Water Board regulations and will be delivered to the San Francisco Bay and Central Valley Water Boards for review and approval.

**Location:** A Qualified SWPPP Developer (QSD) would determine the combined Risk Level (Level 1, 2, or 3) of each construction site, which involves an evaluation of the site's "Sediment Risk" and "Receiving Water Risk."

**Timing:** BMPs will be in place before, during, and after construction until the project is complete and the site has reached compliance with applicable State Water Board regulations.

**Monitoring:** DWR will monitor the development of all SWPPPs by the QSD. The QSD will be responsible for day-to-day implementation of the SWPPPs, including BMP inspections, maintenance, and water quality sampling as outlined in the SWPPPs. Monitoring requirements will be developed in coordination with the Regional Water Boards for each SWPPP based upon the Risk Level determined.

**Reporting Requirements:** DWR will review and approve all SWPPPs developed by the QSD prior to delivery to the San Francisco Bay and Central Valley Water Boards for review and approval. The QSD will report to DWR the results of BMP inspections, maintenance, and water quality sampling within 5 days of completion. The QSD will also be responsible for reporting to the San Francisco Bay and Central Valley Water Boards. Reporting requirements will be developed in coordination with the Regional Water Boards for each SWPPP based upon the Risk Level determined.

### 3.10 Environmental Commitment: Develop and Implement Erosion and Sediment Control Plans & AMM4: Erosion and Sediment Control Plan

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement Erosion and Sediment Control Plans AMM4: Erosion and Sediment Control Plan	DWR and Construction Contractors	Prior to, during, and after construction	Impact WQ-31, GEO-15, SOILS-1, SOILS-6, AQUA-1, AQUA-2, AQUA-7, AQUA-19, AQUA-20, AQUA-37, AQUA-38, AQUA-43, AQUA-44, AQUA-55, AQUA-56, AQUA-61, AQUA-62, AQUA-73, AQUA-74, AQUA-79, AQUA-81, AQUA-89, AQUA-91, AQUA-92, AQUA-97, AQUA-109, AQUA-110, AQUA-115, AQUA-127, AQUA-128, AQUA-133, AQUA-145, AQUA-146, AQUA-151, AQUA-153, AQUA-163, AQUA-164, AQUA-169, AQUA-181, AQUA-182, AQUA-187, AQUA-199, AQUA-200, AQUA-205, REC-4, REC-9, ECON-3, ECON-15, UT-4, PH-3, PH-7, PH-9, BIO-3, BIO-5, BIO-6, BIO-11, BIO-14, BIO-17, BIO-18, BIO-20, BIO-21, BIO-23, BIO-24, BIO-25, BIO-28, BIO-31, BIO-32, BIO-33, BIO-35, BIO-36, BIO-38, BIO-39, BIO-44, BIO-45, BIO-46, BIO-47, BIO-49, BIO-50, BIO-52, BIO-53, BIO-57, BIO-59, BIO-66, BIO-67, BIO-69, BIO-71, BIO-72, BIO-74, BIO-75, BIO-78, BIO-83, BIO-85, BIO-87, BIO-89, BIO-91, BIO-93, BIO-95, BIO-98, BIO-100, BIO-102, BIO-104, BIO-107, BIO-109, BIO-111, BIO-113, BIO-115, BIO-117, BIO-119, BIO-121, BIO-123, BIO-125, BIO-127, BIO-130, BIO-132, BIO-134, BIO-136, BIO-138, BIO-140, BIO-142, BIO-144, BIO-148, BIO-150, BIO-152, BIO-162, BIO-163, BIO-164, BIO-165, BIO-166, BIO-176, BIO-183, TRANS-14

**Commitment:** DWR commit to implementing measures as described below as part of the construction activities. In accordance with these environmental commitments, DWR will ensure the preparation and implementation of erosion and sediment control plans to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas damaged by construction activities. This commitment is related to AMM4, Erosion and Sediment Control Plan, described in Section 3B.4.4 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. It is anticipated that multiple erosion and sediment control plans will be prepared for project-related construction activities, each taking into account site-specific conditions such as proximity to surface water, erosion potential, drainage, etc. The plans will include all the necessary CGP requirements regarding erosion control and will specify BMPs for erosion and sediment control that are to be implemented during construction activities. These BMPs will be incorporated into the SWPPPs (see *Environmental Commitment: Develop and Implement Stormwater Pollution Prevention Plans*).

Erosion control measures will include the following:

- Install physical erosion control stabilization features (hydroseeding with native seed mix, mulch, silt fencing, fiber rolls, sand bags, and erosion control blankets) to capture sediment and control both wind and water erosion. Erosion control may not utilize plastic monofilament netting or similar materials.
- Keep emergency erosion-control supplies onsite at all times during construction, and have the contractor(s) use these emergency stockpiles as needed. DWR and/or the contractors will ensure that supplies used from the emergency stockpiles are replaced within 48 hours. DWR will also ensure that materials used in construction of erosion control methods will be removed from the work site and properly disposed when no longer needed.
- Design grading to be compatible with adjacent areas and minimize potential for disturbance of adjacent terrain and natural land features and minimize erosion in disturbed areas to the extent feasible.
- Divert runoff away from steep, denuded slopes, or other critical areas with barriers, berms, ditches, or other facilities.
- To the extent feasible, retain native trees and vegetation to help stabilize hillsides, retain moisture, and reduce erosion.
- Sequence clearing of native vegetation, and disturbance of soils to minimize overall time of soil disturbance.
- Implement construction management and scheduling measures to avoid exposure to rainfall events, runoff, or flooding at construction sites to the extent feasible.
- Conduct frequent site inspections (before and after significant storm events) to ensure that control measures are intact and working properly and to correct problems as needed.
- Install drainage control features (e.g., berms and swales, slope drains) as necessary to avoid and minimize erosion.
- Install wind erosion control features (e.g., application of hydraulic mulch or bonded fiber matrix).

Sediment control measures will include:

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

After construction is complete, site-specific restoration efforts will include grading, post construction BMPs for erosion control, and revegetation. Revegetation will emphasize self-

sustaining, local native plants, unless the owner of the property or an agency having jurisdiction requires a different but equally or more effective approach to restoring disturbed areas. All disturbed areas will be graded, with disturbed areas revegetated by seeding or other means. Once post construction BMPs are constructed and revegetation is appropriately established a Notice of Termination will be filed with the State Water Board.

**Responsible Parties:** DWR and its construction contractors will be responsible for development and implementation of the erosion and sediment control plan.

**Regulating/Permitting Agencies:** Implementation will be in compliance with applicable State Water Board, Regional Water Board Region 5 and Region 2, regulations and the SWPPP.

**Location:** This environmental commitment will be implemented at each site-specific construction site for the project.

**Timing:** Implementation will occur before, during, and after construction. After construction is complete, site-specific restoration efforts will include grading, post construction BMPs for erosion control, and revegetation. Revegetation will emphasize self-sustaining, local native plants, unless the owner of the property or an agency having jurisdiction requires a different but equally or more effective approach to restoring disturbed areas. All disturbed areas will be graded, with disturbed areas revegetated by seeding or other means.

**Monitoring:** DWR will develop erosion and sediment control plans consistent with this environmental commitment and AMM. During construction DWR will deploy qualified monitors to perform regular inspections and monitor implementation of the site-specific erosion and sediment control plans and BMPs, as well as monitoring effectiveness in erosion and sediment control. Specific monitoring and effectiveness criteria will be developed based upon site-specific conditions and contained in the erosion and sediment control plan. After construction, DWR will continue to deploy qualified monitors and construction monitors to oversee implementation of the site-specific restoration efforts.

**Reporting Requirements:** DWR will review the draft and final plans to ensure consistency with the environmental commitment, AMMs and inclusion of erosion and sediment control measures listed above as well as and incorporation of the BMPs into the SWPPPs. The qualified monitors will report inspection and monitoring data to DWR, who will assess the effectiveness of the erosion and sediment control measures in minimizing or avoiding erosion and sedimentation impacts. DWR will review these reports and determine if any revisions to the erosion and sediment control plans are required on a site-specific basis. Once post construction BMPs are constructed and revegetation is appropriately established a Notice of Termination will be filed with the State Water Board.

### 3.12 Environmental Commitment: Develop and Implement Fish Rescue and Salvage Plans & AMM8: Fish Rescue and Salvage Plan

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement Fish Rescue and Salvage Plans  AMM8: Fish Rescue and Salvage Plan	DWR	Prior to and during construction	Impact AQUA-1, AQUA-2, AQUA-7, AQUA-19, AQUA-20, AQUA-37, AQUA-38, AQUA-43, AQUA-55, AQUA-56, AQUA-61, AQUA-73, AQUA-74, AQUA-79, AQUA-81, AQUA-91, AQUA-92, AQUA-97, AQUA-109, AQUA-110, AQUA-115, AQUA-127, AQUA-128, AQUA-145, AQUA-146, AQUA-151, AQUA-153, AQUA-163, AQUA-164, AQUA-169, AQUA-181, AQUA-182, AQUA-187, AQUA-199, AQUA-200, AQUA-205, REC-4

**Commitment:** Fish rescue operations will occur at any in-water construction site where dewatering and resulting isolation of fish may occur (e.g., when dewatering creates isolated pools within the stream channel). Fish Rescue and Salvage Plans will be developed by the DWR in coordination with fish agencies and will include detailed procedures for fish rescue and salvage to minimize the number of Chinook salmon, steelhead, green sturgeon, and other fish stranded during placement and removal of cofferdams at the intake construction sites. This commitment is related to AMM8, Fish Rescue and Salvage Plan, described in Section 3B.4.8 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. The plans will identify the appropriate procedures for removing fish from the construction zone, and preventing fish from re-entering the construction zone during construction, or prior to dewatering. These plans will include detailed fish collection, holding, handling, and release procedures. These plans will be submitted to the appropriate resource agencies (CDFW, USFWS, and NMFS) for their review and acceptance. DWR, in undertaking construction at the construction sites, will develop a plan that includes the requirements set forth below, unless otherwise required by these permits or unless equally effective strategies are developed.

The appropriate fish collection method will be determined by a qualified fish biologist for all species of interest, in consultation with the designated resource agency biologist, and based on site-specific conditions prior to dewatering the cofferdam. Contact information provided by NMFS, USFWS, and CDFW will be supplied to the biologist on-site. Prior to construction site dewatering, fish will be captured and relocated to minimize direct mortality and other forms of take. Capture, release, and relocation measures will be consistent with the general guidelines and procedures set forth in Chapter 9 of the most recent edition of *California Salmonid Stream Habitat Restoration Manual* (California Department of Fish and Game 2010) to minimize impacts to species. Collection methods may include use of seines (nets) and/or dip nets to collect and remove fish, and electrofishing techniques may also be permitted.

All fish rescue and salvage operations will be conducted under the guidance of a qualified fish biologist. These activities will occur as soon as possible after completion of the activity which results in fish being trapped.

Unless otherwise required by these permits, or unless equally effective strategies are developed, DWR, in undertaking construction at the construction sites, will provide the following.

- A minimum 7-day notice to the appropriate fish regulatory agencies, prior to an anticipated activity that could result in isolating fish, such as installation of a cofferdam.
- A minimum 48-hour notice to the appropriate fish regulatory agencies of dewatering activities that are expected to require fish rescue.
- Safe working access for the appropriate fish regulatory agency personnel to the construction site for the duration of implementation of the fish rescue plan.
- Temporary cessation of dewatering if fish rescue workers determine that water levels may drop too quickly to allow successful rescue of fish.
- A work site that is accessible and safe for fish-rescue workers.

In some cases it may not be possible to conduct a fish rescue because of inaccessibility for electrofishing or seining to be conducted effectively, or where safety of field crews is compromised. In these situations, the onsite fish biologist, in consultation with the designated resource agency biologist, may determine that it is necessary to begin the dewatering process as a means of facilitating fish rescue. Dewatering may occur until the onsite fish biologist determines that conditions are made appropriate to conduct fish rescue operations. During the dewatering process, a qualified biologist or fish rescue team will be onsite with the aim of ensuring that take of covered fish is minimized to the maximum extent practicable. In the event that the on-site biologist determines that there is a more practicable and effective means to minimize impacts than specified in the Fish Rescue and Salvage Plan, the qualified biologist may propose such methods in lieu of those found in the Fish Rescue and Salvage Plan.

If fish rescue cannot be attempted (e.g., because of safety), a visual survey from the bank will be undertaken to document fish presence and the likely extent of effects. Binoculars will be used to identify fish; however, this method may not be feasible, if water clarity is low.

The fish rescue team will notify the contractor when the fish rescue has been completed and that dewatering can recommence. The results of the fish rescue and salvage operations (including date, time, location, comments, method of capture, fish species, number of fish, approximate age, condition, release location, and release time) will be reported to the appropriate resource agencies, as specified in the pertinent permits.

**Responsible Parties:** DWR will be responsible for implementing this environmental commitment.

**Regulating/Permitting Agencies:** These plans will be submitted to the appropriate resource agencies (CDFW, USFWS, and NMFS) for their review.

**Location:** Fish rescue operations will occur at any in-water construction site where dewatering and resulting isolation of fish may occur (e.g., when dewatering creates isolated pools within the stream channel).

**Timing:** The Fish Rescue and Salvage Plans will be prepared prior to construction and implementation will occur during construction.

**Monitoring:** DWR will oversee development of the Plans in coordination with the Agencies listed above. Monitoring of the implementation of the Fish Rescue and Salvage Plans and effectiveness of fish salvage and rescue in minimizing the number of Chinook salmon, steelhead, green sturgeon,



delta smelt, and other covered fish stranded during project-related construction activities, would be species-, site-, and method-specific, and will be established within each Plan in coordination with the appropriate agencies. All fish rescue and salvage operations will be conducted under the guidance of a qualified DWR fish biologist.

**Reporting Requirements:** DWR will consult with the Agencies throughout the development of the Plans and all appropriate agencies will be involved in completion and finalization of the plans. DWR will be responsible for ensuring that the conditions of the site- and plan-specific reporting requirements included in the Fish Rescue and Salvage Plan are adhered to for that site. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this environmental commitment.

### 3.13 Environmental Commitment: Develop and Implement a Barge Operations Plan & AMM7: Barge Operations Plan

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement a Barge Operations Plan  AMM7: Barge Operations Plan	DWR and Construction Contractors	Prior to and during construction	Impact AQUA-1, AQUA-2, AQUA-7, AQUA-19, AQUA-20, AQUA-37, AQUA-38, AQUA-43, AQUA-55, AQUA-56, AQUA-61, AQUA-73, AQUA-74, AQUA-79, AQUA-91, AQUA-92, AQUA-97, AQUA-109, AQUA-110, AQUA-115, AQUA-127, AQUA-128, AQUA-145, AQUA-146, AQUA-151, AQUA-153, AQUA-163, AQUA-164, AQUA-169, AQUA-181, AQUA-182, AQUA-187, AQUA-199, AQUA-200, AQUA-205, REC-4, REC-9, HAZ-1

**Commitment:** To address the following potential impacts on aquatic habitat and species from barge and tugboat operations associated with water conveyance facilities construction, DWR will ensure that a barge operations plan is developed and implemented for each project that requires the use of a barge. This commitment is related to AMM7, Barge Operations Plan, described in Section 3B.4.7 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. This plan will be developed and submitted by the construction contractors per standard DWR contract specifications as part of the traffic plans required by those specifications (see Section 01570 of standard DWR construction contracts<sup>16</sup>). The barge operations plan will be part of a comprehensive traffic control plan coordinated with the Coast Guard for large channels. The comprehensive traffic

<sup>16</sup> In 2002 DWR developed standard specifications for contractors to follow when constructing projects. These specifications are designed to protect environmental resources, including air quality, at the project site. The contractor must meet all State and federal environmental statutes, rules, regulations, and policies enacted to protect the environmental resources and ensure that any significant environmental impacts of projects are identified and adequately mitigated. As part of this mitigation, contractors must develop and submit detailed plans including, but not limited to, an Air Quality Control Plan, Traffic and Noise Abatement Plan, and a Fire Prevention and Control Plan.

control plan will address traffic routes and machines used to deliver materials to and from the barges, to include the following. DWR, in undertaking construction at the construction sites, will develop a barge operations plan that includes the requirements set forth below, unless equally effective strategies are developed.

- Bottom scour from propeller wash.
- Bank erosion or loss of submerged or emergent vegetation from propeller wash and/or excessive wake.
- Accidental material spillage.
- Sediment and benthic (bottom-dwelling) community disturbance from accidental or intentional barge grounding or deployment of barge spuds (extendable shafts for temporarily maintaining barge position).
- Hazardous materials spills (e.g., fuel, oil, hydraulic fluids).
- Introduction of aquatic invasive species

The plan will be developed to limit barge-related effects on aquatic species. The plan will include provisions to minimize or reduce effects on aquatic species.

The plan will serve as a guide to barge operations and to a Biological Monitor who will evaluate barge operations on a daily basis during construction with respect to stated performance measures.

DWR will ensure that the barge plan will be implemented by barge operators and kept aboard all vessels operating at the construction sites and barge landings.

*Sensitive Resources:* This plan is intended to protect aquatic species and habitat in the vicinity of barge operations. The plan will be developed to avoid barge-related effects on aquatic species; if and when avoidance is not feasible, the plan will include provisions to minimize effects on aquatic species. The sensitive resources potentially affected by barge maneuvering and anchoring in affected areas are listed below.

- Sediments that could cause turbidity or changes in bathymetry, if disturbed.
- Bottom-dwelling (benthic) invertebrates that provide the prey base for a number of aquatic species.
- Riparian vegetation that provides shade, cover, habitat structure, and organic nutrients to the aquatic environment.
- Submerged aquatic vegetation that provides habitat structure and primary (plant) production.
- Transport and introduction of invasive aquatic species (plants, fish and animals)

*Responsibilities:*

- Construction contractors operating barges in the process of constructing the water conveyance facilities will be responsible for the following.
- Operating vessels safely and following this plan and other reasonable measures to prevent adverse effects on aquatic resources of the Delta.
- Reading, understanding, and following the barge operations plan.

- Reporting to the Project Biological Monitor any vessel grounding or other deviations from this plan that could have resulted in the disturbance of bottom sediments, damage to river banks, or loss of submerged, emergent, or riparian vegetation.
- Immediate reporting of material fuel or oil spills to the CDFW Office of Spill Prevention and Response (OSPR), the Project Biological Monitor, and DWR.
- Implementing all other relevant plans, including the hazardous materials management plans; SWPPPs; and the spill prevention, containment, and countermeasures plans.

The Biological Monitor will be responsible for the following.

- Observing a sample of barge operation activities including loading and unloading at least one barge at each of the barge loading and unloading facilities.
- Same-day reporting to DWR of any observed problems with barge operations.
- Monitoring during construction will include observation of barge landing, loading or unloading, and departure of one or more barges at each active barge landing site and the condition of both river banks at each landing site, pile driving, and other in-water construction activity as directed by DWR, and visual inspection for invasive aquatic species on in-water equipment such as barges and small work boats. Annual reporting to DWR a summary of monitoring observations over the course of each construction year, including an evaluation of the plan performance measures. The annual report will also include a description of and representative photographs and/or videos of conditions of river banks and vegetation.
- The success of this plan in protecting aquatic resources will be assessed by a qualified biologist. The Biological Monitor will visit each intake and barge landing site to determine the extent of emergent and riparian vegetation, bank conditions, and general site conditions during the growing season prior to initiation of construction and then annually during and after construction.

*Barge Avoidance and Minimization Measures:* The following avoidance measures will be implemented to ensure that the goal of avoiding impacts on aquatic resources from tugboat and barge operations will be achieved.

If deviations from these procedures are required to maintain the safety of vessels and crew, the Biological Monitor will be informed of the circumstances and if there appeared to be any impacts on water quality, habitats, fish, or wildlife. Any such impacts will be brought to the attention of the applicable resource agency in order to ascertain and implement appropriate remedial measures.

*General Procedures:*

- During low light conditions barge is outfitted with lighting in compliance and standards of the U.S. Coast Guard for boating visualization.
- In higher boating traffic areas it may be deemed necessary to have warning buoys near the barge/ship and/or a 5 mph zone will be requested from the U.S. Coast Guard near the construction site.
- If anchors are needed, the barge must display warnings for underwater anchors so that other boaters are aware of the potential danger beneath the water in compliance with U.S. Coast Guard regulations.

- 1 • Personnel on the barge/ship will watch for colored plumes in the water when drilling, grouting  
2 and pulling casing.
- 3 • Tow wires or hawsers, winches and associated equipment should be in good working condition  
4 and should be formally inspected and properly maintained.
- 5 ○ Vessel operators should have a policy in place for inspecting tow wires or hawsers and for  
6 taking those that do not meet inspection criteria out of service.
- 7 • Every manned vessel should be supplied with a fire control plan that clearly shows, for each  
8 deck, the: control stations, fire detection and fire alarm systems, fire extinguishing appliances,  
9 sprinkler installations, means of access to different compartments, fire dampers, and ventilating  
10 system, including fan control, etc.

#### 11 *Environmental Training:*

12 DWR will ensure that tugboat pilots will be required to read and follow this plan and to keep a copy  
13 aboard and accessible while working at these sites. DWR will ensure that all tugboat crew members  
14 responsible for piloting a vessel at either the intake or barge landing sites will read and agree to  
15 comply fully with this plan. Crews should be trained to become and remain proficient at operating  
16 winches and towing gear. Periodically, each crew member should participate in drills and receive  
17 instruction on, as a minimum, the following emergency situations that may be encountered while  
18 towing: fire-fighting duties, loss of propulsion, loss of steering, grounding, allision or collision, oil  
19 spill, man overboard, loss of tow wire (hawser or bridle failure), and abandoning towing vessel.

#### 20 *Dock Approach and Departure Protocol:*

21 DWR will develop and implement a protocol for dock approach and departure to ensure the  
22 following.

- 23 • Vessel operators will obey all federal and state navigation regulations that apply to the  
24 Sacramento delta.
- 25 • All vessels will approach and depart from the intake and barge landing sites at dead slow in  
26 order to reduce vessel wake and propeller wash at the sites frequented by tug and barge traffic.
- 27 • In order to minimize bottom disturbance, anchors and barge spuds will be used to secure  
28 vessels only when it is not possible to tie up.
- 29 • Barge anchoring will be pre-planned. Anchors will be lowered into place and not be allowed to  
30 drag across the channel bed.
- 31 • Vessel operators will limit vessel speed as necessary to maintain wake of less than 2 feet (66  
32 centimeters) at shore.
- 33 • Vessel operators will avoid pushing stationary vessels up against the cofferdam, dock or other  
34 structures for extended periods since this could result in excessive directed propeller wash  
35 impinging on a single location. Barges will be tied up whenever possible to avoid the necessity of  
36 maintaining stationary position by tugboat or by the use of barge spuds.
- 37 • Barges will not be anchored where they will ground during low tides.
- 38 • All tugboats will obey U.S. Coast Guard regulations related to the prevention, notification, and  
39 cleanup of hazardous materials spills.

- All vessels will keep an oil spill containment kit and spill prevention and response plan on-board.
- In the event of a fuel spill, report immediately to the CDFW Office of Spills Prevention and Response: 800-852-7550 or 800-OILS-911 (800-645-7911).
- When transporting loose materials (e.g., sand, aggregate), barges will use deck walls or other features to prevent loose materials from blowing or washing off of the deck.

*Vessel to Vessel Transfer Guidelines:*

Vessel operators will comply with the following guidelines when performing vessel to vessel transfers.

- Any requirements of the local harbor or terminal authority should be met.
- Both vessels should be manned by a Person in Charge (PIC).
- Before any transfer, a safety and pollution checklist should be completed by both vessels and a cargo transfer plan agreed in writing.
- It is recommended that vessels involved in vessel to vessel transfers are equipped with a high level alarm system that can operate throughout the transfer.
- Where needed, a safe means of access between vessels should be provided.

*Performance Measures:*

Performance or effectiveness of the measures implemented under the barge operations plan will be assessed based on the results of the biological monitoring reports. The assessment will evaluate observations for the following indicators of impacts.

- **Emergent vegetation loss.** The extent of emergent vegetation and the dominant species in such vegetation will be determined and mapped by GPS at and across the channel from each of the intake and barge landing sites during the growing seasons prior to, during, and after construction. Extent will be mapped as linear coverage along the landing and opposite banks. In the event that the linear extent of emergent vegetation is found to have decreased by 20% or more following construction (or as otherwise conditioned by applicable Department of Fish and Wildlife streambed alteration agreements), the position and nature of the change will be evaluated for the probability that the loss was due to barge grounding, propeller wash, or other effects related to barge operations. Adequate performance will be achieved if the linear extent of riparian and emergent vegetation following construction is at least 80% of the preconstruction extent (or as otherwise conditioned by applicable Department of Fish and Wildlife streambed alteration agreements).
- **Bank erosion and riparian vegetation loss.** The linear extent of bank erosion will be mapped by GPS at each of the intake and barge landing sites prior to, during, and after construction. Photos and written descriptions will be recorded for each area of eroded bank to describe the extent of the erosion. In the event that the linear extent of eroded bank is found to have increased by 20% or more following construction, the position and nature of the change will be evaluated for the probability (low, moderate, or high) that the erosion was due to barge grounding, propeller wash, or other effects related to barge operations, and pre- and postconstruction photographs will be compared to determine if riparian vegetation was also lost as a result of the erosion.

- 1     • **Cargo containment.** The biological monitor will note the use of deck walls or other appropriate  
2     containment during loading and unloading of sand, aggregate or other materials from a barge at  
3     each landing site. Adequate performance will be achieved if appropriate measures are in use  
4     during each observed loading and unloading. In the unlikely event that an accidental spill occurs  
5     in spite of appropriate containment, the barge crew will describe the type, amount, and location  
6     of the spill to the biological monitor. The biological monitor will make observations at the site of  
7     the material spill and evaluate the potential impacts of the spill on biological resources for  
8     evaluation of whether mitigation is required, and for inclusion in the annual monitoring report.  
9     Any such impacts will be brought to the attention of the applicable resource agency in order to  
10    ascertain and implement appropriate remedial measures.
- 11   • **Fuels spill prevention.** Vessels operating in accordance with the spill prevention, containment,  
12   and countermeasures plan (a component of the hazardous materials management plan  
13   described in Section 3B.2.12 of Appendix 3B), and all applicable federal, State, and local safety  
14   and environmental laws and policies governing commercial tugboat and barge operations, will  
15   be considered to be performing adequately with regard to fuel spill prevention. If a collision  
16   occurs resulting in a contaminant spill, barge/ship contractor's Emergency Action Plan will go  
17   into effect and absorbents and containment booms will be used from the barge to prevent the  
18   spill from spreading.
- 19   • **Barge grounding.** Barges are not to be grounded or anchored where falling tides are reasonably  
20   expected to cause grounding during a low tide. Barge grounding has the potential to disturb  
21   bottom sediments and benthic organisms, as well as creating a temporary obstacle to fish  
22   passage. Performance will be considered adequate if no cases of vessel grounding occur.

### 23   *Contingency Measures*

24   In the event that the Performance Measures are not met, DWR will coordinate with NMFS, USFWS,  
25   CDFW, and Regional Water Board to determine appropriate rectification or compensation for  
26   impacts to aquatic resources as set forth above.

27   **Responsible Parties:** DWR will ensure that a barge operations plan is developed and implemented  
28   for each project that requires the use of a barge. Construction contractors will develop and submit  
29   the Barge Operations Plan per standard DWR contract specifications as part of the traffic plans  
30   required by those specifications (see Section 01570 of standard DWR construction contracts). DWR  
31   will develop and implement a protocol for dock approach and departure. DWR will ensure that this  
32   plan, when approved by DWR and other resource agencies, will be read by barge operators and kept  
33   aboard all vessels operating at the construction sites and barge landings.

34   **Regulating/Permitting Agencies:** The barge operations plan will be part of a comprehensive  
35   traffic control plan coordinated with the Coast Guard for large channels. DWR will coordinate with  
36   NMFS, USFWS, DFW, and California Regional Water Board to determine appropriate rectification or  
37   compensation for impacts to aquatic resources in the event that the Performance Measures are not  
38   met.

39   **Location:** A Barge Operations Plan will be implemented at all construction sites, when barge and  
40   tugboat operations are utilized.

41   **Timing:** Prior to any construction activities involving or supported by deliveries by barge, DWR will  
42   ensure that a barge operations plan is developed and implemented for each activity that requires  
43   the use of a barge. Construction contractors will develop and submit the Barge Operations Plan per

standard DWR contract specifications as part of the traffic plans required by those specifications (see Section 01570 of standard DWR construction contracts). DWR will ensure that this plan, when approved by DWR and other resource agencies, will be read by barge operators and kept aboard all vessels operating at the construction sites and barge landings. During construction, DWR will ensure that all tugboat crew members responsible for piloting a vessel at either the intake or barge landing sites will read and agree to comply fully with this plan.

**Monitoring:** DWR will monitor the development and implementation of a barge operations plan. Prior to construction DWR will contract with the construction contractors to develop the barge operations plan as part of the traffic plans required by standard DWR contract specifications. DWR will review the plan to ensure its compliance with the environmental commitment and AMM7. During construction, the construction monitor for each site will be responsible for monitoring construction contractor compliance with the barge operations plan. The Biological Monitor will be responsible for monitoring barge operation activities to determine if the plan is successful in protecting aquatic resources. The Biological Monitor's monitoring responsibilities are outline above in *Commitment*.

**Reporting Requirements:** The Barge Operations Plan, developed by the construction contractors, will be submitted to DWR for review and approval prior to any construction. Construction contractors will immediately report material fuel or oil spills to the CDFW Office of Spill Prevention and Response (OSPR), the Project Biological Monitor, and DWR. The Biological Monitor will conduct same-day reporting to DWR of any observed problems with barge operations. Annual reporting to DWR shall include a summary of monitoring observations over the course of each construction year, including an evaluation of the plan performance measures. The annual report will also include a description of and representative photographs and/or videos of conditions of river banks and vegetation. The construction monitor will report any deviance from the barge operations plan to DWR and will record daily inspections in the project file.

### 3.14 Environmental Commitment: Construction Equipment Exhaust Reduction Plan

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Construction Equipment Exhaust Reduction Plan	DWR, Construction Contractors, Plan Area air districts	Prior to and during construction	Impact AES-1, AQ-2, AQ-3, AQ-4, AQ-9, AQ-10, AQ-11, AQ-12, AQ-13, AQ-16, AQ-18, AQ-20, ECON-3, ECON-5, ECON-9, ECON-11, ECON-15

**Commitment:** Prior to construction, DWR will develop a construction equipment exhaust reduction plan to reduce criteria air pollutants from construction equipment. The reduction plan will be provided to the appropriate Plan Area air districts for review prior to construction. Control technology that achieves equivalent or greater reductions than those identified below may be specified as new emissions reduction technologies become available and cost-effective.

### Off-Road Heavy-Duty Engines

The reduction plan will require that equipment used to construct project facilities achieve fleet-wide average criteria pollutant emissions rates for equipment greater than 50 horsepower that are equivalent to the use of a model year 2013 fleet. Prior to construction start for each major project feature, DWR will ensure model year 2013 emissions rates are achieved by developing a-specific construction equipment exhaust reduction plan. Contractors may utilize a combination of newer engines, aftermarket controls, and retrofits to achieve the fleet-wide average performance standard. Potential strategies for achieving this fleet-wide average may include the following:

- Electrification of equipment
- Use of diesel particulate filters on non-electrified equipment.
- Use of compressed natural gas (CNG).
- Use of Tier 4 engines.

DWR will quantitatively demonstrate, through equipment-specific modeling, that fleet-wide average achieve criteria pollutant emissions rates for equipment greater than 50 horsepower that are equivalent to the use of a model year 2013 fleet have been achieved by the selected equipment and aftermarket controls. As noted in Appendix 22A, *Air Quality Analysis Methodology*, the air quality analysis and Health Risk Assessment have been performed based on model year 2013 emission factors obtained from the Sacramento Metropolitan Air Quality Management District's Construction Mitigation Calculator. The 2013 model year emission factors for each equipment piece are built from the zero-hour emissions rates, annual deterioration rates, and assumptions about engine operating hours.

In addition to the model year 2013 performance standard, the following best management practices will be incorporated into the reduction plan.

- Minimize idling time either by shutting equipment off when not in use or limiting the time of idling to 3 minutes (5 minutes required by 13 CCR 2449[d][3], 2485). Provide clear signage that posts this requirement for workers at the entrances to the site.
- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by an ASE- certified mechanic and determined to be running in proper condition before it is placed in operation.
- Ensure that emissions from all off-road diesel-powered equipment used on the project site do not exceed 40% opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40% opacity (or Ringelmann 2.0<sup>17</sup>) will be repaired immediately. Non-compliant equipment will be documented and a summary provided annually to DWR and air district with jurisdiction over the construction site. A visual inspection of all in-operation equipment will be made at least weekly by the contractor and witnessed monthly or more frequently by DWR and a periodic summary of the visual survey results will be submitted by the contractor throughout the duration of the project, except that the summary will not be required for any 30-day period in which no construction activity occurs. The summary will include the quantity and type of vehicles inspected, as well as the dates of each survey. The air districts or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure will supersede other air district or state rules or regulations.

<sup>17</sup> Based on the Ringelmann scale, which measures the density of smoke in the air.



### **Marine Vessels**

Prior to construction start for each major project feature, DWR will ensure that all marine vessels used to construct project facilities utilize USEPA certified Tier 3 or newer engines. As noted in Appendix 22A, Air Quality Analysis Methodology, the air quality analysis and HRA have been performed based on model year 2010 emission factors (Tier 3 compliance for new engines) obtained from the ARB (2012b).

### **Heavy Duty Haul Trucks**

Prior to construction start for each major project feature DWR will ensure that all on-road heavy-duty diesel trucks with a gross vehicle weight rating of 19,500 pounds or greater used to construct project facilities comply with EPA 2007 on-road emission standards for PM10 and NOX (0.01 g/bhp-hr and 0.20 g/bhp-hr, respectively). These PM10 and NOX standards were phased in through the 2007 and 2010 model years on a percent of sales basis (50% of sales in 2007 to 2009 and 100% of sales in 2010). As noted in Appendix 22A, Air Quality Analysis Methodology, the Air Quality analysis and Health Risk Assessment have been performed based on model year 2010 emission factors obtained from the ARB's EMFAC2014 model.

### **Locomotives**

Prior to construction start for each major project feature, DWR will ensure that all diesel tunneling locomotives used to construct project facilities utilize EPA certified Tier 4 or newer engines.

**Responsible Parties:** DWR will prepare the Construction Equipment Exhaust Reduction Plan and will ensure that all vehicles meet designated standards. Construction contractors will provide vehicles that meet these standards.

**Regulating/Permitting Agencies:** Regulation will be based on the designated EPA standard for that specific vehicle group. Plan area air districts will review plans.

**Location:** The Construction Equipment Exhaust Reduction Plan will cover all construction in the Plan Area. Regulation will be implemented where all vehicles over emission minimum are present.

**Timing:** The Construction Equipment Exhaust Reduction Plan will be developed prior to beginning construction and all vehicles will be inspected prior to construction. To the extent feasible, Construction Equipment Exhaust Reduction Plan requirements will be developed and incorporated into solicitations for construction bids. If the Construction Equipment Exhaust Reduction Plan cannot be completed in time for solicitation of construction bids, DWR will include a general requirement to capture the requirements for construction contractors to comply with the Construction Equipment Exhaust Reduction Plan, and finalize the requirements prior to beginning construction. Reduction techniques such as limits on time idling, will be implemented throughout construction. If a vehicle is emitting above standard during construction it will either be fixed or replaced.

**Monitoring:** DWR will be responsible for monitoring and overseeing the development of the Construction Equipment Exhaust Reduction Plan prior to beginning construction. Once construction begins, DWR will deploy a construction monitor who will monitor compliance with the plan, opacity, and regular air quality monitoring. Monitoring methods, frequency, and locations will be determined in the plan and reviewed by plan area air districts.

**Reporting Requirements:** The Construction Equipment Exhaust Reduction Plan will be delivered to Plan Area air districts for review 90 days prior to beginning construction. A vehicle exceeding designated regulations will be reported and required to be fixed or replaced by the construction contractors. Construction contractors will provide reports to DWR on the status of construction vehicle's compliance with the designated EPA standard. The construction monitor will report their findings to DWR and the appropriate Plan Area air district as well as retain inspection records in the project files.

### 3.15 Environmental Commitment: DWR Construction Best Management Practices to Reduce GHG Emissions

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
DWR Construction Best Management Practices to Reduce GHG Emissions	DWR and Construction Contractors	Prior to and during construction	Impact AES-1, AQ-2, AQ-3, AQ-4, AQ-9, AQ-10, AQ-11, AQ-12, AQ-13, AQ-16, AQ-18, AQ-20, ECON-3, ECON-5, ECON-9, ECON-11, ECON-15

**Commitment:** DWR will implement the following applicable GHG reduction measures, which are outlined in DWR's Climate Action Plan.

#### ***Preconstruction and Final Design BMPs***

Preconstruction and Final Design BMPs are designed to ensure that individual projects are evaluated and their unique characteristics taken into consideration when determining if specific equipment, procedures, or material requirements are feasible and efficacious for reducing GHG emissions from the project.

**BMP 1.** Evaluate project characteristics, including location, project work flow, site conditions, and equipment performance requirements, to determine whether specifications of the use of equipment with repowered engines, electric drive trains, or other high efficiency technologies are appropriate and feasible for the project or specific elements of the project.

**BMP 2.** Evaluate the feasibility and efficacy of performing on-site material hauling with trucks equipped with on-road engines.

**BMP 3.** Ensure that all economically feasible avenues have been explored for providing an electrical service drop to the construction site for temporary construction power. When generators must be used, consider use of alternative fuels, such as propane or solar, to power generators to the maximum extent feasible, as specified in construction contracts.

**BMP 4.** Evaluate the feasibility and efficacy of producing concrete on-site and specify that batch plants be set up on-site or as close to the site as possible.

**BMP 5.** Evaluate the performance requirements for concrete used on the project and specify concrete mix designs that minimize GHG emissions from cement production and curing while preserving all required performance characteristics.

**BMP 6.** Limit deliveries of materials and equipment to the site to off peak traffic congestion hours. (This BMP is applicable only for deliveries of materials and equipment to the geotechnical exploration sites and transported on public roadways).

#### ***Constructions BMPs***

Construction BMPs apply to all construction and maintenance projects that DWR completes or for which DWR issues contracts. All projects are expected to implement all Construction BMPs unless a variance is granted by the Division of Engineering Chief, Division of Operation and Maintenance Chief, or Division of Flood Management Chief, as applicable, and the variance is approved by the DWR CEQA Climate Change Committee. Variances will be granted when specific project conditions or characteristics make implementation of the BMP infeasible and where omitting the BMP will not be detrimental to the project's consistency with the Greenhouse Gas Reduction Plan (DWR's Climate Action Plan).

**BMP 7.** Minimize idling time by requiring that equipment be shut down after five minutes when not in use (as required by the State airborne toxics control measure [13 CCR, Section 2485]). Provide clear signage that posts this requirement for workers at the entrances to the site and provide a plan for the enforcement of this requirement.

**BMP 8.** Maintain all construction equipment in proper working condition and perform all preventative maintenance. Required maintenance includes compliance with all manufacturer's recommendations, proper upkeep and replacement of filters and mufflers, and maintenance of all engine and emissions systems in proper operating condition. Maintenance schedules will be detailed in an Air Quality Control Plan prior to commencement of construction.

**BMP 9.** Implement tire inflation program on jobsite to ensure that equipment tires are correctly inflated. Check tire inflation when equipment arrives onsite and every two weeks for equipment that remains onsite. Check vehicles used for hauling materials offsite weekly for correct tire inflation. Procedures for the tire inflation program will be documented in an Air Quality Management Plan prior to commencement of construction.

**BMP 10.** Develop a project specific ride share program to encourage carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.

**BMP 11.** Reduce electricity use in temporary construction offices by using high efficiency lighting and requiring that heating and cooling units be Energy Star compliant. Require that all contractors implement procedures for turning off computers, lights, air conditioners, heaters, and other equipment each day at close of business.

**BMP 12.** For deliveries to project sites where the haul distance exceeds 100 miles and a heavy-duty class 7 or class 8 semi-truck or 53-foot or longer box type trailer is used for hauling, a SmartWay26 certified truck will be used to the maximum extent feasible.

**BMP 13.** Minimize the amount of cement in concrete by specifying higher levels of cementitious material alternatives, larger aggregate, longer final set times, or lower maximum strength where appropriate.

**BMP 14.** Develop a project specific construction debris recycling and diversion program to achieve a documented 50% diversion of construction waste.

**BMP 15.** Evaluate the feasibility of restricting all material hauling on public roadways to off-peak traffic congestion hours. During construction scheduling and execution minimize, to the extent possible, uses of public roadways that would increase traffic congestion.

**Responsible Parties:** DWR will implement applicable GHG reduction measures. Construction contractors will work with DWR and comply with the reduction measures.

**Regulating/Permitting Agencies:** GHG emission reductions will be in accordance to DWR's GHG emissions reduction goals detailed in the Climate Action Plan Phase I.

**Location:** Implementation of BMPs will occur at all construction sites.

**Timing:** BMPs will be incorporated into designs and plans prior to construction. To the extent feasible, BMPs will be developed and incorporated into solicitations for construction bids. If the BMPs cannot be finalized in time for solicitation of construction bids, DWR will include a general requirement to capture the requirements for construction contractors to comply with the BMPs, and finalize the requirements prior to beginning construction. They will be implemented throughout construction.

**Monitoring:** DWR will review all designs and plans to ensure incorporation of the BMPs listed above and determine those which require a variance. DWR will deploy a construction monitor during construction to monitor implementation of the required Construction BMPs and ensure contractor compliance. As part of DWR's Climate Action Plan, DWR will monitor its performance annually by quantifying emissions from four emissions sources. This data will be used to monitoring of DWR's performance toward meeting its GHG emissions reduction goals.

**Reporting Requirements:** All projects are expected to implement all Construction BMPs unless a variance is granted by the Division of Engineering Chief, Division of Operation and Maintenance Chief, or Division of Flood Management Chief, as applicable, and the variance is approved by the DWR CEQA Climate Change Committee. Construction monitors will report regularly to DWR on contractor compliance and will record inspection records in the project file.

### 3.16 Environmental Commitment: Develop and Implement Noise Abatement Plan & AMM 31: Noise Abatement

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement Noise Abatement Plan  AMM31: Noise Abatement	DWR and Construction Contractors	Prior to and during construction	Impact REC-2, REC-4, REC-9, REC-10, ECON-3, ECON-5, ECON-9, ECON-15, NOI-1, NOI-2, NOI-4

**Commitment:** DWR and contractors hired to construct any conveyance components of the project will implement a site-specific noise abatement plan to avoid or reduce potential construction-, maintenance-, and operation-related noise impacts. This commitment is related to AMM31, Noise

Abatement, and AMM9, Underwater Sound Control and Abatement Plan, described in Sections 3B.4.31 and 3B.4.9 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. The noise abatement plan will include measures such as restrictions on use of construction equipment outside of daytime hours, requiring use of noise reducing technologies for construction equipment, installation of temporary barriers or enclosures to reduce construction noise at sensitive receptors, and local coordination efforts to reduce noise effects on sensitive uses including but not limited to schools, parks, places of worship, and residential uses. As applicable, the following components will be included in the plan.

### **Construction and Maintenance Noise**

The contractor will employ best practices to reduce construction noise.

- Contracts shall specify that on-site construction practices will comply with the measures identified below. Exceptions to these restrictions may be permitted for legally mandated back-up alarms, warning horns and similar devices. Inaudible safety measures, such as flaggers and worker access restrictions to construction areas, may be considered on a case-by-case basis, and shall be used where feasible and necessary to reduce noise to acceptable levels.
- Limit impact pile driving to the hours between 7 a.m. and 7 p.m.
- Locate, store, and maintain portable and stationary equipment as far as feasible from nearby residents.
- At a given noise-sensitive land use that includes an outdoor area of frequent human use (i.e. residential yards, parks, schools, playgrounds, places of worship, swimming pools, recreation areas, campgrounds, sports courts, and outdoor areas associated with institutional use), where it is determined that construction-related noise will cause noise levels to exceed the daytime ambient level by 5 A-weighted decibels (dBA), or 60 dBA  $L_{eq}^{18}$ , whichever is greater, at noise sensitive receptors, a temporary sound barrier shall be constructed between the outdoor use area and the construction related noise source.
- At buildings where people normally sleep, where it is determined that construction-related noise will cause noise levels to exceed the nighttime ambient level by 5 dBA, or 50 dBA  $L_{eq}$ , whichever is greater, a temporary sound wall barrier be constructed between the sensitive area and the construction related noise source.
- In the event of complaints by affected residents due to on-site construction noise generated during nighttime hours, the contractor will monitor noise levels intermittently (between 10:00 p.m. and 7:00 a.m.) at the dwelling unit of the person lodging the complaint<sup>19</sup>. If measured construction noise during nighttime hours exceeds 50 dBA interior  $L_{max}^{20}$  (70 dBA exterior  $L_{max}$ ) or 5 dB above ambient noise, whichever is greater, at the dwelling unit, the construction contractor will implement additional sound-attenuating mitigation measures where site conditions allow, such as limitations on the use of noise-generating equipment, or installation of additional temporary barriers or enclosures. Where the above-described strategies are

<sup>18</sup> A-weighted sound levels are typically measured or presented as  $L_{eq}$ , which is defined as the average sound level for a stated period of time.

<sup>19</sup> In contrast to the 50 dBA  $L_{eq}$  standard for nighttime construction noise, the 50 dBA interior  $L_{max}$  threshold (or 70 dBA exterior  $L_{max}$ ) is used to address the potential for sleep disturbance during nighttime construction.

<sup>20</sup> The maximum sound pressure level over a defined period

ineffective in reducing noise to the identified levels or where site conditions prohibit the ability to do so, the affected residents<sup>21</sup> shall be offered short-term relocation assistance for the duration of the time that nighttime noise levels are expected to exceed the specified levels. Exceptions to this commitment can be made for legally-mandated warning devices, such as back-up alarms and warning horns.

- To the extent feasible, route and schedule truck traffic in order to reduce construction noise impacts and traffic noise levels at noise-sensitive land uses (e.g., schools, libraries, and places of worship).
- To the extent feasible (e.g., where required by haul permits), limit off-site trucking activities (e.g., deliveries, export of materials) to the hours of 7:00 a.m. to 10:00 p.m. to minimize noise impacts on nearby residences.
- A vegetation screen or other type of screen will be installed or planted on the south side of Hood Franklin Road along the length of Stone Lake's National Wildlife Refuge Property to reduce disturbance to Greater Sandhill Cranes and to visitors.
- Blasting at excavation sites will be conducted at a distance of at least 1,000 feet from the nearest noise-sensitive land use or temporary relocation will be provided.

#### *Operation Noise*

Pump station buildings will be designed and constructed such that operation noise levels at nearby residential receptors do not exceed 50  $L_{eq}$  during daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA  $L_{eq}$  during nighttime hours (10 p.m. to 7 a.m.). Acoustical measures such as terrain shielding, pump enclosures, and acoustical building treatments will be incorporated into the facility design in order to meet this performance standard.

**Responsible Parties:** DWR and hired construction contractors will be responsible for designing and implementing a Noise Abatement Plan. The Noise Abatement Plan must be prepared in consultation with the Engineer and subject to final approval by DWR. DWR will provide a copy of the Noise Abatement Plans to counties that will be affected by construction and operations of the water conveyance facility and given the opportunity to provide input during the development process. Construction contractors will be responsible for implementing approved noise abatement measures.

**Regulating/Permitting Agencies:** N/A for this environmental commitment.

**Location:** A Noise Abatement Plan will be implemented as appropriate at all construction sites.

**Timing:** DWR and the Construction Contractors will establish noise abatement measures required for each construction site prior to final design plans and bid documents. After approval of measures DWR will provide Noise Abatement Plans to applicable counties. During construction the noise abatement measures will be implemented construction contractors to avoid or reduce potential reduce potential construction-, maintenance-, and operation-related noise impacts.

**Monitoring:** DWR will monitor development of site-specific Noise Abatement Plans and inclusion of requirements for implementation on contracts with construction contractors. DWR will review facility designs to ensure pump station buildings are designed such that operation noise levels at nearby residential receptors do not exceed 50  $L_{eq}$  during daytime hours (7:00 a.m. to 10:00 p.m.)

<sup>21</sup> Permanent residents or tenants of rental dwelling units.

and 45 dBA  $L_{eq}$  during nighttime hours (10 p.m. to 7 a.m.). Acoustical measures such as terrain shielding, pump enclosures, and acoustical building treatments will be incorporated into the facility design in order to meet this performance standard.

DWR and the construction contractors are responsible for overseeing the implementation of the noise abatement Plan. DWR will deploy a qualified monitor to oversee implementation of, and compliance with, the noise abatement plan during construction. The qualified monitor will perform noise level monitoring within the project area to ensure construction noise levels do not exceed applicable local noise ordinance standards for daytime and nighttime noise levels, to the extent practicable. After construction and during operation, the qualified monitor will perform noise level monitoring of operational noise levels.

**Reporting Requirements:** DWR will review and approval all Noise Abatement Plans as well as facility designs prior to implementation. DWR's construction monitor will report any deficiency in compliance with this environmental commitment during construction to DWR. The qualified monitor will report all noise level monitoring data and results to DWR on a regular basis and will alert DWR to any exceedances in construction or operational noise level thresholds. DWR will review any exceedances and modify the Noise Abatement Plan as needed to ensure it, in combination with Mitigation Measures NOI-1a and NOI-1b, would reduce the impacts of intake construction on noise-sensitive land uses.

### 3.17 Environmental Commitment: Develop and Implement Hazardous Materials Management Plans & AMM32: Hazardous Material Management

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement Hazardous Materials Management Plans	DWR and Construction Contractors	Prior to and during construction	Impact AQUA-1, AQUA-2, AQUA-7, AQUA-19, AQUA-20, AQUA-37, AQUA-38, AQUA-43, AQUA-55, AQUA-56, AQUA-61, AQUA-62, AQUA-73, AQUA-74, AQUA-79, AQUA-89, AQUA-91, AQUA-92, AQUA-97, AQUA-109, AQUA-110, AQUA-115, AQUA-127, AQUA-128, AQUA-133, AQUA-145, AQUA-146, AQUA-151, AQUA-153, AQUA-163, AQUA-164, AQUA-169, AQUA-181, AQUA-182, AQUA-187, AQUA-199, AQUA-200, AQUA-205, REC-4, REC-9, ECON-3, ECON-15, UT-1, UT-8, HAZ-1, HAZ-2, HAZ-6, HAZ-7
AMM32: Hazardous Material Management			

**Commitment:** DWR will ensure that each project contractor responsible for construction of a project facility or project will develop and implement a hazardous materials management plan (HMMP) before beginning construction. This commitment is related to AMM32, Hazardous Materials Management, described in Section 3B.4.32 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. It is anticipated that multiple HMMPs will be prepared for the overall project construction activities, each taking into account site-specific conditions such as hazardous materials

present on site and known historic site contamination. A database on known historic instances of contamination and results of any field inspections regarding the presence of hazardous chemicals will be maintained. The HMMPs will provide detailed information on the types of hazardous materials used or stored at all sites associated with the water conveyance facilities (e.g., intake pumping plants, maintenance facilities); phone numbers of applicable city, county, state, and federal emergency response agencies; primary, secondary, and final cleanup procedures; emergency-response procedures in case of a spill; and other applicable information. The plan will include appropriate practices to reduce the likelihood of a spill of toxic chemicals and other hazardous materials during construction and facilities operation and maintenance. A specific protocol for the proper handling and disposal of hazardous materials will be established before construction activities begin and will be implemented during project construction.

The HMMP will include, but not be limited to, the following measures or practices.

- Fuel, oil, and other petroleum products will be stored only at designated sites.
- Hazardous materials containment containers will be clearly labeled with the identity of the hazardous materials contained therein, handling and safety instructions, and emergency contact information.
- Storage, use, or transfer of hazardous materials in or near wet or dry streams will be consistent with the Fish and Game Code (Section 5650) and/or with the permission of California Department of Fish Wildlife (CDFW).
- Material Safety Data Sheets (MSDS) will be made readily available to the contractor's employees and other personnel at the work site.
- The accumulation and temporary storage of hazardous wastes will not exceed 90 days.
- Soils contaminated by spills or cleaning wastes will be contained and removed to an approved disposal site by an appropriately-certified hazardous waste disposal contractor.
- Hazardous waste generated at work sites, such as contaminated soil, will be segregated from other construction spoils and properly handled, hauled, and disposed of at an approved disposal facility by a licensed hazardous waste hauler in accordance with applicable law and regulations. The contractor will obtain permits required for such disposal.
- Emergency spill containment and cleanup kits will be located at the work site. The contents of the kit will be appropriate to the type and quantities of chemical or goods stored at the work site.

**Responsible Parties:** DWR will ensure that each project contractor responsible for construction of a project facility or project will develop and implement a HMMP before beginning construction.

**Regulating/Permitting Agencies:** The Department of Toxic Substances Control (DTSC), the EPA, and CDFW will be consulted during the development of the HMMPs.

**Location:** It is anticipated that multiple HMMPs will be prepared for the overall project construction activities, each taking into account site-specific conditions such as hazardous materials present on site and known historic site contamination.

**Timing:** DWR will ensure that each project contractor responsible for construction of a project facility or project will develop and implement a hazardous materials management plan (HMMP) before beginning construction. The plan will include appropriate practices to reduce the likelihood



of a spill of toxic chemicals and other hazardous materials during construction and facilities operation and maintenance.

**Monitoring:** DWR will monitor contractor development of the HMMPs through inclusion of this requirement in construction contracts. DWR will review all HMMPs developed by the construction contractor to ensure compliance with this environmental commitment and AMM and inclusion of the measures and practices listed above. During construction, the construction monitor will monitor implementation of specific protocol for the proper handling and disposal of hazardous materials of the measures and practices included in each HMMP by the construction contractor.

**Reporting Requirements:** The construction contractors will provide all HMMPs to DWR for review and approval prior to commencing construction activities. HMMPs which include storage, use, or transfer of hazardous materials in or near wet or dry streams will be consistent with the Fish and Game Code (Section 5650) and will be provided to the CDFW, EPA, and DTSC after review by DWR. HMMPs are required for hazardous waste disposal permits and will provided to the appropriate permitting agency by the construction contractor for review and approval of hazardous waste permit. During construction, the construction monitor will report any deficiencies in compliance with the HMMP to DWR immediately. The construction contractor will report any inability to comply with the HMMP and any spills of hazardous waste to DWR immediately. In the event the construction contractor is unable to comply with the HMMP, DWR will coordinate with the construction contractor to, if feasible, comply with the HMMP. If compliance is not feasible, DWR and the construction contractors will revisit the HMMP and explore revisions as appropriate, with the goal of achieving at least the same level of environmental protection as compliance with the HMMP would have achieved. In the event of a spill, the Spill Prevention, Containment, Contaminant, and Countermeasure Plan (as discussed in Section 3.14, *Environmental Commitment: Develop and Implement Spill Prevention, Containment, and Countermeasure Plans & AMM5: Spill Prevention, Containment, and Countermeasure Plan*) will specify actions that would be taken should any spills occur. DWR will monitor the implementation of these actions.

### 3.18 Environmental Commitment: Develop and Implement Spill Prevention, Containment, and Countermeasure Plans & AMM5: Spill Prevention, Containment, and Countermeasure Plan

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement Spill Prevention Containment, and Countermeasure Plans	DWR and Construction Contractors	Prior to and throughout construction.	Impact WQ-31, AQUA-1, AQUA-2, AQUA-7, AQUA-19, AQUA-20, AQUA-37, AQUA-38, AQUA-43, AQUA-44, AQUA-55, AQUA-56, AQUA-61, AQUA-62, AQUA-73, AQUA-74, AQUA-79, AQUA-81, AQUA-89, AQUA-91, AQUA-92, AQUA-97, AQUA-109, AQUA-110, AQUA-115, AQUA-127, AQUA-128, AQUA-133,
AMM5: Spill Prevention, Containment, and Countermeasure Plan			

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
			AQUA-145, AQUA-146, AQUA-151, AQUA-153, AQUA-163, AQUA-164, AQUA-169, AQUA-181, AQUA-182, AQUA-187, AQUA-199, AQUA-200, AQUA-205, BIO-3, BIO-5, BIO-8, BIO-11, BIO-14, BIO-17, BIO-20, BIO-23, BIO-26, BIO-28, BIO-31, REC-4, REC-9, UT-1, UT-8, HAZ-1, HAZ-2, HAZ-6, HAZ-7

**Commitment:** It is anticipated that multiple Spill Prevention, Containment, and Countermeasure Plans (SPCCPs) will be prepared for project construction activities, each taking into account site-specific conditions. This commitment is related to AMM5, Spill Prevention, Containment, and Countermeasure Plan, described in Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. The SPCCPs will be developed in accordance with the regulatory requirements of Title 40 of the Code of Federal Regulations, Part 112 (40 CFR Part 112). 40 CFR Part 112, or the Spill Prevention, Control, and Countermeasure Rule, includes requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires the preparation, amendment and implementation of SPCCPs for specific facilities. The SPCCPs will be developed and implemented to minimize effects from spills of oil or oil-containing products<sup>22</sup> during project construction and operation. The SPCCPs will include the following measures and practices.

- All necessary personnel will be trained in emergency response and spill containment techniques, and will also be made aware of the pollution control laws, rules, and regulations applicable to their work.
- Petroleum products will be stored in nonleaking containers at impervious storage sites from which an accidental spill cannot escape.
- Absorbent pads, pillows, socks, booms, and other spill containment materials will be stored and maintained at the hazardous materials storage sites for use in the event of an accidental spill.
- Contaminated absorbent pads, pillows, socks, booms, and other spill containment materials will be placed in nonleaking sealed containers until transport to an appropriate disposal facility.
- When transferring oil or other hazardous materials from trucks to storage containers, absorbent pads, pillows, socks, booms or other spill containment material will be placed under the transfer area.
- Refueling of construction equipment will occur only in designated areas that will be a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands.
- Equipment used in direct contact with water will be inspected daily for oil, grease, and other petroleum products. All equipment must be cleaned of external petroleum products prior to beginning work where contact with water may occur to prevent the release of such products to surface waters.
- Oil-absorbent booms will be used when equipment is used in or immediately adjacent to waters.

<sup>22</sup> "Oil" includes a variety of petroleum and non-petroleum based substances including gasoline, diesel fuel, motor oil, hydraulic fluid, aviation fuel, oil-based paint, oil-based paint thinner, roofing tar, and petroleum-based solvents.

- All reserve fuel supplies will be stored only within the confines of a designated staging area, to be located a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands.
- Fuel transfers will take place a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands, and absorbent pads will be placed under the fuel transfer operation.
- Staging areas will be designed to contain contaminants such as oil, grease, fuel, and other petroleum products so that should an accidental spill occur, they do not drain toward receiving waters or storm drain inlets.
- All stationary equipment will be staged in appropriate staging areas and positioned over drip pans.
- In the event of an accidental spill, personnel will identify and secure the source of the discharge and contain the discharge with sorbents, sandbags, or other material from spill kits and will contact appropriate regulatory authorities (e.g., National Response Center will be contacted if the spill threatens navigable waters of the United States or adjoining shorelines, as well as other appropriate response personnel).
- Discharge prevention measures will include procedures for routine handling of products (e.g., loading, unloading, and facility transfers) (*40 CFR 112.7(a)(3)(i)*).
- Discharge or drainage controls will be implemented such as secondary containment around containers and other structures, equipment, and procedures for the control of a discharge (*40 CFR 112.7(a)(3)(ii)*).
- Countermeasures will be implemented for discharge discovery, response, and cleanup (both the facility's capability and those that might be required of a contractor) (*40 CFR 112.7(a)(3)(iii)*).
- Methods of disposal of recovered materials will comply with applicable legal requirements (*40 CFR 112.7(a)(3)(iv)*).

Methods of cleanup may include the following.

- Physical—Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Mechanical—Mechanical methods include, but may not be limited to, the use of vacuum cleaning systems and pumps.
- Chemical—Cleanups of material can be achieved with the use of appropriate chemical agents such as sorbents, gels, and foams.

**Responsible Parties:** DWR will create the SPCCPs. Construction contractors will implement SPCCPs and comply with the regulations.

**Regulating/Permitting Agencies:** Environmental Protection Agency's (EPA's) oil spill prevention program.

**Location:** The SPCCPs will be implemented at all construction sites.

**Timing:** SPCCPs will be drafted prior to construction. The plans will be implemented throughout construction

**Monitoring:** SPCCPs will be prepared for project construction activities, each taking into account site-specific conditions. They will follow the requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines.

DWR will monitor the development and implementation of the SPCCPs to minimize effects from spills of oil or oil-containing products during project construction and operation. As part of each SCPP, an inspection program which includes regularly scheduled inspections, evaluations, and testing by qualified personnel will be developed in accordance with EPA's *SPCC Guidance for Regional Inspectors*. DWR will review and approve all SPCCPs to ensure the above measures and practices are included and the SPCCPs are prepared in accordance with 40 CFR Part 112. During construction, DWR will be responsible implementation of the SPCCP as well as conducting inspections, evaluation, and testing required in each site-specific SPCCP.

**Reporting Requirements:** The inspection program personnel will report to DWR any deficiencies in compliance with the SPCCP as well as any spills of gasoline, diesel fuel, oil, or other related substance. These events will be recorded and evaluated by DWR as needed on a site-by-site basis to amend SPCCPs as needed to reduce the severity of and/or avoid the potentially significant impacts on the public and environment. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this environmental commitment.

### 3.19 Environmental Commitment: Develop and Implement a Fire Prevention and Control Plan

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement a Fire Prevention and Control Plan	DWR, fire suppression agencies, construction contractors	Prior to and during construction	Impact ECON-3, ECON-15, UT-1, UT-8, HAZ-5, HAZ-7

**Commitment:** DWR will develop and implement a fire prevention and control plan in consultation with the appropriate fire suppression agencies to verify that the necessary fire prevention and response methods are included in the plan. The plan will include fire prevention and suppression measures, and will consider the policies and standards in the affected jurisdictions.

At a minimum, the following components, as applicable, will be included in the plan. If a component is not applicable, DWR or its contractor will explain in the plan why that component or a portion thereof is not included in the plan.

- If a fire should start, the appropriate fire protection agencies will be contacted immediately.
- Procedures and policies for controlling any fires that are on the work site, and other related fire prevention and control procedures developed in consultation with and fire protection agencies.
- Procedures for regular maintenance of safeguards installed on heat-producing equipment to prevent the accidental ignition of combustible materials.

- 1 • A list of all major potential fire hazards, proper handling and storage procedures for hazardous  
2 materials, potential ignition sources and their control, and the type of fire protection equipment  
3 necessary to control each potential major hazard.
- 4 • Smoking will be allowed only in areas designated for smoking, and these areas will be cleared of  
5 vegetation, or in enclosed vehicles. Cigarette butts are to be disposed of in car ashtrays or other  
6 approved disposal containers and dumped daily in a proper receptacle off the work site.
- 7 • The contractor will be responsible for maintaining appropriate fire suppression equipment at  
8 the work site including a water truck or fire truck with a water tank of at least 3,000 gallon  
9 capacity. Fire extinguishers, shovels and other firefighting equipment will be available at work  
10 sites and on appropriate construction equipment. The contractor will be required to ensure that  
11 each construction vehicle on the work site will be equipped with a minimum 20 pound (or two  
12 10 pound) fire extinguisher(s).
- 13 • At the work site, a sealed fire toolbox will be located at a point accessible in the event of fire.  
14 This fire toolbox will contain: one back-pack pump-type extinguisher filled with water, two  
15 axes, two McLeod fire tools, and shovels so that employees at the work site can be equipped to  
16 fight fire.
- 17 • Gasoline-powered construction equipment with catalytic converters will be equipped with  
18 shielding or other acceptable fire prevention features. Internal combustion engines will be  
19 equipped with spark arrestors.
- 20 • Welding sites will include fire prevention provisions.
- 21 • The contractor will maintain contact with local firefighting agencies throughout the fire season  
22 for updates on fire conditions, and such fire conditions will be communicated daily to the on-site  
23 employees of the contractor and subcontractors daily.

24 In addition to the plan, fire protection will conform to the State Fire Marshal requirements, and will  
25 be in full compliance with Cal/OSHA standards for fire safety and prevention. Road designs will be  
26 developed in consultation with the State Fire Marshal. Any fire hydrants will be located as deemed  
27 acceptable by the State Fire Marshal and are to meet State government standards. Fire protection  
28 using water will be provided by a potable water system either from the nearest municipal clean  
29 water conveyance system or from a self-contained filtration and treatment system that takes water  
30 from an adjacent waterway or a site well or tank.

31 **Responsible Parties:** DWR, in consultation with the appropriate fire suppression agencies will  
32 develop a proper fire prevention and suppression plan. The construction contractor will be  
33 responsible for maintaining proper fire suppression equipment.

34 **Regulating/Permitting Agencies:** Fire protection will conform to the State Fire Marshal  
35 requirements, and will be in full compliance with Cal/OSHA standards for fire safety and prevention.

36 **Location:** Plan will be implemented at all construction sites.

37 **Timing:** The fire prevention plan will be developed prior to construction. Plan regulations will be  
38 implemented and maintained throughout construction.

39 **Monitoring:** DWR will monitor development and implementation of the fire prevention plan at all  
40 construction sites. The construction monitor and facility inspector at each site will regularly inspect

the site and monitor personnel to ensure compliance with the fire prevention and suppression measures included in the plan.

**Reporting Requirements:** In the event of a fire, the appropriate fire protection agencies will be contacted immediately. Procedures and policies will be implemented for controlling any fires that are on the work site, and other related fire prevention and control procedures developed in consultation with and fire protection agencies. DWR will be notified by the construction contractor of any fire-related incident and DWR will determine if any updates to the Fire Prevention and Control Plan are required.

## 3.20 Environmental Commitment: Develop and Implement Mosquito Management Plans & AMM33: Mosquito Management

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Develop and Implement Mosquito Management Plans	DWR, Mosquito and Vector Control Districts, Construction Contractors	Prior to and during construction	Impact ECON-3, ECON-9, ECON-15, PH-1, PH-5, PH-10
AMM33: Mosquito Management			

### ***During Construction***

This commitment is related to AMM33, *Mosquito Management*, described in Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. To aid in mosquito management and control during construction of the intakes, DWR will consult with appropriate Mosquito and Vector Control Districts (MVCDs). Consultation will occur with the following MVCDs: San Joaquin County Mosquito and Vector Control District and Sacramento-Yolo Mosquito and Vector Control District. Consultation will occur before the sedimentation basins, solids lagoons, modified Clifton Court Forebay, and the intermediate forebay inundation area become operational. Once these components are operational, DWR will consult again with the MVCDs to determine if mosquito populations are beyond thresholds as defined in Mosquito Management Plan. DWR will then use mosquito control techniques as applicable. Activities will be the responsibility of DWR, in coordination with applicable MVCDs, and will include, but not be limited to:

- Monitoring for mosquito vector species and population abundance during the high mosquito season (June through September).
- Introducing biological controls, such as mosquito fish, to sedimentation basins, solids lagoons, modified Clifton Court Forebay, and the intermediate forebay inundation area, if mosquitoes are present.
- Introducing physical controls (e.g., discharging dewatered water more frequently or increasing circulation) to sedimentation basins, solids lagoons, modified Clifton Court Forebay, and the intermediate forebay inundation area if mosquitoes are present.

## During Restoration

To aid in vector management and control, the construction contractors, with DWR's approval, will be required to develop mosquito management plans and consult with appropriate MVCDs with respect to restoration and conservation activities within the Restoration Opportunity Areas (ROAs). Consultation will occur with the following MVCDs: Alameda County Vector Control Services District, Contra Costa Mosquito and Vector Control District, Sacramento-Yolo Mosquito and Vector Control District, San Joaquin County Mosquito and Vector Control District, and Solano County Mosquito Abatement District. Consultation will include, but may not be limited to, review of the mosquito management plans and BMPs to be implemented at the restoration sites and review of proposed mosquito monitoring efforts at restoration sites and assistance with monitoring efforts where feasible. In addition, DWR will consult with the applicable MVCD during all phases of restoration and conservation, including design, implementation, and operations. *The Central Valley Joint Venture's Technical guide to Best Management Practices for Mosquito Control in Managed Wetlands (Kwasny et al. 2004)* and the California Department of Public Health's *Best Management Practices for Mosquito Control in California* (California Department of Public Health 2012), and other guidelines will be used to help design appropriate restoration and conservation features to the extent feasible, consistent with the biological goals and objectives of the project. The mosquito management plans will address wetland design considerations, water management practices, vegetation management, biological controls, and wetland maintenance. BMPs included in the mosquito management plans will include (as applicable), but may not be limited to:

- Delayed or phased fall flooding—phased flooding involves flooding habitat throughout the fall and winter in proportion to wildlife need and takes into consideration other wetland habitat that may be available in surrounding areas.
- Rapid fall flooding.
- Maintain stable water levels.
- Circulate water.
- Use deep initial flooding.
- Subsurface irrigate.
- Utilize water sources with mosquito predators for flooding.
- Drain irrigation water into ditches or other water bodies with abundant mosquito predators.
- Employ vegetation management practices to reduce mosquito production in managed wetlands (e.g., mowing, burning, disking of vegetation that serves as mosquito breeding substrate).
- Design wetlands and operations to be inhospitable to mosquitoes.
- Implement monitoring and sampling programs to detect early signs of mosquito population problems.
- Use biological agents such as mosquito fish to limit larval mosquito populations.
- Use larvicides and adulticides, as necessary. If larvicides and adulticides are required, DWR will evaluate the effects of these chemicals and, if required, prepare a monitoring program for review by fish and wildlife agencies to evaluate effects, if any, application would have on macroinvertebrates and associated covered fish and wildlife species.

**Responsible Parties:** DWR will consult with Mosquito and Vector Control Districts to draft prevention and control plans. Construction contractors, with DWR's approval, will be required to develop mosquito management plans

**Regulating/Permitting Agencies:** N/A for this environmental commitment.

**Location:** All monitoring will occur at sedimentation basins, solids lagoons, modified Clifton Court Forebay, and the intermediate forebay inundation area.

**Timing:** Consultation will occur before the sedimentation basins, solids lagoons, modified Clifton Court Forebay, and the intermediate forebay inundation area become operational. Once these components are operational, DWR will consult again with the MVCDs to determine if mosquito populations are beyond thresholds as defined in Mosquito Management Plan.

**Monitoring:** DWR will ensure consultation with appropriate MVCDs is conducted. If it is determined in consultation with the MVCDs that mosquito populations are beyond the thresholds defined in the Mosquito Management Plan, DWR will monitor the implementation of the required mosquito control techniques (as determined by consultation with the MVCDs). DWR will deploy a qualified monitor to monitor the implementation of the mosquito control techniques. DWR will monitor the development of mosquito management plans by DWR in consultation with the appropriate MVCDs. DWR will review all mosquito management plans developed to ensure they are consistent with the guidelines and BMPs laid out in this commitment and associated AMM.

**Reporting Requirements:** DWR will consult with MCVDs, and fish and wildlife agencies where necessary to complete mosquito management plans. Mosquito populations will be monitored and reported to the MVCDs. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this environmental commitment.

## 3.21 Environmental Commitment: Conduct Environmental Training & AMM1: Conduct Worker Awareness Training

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Conduct Environmental Training	DWR	Prior to construction	Impact AQUA 1-3; 11-13; 21-23; 34-36; 43-45; 52-54; 61-63; 70-72; 79-81; 88-90
AMM1: Conduct Worker Awareness Training			Impact REC-4

**Commitment:** Prior to construction, the DWR will inform field management and construction personnel of the need to avoid and protect sensitive resources. Training will be conducted during preconstruction meetings so that construction personnel are aware of their responsibilities and the importance of compliance. This commitment is related to AMM1, Worker Awareness Training, described in Section 3B.4.1 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. This training will be provided by qualified resource specialists (e.g., certified biologists,



cultural resource specialists, etc.) as specified by individual management plans and/or mitigation plans.

Construction personnel will be educated on the types of sensitive resources located in the Plan Area and the measures required to avoid impacts on these resources. Materials covered in the training program will include environmental rules and regulations for the construction activities and requirements for limiting activities to approved work areas, timing restrictions, and avoidance of sensitive resource areas.

Training seminars will be held to educate construction supervisors and managers on the following.

- The need for resource avoidance and protection.
- Important timing windows for covered species (i.e. timing of covered fish migration/spawning/rearing, wildlife mating/nesting/fledging, plant flowering periods).
- Provide specific training related to the relevant AMMs that will be implemented during construction for the protection of covered fish, wildlife and plant species, depending upon work to be performed and location of the work (i.e., in-water, upland, wetland).
- The legal requirements for resource avoidance and protection.
- Identification of relevant special-status fish, wildlife, and plant species, depending upon work to be performed and location of the work (e.g., in-water, upland, wetland).
- Protocol for identifying the proper AMMs to implement for the protection of special-status fish, wildlife and plants based upon the nature, timing, and location of construction activities to be performed.
- Brief discussions of covered species and natural communities of concern.
- Boundaries of the work area.
- Avoidance and minimization commitments.
- Exclusion and construction fencing methods.
- Roles and responsibilities.
- What to do when covered fish, wildlife or plants are encountered (dead, injured, stressed, or entrapped) in work areas.
- Staking methods to protect resources.
- Environmental commitments.
- Emergency procedures.
- Consequences of violations of the laws and regulations protecting resources.

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

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

**Responsible Parties:** DWR will inform field management and construction personnel of the need to avoid and protect sensitive species resources and will be responsible for providing environmental training to all construction personnel as appropriate.

**Regulating/Permitting Agencies:** The environmental training program comes under the jurisdiction of the following agencies: USFWS, NMFS, CDFW, and USACE. The USFWS will require DWR to submit resumes of scientific staff for approval prior to implementing the environmental training program.

**Location:** Environmental training will be implemented as appropriate at all construction sites.

**Timing:** DWR will implement environmental training for each construction site prior to construction.

**Monitoring:** DWR and above mentioned regulating/permitting agencies are responsible for overseeing the implementation of the environmental training program. DWR will monitor construction contractor's compliance by reviewing the record of construction personnel who have participated in the training as well as ensuring all new construction personnel do not commence work until receiving confirmation they have received mandatory training.

**Reporting Requirements:** Reports from the environmental training program will be submitted to the appropriate regulating/permitting agencies. The construction contractor will supply confirmation to DWR that all construction personnel have completed the mandatory training prior to beginning construction and will report any new construction personnel to DWR as well as provide a sheet indicating attendance and completion of environmental training.

## 3.22 Environmental Commitment: Fugitive Dust Control & AMM35: Fugitive Dust Control

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Fugitive dust control	DWR and Construction Contractors	Prior to and during construction	Impact AES-1, Impact AQ-1 (1C, 2C, 6C only), Impact AQ-2, Impact AQ-3, Impact AQ-4, Impact AQ-9, Impact AQ-10, Impact AQ-14
AMM35: Fugitive dust control			

**Commitment:** DWR will implement basic and enhanced control measures at all construction and staging areas to reduce construction-related fugitive dust. This commitment is related to AMM35, Fugitive Dust Control, described in Section 3B.4.35 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. The following measures are based on the Sacramento Metropolitan Air Quality Management District's (SMAQMD's) CEQA guidelines, and are in conformance with the Bay Area Air Quality Management District (BAAQMD), San Joaquin Valley Air Pollution Control

District (SJVAPCD), and Yolo Solano Air Quality Management District (YSAQMD) fugitive dust control requirements.

### ***Basic Fugitive Dust Control Measures***

DWR will ensure that the following measures will be implemented to control dust during construction activities.

- Water will be applied to all exposed surfaces as reasonably necessary to prevent visible dust from leaving work areas. Frequency of watering will be increased during especially dry or windy periods or in areas with high construction activity. Exposed surfaces include (but are not limited to) soil piles, graded areas, unpaved parking areas, staging areas, and access roads. If water or other dust control measures cannot be implemented to unpaved access roads, vehicle speeds will be limited to 15 miles per hour on such road segments.
- Cover or maintain at least 2 feet of freeboard space on haul trucks transporting soil, sand, or other loose material on the site. Haul trucks transporting soil, sand, or other loose material that will be traveling along freeways or major roadways will be covered.
- Use wet power vacuum street sweepers to remove any visible trackout mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited.
- Disturbed areas should be promptly finished and/or protected and maintained in a manner to control fugitive dust. Mulch, dust palliative, soil binders, or other reasonable mitigation measures will be used in inactive areas.

### ***Enhanced Fugitive Dust Control Measures for Land Disturbance***

DWR will ensure that the following measures will be implemented to control dust during soil disturbance activities.

- Water exposed soil with adequate frequency for continued moist soil. However, do not overwater to the extent that sediment flows off the site.
- Suspend excavation, grading, and/or demolition activity when wind speeds exceed 20 mph.
- Where appropriate, install wind breaks (e.g., plant trees, solid fencing) on windward side(s) of construction areas.
- Plant vegetative ground cover (native grass/plant seed) in disturbed areas as soon as reasonable after construction is completed. Water appropriately until vegetation is established.

### ***Measures for Entrained Road Dust***

DWR will ensure that the following measures will be implemented to control entrained road dust from unpaved roads, for example dust kicked up from unpaved roadway surfaces.

- Install rattle plates, stabilized construction entrances/exits, wheel washers, or wash off all trucks, vehicles, and equipment leaving the site.
- Treat site accesses to a distance of 100 feet from the paved road with a 6 to 12-inch layer of wood chips, mulch, or gravel to reduce generation of road dust and track out onto public roads.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person will respond and take corrective action within 48 hours. The phone number of the District will also be visible to ensure compliance.

### **Measures for New Concrete Batching Plants**

DWR will ensure that the following measures will be implemented to control dust during concrete batching activities.

- Apply water and/or chemical suppressants to reduce fugitive dust emissions from active storage piles and during aggregate and sand delivery, storage, and transfer.
- Use a hood system vented to a fabric filter/baghouse to reduce fugitive dust emissions during cement delivery and hopper and central mix loading.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementation of fugitive dust control measures. Specifically, for the water conveyance facility construction, DWR and its construction contractors will be responsible for implementation of fugitive dust control measures. Construction contractors will develop one or more Dust Control Plans prior to groundbreaking. DWR will submit Dust Control Plans to the air district (s) for approval. During construction, the construction contractors are the designated dust control site coordinator and responsible for implementing dust control as specified in the Dust Control Plans.

**Regulating/Permitting Agencies:** The air quality study area falls under the area of four air districts: YSAQMD, SMAQMD, BAAQMD, and SJVAPCD.

**Location:** A Dust Control Plan will be implemented as appropriate at all construction sites.

**Timing:** DWR and the construction contractors will establish fugitive dust control measures required for each construction site prior to final design plans and bid documents. Construction contractors will submit a fugitive dust control plan for approval to DWR who will, after review and approval, provide the Dust Control Plan to the appropriate air district(s). During construction, the fugitive dust control measures will be implemented by the construction contractors who will also ensure proper documentation is followed. Dust Control Plans will be submitted to the appropriate air district(s) prior to final design plans and bid documents with sufficient time for review and approval. These times vary for each district. Plans will be approved by the appropriate air district(s) prior to the commencement of construction activities.

**Monitoring:** DWR and the construction contractors are responsible for overseeing the implementation of the Dust Control Plans.

The construction contractor is the designated dust control site coordinator and responsible for implementing dust control as specified in the Dust Control Plan. The site coordinator will have authority over dust issues, and will have a fully trained backup able to serve in a similar capacity. The site coordinator's responsibilities may include, but are not limited to:

- Read and understand dust control permit/s and plan and have them available at the job site
- Implement the dust control plan and ensure that all employees, workers, and subcontractors know their dust control responsibilities
- Use contingency control measures when primary controls are ineffective
- Monitor the worksite for compliance with the dust control plan
- Maintain a daily Construction Contractor's Operators Log monitoring the implementation and effectiveness of the control measures.

DWR will use environmental inspectors for enforcing compliance with the dust control plan. The environmental inspectors will be responsible for making sure that dust control is effective and appropriately recorded by the site coordinator.

DWR will request that the appropriate air districts deploy District inspectors throughout the construction phase.

**Reporting Requirements:** Dust Control Plans will be submitted by DWR to the appropriate air district(s) for review and approval prior to final design plans and bid documents. These plans will include the criteria when specific dust suppression activities will be implemented. Construction contractors will maintain records of dust suppression activities.

### 3.23 Environmental Commitment: Disposal and Reuse of Spoils, Reusable Tunnel Material (RTM), and Dredged Material, AMM6: Disposal and Reuse of Spoils, Reusable Tunnel Material, and Dredged Material, & AMM10: Restoration of Temporarily Affected Natural Communities

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Disposal and Reuse of Spoils, Reusable Tunnel Material (RTM), and Dredged Material	DWR and Construction Contractors	Prior to, during, and after construction.	Impact WQ-31, SOILS-2, AQUA-1, AQUA-2, AQUA-6, AQUA-7, AQUA-19, AQUA-20, AQUA-24, AQUA-37, AQUA-38, AQUA-43, AQUA-44, AQUA-55, AQUA-56, AQUA-61, AQUA-62, AQUA-73, AQUA-74, AQUA-79, AQUA-89, AQUA-91, AQUA-92, AQUA-97, AQUA-109, AQUA-110, AQUA-115, AQUA-127, AQUA-128, AQUA-145, AQUA-146, AQUA-151, AQUA-163, AQUA-164, AQUA-169, AQUA-181, AQUA-182, AQUA-187, AQUA-199, AQUA-200, AQUA-205, BIO-1, BIO-5, BIO-6, BIO-8, BIO-9, BIO-11, BIO-12, BIO-15, BIO-18, BIO-20, BIO-21, BIO-23, BIO-24, BIO-28, BIO-29, BIO-31, BIO-32, BIO-33, BIO-35, BIO-36, BIO-38, BIO-39, BIO-44, BIO-45, BIO-46, BIO-47, BIO-49, BIO-50, BIO-52, BIO-53, BIO-57, BIO-59, BIO-66, BIO-67, BIO-69, BIO-71, BIO-72, BIO-74, BIO-75, BIO-78, BIO-83, BIO-85, BIO-87, BIO-89, BIO-91, BIO-93, BIO-95, BIO-98, BIO-100, BIO-102, BIO-104, BIO-107, BIO-109, BIO-111, BIO-113, BIO-115, BIO-117, BIO-119, BIO-121, BIO-123, BIO-125, BIO-127, BIO-130, BIO-132, BIO-134, BIO-136, BIO-138, BIO-140, BIO-142, BIO-144, BIO-148, BIO-150, BIO-152, BIO-
AMM6: Disposal and Reuse of Spoils, Reusable Tunnel Material, and Dredged Material			
AMM10: Restoration of Temporarily Affected Natural Communities			

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
			153, BIO-162, BIO-163, BIO-164, BIO-165, BIO-166, BIO-176, BIO-183, BIO-186, LU-1, AG-1, REC-1, REC-2, REC-4, REC-9, ECON-6, UT-5, HAZ-1, HAZ-6, HAZ-7

**Commitment:** In the course of constructing or operating project facilities, substantial quantities of material are likely to be removed from their existing locations based upon their properties or the need for excavation of particular features. Spoils refer to excavated native soils and are associated with construction of pumping plant facilities and other water conveyance features. Reusable tunnel material (RTM) refers to the mixture of saturated soils and biodegradable soil conditioners or additives that will be generated by tunneling operations and are appropriate for reuse based upon chemical characterization and physical properties. Dredged material refers to sediment removed from the bottom of a body of water for the purposes of in-water construction, or water conveyance, operation (e.g. sediment collected at intake sites), or storage requirements. The quantities of these materials generated by construction or operation of project facilities would vary depending on the alternative selected for implementation. See further discussion in Chapter 3, *Description of Alternatives*, Section 3.6.1 of the FEIR/FEIS. These materials will require handling, storage, and disposal, as well as chemical characterization, prior to any reuse. Temporary storage areas will be designated for these materials. However, to reduce the long-term effects on land use and potentially support implementation of other project elements, DWR will develop site-specific plans for the beneficial reuse of these materials, to the greatest extent feasible. This commitment is related to AMM6; Disposal and Reuse of Spoils, Reusable Tunnel Material (RTM), and Dredged Material; and AMM10; Restoration of Temporarily Affected Natural Communities; described in Section 3B.4.6 and 3B.4.10 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS. A flowchart outlining the process for disposal and reuse of these materials is shown in Figure 3B-1.

#### **Material Storage Site Determination**

Material refers to Spoils, RTM, sediment, and dredged material. These materials will be temporarily stored in designated storage areas. Sediment collected at intake sites will be stored at solids lagoons adjacent to sedimentation basins. Selection of designated storage areas will be based on, but not limited to, the following criteria.

- Material may be placed in project-designated borrow areas.
- Areas for material storage will be located and average of no more than 10 miles from the construction feature
- Areas for material storage will not be located within 100 feet of existing residential or commercial buildings.
- Areas for material storage will not be located within 100 feet of a military facility.
- Material will be located in areas where it will not interfere with existing roads, rail lines, or infrastructure.
- Placement of material in sensitive natural communities and habitat areas, such as surface waters, wetlands, vernal pool complex, alkali seasonal wetland complex or grassland, native grasslands, riparian areas, or crane roost sites, will be avoided or minimized to the extent feasible, consistent with the biological goals and objectives of the project. If placement of

material in vernal pool complex or alkali seasonal wetland complex cannot be avoided, material will not be placed within 250 feet of vernal pools or alkali seasonal wetlands (i.e., wetted acres will be avoided by at least 250 feet).

- Landowner concerns and preferences will be considered in designating sites for material storage. DWR will consult directly with landowners to refine the storage area footprint to further minimize impacts to surrounding land uses, including agricultural operations.
- Where feasible, dredged material will be stored on higher elevation land that is set back from surface water bodies a minimum of 150 feet. Upland disposal will help ensure that the material will not be in direct contact with surface water prior to its draining, characterization, and potential treatment.

Additional considerations have been made for the storage of RTM. For example, the proposed locations of the storage areas for RTM have been designed to be close to where the material will be brought to the surface, as well as close to where reuse is expected to occur. In some cases, storage areas are located adjacent to barge landings to facilitate movement to other reuse locations in the Delta.

The area required for material storage is flexible and will depend on several factors.

- The speed with which material is brought to the surface, stored, dried, tested, and moved to reuse locations will be important in determining the final size of storage areas. If material can be dried faster and moved offsite more quickly, less area will be needed at each location.
- The depth to which the material is stacked. Material that is stored in deeper piles will require less area but may dry more slowly, extending the time that is needed.
- The proportion of material at one storage area or another. There will be flexibility during construction to prioritize material storage in some areas as opposed to other areas, based on feasibility of reuse or minimization of impacts.

To preserve this flexibility during construction, the analysis assumes a range of storage area footprints that could be needed across different alternatives (based on different assumptions for the depth of material storage). It is anticipated that less or substantially less of the maximum storage area footprint would actually be required during the construction period. The assumptions used for Alternative 4A represent the maximum storage area that would be needed. To illustrate the potential for smaller RTM storage areas, a range of acreages is provided in relevant impact discussions, accounting for the factors listed above.

### ***Material Storage Site Preparation***

A portion of the temporary sites selected for storage of spoils, RTM, and dredged material will be set aside for topsoil storage. The topsoil will be saved for reapplication to disturbed areas post construction. Suitable vegetative material from work site clearing will be chipped, stockpiled, and spread over disturbed soil areas for dust and erosion control purposes where feasible and appropriate and where such material does not contain seeds of nonnative species. Cleared areas will be grubbed as necessary to prepare the areas for grading or other construction activities. Rocks and other inorganic grubbed materials may be used to backfill borrow areas. The contractor will remove from the work site all debris, rubbish, and other materials not directed to be salvaged and dispose of them in an approved disposal site after obtaining all permits required.

## ***Draining, Chemical Characterization, and Treatment***

RTM and associated decant liquid will undergo chemical characterization by the contractor(s) prior to reuse or discharge, respectively, to determine whether it will meet requirements of the National Pollutant Discharge Elimination System (NPDES) and the Central Valley Regional Water Quality Control Board (Central Valley Water Board) requirements. Should RTM decant liquid constituents exceed discharge limits, these tunneling byproducts will be treated to comply with NPDES permit requirements. Discharges from RTM draining operations will be conducted in such a way as to not cause erosion at the discharge point. If RTM liquid requires chemical treatment, chemical treatment will ensure that after treatment RTM liquid will be nontoxic to aquatic organisms.

While additives used to facilitate tunneling will be nontoxic and biodegradable, it is possible that some quantity of RTM will be deemed unsuitable for reuse. In such instances, the material will be disposed of at a site approved for disposal of such material. In the case of RTM, such requirements are anticipated to apply to less than 1% of the total volume of excavated material (or, 270,000 cubic yards).

Hazardous materials excavated during construction will be segregated from other construction spoils and properly handled and disposed in accordance with applicable federal, state, and local regulations. Riverine or in-Delta sediment dredging and dredge material disposal activities may involve potential contaminant discharges not addressed through typical NPDES or State Water Board CGP processes. Construction of Dredge Material Disposal (DMD) sites will likely be subject to the State Water Board CGP (Order No. 2009-0009-DWQ). The following list of best management practices (BMPs) is based on information from the various regulatory programs that exist to manage dredging operations, and will be implemented during handling and disposal of any potentially hazardous dredged material.

- DWR will ensure the preparation and implementation of a pre-dredge sampling and analysis plan (SAP) to be developed and submitted by the contractor(s) as part of the water plan required pursuant to standard DWR contract specifications Section 01570. Prior to initiating any dredging activity, the SAP will evaluate the presence of contaminants that may impact water quality from the following discharge routes.
  - In-stream discharges during dredging.
  - Direct exposure to contaminants in the material through ingestion, inhalation or dermal exposure.
  - Effluent (return flow) discharge from an upland disposal site.
  - Leachate from upland dredge material disposal that may affect groundwater or surface water.
- Conduct dredging within the allowable in-water “work windows” established by USFWS, NMFS, and CDFW.
- Conduct dredging activities in a manner that will not cause turbidity in the receiving water, as measured in surface waters 300 feet down-current from the construction site, to exceed the Basin Plan objectives beyond an approved averaging period by the Regional Water Boards and CDFW. Existing threshold limits in the Basin Plan for turbidity generation are as follows.
  - Where natural turbidity is between 0 and 5 NTUs, increases will not exceed 1 NTU.
  - Where natural turbidity is between 5 and 50 NTUs, increases will not exceed 20%.



- Where natural turbidity is between 50 and 100 NTUs, increases will not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases will not exceed 10%.
- If turbidity generated during dredging exceeds implementation requirements for compliance with the Basin Plan objectives, silt curtains will be utilized to control turbidity. Exceptions to turbidity limits set forth in the Basin Plan may be allowed for dredging operations; in this case, an allowable zone of dilution within which turbidity exceeds the limits will be defined and prescribed in a discharge permit.
- The DMD sites will be designed to contain all of the dredged material and all systems and equipment associated with necessary return flows from the DMD site, including equipment to handle, settle, and/or treat the water prior to return to the receiving water.
- The dredged material disposal site will be designed by a California-licensed professional engineer.
- Two feet of freeboard above the 100-year flood event elevation will be maintained in all dredge material disposal site settling pond(s).
- To the extent feasible dredging equipment will be kept out of riparian areas
- Dredge spoil will be disposed of outside of riparian areas.

DMD sites will be constructed using appropriate BMPs (such as erosion and sediment control measures [see *Develop and Implement Stormwater Pollution Prevention Plans* for examples]) to prevent discharges of contaminated stormwater to surface waters or groundwater. Some of these BMPs may not be applicable to dredging activities that would occur as part of operation and maintenance of the sedimentation basins and solids lagoons at intake sites.

### **Material Reuse Plans**

Prior to construction, draining, and chemical characterization of spoil, RTM, and dredged material, DWR will identify sites for reusing such materials to the greatest extent feasible, in connection with project construction activities, habitat restoration and protection activities, as well as potential beneficial uses associated with flood protection and management of groundwater levels within the Plan Area. DWR will undertake a thorough investigation to identify sites for the appropriate reuse of material, and, based on the properties of the material and in consultation with DWR and other interested parties, DWR will identify the specific site for that material. Potential methods of reuse may include, but not be limited to, the following.

- Fill material for construction of embankments or building pads.
- Fill material for levee maintenance.
- Fill material for habitat restoration projects.
- Fill material for roadway projects.
- Localized subsidence reversal.
- Material for flood response.
- Material to fill project-related borrow areas.
- Other beneficial means of reuse.

Material applied to reduce the localized effects of subsidence will be placed on lower elevation lands and lands adjacent to levees, in order to minimize effects on agricultural practices and improve levee stability. The material may be left in place and used as stockpile to assist in flood response. The feasibility of these approaches to reuse will depend upon the suitability of the material for each purpose based on testing of relevant properties. Site-specific factors such as local demand for materials and the ability to transport the materials would also be important considerations in assessing options for reuse. Prior to undertaking the reuse of the materials for these purposes, DWR shall consider whether such reuse may lead to significant or adverse environmental effects that should be addressed through site-specific environmental documents prepared under NEPA and/or CEQA.

DWR will consult relevant parties, such as landowners, reclamation districts, flood protection agencies, federal and state agencies with jurisdiction in the Delta, and counties, in developing such site-specific spoil, RTM, and dredged material reuse plans. Where DWR determine that it is appropriate that materials be used to prepare land at elevations suitable for project -related restoration or protection of habitat, DWR will coordinate with the project Implementation Office in developing site-specific plans for transporting and applying the materials to restoration work sites.

Following removal of spoils, RTM, and dredged material from temporary storage sites, stockpiled topsoil at these areas will be reapplied, and disturbed areas will be returned, to the extent feasible, to preconstruction conditions, by carefully grading to re-establish surface conditions and elevations and reconstructing features such as irrigation and drainage facilities. Restoration of the RTM draining sites will be designed to prevent surface erosion and transport of sediment. Following these activities, the land will be suitable for returning to agricultural production, under the discretion of the landowner. Such areas may also be appropriate for the implementation of habitat restoration or protection in consideration of the project's biological goals and objectives.

In some instances, it may be infeasible to transport and reuse spoil, RTM, or dredged materials for another use due to factors such as the distances and costs involved and/or any environmental effects associated with transport (e.g., unacceptable traffic concerns or levels of diesel emissions). In such instances, sites will be evaluated for the potential to reapply topsoil over the spoils, RTM, or dredged material and to continue or recommence agricultural activities. If, in consultation with landowners and any other interested parties, DWR determine that continued use of the land for agricultural or habitat purposes will be infeasible, the potential for other productive uses of the land will be examined, including stockpile and staging areas for flood response or the potential for the site to host solar or wind power generation facilities (if deemed acceptable after any necessary environmental review). Such instances may require the acquisition of interests in the land and/or coordination with utilities or other entities; specific arrangements will be made on a case-by-case basis. Environmental review will be required where necessary under CEQA and/or NEPA.

#### *Potential Environmental Effects of RTM Use*

It is anticipated that one or more of these disposal and reuse methods could be implemented on any individual spoil, RTM, or dredged material site. Depending on which combination of these approaches is selected, implementation of material reuse plans could create environmental impacts requiring site-specific analysis under CEQA and/or NEPA. Many of these activities would require trucks or barges to gather and haul materials from one section of the Plan Area to another. For instance, reuse of material in the implementation of tidal habitat associated with restoration activities could require material to be transported to locations in the West Delta ROA (including

Sherman and Twitchell Islands) or the Cosumnes/Mokelumne ROA (including Glannvale Tract and McCormack-Williamson Tract), among other areas. Locations for reuse in support of levee stability could include areas protected by nonproject levees or where levee problems have been reported in the past, including Staten Island, Bouldin Island, Empire Tract, Webb Tract, Bacon Island, or other places in the Delta. While reuse locations near to the spoil or RTM areas would be preferred, such activity would require use of local roadways, which could lead to short-term effects on traffic, noise levels, and air quality. Similarly, earthwork and grading activities to restore sites to preconstruction conditions and to apply the materials consistent with their reuse could create noise and effects on air quality during the implementation of reuse plans.

If materials are applied for the purposes of flood protection, flood response, habitat restoration or subsidence reversal, it is possible that existing topsoil could be overcovered and that Important Farmland or farmland with habitat value for one or more covered species could be disturbed temporarily or converted from active agricultural uses. Additionally, materials placed near levees could affect drainage and/or irrigation infrastructure. If material is used for habitat restoration that would have otherwise been implemented as part of the project, reuse of materials could offset the need for fill materials from other sources.

Depending on the selected reuse strategies, however, implementation of spoil, RTM, and dredged material reuse plans could also result in beneficial effects associated with flood protection and response, habitat creation, and depth to groundwater in areas where the ground level is raised.

#### *Disposal of RTM, Spoils, and Dredged Material*

A Sampling and Analysis Plan (SAP) will be developed for the disposal of RTM and Dredged Materials. This SAP will be consistent with the USACE and USEPA Public Notice 99-4 which provides guidance on SAPs as well as reporting requirements for material test results (USACE and USEPA 1999).

In compliance with Section 13260(a) of the California Water Code, prior to disposal of RTM, a Waste Discharge Requirements (WDR) General Order will be issued by the appropriate Regional Water Board based on submittal of a Report of Waste Discharge (RWD) by DWR (or authorized contractor[s]). The WDR Order will require the Discharger to conduct chemical and physical testing of sediments to be extracted prior to dredging, tunneling, etc. The WDR Order may also require supporting special studies and technical reports. Project operations will be subject to this Order and associated monitoring and reporting program.

For disposal of materials within the San Francisco Bay State Board jurisdiction (Region 2) the SAP and results reports will be submitted to the Dredged Material Management Office (DMMO). The DMMO was created to fulfil the cooperative permitting framework goal of the Long Term Management Strategy (LTMS). The DMMO is made up of the participating LTMS agencies (the State Water Board; the San Francisco Bay Water Board; the San Francisco Bay Conservation and Development Commission [BCDC]; USACE, South Pacific Division and San Francisco District; and USEPA, Region 9), the State Lands Commission, and the California Department of Fish and Game and is tasked with reviewing SAPs, test results and permit applications (USACE and USEPA 1999). The DMMO is discussed further under *Permitting* below.

To ensure that sediment accepted at the proposed sites meets state water quality standards, the proposed project will adhere to testing requirements set forth by the DMMO agencies. Sediments must be analyzed for contaminants prior to approval of each dredging project. The San Francisco

Bay Water Board staff will review sediment testing data from the project to evaluate its conformity with the dredged material acceptance criteria provided in the WDR General Order which will be adopted for the project by the San Francisco Bay Water Board on a site-specific basis.

Disposal of RTM, Spoils, and Dredge Material within the jurisdiction of the Central Valley Water Board (Region 5) will be subject to the requirements identified by the San Francisco Bay Water Board for evaluation, screening, and disposal as, at this time, the San Francisco Bay Water Board has developed more comprehensive and detailed guidelines for the beneficial reuse of materials. For the purposes of evaluation in this document the requirements set forth by the San Francisco Bay Water Board will be used as the criteria for disposal in both Region 2 and Region 5. WDR General Orders will be issued by the respective Regional Water Board which will determine the final criteria and requirements for RTM, Spoils, and Dredge Material Disposal (DMD).

Sacramento River sediment removed from the water column at the intake sedimentation basins will be reused as described below. However, to the maximum extent feasible, the first and preferred disposition of this material will be to reintroduce it to the water column in order to maintain Delta water quality (specifically, turbidity, as a component of delta smelt critical habitat). DWR will collaborate with USFWS and CDFW to develop and implement a sediment reintroduction plan that provides the desired beneficial habitat effects of maintained turbidity while addressing related permitting concerns (the proposed sediment reintroduction is expected to require permits from the Central Valley Water Board and USACE). CDFW, USFWS, and NMFS will have approval authority for this plan and for monitoring measures, to be specified in the plan, to assess its effectiveness.

#### ***Inland Disposal of Materials***

Inland- disposal of RTM, spoils, and dredge material will be subject to evaluation and testing as described in the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual (U.S. Environmental Protection Agency and U.S. Army Corps of Engineers 1998), also referred to as the "Inland Testing Manual" (ITM). The ITM was prepared by the USEPA and the USACE as part of the Long-Term Management Strategy and was developed to establish guidance for conducting testing of dredged materials and to assess the potential for contaminant-related impacts associated with dredged material disposal in open water.

Material disposal within the baseline is regulated under Section 404 of the Clean Water Act (CWA) and is subject to compliance with the CWA Section 404(b)(1) Guidelines. As described by the LTMS Management Plan, July 2001, the baseline includes San Francisco Bay and adjacent waters of the U.S., including wetlands. Sediment Quality Criteria (SQC) have not been developed for the Bay Area that represent a single sediment chemical concentration below which disposal poses minimal risk to the aquatic environment. LTMS agencies implemented a measure in 2001 stating that sediment quality screening guidelines for various beneficial uses will be provided by the San Francisco Bay Water Board's *Sediment Screening Criteria and Testing Requirement for Wetland Creation and Upland Beneficial Reuse*.

#### ***Wetland/Upland Material Disposal***

Wetland and upland beneficial reuse of RTM, spoils, and dredge material at restoration sites in Region 2 and 5 will be subject to evaluation and testing as required by the San Francisco Bay Water Board Waste Discharge Requirements Order which will be adopted for the project by the San Francisco Bay Water Board and the Central Valley Water Board. The San Francisco Bay Water Board has developed a *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines*

(Draft May 2000). This document aids in the screening and testing of dredged materials for beneficial reuse and outlines the anticipated requirements; however, permits for beneficial reuse will be site-specific for the reuse sites identified in the RTM plan for the proposed project. For the purposes of the proposed project it is assumed that RTM is subject to the same screening and testing guidelines as dredged materials.

These guidelines contain testing requirements and evaluation of test results for materials which are intended to be used in upland beneficial reuse environments such as habitat/wetland creation, levee maintenance/fill, and construction fill. The screening values which will be used by the San Francisco Bay Water Board and the Central Valley Water Board to evaluate suitability of materials are contained within.

Sediment characterization will follow the protocols specified in the DMMO guidance document, *"Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region"* (USACE Public Notice 01-01, or most current version) with the exception that the water column bioassay simulating in-bay unconfined aquatic disposal will be replaced with the modified effluent elutriate test, as described in Appendix B of the Inland Testing Manual, for both water column toxicity and chemistry (DMMO suite of metals only) and the Water Board May 2000 staff report, *"Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines,"* or most current revised version. San Francisco Bay Water Board-recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse to Dredged Material are contained in Table 3-3 below.

#### ***RTM and Dredge Material Screening***

Sediment dredging sites would undergo initial screening and site evaluation to determine and identify any potential for contamination to be present as hazardous waste. Such screening may include review of site documentation, field reconnaissance surveys, historical aerial imagery, and potential in-water observation and analysis (e.g., visual survey, sediment sampling).

Potential presence of hazardous waste would be evaluated with appropriate sediment sampling and chemical characterization procedures. Confirmed presence of hazardous wastes would trigger the need for further planning and analysis of the extent of contamination, and appropriate removal and disposal at a licensed hazardous waste disposal facility.

#### ***Screening Criteria for Inland Disposal***

Sediment Quality Criteria (SQC) have not been developed for the Bay Area that represent a single sediment chemical concentration below which disposal poses minimal risk to the aquatic environment (LTMS 2001). The LTMS agencies plan to develop a Regional Implementation Manual (RIM) describing testing and analysis requirements for disposal of dredged material in the Bay Area. The RIM will include regional test protocols, contaminants of concern, appropriate species for bioassays, and quality assurance guidance. Sediment quality guidelines, new or modified testing procedures, reference sites, and other testing and suitability-related information will be included as they become available. (LTMS, 2001)

To facilitate and promote beneficial reuse of dredged material, the LTMS agencies implemented the following measure in 2001:

The San Francisco Bay Water Board will revise *Sediment Screening Criteria and Testing Requirements for Wetland Creation and Upland Beneficial Reuse*, which will provide guidelines on testing (including recommendations for reference sites) and sediment quality screening for various beneficial uses. A

draft version of the revised document has been issued for public comment and, following the close of the comment period, will be revised and finalized through the formal administrative process (LTMS, 2001)

The San Francisco Bay Water Board's *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines* (Draft May 2000) is discussed below and provides the guidelines for testing and screening of sediment disposed of for wetland/upland beneficial uses and apply to inland disposal of sediment as well as. These screening guidelines are assumed to be adopted for testing and screening for disposal within the Region 5.

### **Screening Criteria**

Sediment characterization will follow the protocols specified in:

- The DMMO guidance document, "Guidelines for Implementing the Inland *Testing Manual in the San Francisco Bay Region*" (USACE Public Notice 01-01, or most current version) with the exception that the water column bioassay simulating in-bay unconfined aquatic disposal will be replaced with the modified effluent elutriate test, as described in Appendix B of the Inland Testing Manual, for both water column toxicity and chemistry (DMMO suite of metals only); and
- San Francisco Bay Water Board Draft May 2000 staff report, "Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines," or most current revised version.

Surface and foundation material are subject to acceptance criteria derived from the San Francisco Bay Water Board guidelines. The following are anticipated reuse options for RTM and dredge material:

- fill material for construction of embankments or building pads;
- fill material for levee maintenance;
- fill material for habitat restoration projects;
- fill material for roadway projects;
- localized subsidence reversal;
- material for flood response;
- material to fill project-related borrow areas; or
- other beneficial means of reuse.

The San Francisco Bay Water Board guidelines identify two general classes of dredged material suitable for reuse. Once a potential method of reuse has been identified, dredged material, spoils, and RTM, in the amount necessary to fulfill that reuse method, will be screened to determine if the material meets the wetland surface material screening values or the wetland foundation material screening values which will be contained in the San Francisco Bay Water Board and Central Valley Water Board Water Quality Certification. Material which does not meet the wetland surface material screening values but does meet the wetland foundation material screening values will likely still be suitable for the upland reuse options listed above. The screening criteria developed for the San Francisco Bay Water Board guidelines were based on statistical estimates of sediment toxicity and ambient concentrations of chemicals found in the sediments of San Francisco Bay (San Francisco Bay Regional Water Quality Control Board 2000).

Wetland surface material is material which is placed in the biotic zone during wetland creation and exhibits bulk sediment concentrations that fall within the range of ambient conditions in the central portions of San Francisco Bay. The screening guidelines for wetland surface material are the most protective of sensitive potential biological receptors. Wetland surface material is not expected to pose a threat to water quality or the aquatic environment (San Francisco Bay Regional Water Quality Control Board 2000).

Wetland foundation material is material used in wetland creation and restoration projects which is covered by surface material and is not in contact with flora and fauna. These materials generally fall within the range of ambient conditions typically found around the margins of the Bay. This material is not of a quality that constitutes a hazardous or listed waste, but has potential for biological effects and should not come in contact with sensitive potential biological receptors (San Francisco Bay Regional Water Quality Control Board 2000). The screening guidelines below (Table 3-3) are intended to protect biological receptors from adverse environmental effects during material placement or leachate after placement. Wetland foundation material must be tested to ensure that any water that leaches through the material will not adversely impact the aquatic environment. Final determination of sediment suitability for any specific permit action, however, will be site-specific and will take into consideration placement of foundation materials.

Material which does not meet the criteria for wetland surface material but does meet the criteria for wetland foundation material may be used for upland purposes contingent upon the leaching characteristics and evaluation of direct human contact with the material. Sediment for upland reuse which involves continual human contact will need to be evaluated for constituents whose ambient concentrations are not an issue for sediments in wetlands or water but would exceed the USEPA Region 9 Preliminary Remediation Goals.

**Table 3-3. Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged Material**

Analyte	Wetland Surface Material		Wetland Foundation Material	
	Concentration	Decision Basis	Concentration	Decision Basis
<b>METALS (mg/kg)</b>				
Arsenic	15.3	Ambient Values	70	ER-M
Cadmium	0.33	Ambient Values	9.6	ER-M
Chromium	112	Ambient Values	370	ER-M
Copper	68.1	Ambient Values	270	ER-M
Lead	43.2	Ambient Values	218	ER-M
Mercury	0.43	Ambient Values	0.7	ER-M
Nickel	112	Ambient Values	120	ER-M
Selenium	0.64	Ambient Values		
Silver	0.58	Ambient Values	3.7	ER-M
Zinc	158	Ambient Values	410	ER-M
<b>ORGANOCHLORINE PESTICIDES/PCBS (lg/kg)</b>				
DDTS, sum	7.0	Ambient Values	46.1	ER-M
Chlordanes, sum	2.3	TEL	4.8	PEL
Dieldrin	0.72	TEL	4.3	PEL
Hexachlorocyclohexane, sum	0.78	Ambient Values		

Analyte	Wetland Surface Material		Wetland Foundation Material	
	Concentration	Decision Basis	Concentration	Decision Basis
Hexachlorobenzene	0.485	Ambient Values		
PCBs, sum	22.7	ER-L	180	ER-M
<b>POLYCYCLIC AROMATIC HYDROCARBONS (lg/kg)</b>				
PAHs, total	3,390	Ambient Values	44,792	ER-M
Low molecular weight PAHs, sum	434	Ambient Values	3,160	ER-M
High molecular weight PAHs, sum	3,060	Ambient Values	9,600	ER-M
1-Methylnaphthalene	12.1	Ambient Values		
1-Methylphenanthrene	31.7	Ambient Values		
2,3,5-Trimethylnaphthalene	9.8	Ambient Values		
2,6-Dimethylnaphthalene	12.1	Ambient Values		
2-Methylnaphthalene	19.4	Ambient Values	670	ER-M
2-Methylphenanthrene		Ambient Values		
3-Methylphenanthrene		Ambient Values		
Acenaphthene	26.0	Ambient Values	500	ER-M
Acenaphthylene	88.0	Ambient Values	640	ER-M
Anthracene	88.0	Ambient Values	1,100	ER-M
Benz(a)anthracene	412	Ambient Values	1,600	ER-M
Benzo(a)pyrene	371	Ambient Values	1,600	ER-M
Benzo(e)pyrene	294	Ambient Values		
Benzo(b)fluoranthene	371	Ambient Values		
Benzo(g,h,i)perylene	310	Ambient Values		
Benzo(k)fluoranthene	258	Ambient Values		
Biphenyl	12.9	Ambient Values		
Chrysene	289	Ambient Values	2,800	ER-M
Dibenz(a,h)anthracene	32.7	Ambient Values	260	ER-M
Fluoranthene	514	Ambient Values	5,100	ER-M
Fluorene	25.3	Ambient Values	540	ER-M
Indeno(1,2,3-c,d)pyrene	382	Ambient Values		
Naphthalene	55.8	Ambient Values	2,100	ER-M
Perylene	145	Ambient Values		
Phenanthrene	237	Ambient Values	1,500	ER-M
Pyrene	665	Ambient Values	2,600	ER-M
Source: San Francisco Bay Regional Water Quality Control Board Guidelines 2000.				

### ***Draining of RTM, Spoils, and Dredge Material Disposal (DMD)***

RTM, dredge material, and associated decant liquid from RTM/DMD/wetland restoration sites will undergo chemical characterization by the contractor(s) prior to reuse or discharge, respectively, to determine whether it will meet the site specific National Pollutant Discharge Elimination System (NPDES) and associated Regional Water Board requirements. The Regional Water Board requirements to be met are dependent upon the location determined in the Material Storage Site Determination; this could be San Francisco Bay Water Board or Central Valley Water Board.



## **NPDES Requirements**

Water Quality Based Effluent Limits (WQBELs) will be determined by the appropriate Regional Water Board on a site-specific basis. Effluent Limits are determined based upon: California Toxics Rule (40 CFR Section 131.38); National Toxics Rule; Primary and Secondary maximum contaminants levels (MCLs) (EPA Region 9 MCLs for drinking water standards) and; Basin Plan Site-specific objectives (the San Francisco Bay Water Board and Central Valley Water Board).

The most stringent criteria will be applied for WQBELs. Monthly average and daily maximum effluent limits will be set by the Regional Water Board in the NPDES. Water quality objectives are achieved primarily through adoption of water discharge requirements. If required, treatment systems will be developed and implemented to reduce contaminant discharges to ensure compliance with the NPDES permit terms and conditions for the RTM/DMD drainage.

## **Sediment and Water Quality Standards**

RTM and DM in-water disposal, upland disposal, and wetland restoration activities will be subject to regulatory standards for surface water from direct discharge and DMD dewatering and drainage return flows, and long-term operations-related discharges associated with groundwater leachate, and stormwater runoff. Sediment surfaces will be regulated subject to sediment quality objectives and policies.

Surface Water Quality Criteria/Objectives for the Central Valley Water Board are contained in the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* and in the *San Francisco Bay Basin (Region 2) Water Quality Control Plan* for the San Francisco Bay Water Board. These Basin Plans designate beneficial uses, establish water quality objectives, contain implementation plans and policies for protecting waters of the basin, and incorporate by reference, plans and policies adopted by the State Water Board.

The Delta waterways are listed pursuant to CWA Section 303(d) as impaired for chlorpyrifos, DDT, diazinon, Group A pesticides, mercury, unknown toxicity and has recently been listed for pathogens near the Port of Stockton turning basin. A portion of the Delta is listed for electrical conductivity, and low dissolved oxygen causes impairment in the Stockton Deep Water Ship Channel from Channel Point to Disappointment Slough.

The USEPA adopted the *National Toxics Rule* (NTR) on February 5, 1993 and the *California Toxics Rule* (CTR) on May 18, 2000. These Rules contain water quality standards applicable to the proposed project. The State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters (SIP), Enclosed Bays, and Estuaries of California* (known as the State Implementation Plan) which contains guidance on implementation of the *National Toxics Rule* and the *California Toxics Rule*. The Basin Plans contain the "Policy for Application of Water Quality Objectives" that requires consideration of published standards of other agencies in implementing narrative water quality objectives. The CTR and NTR standards may be incorporated in waste discharge requirements where appropriate to implement the Basin Plans consistent with the Policy for Application of Water Quality Objectives.

At a minimum, water designated for domestic or municipal supply will not contain concentrations of chemical constituents in excess of the California maximum contaminant levels (MCLs) specified in the following provisions of Title 22, CCR: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) of Section 64449. The

Regional Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

### *Antidegradation Policy*

State Water Board Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality Waters in California") requires that the Regional Board, in regulating the discharge of waste, must maintain high quality waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Board's policies (e.g., quality that exceeds water quality objectives).

The discharges authorized by the WDR General Order will be consistent with State Water Board Resolution 68-16 and 40 CFR 131.12 (the federal antidegradation policy). The WDR General Order will establish requirements that will result in best practicable treatment or control of the discharge to assure that pollution or nuisance will not occur and that the discharges will not unreasonably affect beneficial uses or result in water quality less than prescribed in the Basin Plans. The assimilative capacity of the underlying soil should prevent degradation of groundwater from infiltration of incidental waste constituents. The receiving water and groundwater limits determined in the WDR General Order are intended to ensure that the assimilative capacity will not be exceeded. If the discharge is causing such an increase, then the proposed project may be required to cease the discharge, implement source control, change the method of disposal, or take other action to prevent groundwater or surface water degradation.

### *Sediment Quality Objectives*

RTM/DMD and wetland restoration activities also will consider the narrative sediment quality objectives of the *Water Quality Control Plan for Enclosed Bays and Estuaries* adopted by the State Water Board in April 2011. Implementation procedures for these objectives are under development.

### *Permitting*

The following agencies also have jurisdiction over dredging and disposal projects:

- California Department of Fish and Wildlife
- National Marine Fisheries Service
- United States Fish and Wildlife Service
- United States Army Corps of Engineers
- State Lands Commission
- San Francisco Bay Regional Water Quality Control Board or Central Valley Regional Water Quality Control Board (Location Dependent)
- San Francisco Bay Conservation and Development Commission

### *Permitting Agencies*

Numerous state and federal agencies regulate dredging and dredged material disposal in the Bay Area. The primary state and federal agencies involved in permitting such projects are the San Francisco Bay and Sacramento-San Joaquin Delta are the BCDC, SLC, San Francisco Bay Water Board,

Central Valley Water Board, USACE, and USEPA. These agencies established the DMMO to coordinate the regulatory processes for dredging and disposal projects. Different laws and regulations govern their roles and responsibilities, but often their purposes and goals overlap (Table 3-4 below).

**Table 3-4. Basis for Regulatory Authority and Mandates of Primary State and Federal Agencies with Jurisdiction over Dredging and Dredged Material Disposal Projects in the San Francisco Bay Region**

			San Francisco Bay Water Board/Central Valley Water Board	SLC
USACE	USEPA	BCDC		
<b>Basis for Regulatory Authority</b>				
CWA MPRSA Rivers and Harbors Act of 1899	CWA MPRSA	McAteer-Retris Act Suisun Marsh Protection Act Coastal Zone Management Act	Porter Cologne Water Quality Control Act CWA	Ownership of State Lands
<b>Mandate Includes</b>				
Regulate placement of dredged or fill materials into waters of the U.S. Regulate transportation of dredged material for the purpose of ocean disposal Protect and maintain navigable capacity of nation's waters	Maintain integrity of nation's waters Oversee disposal of materials, including dredged material, into ocean water	Reduce Bay fill Protect and manage coastal zone resources	Protect the beneficial uses of waters of the state	Manage state's sovereign lands for purposes consistent with the public trust.
<b>Regulatory Authority of DMMO Agencies for Dredged Material Disposal Environments</b>				
<b>In-Bay</b>				
Department of the Army permit pursuant to CWA and Rivers and Harbors Act of 1899	CWA permit oversight	Permit, pursuant to McAteer-Petris Act (MPA) or Suisun Marsh Preservation Act (SMPA), or federal consistency Determination (CD), pursuant to Coastal Zone Management Act (CZMA), for dredging and disposal	CWA Section 401 Water Quality Certification (WQC) or Waste Discharge Requirements (WDRs) pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands

USACE	USEPA	BCDC	San Francisco Bay Water Board/Central Valley Water Board	SLC
<b>Wetland (existing) enhancement</b>				
Department of Army permit pursuant to CWA	CWA permit oversight	Permit, pursuant to MPA or SMPA, or CD, pursuant to CZMA, for dredging, permit or CD for disposal if site within BCDC jurisdiction	CWA Section 401 WQC or WDRs pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands
<b>Restoration of diked historic baylands</b>				
Department of the Army permit pursuant to Rivers and Harbors Act of 1899, and to CWA if disposal site in waters of the US	CWA permit oversight if disposal site in waters of the US	Permit, pursuant to MPA or SMPA, or CD, pursuant to CZMA, for dredging, permit or CD for disposal if site within BCDC jurisdiction	CWA Section 401 WQC or WDRs pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands
<b>Upland disposal (other than diked historic baylands, waters of the US)</b>				
Advisory, Department of Army permit pursuant to CWA for return flows to waters of US	Advisory, CWA permit oversight	Advisory	CWA Section 401 WQC or WDRs pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands
<b>Landfill</b>				
Advisory	Advisory	Advisory	CWA Section 401 WQC or WDRs pursuant to Porter-Cologne Water Quality Control Act	Permit or lease if disposal on state lands
Source: Long Term Management Strategy 2001.				

#### 1 DMMO

2 The DMMO does not issue permits; instead, it makes consensus-based recommendations to the  
3 member agencies on the adequacy of permit applications. This includes recommendations on the  
4 completeness of the permit applications, adequacy of sediment sampling and analysis plans, and  
5 suitability of sediments for proposed disposal environments. The member agencies may also  
6 recommend permit conditions to be included in individual member agency permits.

7 In the event a project-related dredging and disposal action does not fall under the jurisdiction of  
8 each of the DMMO member agency, it will still be reviewed by the DMMO, but only the agencies with  
9 regulatory authority participate in approving sediment sampling plans or making recommendations

on sediment suitability. Agencies without regulatory authority will have the opportunity to review the project proposals in an advisory capacity only.

Project are initially reviewed by the DMMO and later move through the permitting processes of the individual agencies. The process for obtaining approvals has three phases: (1) suitability determination; (2) permit process; and (3) episode approval, described below. The DMMO is a comprehensive entry point for the permitting progress; however, applicants and permittees must obtain separate approval from the appropriate DMMO member agencies.

The DMMO member agencies determine suitability of the permit application by making a joint recommendation to the individual member agencies on whether the sediments to be dredged are appropriate, in terms of potential for environmental impacts, for the proposed disposal or reuse site. The recommendation is usually based on the results of sediment testing (LTMS 2001).

The project proponents will submit to the DMMO either a sediment Sampling and Analysis Plan (SAP), or a written request (with supporting information) requesting a "Tier I" exclusion from testing requirements based on factors such as previous testing history and physical characteristics of the material proposed for dredging.

The CWA Section 404(b)(1) guidelines provide the substantive criteria used by the USEPA, USACE, and the San Francisco Bay Water Board in evaluating proposed discharges to waters of the U.S and fundamental to the CWA Section 404(b)(1) guidelines is the guideline that dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or cumulatively on the ecosystem(s) of concern.

The DMMO will review the SAP to determine consistency with state and federal guidance on testing protocols and to determine whether the proposed testing program would provide the agencies with sufficient information to make a suitability determination of the material for disposal at a specific site. Upon review of a SAP, the DMMO will either approve the SAP, approve the SAP with conditions, or not approve the SAP (LTMS 2001).

Upon approval of the SAP, the project proponents will proceed with testing the sediments proposed for dredging.

The report of these testing results will be submitted to the DMMO for review, at which time the DMMO may recommend one of the following to their respective agencies:

- **Sediments are suitable for the proposed disposal environment**, the applicant may proceed to the next phase (permit process) of authorization.
- **Require further information, such as additional testing of sediments**, to make a recommendation, the applicant may provide the requested information or choose to alter the project in such a way that the agencies can make a determination without additional information.<sup>4</sup>
- **Some or all of the sediments are not suitable for the proposed disposal environment**, the applicant may elect to not undertake or modify the project, such as by proposing another disposal location, and obtain a suitability determination for the modified project (often the suitability determination process can proceed more quickly for a modified project because of the availability of information from the original project proposal). (LTMS 2001).

The project proponents will conduct confirmation sampling of incoming dredged sediment to demonstrate that contaminant concentrations do not exceed the applicable numeric acceptance criteria in the Waste Discharge Permit. Surface grab samples will be collected from each sediment placement cell as it is being filled. The number of samples collected will be consistent with the volume-based frequency employed during the pre-dredge sediment testing program described in the Waste Discharge Permit. Potential minimum sediment sampling guidelines are presented in Table 3-5.

**Table 3-5. Minimum Sediment Sampling Guidelines**

Dredge Volume (cubic yards)	Total Number of Samples	Number of Samples per Composite	Total Number of Tests
5,000-20,000	4	4	1
20,000-100,000	8	4	2
100,000-200,000	12	4	3
200,000-300,000	16	4	4
300,000-400,000	20	4	5
400,000-500,000	24	4	6

Source: San Francisco Bay Regional Water Quality Control Board Screening and Testing.

***Permits Required for Dredging and Material Disposal***

***National Pollutant Discharge Elimination System***

Any project proposing to discharge pollutants into surface water must file a complete National Pollutant Discharge Elimination System (NPDES) permit application form with the appropriate Regional Water Board. The Regional Water Board requirements to be met are dependent upon the location determined in the Material Storage Site Determination.

***Water Quality Certification under Section 401 of the CWA***

Under federal CWA Section 401 every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification that the proposed activity will comply with state water quality standards. Most Certifications are issued in connection with USACE Section 404 CWA permits for dredge and fill discharges.

***Section 404 CWA***

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. The proposed project will require a Section 404 permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g. certain farming and forestry activities).

The purpose of the program is to ensure that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. During the permit application process, the project proponents will be required to demonstrate that steps were taken to avoid impacts to wetlands, streams and other aquatic resources; that potential impacts were minimized; and that compensation will be provided for all remaining unavoidable impacts (USEPA 2015).

An individual permit will be required for any significant impacts as a result of the proposed project. Individual permits are reviewed by the USACE.

### *Section 1602 Streambed Alteration Agreement*

A CDFW Section 1602 Streambed Alteration Agreement will be required for disposal of RTM, spoils, and Dredged Material. This permit governs proposed project activities that will modify the physical characteristics of the stream and activities that may affect fish and wildlife resource that use the stream and surrounding habitat. The proposed project will require a Master Agreement; this is an agreement for a duration longer than 5 years that is similar to a programmatic agreement.

### *Potential State Lands Permit or Lease*

A Permit or Lease may be required for dredging on State land from the California State Lands Commission. For work in harbors and waterways, dredging permits are issued by the Commission.

### *Suisun Marsh Preservation Act Permit*

The BCDC issues marsh development permits for any activity that qualifies as a marsh development within the primary management area of the Suisun Marsh. A project permit will be required for any new or maintenance dredging or for the disposal of dredged material within the BCDC's jurisdiction.

### *Section 10 Permit*

The proposed project will require a USACE Section 10 permit (Rivers & Harbors Act) for dredging operations within waterways of the United States and may require a Clean Water Act (CWA) Section 404 permit for the discharge of the "effluent" to surface waters. Each project requires a NPDES permit as well as a CWA Section 401 Water Quality Certification from the Regional Board. Such Certification will be issued; in conjunction with each approved "Notice of Applicability". The federal permits must be obtained prior to discharge.

### *Waste Discharge Requirements*

Projects proposing to use wetland foundation material are expected to require Waste Discharge Permits from the San Francisco Bay Water Board and the Central Valley Water Board to ensure that there will be minimal risk of adverse impacts. The appropriate Regional Water Board will review the proposed project, then may grant or deny certification. Additionally, the Regional Water Board may choose to act under the authority of the state Porter Cologne Water Quality Control Act. The Regional Water Board would do this by issuing waste discharge requirements for the project in combination with the water quality certification.

Water quality certifications and waste discharge requirements often contain conditions to protect water resources. The proposed project will meet these conditions during the term of the permit. The BCDJ also regulates dredging and disposal under the provisions of the McAteer-Petris Act. The Regional Water Board will implement these measures through its issuance of Waste Discharge Requirements and Water Quality Certifications under Section 401 of the CWA or other orders. In addition, the Water Board may require pre- and post-dredge surveys to determine disposal volumes and compliance with permit conditions.

Projects eligible for enrollment under the WDR General Order may also be subject to regulation by CDFW, NMFS, USFWS, and SLC.

## **Reusable Tunnel Material Testing Report Results**

Testing of RTM was conducted on samples collected during geotechnical investigations from 2009 through 2012. Environmental tests were conducted on identified baseline and conditioned soil samples. The results of the geotechnical, environmental, and planting suitability tests, RTM appears to be suitable for the above proposed beneficial uses following storage and drying. Consultation with the governing regulatory agency would be required to obtain the necessary approvals and permits. This study consisted of a limited number of samples and tests, and does not constitute a complete evaluation of RTM. RTM and associated decant liquid will undergo chemical characterization by the contractor(s) prior to reuse or discharge, respectively. The results of these tests can be found in the Reusable Tunnel Material Testing Report (URS 2014).

## ***Restoration of Temporarily Affected Natural Communities***

Prior to initiating covered activities that will result in temporary effects on natural communities in the project area, a restoration and monitoring plan will be developed. Restoration and monitoring plans will be prepared by DWR and kept on file for review by any of the fish and wildlife agencies at their request.

Restoration and monitoring plans will include methods for stockpiling and storing topsoil, restoring soil conditions, and revegetating disturbed areas; monitoring and maintenance schedules; adaptive management strategies; reporting requirements; and success criteria. Restoration will commence immediately after construction is completed, or if construction is completed during a season that is inappropriate for planting the natural community, restoration will commence during the appropriate season for restoring that natural community (e.g., fall plantings for riparian natural community) and within 1 year of completing construction.

With the exception of some borrow sites, temporarily disturbed areas will be restored to the natural community present prior to disturbance. Cultivated lands that are used for borrow sites and cannot be restored to cultivated lands following disturbance, because of topographic alteration, may be restored as grasslands.

**Responsible Parties:** DWR will develop site-specific plans for the beneficial reuse of materials to the greatest extent feasible. DWR will ensure the preparation and implementation of a pre-dredge sampling and analysis plan (SAP) to be developed and submitted by the contractors as part of the water plan required per standard DWR contract specifications Section 01570. Additionally, this SAP will be consistent with the USACE and USEPA Public Notice 99-4 which provides guidance on SAPs as well as reporting requirements for material test results (USACE and USEPA, 1999).

Construction contractors will implement plans for disposal and reuse of spoils. DWR will consult relevant parties, such as landowners, reclamation districts, flood protection agencies, federal and state agencies with jurisdiction in the Delta, and counties, in developing such site-specific spoil, RTM, and dredged material reuse plans. Where DWR determines that it is appropriate that materials be used to prepare land at elevations suitable for Alternative 4A-related restoration or protection of habitat, the DWR will develop site-specific plans for transporting and applying the materials to restoration work sites.

The SAP and results reports will be submitted to the Dredged Material Management Office (DMMO). The Dredged Material Management Office was created to fulfil the cooperative permitting framework goal of the Long Term Management Strategy (LTMS). The DMMO is made up of the participating LTMS agencies [the State Water Board; the San Francisco Bay Water Board; the San



Francisco Bay Conservation and Development Commission (BCDC); the USACE, South Pacific Division and San Francisco District; and the USEPA, Region 9], the State Lands Commission, and the CDFW and is tasked with reviewing SAPs, test results and permit applications (USACE and USEPA, 1999).

**Regulating/Permitting Agencies:** Inland disposal of RTM and Dredge Material will be subject to evaluation and testing as described in the *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual* (USEPA and USACE, 1998), also referred to as the “Inland Testing Manual” (ITM). The ITM was prepared by the USEPA and the USACE as part of the Long-Term Management Strategy and was developed to establish guidance for conducting testing of dredged materials and to assess the potential for contaminant-related impacts associated with dredged material disposal in open water (USEPA and USACE, 1998).

As the San Francisco Bay Water Board Guidelines provides the most comprehensive and detailed guidance for placement of dredged material, it will be used to identify the testing requirements and screening values all dredged, spoil, and RTM will adhere to for the project.

**Location:** Spoils, RTM, and dredged material will be temporarily stored in designated storage areas (sediment collected at intake sites would be stored at solids lagoons adjacent to sedimentation basins). The area required for material storage is flexible and will depend on several factors which are described above under *Material Storage Site Determination*.

Prior to construction, draining, and chemical characterization of spoil, RTM, and dredged material, DWR will identify sites for reusing such materials to the greatest extent feasible, in connection with Alternative 4A construction activities, habitat restoration and protection activities, as well as potential beneficial uses associated with flood protection and management of groundwater levels within the Plan Area. DWR will undertake a thorough investigation to identify sites for the appropriate reuse of material, and, based on the properties of the material and in consultation with other interested parties, DWR will identify the specific site for that material.

**Timing:** This environmental commitment consists of multiple actions, occurring simultaneously and successively:

- Material Storage Site Determination Phase – Potential spoils and reuse sites are already identified and evaluated; however, determination of placement locations will be determined during construction based upon the factors described above under *Material Storage Site Determination*.
- Material Storage Site Preparation Phase– Preparation of the sites selected through the material storage site determination process will occur prior to placement of any materials at the designated storage areas.
- Draining, Chemical Characterization, and Treatment Phase – Preparation and implementation of a pre-dredge sampling and analysis plan (SAP) will be developed and submitted by the Contractors as part of the water required per standard DWR contract specifications Section 01570. Chemical characterization of the materials will occur during construction prior to reuse or discharge. Dredging will be conducted within the allowable in-water “work windows” established by USFWS, NMFS, and CDFW.
- Material Reuse Plans Phase – Material Reuse Plans will be developed on a site-specific basis prior to initiating construction, draining, and chemical characterization of RTM. Once sites are

identified for the appropriate reuse of RTM, DWR will consult with relevant parties on the development of the site-specific Material Reuse Plans.

**Monitoring:** RTM and associated decant liquid will undergo chemical characterization as designated by the SAP prior to reuse or discharge to determine whether it will meet National Pollutant Discharge Elimination System (NPDES) and, dependent upon its placement location, the requirements of the Central Valley Water Board, San Francisco Bay Water Board, and/or Long Term Management Strategy.

DWR will ensure preparation and implementation of pre-dredge SAP. Sediment characterization contained in the SAP will be consistent with follow the protocols specified in:

- The DMMO guidance document, “Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region” (Corps Public Notice 01-01, or most current version) with the exception that the water column bioassay simulating in-bay unconfined aquatic disposal will be replaced with the modified effluent elutriate test, as described in Appendix B of the Inland Testing Manual, for both water column toxicity and chemistry (DMMO suite of metals only); and,
- Water Board May 2000 staff report, “Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines,” or most current revised version.

The San Francisco Bay Water Board Guidelines identifies two general classes of dredged material suitable for reuse. Once a potential method of reuse has been identified, dredged material and RTM, in the amount necessary to fulfill that reuse method, will be screened to determine if it meets the wetland surface material screening values or the wetland foundation material screening values which will be contained in the San Francisco Bay Water Board Water Quality Certification. Material which does not meet the wetland surface material screening values but does meet the wetland foundation material screening values will likely still be suitable for the upland reuse options listed above. The screening criteria developed for the San Francisco Bay Water Board Guidelines were based on statistical estimates of sediment toxicity and ambient concentrations of chemicals found in the sediments of San Francisco Bay (San Francisco Bay Regional Water Quality Control Board 2000).

Wetland surface material is material which is placed in the biotic zone during wetland creation and exhibits bulk sediment concentrations that fall within the range of ambient conditions in the central portions of San Francisco Bay. The screening guidelines for wetland surface material (Figure 1) are the most protective of sensitive potential biological receptors. Wetland surface material is not expected to pose a threat to water quality or the aquatic environment (San Francisco Bay Regional Water Quality Control Board 2000).

Wetland foundation material is material used in wetland creation and restoration projects which is covered by surface material and is not in contact with flora and fauna. These materials generally fall within the range of ambient conditions typically found around the margins of the Bay. This material is not of a quality that constitutes a hazardous or listed waste (San Francisco Bay Regional Water Quality Control Board 2000), but has potential for biological effects and should not come in contact with sensitive potential biological receptors. The screening guidelines below (Table 3-6) are intended to protect biological receptors from adverse environmental effects during material placement or leachate after placement. Wetland foundation material must be tested to ensure that any water that leaches through the material will not adversely impact the aquatic environment. Final determination of sediment suitability for any specific permit action, however, will be site-specific and will take into consideration placement of foundation materials.

Material which does not meet the criteria for wetland surface material but does meet the criteria for wetland foundation material may be used for upland purposes contingent upon the leaching characteristics and evaluation of direct human contact with the material (San Francisco Bay Regional Water Quality Control Board 2000). Sediment for upland reuse which involves continual human contact will need to be evaluated for constituents whose ambient concentrations are not an issue for sediments in wetlands or water but would exceed the EPA Region IX Preliminary Remediation Goals.

**Table 3-6. Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged Material**

Analyte	Wetland Surface Material		Wetland Foundation	
	Concentration	Decision	Concentration	Decision
<b>METALS (mg/kg)</b>				
Arsenic	15.3	Ambient	70	ER-M
Cadmium	0.33	Ambient	9.6	ER-M
Chromium	112	Ambient	370	ER-M
Copper	68.1	Ambient	270	ER-M
Lead	43.2	Ambient	218	ER-M
Mercury	0.43	Ambient	0.7	ER-M
Nickel	112	Ambient	120	ER-M
Selenium	0.64	Ambient		
Silver	0.58	Ambient	3.7	ER-M
Zinc	158	Ambient	410	ER-M
<b>ORGANOCHLORINE PESTICIDES/PCBS (!lg/kg)</b>				
DDTs, sum	7.0	Ambient	46.1	ER-M
Chlordanes, sum	2.3	TEL	4.8	PEL
Dieldrin	0.72	TEL	4.3	PEL
Hexachlorocyclohexane, sum	0.78	Ambient		
Hexachlorobenzene	0.485	Ambient		
PCBs, sum	22.7	ER-L	180	ER-M
<b>POLYCYCLIC AROMATIC HYDROCARBONS (!lg/kg)</b>				
PAHs, total	3,390	Ambient	44,792	ER-M
Low molecular weight PAHs, sum	434	Ambient	3,160	ER-M
High molecular weight PAHs, sum	3,060	Ambient	9,600	ER-M
1-Methylnaphthalene	12.1	Ambient		
1-Methylphenanthrene	31.7	Ambient		
2,3,5-Trimethylnaphthalene	9.8	Ambient		
2,6-Dimethylnaphthalene	12.1	Ambient		
2-Methylnaphthalene	19.4	Ambient	670	ER-M
2-Methylphenanthrene		Ambient		
3-Methylphenanthrene		Ambient		
Acenaphthene	26.0	Ambient	500	ER-M
Acenaphthylene	88.0	Ambient	640	ER-M
Anthracene	88.0	Ambient	1,100	ER-M
Benz(a)anthracene	412	Ambient	1,600	ER-M
Benzo(a)pyrene	371	Ambient	1,600	ER-M
Benzo(e)pyrene	294	Ambient		
Benzo(b)fluoranthene	371	Ambient		
Benzo(g,h,i)perylene	310	Ambient		
Benzo(k)fluoranthene	258	Ambient		
Biphenyl	12.9	Ambient		
Chrysene	289	Ambient	2,800	ER-M
Dibenz(a,h)anthracene	32.7	Ambient	260	ER-M

Analyte	Wetland Surface Material		Wetland Foundation	
	Concentration	Decision	Concentration	Decision
Fluoranthene	514	Ambient	5,100	ER-M
Fluorene	25.3	Ambient	540	ER-M
Indeno(1,2,3-c,d)pyrene	382	Ambient		
Naphthalene	55.8	Ambient	2,100	ER-M
Perylene	145	Ambient		
Phenanthrene	237	Ambient	1,500	ER-M
Pyrene	665	Ambient	2,600	ER-M
(San Francisco Regional Water Quality Control Board Guidelines 2000)				

Placement of RTM will be consistent with the relevant TMDLS and Basin Plans for the appropriate regional water quality control board.

The Contractor will be responsible for ensuring dredging activities are conducted in a manner that will not cause turbidity in the receiving water, as measured in surface waters 300 feet down-current from the construction site, to exceed the Basin Plan objectives beyond an approved averaging period by the Regional Water Board and CDFW.

**Reporting Requirements:** Reporting requirements will be consistent with protocols specified in the DMMO guidance document, "Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region" (Corps Public Notice 01-01, or most current version) and the Water Board May 2000 staff report, "Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines," or most current revised version.

## 3.24 Environmental Commitment: Provide Notification of Maintenance Activities in Waterways & AMM36: Notification of Activities in Waterways

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Provide Notification of Maintenance Activities in Waterways	DWR and Construction Contractors	Prior to construction or maintenance of any in-water	Impact REC-3, Impact REC-7, Impact ECON-3, Impact ECON-9, Impact ECON-11, Impact ECON-15
AMM36: Notification of Activities in Waterways			

**Commitment:** Before maintenance activities begin in waterways, DWR will ensure the posting of information regarding the maintenance of any in-water project facilities (e.g., intakes for the water conveyance facility) at nearby affected Delta marinas and public launch ramps. This information will include maintenance site location(s), maintenance schedules, speed limits, and identification of no-wake zone and/or detours, where applicable. Information on detours would include site-specific details regarding any temporary partial channel closures, including contacting the U.S. Coast Guard, boating organizations, marina operators, city or county parks departments, and California Department of Parks and Recreation (DPR), where applicable. This commitment is related to

AMM36, Notification of Activities in Waterways, described in Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS.

**Responsible Parties:** DWR and its construction contractors

**Regulating/Permitting Agencies:** N/A for this environmental commitment.

**Location:** Specific locations for notices include marinas, parks, and recreation sites, as examples. The specific locations of these notices will be determined by the informed stakeholders.

**Timing:** Prior to maintenance or construction of in-water project facilities and at least 30 days prior to activity.

**Monitoring:** DWR will determine specific location and types of notices to be provided. Once these are determined, DWR will contract with the appropriate construction contractor to implement notification and will then monitor implementation of this commitment/AMM and ensure that posting of information is complete 30 days prior to maintenance activities.

**Reporting Requirements:** DWR will be notified upon completion of posted notification by the construction contractor for each maintenance activity site.

## 3.25 Environmental Commitment: Selenium Management & AMM27

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
Selenium Management	DWR	During tidal natural communities restoration design schedule	WQ-26, AQUA-116, BIO-56, BIO-59, BIO-61, BIO-63, BIO-65, BIO-67, BIO-68, BIO-71, BIO-74, BIO-89, BIO-102, BIO-119, BIO-120, BIO-123, BIO-129b, BIO-133, BIO-136, BIO-147, BIO-183
AMM 27: Selenium Management			

**Commitment:** The activities described in this environmental commitment require a series of actions to identify and evaluate potentially feasible actions to minimize conditions that promote bioaccumulation of selenium in restored areas. This commitment is related to AMM27, *Selenium Management*, described in Section 3B.4.27 of Appendix 3B, *Environmental Commitments, AMMs, and CMs* of the FEIR/FEIS.

This environmental commitment would include DWR performing the following actions.

- Before ground-breaking activities associated with site-specific restoration occurs, DWR will retain a qualified water quality specialist, wildlife, or fisheries biologist with expertise in selenium management to develop a comprehensive Selenium Monitoring and Management Plan (SMMP). The SMMP will evaluate site-specific restoration conditions and include design elements that minimize conditions that could be conducive to increases of bioavailable selenium in restored areas. As part of the SMMP, the qualified specialist will assess whether, in light of site-specific conditions, the proposed restoration project could cause potentially significant increases in bioavailable selenium due to increased residence time for water-borne selenium within inundated portions of the restoration area. If any such potentially significant effects are identified, the SMMP will include a Mitigation Plan that includes components that will reduce

levels of bioavailable selenium such that the affected water body (or portion of a water body) would not be expected to cause measurably higher body burdens in aquatic organisms, thus reducing those effects to less-than-significant levels. The design elements would be integrated into site-specific restoration designs based on site conditions, community type (tidal marsh, nontidal marsh, floodplain), and potential organic forms of selenium in water. Specific approaches that are intended to avoid or minimize potential increases in selenium bioavailability at future restoration sites could include the following:

- Minimizing bioavailable selenium concentrations associated with anoxic or near-anoxic conditions by reducing the amount of organic material at a restoration site (however, where this measure could limit the benefit of restoration areas by limiting the amount of carbon they supply to the Delta as a whole, it would run directly counter to the goals and objectives of the project, so it should not be implemented in such a way that it reduces the benefits to the Delta ecosystem provided by restoration areas), and
- Managing vegetation, water levels and residence time to reduce bioavailable selenium concentrations and bioaccumulation, as feasible.
- Define adaptive management strategies that can be implemented to monitor and minimize, as feasible, actual post-restoration bioavailable selenium concentrations in the water, and if necessary, bioaccumulation of selenium. The adaptive management strategies could be applied where site conditions indicate a high probability of selenium bioaccumulation and effects on covered species.
- For each restoration project under Environmental Commitment 4 Tidal Habitat Restoration, a project-specific SMMP would be developed and would incorporate all of the management measures discussed below or include an explanation of why a particular measure cannot be incorporated. The plan would include the following components:
  - A brief review of predicted changes in water residence time at assessment locations in the Delta, expected changes in bioavailable selenium concentrations, and possible changes in bioaccumulation by fish and aquatic invertebrates.
  - A determination if sampling for characterization of selenium concentrations in biota and/or post-restoration monitoring is warranted.
  - A plan for conducting the sampling for selenium, if characterization sampling is recommended. To cover any sampling or monitoring, the project-specific SMMP would also include a quality assurance/quality control program specifying sampling procedures, analytical methods, data review requirements, and data management and reporting procedures.
  - Statistical analyses of selenium water concentrations and fish tissue levels collected over time to evaluate trends in these parameters.

This environmental commitment provides specific tidal habitat restoration design elements to reduce the potential for bioaccumulation of selenium and its bioavailability in tidal habitats. Consequently, this commitment would be implemented as part of the tidal habitat restoration design schedule.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** Regional Water Quality Control Boards

**Location:** Restoration areas.

**Timing:** This mitigation would be implemented as part of the tidal natural communities restoration design schedule

**Monitoring:** The effectiveness of selenium management to reduce selenium concentrations and/or bioaccumulation would be evaluated separately for each restoration effort as part of design and implementation. The SMMP for each restoration effort that could cause potentially significant increases in bioavailable selenium due to increased residence time for water-borne selenium within inundated portions of the restoration area will contain site-specific monitoring and reporting requirements as required for each site. DWR will monitor the development of the SMMP and its compliance with this environmental commitment through regular reviews.

**Reporting Requirements:** The SMMP for each restoration effort that could cause potentially significant increases in bioavailable selenium due to increased residence time for water-borne selenium within inundated portions of the restoration area will contain site-specific monitoring and reporting requirements as required for each site. The SMMP shall include components that will reduce levels of bioavailable selenium such that the affected water body (or portion of a water body) would not cause measurably higher body burdens in aquatic organisms. DWR will deliver the SMMP to the appropriate Regional Water Board for review after completion.

## 3.26 Environmental Commitment: Comply with Caltrans' Division of Aeronautics on Location of Conveyance Facilities within 2 Miles of Airport Boundary

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Comply with Caltrans' Division of Aeronautics on Location of Conveyance Facilities Within 2 Miles of Airport Boundary	DWR	Prior to construction	HAZ-4

**Commitment:** If the proposed sites of project conveyance facilities are within 2 miles, measured by air line, of that point on an airport runway, or runway proposed by an airport master plan, which is nearest the site, DWR shall, before acquiring title to property for construction of the facilities or for an addition to a present site, notify the Caltrans' Division of Aeronautics prior to initiating construction of the project conveyance facilities, in writing, of the proposed acquisition. The department shall investigate the proposed site and, within 30 working days after receipt of the notice, shall submit to DWR a written Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) of the investigation and its recommendations concerning acquisition of the site. DWR would comply with Caltrans' recommendations based on its investigations and compliance with the recommendations of the OE/AAA.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A

**Location:** Sites of project conveyance facilities within 2 miles, measured by air line, of that point on an airport runway or runway proposed by an airport master plan, which is nearest the site.

**Timing:** Prior to construction.

**Monitoring:** DWR will notify the Caltrans's Division of Aeronautics of sites which fall within the criteria laid out in the above *Action*.

**Reporting Requirements:** DWR will retain records of written OE/AAAs and recommendations concerning acquisition of the site. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this environmental commitment.

### 3.27 Environmental Commitment: Use of Slurry Cutoff Walls to Protect Groundwater during Dewatering Operations

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Use of Slurry Cutoff Walls to Protect Groundwater during Dewatering Operations	DWR	Prior to and during construction	Impact GW-1, GW-2, GW-3, GW-4, GW-5

**Commitment:** Groundwater conditions are generally within 5 to 10 feet of the ground surface near the intake locations, the Intermediate Forebay, tunnel shafts, and Clifton Court/Byron Tract Forebay. The bottom elevation (or invert) of the intake structures, tunnel shafts, and forebays will be below the groundwater elevation prior to construction. Depending on the construction methods to be used, the groundwater will need to be removed from the construction area prior to or after excavation. DWR shall use methods to remove the groundwater in a manner that would protect groundwater elevations and quality in adjacent properties. These methods will include use of slurry cutoff walls at the construction sites, as summarized below.

- **Intakes:** Deep slurry cutoff walls at the intakes will be installed to reduce or avoid levee under-seepage in accordance with USACE requirements and to reduce the groundwater inflow into deep excavations within the intake construction sites. The deep slurry cutoff walls will be installed around the structures to minimize the need for dewatering and the related effects on groundwater conditions near the construction locations. The structures at the intake locations to be constructed below the ground surface will be constructed using impermeable structural material (e.g., concrete). Along the Sacramento River, cutoff walls will be extended into the levees in accordance with USACE requirements and a sheet pile cofferdam will be constructed prior to dewatering and excavation of the site.



- 1 • Tunnel Shafts: Slurry diaphragm walls will be installed prior to construction of the tunnel shafts  
2 to minimize the need for dewatering. The tunnel shafts and the bottom of the tunnel shafts will  
3 be constructed of impermeable material to prevent groundwater from entering the tunnel  
4 shafts.
- 5 • Forebays: Deep slurry cutoff walls at the forebays will be installed to reduce or avoid levee  
6 under-seepage in accordance with Division of Safety of Dams requirements for water storage  
7 facilities. The deep slurry cutoff walls around the forebays will minimize the need for  
8 dewatering and the related effects on groundwater conditions near the construction locations.  
9 At Clifton Court Forebay, new embankments around the construction site will include  
10 installation of a sheet pile cofferdam prior to dewatering and excavation of the site.

11 Construction of slurry cutoff walls along the water bodies at the intake locations and the forebays  
12 will extend to the levees where the slurry cutoff wall will connect to a diaphragm wall installed  
13 along the levee. The diaphragm wall will serve as a structural wall for the intake. The slurry cutoff  
14 wall also will be constructed along the backside of the intake structure sites. This slurry cutoff wall  
15 will be tied into the proposed slurry cutoff wall that parallels the river or sloughs. In this  
16 arrangement, the entire construction area within the slurry cutoff wall perimeter can be dewatered  
17 without impacting surrounding groundwater levels.

18 The slurry cutoff wall will extend to a depth below the invert elevation of the excavation to allow for  
19 removal of groundwater below the excavation and formation of a structurally-sound foundation for  
20 the intake, levee, or other structures. The depths of the slurry cutoff wall will be dependent upon the  
21 local geology and could change even at the same intake location or along the forebay levee. The  
22 design objective will be to extend the slurry cutoff wall to a clay layer that will allow the wall to form  
23 a relatively good seal that would force the groundwater to move around or under the slurry cutoff  
24 walls.

25 During design geotechnical borings will be completed to develop specific design parameters for  
26 slurry cutoff walls and seepage control methods at each location. It is anticipated that the design  
27 parameters will not only be different for each site, but will change along the extent of the slurry  
28 cutoff wall at each site. The geotechnical information will be used to identify groundwater flow and  
29 recharge rates, groundwater dewatering rates, horizontal extents of the zone of influence, and  
30 depths of potential groundwater elevation changes that could occur if the slurry cutoff walls were  
31 not installed.

### 32 **Responsible Parties:** DWR

33 **Regulating/Permitting Agencies:** Along the Sacramento River, cutoff walls will be extended into  
34 the levees in accordance with USACE requirements.

35 **Location:** At intake, tunnel shaft, and forebay construction sites.

36 **Timing:** Prior to and during construction.

37 **Monitoring:** DWR will ensure intake, tunnel shaft, and forebay designs are in accordance with this  
38 environmental commitment. Monitoring of the effectiveness of these design elements will be  
39 performed as described in Mitigation Measures GW-1, as described above in Section 2.4, *Mitigation*  
40 *Measure GW-1: Maintain Water Supplies in Areas Affected by Construction Dewatering.*

41 **Reporting Requirements:** All monitoring data will be reported on a monthly basis to DWR and in  
42 an annual summary report prepared by the DWR and its construction contractors that will evaluate

the impacts of the construction dewatering and the effectiveness of the slurry cutoff walls for that year. The monthly reports will contain tabular water level data as well as changes in water levels from the previous months. The annual report will summarize monthly data and show the most recent water level contour map as well as the pre-construction contour map. The final report will include water-level contour maps for the area of the groundwater aquifer that is affected by dewatering showing initial, pre-construction water levels and final, post-construction water levels. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this environmental commitment.

### 3.28 Environmental Commitment: Use of Slurry Cutoff Walls and Toe Drains to Minimize Seepage from Forebays

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Use of Slurry Cutoff Walls and Toe Drains to Minimize Seepage from Forebays	DWR	Prior to and during construction	Impact GW-1, GW-2, GW-4, GW-5

**Commitment:** The forebays will be constructed with slurry cutoff walls around the embankments. These walls will avoid or minimize water from flowing through the embankments in accordance with the DWR Division of Safety of Dams requirements. The impermeable or low-permeability slurry cutoff walls will extend to an impermeable soil layer. The impermeable layers could be discontinuous around the perimeter of the forebays. In those areas, the potential for groundwater flow at depths under the embankments will be minimized through the placement of grout along the bottom of the slurry cutoff walls.

The material along the bottom of the forebays could range from impermeable to low-permeability soils. When the surface water elevations in the forebays rise towards the maximum design surface water elevation, the weight of the water has the potential to result in groundwater flow through the embankments. French drains and/or interceptor wells will be installed on the land-side of the forebay levees and implementation of a groundwater monitoring program to reduce the potential for seepage onto adjacent properties.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** N/A for this mitigation measure.

**Location:** Forebay construction sites.

**Timing:** Prior to and during construction.

**Monitoring:** DWR will ensure forebay designs are in accordance with this environmental commitment. Monitoring of the effectiveness of these design elements will be performed as

described in Mitigation Measures GW-5, as described above in section 2.5, *Mitigation Measure GW-5: Agricultural Lands Seepage Minimization*.

**Reporting Requirements:** All monitoring data will be reported on a monthly basis and in an annual summary report prepared by the DWR that will evaluate the potential impacts of project operation for that year. The monthly reports will contain tabular water level as well as compute changes in water levels from the previous months. The annual report will summarize monthly data and evaluate if impacts have occurred. Monitoring data and summary reports will be submitted to DWR. After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this environmental commitment.

## Avoidance and Minimization Measures

### 4.1 Avoidance and Minimization Measure 2: Construction Best Management Practices and Monitoring

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM2: Construction Best Management Practices and Monitoring	DWR	Prior to and during construction	Impact BIO-1, BIO-3, BIO-5, BIO-6, BIO-8, BIO-9, BIO-11, BIO-12, BIO-14, BIO-15, BIO-17, BIO-18, BIO-20, BIO-21, BIO-23, BIO-24, BIO-28, BIO-29, BIO-31, BIO-32, BIO-33, BIO-35, BIO-36, BIO-38, BIO-39, BIO-44, BIO-45, BIO-46, BIO-47, BIO-49, BIO-50, BIO-52, BIO-53, BIO-57, BIO-59, BIO-66, BIO-67, BIO-69, BIO-71, BIO-72, BIO-74, BIO-75, BIO-78, BIO-83, BIO-85, BIO-87, BIO-89, BIO-91, BIO-93, BIO-95, BIO-98, BIO-100, BIO-102, BIO-104, BIO-107, BIO-109, BIO-111, BIO-113, BIO-115, BIO-117, BIO-119, BIO-121, BIO-123, BIO-125, BIO-127, BIO-130, BIO-132, BIO-134, BIO-136, BIO-138, BIO-140, BIO-142, BIO-144, BIO-148, BIO-150, BIO-152, BIO-153, BIO-162, BIO-163, BIO-164, BIO-165, BIO-166, BIO-169, BIO-170, BIO-171, BIO-172, BIO-173, BIO-176, BIO-183

**Action:** DWR will ensure that all construction and operation and maintenance activities in and adjacent to sensitive resources areas (e.g., fish, wildlife, and plant species habitats, and natural communities) implement BMPs and have construction monitored by qualified technical specialists. Depending on the resource of concern and construction timing, construction activities and areas will be monitored for compliance with water quality regulations (SWPPP monitoring) and with AMMs developed for sensitive biological resources (biological monitoring).

Before implementing an approved project, DWR will prepare a construction monitoring plan for the protection of fish, wildlife, and plant species. The plan will include the following elements.

- Reference to or inclusion of the SWPPP prepared under the CGP, where one is needed (AMM3).
- Summaries or copies of planning and preconstruction surveys (if applicable) for natural communities and special-status species.
- Description of AMMs to be implemented, including a description of project-specific BMPs or additional measures not otherwise included in the FEIR/FEIS.
- Descriptions of monitoring parameters (e.g., turbidity), including the specific activities to be monitored (e.g., dredging, grading activities) and monitoring frequency and duration (e.g., once per hour during all in-water construction activities), as well as parameters and reporting

criteria (e.g., Turbidity is not to exceed 10 NTU above background. Exceedances will be reported to the Environmental Manager and the construction superintendent must identify and correct the cause.).

- Description of roles and responsibilities of the monitors and protocols for notifying the Environmental Manager and Construction Manager of concerns.
- A monitoring log prepared by the construction monitor, which documents the day's construction activities, notes any problems identified and solutions implemented to rectify those problems, and notifications to the construction superintendent and/or the fish and wildlife agencies regarding any exceedances of specific parameters (i.e., turbidity) or observations of special-status species.

The following measures will be implemented prior to and during construction activities or other project activities for the protection of fish, wildlife and plant species, their designated critical habitat, and natural communities. Additional measures may be developed for site-specific conditions or specific special-status species during the review and preconstruction planning of individual projects.

- All in-water construction activities will be conducted during the allowable in-water work windows established by USFWS, NMFS, and CDFW for the protection of fish species.
- Qualified biologists will monitor construction activities in areas identified during the planning stages and species/habitat surveys as having fish, wildlife, and plant species, their designated critical habitat, and other sensitive natural communities. The intent of the biological monitoring is to ensure that specific AMMs that have been integrated into the project design and permit requirements are being implemented correctly during construction and are working appropriately and as intended for the protection of special-status species, natural communities, and the environment in general.
- Biological monitors will be professional biologists selected for their knowledge of the special-status species and natural communities that may be affected by construction activities. The qualifications of the biologist(s) will be presented to the fish and wildlife agencies prior to initiating construction. If a special status species is observed in an active work area, the biological monitors shall immediately provide the Construction Manager with its location and recommendation on how to handle the special status species. The Construction Manager shall work with the contractor and biological monitor to take steps necessary to ensure the protection of the species consistent with permits and authorizations.
- During construction, the nondisturbance buffers described under the special-status species' AMMs, below, will be established and maintained as necessary. A qualified biologist will monitor the site consistent with the requirements described for special-status species to ensure that buffers are enforced and resources are not disturbed.
- Exclusionary fencing will be placed at the edge of active construction activities and staging areas (after having been cleared by biological surveys) to restrict wildlife access from the adjacent habitats. The need for exclusionary fencing will be determined during the preconstruction surveys and construction planning phase and may vary depending on the species and habitats present. Exclusion fencing will be maintained such that it is intact during rain events. Fencing will be checked daily by the construction inspector or environmental monitors. Damaged fencing will be repaired promptly to reduce the risk of access by sensitive species. Active construction and staging areas will be delineated with high-visibility temporary fencing at least

4 feet in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment outside the defined project footprint. Such fencing will be inspected and maintained daily by the construction foreman until completion of the project. The fencing will be removed from areas only after all construction activities are completed and equipment is removed. No project-related construction activities will occur outside the delineated project construction areas.

- Project-related vehicles will observe a speed limit of 20 miles per hour in construction areas, except on county roads and state and federal highways. A vehicle speed limit of 20 miles per hour will be posted and enforced on all nonpublic access roads, particularly on rainy nights when California tiger salamanders and California red-legged frogs are most likely to be moving between breeding and upland habitats. Extra caution will be used on cool days when giant garter snakes may be basking on roads.
- All ingress/egress at the project site will be restricted to those routes identified in the project plans and description. Cross-country access routes will be clearly marked in the field with appropriate flagging and signs.
- All vehicle parking will be restricted to established areas, existing roads, or other suitable areas.
- To avoid attracting predators, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in enclosed containers and trash will be removed and disposed of at an appropriate facility at least once a week from the construction or project site. All contracts with contractors will include language reminding them of the obligations to abide by all laws related to litter. These obligations will be applicable both within work areas and while traveling along public roads within the Plan Area. Vehicles carrying trash will be required to have loads covered and secured to prevent trash and debris from falling onto roads and adjacent properties.
- To avoid injury or death to wildlife, no firearms will be allowed on the project site except for those carried by authorized security personnel or local, state, or federal law enforcement officials.
- To prevent harassment, injury, or mortality of sensitive wildlife by dogs or cats, no canine or feline pets will be permitted in the active construction area.
- To prevent inadvertent entrapment of special status wildlife during construction, in areas that may be occupied by special status wildlife at risk for entrapment, all excavated, steep-walled holes or trenches more than 1 foot deep will be covered at the close of each working day with plywood or similar material, and/or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If a special-status species is encountered during construction work, to the extent feasible, construction activities should be diverted away from the animal until it can be moved by a USFWS- or CDFW-approved biologist.
- Capture and relocation of trapped or injured wildlife can only be performed by personnel with appropriate USFWS and CDFW handling permits. Any sightings and any incidental take will be reported to CDFW and USFWS via email within 1 working day of the discovery. A follow-up report will be sent to these agencies, including dates, locations, habitat description, and any corrective measures taken to protect special-status species encountered. For each special-status species encountered, the biologist will submit a completed CNDDDB field survey form (or equivalent) to CDFW no more than 90 days after completing the last field visit to the project site.

- 1 • Plastic monofilament netting or similar material will not be used for erosion control, because  
2 smaller wildlife may become entangled or trapped in it. Acceptable substitutes include coconut  
3 coir matting or tackified hydroseeding compounds. This limitation will be communicated to the  
4 contractor through specifications or special provisions included in the construction bid  
5 solicitation package.
- 6 • Special-status wildlife can be attracted to den-like structures such as pipes and may enter stored  
7 pipes and become trapped or injured. All construction pipes, culverts, or similar features;  
8 construction equipment; or construction debris left overnight in areas that may be occupied by  
9 special status species that could occupy such structures will be inspected by the biological  
10 monitor prior to being used for construction. Such inspections will occur at the beginning of  
11 each day's activities, for those materials to be used or moved that day. If necessary, and under  
12 the direct supervision of the biologist, the structure may be moved up to one time to isolate it  
13 from construction activities, until the special-status species has moved from the structure of  
14 their own volition, been captured and relocated, or otherwise been removed from the structure.
- 15 • Rodenticides and herbicides will be used in accordance with the manufacturer recommended  
16 uses and applications and in such a manner as to prevent primary or secondary poisoning of  
17 special-status fish, wildlife, and plant species and depletion of prey populations upon which they  
18 depend. All uses of such compounds will observe label and other restrictions mandated by the  
19 U.S. Environmental Protection Agency (EPA), the California Department of Pesticide Regulation,  
20 and other appropriate state and federal regulations, as well as additional project-related  
21 restrictions imposed by USFWS, NMFS and/or CDFW. If rodent control must be conducted in San  
22 Joaquin kit fox habitat, zinc phosphide should be used because of its proven lower risk to kit fox.  
23 In addition, the method of rodent control will comply with those discussed in the 4(d) rule  
24 published in the final listing rule for tiger salamander (69 *Federal Register* [FR] 47211–47248).  
25 The rodent control restrictions described above will be implemented *in perpetuity*.
- 26 • Nets or bare hands may be used to capture and handle special-status fish or wildlife species. A  
27 professional biologist will be responsible for and direct any efforts to capture and handle  
28 special-status species. Any person who captures and handles special-status species will not use  
29 soaps, oils, creams, lotions, insect repellents, solvents or other potentially harmful chemicals of  
30 any sort on their hands within 2 hours before handling special-status fish or wildlife. Latex  
31 gloves will not be used either. To avoid transferring diseases or pathogens between aquatic  
32 habitats during the course of surveys or the capture and handling of special-status fish or  
33 wildlife species, all species captured and handled will be released in a safe, aquatic environment  
34 as close to the point of capture as possible, and not transported and released to a different water  
35 body. When capturing and handling special-status amphibians, the biologists will follow the  
36 Declining Amphibian Task Force's *Code of Practice* (U.S. Fish and Wildlife Service no date [a]).  
37 While in captivity, individual amphibians will be kept in a cool, moist, aerated environment such  
38 as a dark (i.e., green or brown) bucket containing a damp sponge. Containers used for holding or  
39 transporting these species will be sanitized and will not contain any standing water.
- 40 • CDFW, NMFS and/or USFWS will be notified within 1 working day of the discovery of, injury to,  
41 or mortality of a special-status species that results from project-related construction activities  
42 or is observed at the project site. Notification will include the date, time, and location of the  
43 incident or of the discovery of an individual special-status species that is dead or injured. For a  
44 special-status species that is injured, general information on the type or extent of injury will be  
45 included. The location of the incident will be clearly indicated on a U.S. Geological Survey 7.5-  
46 minute quadrangle and/or similar map at a scale that will allow others to find the location in the

field, or as requested by CDFW, NMFS and/or USFWS. The biologist is encouraged to include any other pertinent information in the notification.

- Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities will be minimized by adhering to the following activities. Project designs will limit or cluster permanent project features to the smallest area possible while still permitting achievement of project goals. To minimize temporary disturbances, all project-related vehicle traffic material storage will be restricted to established and/or designated ingress/egress points, construction areas, and other designated staging/storage areas. These areas will also be included in preconstruction surveys and, to the extent possible, will be established in locations disturbed by previous activities to prevent further effects.
- Spoils, RTM, and dredged material will be disposed of at an approved site or facility in accordance with all applicable federal, state, and local regulations.
- Upon completion of the project, all habitat subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, will be recontoured to preproject elevations, as appropriate and necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to “temporary” disturbance is any area that is disturbed to allow for construction of the project, but is not required for operation or maintenance of any project-related infrastructure, will not be subject to further disturbance after project completion by DWR, and has the potential to be revegetated. Appropriate methods and native plant species used to revegetate such areas will be determined on a site-specific basis in consultation with USFWS, NMFS, and/or CDFW, and biologists (AMM10).

**Responsible Parties:** DWR and its construction contractors

**Regulating/Permitting Agencies:** USFWS, NMFS, and/or CDFW

**Location:** Around and near construction sites

**Timing:** Prior to and during construction

**Monitoring:** DWR will appoint a construction monitor to oversee implementation of all measures described in the action above. The construction monitor will also perform inspections as necessary to ensure compliance by construction contractors with these measures and coordinate inspections by other appointed monitors and inspectors.

**Reporting Requirements:** Prior to construction, the construction monitor will report to DWR on the status of the monitoring plans described in the action above. During construction, the construction monitor will report to DWR weekly on the results of construction inspections related to the measures above and compliance with wildlife agency requirements.



## 4.2 Avoidance and Minimization Measure 9: Underwater Sound Control and Abatement Plan

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM 9: Underwater Sound Control and Abatement Plan	DWR and Construction Contractors	Prior to and during construction	Impact AQUA-1, AQUA-19, AQUA-37, AQUA-55, AQUA-73, AQUA-92, AQUA-109, AQUA-127, AQUA-145, AQUA-163, AQUA-181, AQUA-199

**Action:** DWR will develop and implement an underwater sound control and abatement plan outlining specific measures that will be implemented to avoid and minimize the effects of underwater construction noise on covered fish species, particularly the underwater noise effects associated with impact pile driving activities. Potential underwater noise effects on covered fish species from impact pile driving will be avoided and minimized by regulating the period during which impact pile driving is permitted and by controlling and/or abating underwater noise generated during impact pile driving.

The plan will be provided to the appropriate fish and wildlife agencies for their review and approval prior to implementation of any in-water impact pile driving activities. The plan will evaluate the potential effects of underwater noise on covered fish species in the context of applicable and interim underwater noise thresholds established for disturbance and injury of fish (California Department of Transportation 2009). The thresholds include the following.

- Injury threshold for fish of all sizes includes a peak sound pressure level of 206 decibels (dB) relative to 1 micropascal.
- Injury threshold for fish less than 2 grams is 183 dB cumulative sound exposure level, and 187 dB cumulative sound exposure level for fish greater than or equal to 2 grams.
- Disturbance threshold for fish of all sizes is 150 dB root mean square relative to 1 micropascal.

The specific number of pilings that will be driven per day with an impact pile driver, and thus the number of pile strikes per day, will be defined as part of the design of project elements that require pilings.

Impact pile driving activities may be required at the north Delta intake sites, barge landing sites, at construction sites at and near Clifton Court Forebay, and at the Head of Old River Gate construction site. The sound control and abatement plan will restrict in-water work to the in-water work window specified in permits issued by the fish and wildlife agencies.

The underwater noise generated by impact pile driving will be abated using the best available and practicable technologies. Examples of such technologies include, but are not limited to, the use of cast-in-drilled-hole rather than driven piles; use of vibratory rather than impact pile driving equipment; using an impact pile driver to proof piles initially placed with a vibratory pile driver; noise attenuation using of pile caps or cushions (e.g., wood or micarta), bubble curtains, air-filled fabric barriers, or isolation piles; or installation of piling-specific cofferdams. Specific techniques to be used will be selected based on site-specific conditions and practicality.

In addition to establishing protocols for attenuating underwater noise levels produced during in-water construction activities, DWR will develop operational protocols when impact pile driving is

necessary, to further minimize potential underwater noise impacts. These operational protocols will be used to minimize the effects of impact pile driving on covered fish species. These protocols may include, but not be limited to, the following: monitoring the in-water work area for fish that may be showing signs of distress or injury as a result of pile driving activities and stopping work when distressed or injured fish are observed; initiating impact pile driving with a “soft-start,” such that pile strikes are initiated at reduced impact and increase to full impact over several strikes to provide fish an opportunity to move out of the area; and when more than one pile driving rig is employed, ensure pile driving activities are initiated in a way that provides an escape route and avoids “trapping” fish between pile driving and underwater noise levels that could potentially cause injury. These protocols are expected to avoid and minimize the overall extent, intensity, and duration of potential underwater noise effects associated with impact pile driving activities.

**Responsible Parties:** DWR and hired construction contractors will be responsible for designing and implementing an Underwater Noise Abatement Plan. The Underwater Noise Abatement Plan must be prepared in consultation with the Engineer and subject to final approval by DWR. Construction contractors will be responsible for implementing approved noise abatement measures.

**Regulating/Permitting Agencies:** The plan will be provided to the appropriate fish and wildlife agencies for their review and approval prior to implementation of any in-water impact pile driving activities.

**Location:** An Underwater Noise Abatement Plan will be implemented as appropriate at all underwater construction sites.

**Timing:** DWR and the Construction Contractors will establish underwater noise abatement measures required for each underwater construction site prior start of pile driving activities. After approval of measures DWR will provide the Underwater Noise Abatement Plans to the appropriate fish and wildlife agencies. During construction the noise abatement measures will be implemented by construction contractors.

**Monitoring:** DWR will monitor development of site-specific Underwater Noise Abatement Plans and inclusion of requirements for implementation on contracts with construction contractors. DWR will develop operational protocols when impact pile driving is necessary, to further minimize potential underwater noise impacts which may include monitoring.

DWR and the construction contractors are responsible for overseeing the implementation of the Underwater Noise Abatement Plan. DWR will deploy a qualified monitor to oversee implementation of, and compliance with, the noise abatement plan during underwater construction.

**Reporting Requirements:** DWR will review and approval all Underwater Noise Abatement Plans prior to implementation. Underwater Noise Abatement Plans will be provided to the appropriate fish and wildlife agencies for their review and approval prior to implementation of any in-water impact pile driving activities.

## 4.3 Avoidance and Minimization Measure 10: Restoration of Temporarily Affected Natural Communities

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM 10: Restoration of Temporarily Affected Natural Communities	DWR	Prior to, during, and after construction	Impact BIO-1, BIO-6, BIO-9, BIO-11, BIO-12, BIO-15, BIO-18, BIO-20, BIO-21, BIO-23, BIO-24, BIO-28, BIO-31, BIO-32, BIO-33, BIO-35, BIO-36, BIO-38, BIO-39, BIO-44, BIO-45, BIO-46, BIO-47, BIO-49, BIO-50, BIO-52, BIO-53, BIO-83, BIO-95, BIO-100, BIO-104, BIO-109, BIO-117, BIO-138, BIO-152, BIO-153, BIO-162, BIO-163, BIO-164, BIO-165, BIO-166, BIO-176, BIO-186

**Commitment:** Prior to initiating project activities that will result in temporary effects on natural communities within the Plan Area, site-specific restoration and monitoring plan will be developed. Restoration and monitoring plans will be prepared by DWR and kept on file for review by any of the fish and wildlife agencies at their request. A list of restoration and monitoring plans for temporary construction impacts will be provided to the fish and wildlife agencies as part of the project's annual report.

Restoration and monitoring plans will include methods for stockpiling and storing topsoil, restoring soil conditions, and revegetating disturbed areas; monitoring and maintenance schedules; adaptive management strategies; reporting requirements; and success criteria. Restoration and monitoring plans will be prepared by DWR in consultation with CDFW, USFWS, and NMFS. These site-specific restoration and monitoring plans may be modified over time and in light of changing circumstances. Restoration will commence immediately after construction is completed, or if construction is completed during a season that is inappropriate for planting the natural community, restoration will commence during the appropriate season for restoring that natural community (e.g., fall plantings for riparian natural community) and within 1 year of completing construction.

With the exception of some borrow sites, temporarily disturbed areas will be restored to the natural community present prior to disturbance. Cultivated lands that are used for borrow and RTM sites and cannot be restored to cultivated lands following disturbance, because of topographic alteration, may be restored as grasslands.

The natural communities that are restored in temporarily disturbed areas may count toward the protection requirements under Environmental Commitment 3 if the areas meet the siting and design criteria and other requirements referred to under Environmental Commitment 3.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** Fish and Wildlife Agencies (i.e., CDFW, USFWS, NMFS) (where necessary).

**Location:** Throughout the project area.

**Timing:** Prior to, during and after construction. Prior to initiating project activities that will result in temporary effects on natural communities within the Plan Area, preparation of a site-specific restoration and monitoring plan will be developed.

**Monitoring:** DWR will monitor post-construction activities to ensure that site-specific plans are carried out.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this AMM.

## 4.4 Avoidance and Minimization Measure 11: Covered Plant Species

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM 11 Covered Plant Species	DWR	Prior to Construction	Impact BIO-169, BIO-170, BIO-171, BIO-172, BIO-173, BIO-186

**Commitment:** A complete botanical survey of project sites in areas of suitable habitat for special status plants will be completed using Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 1996) and Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (California Department of Fish and Game 2009). The surveys will be floristic in nature and conducted in a manner that maximizes the likelihood of locating special-status plant species or special-status natural communities that may be present (i.e., during the appropriate season and at an appropriate level of ground coverage).

Special-status plant surveys required for project-specific permit compliance will be conducted during the planning phase to allow design of the individual project activities to avoid or minimize adverse impacts to habitat for specified special-status plants. The purpose of these surveys will be to verify that the locations of special-status plants identified in previous record searches or surveys are extant, identify any new special-status plant occurrences, and cover any portions of the project area not previously identified. The extent of mitigation of direct loss of or indirect effects on special-status plants will be based on these survey results. Locations of special-status plants in proposed construction areas will be recorded using a GPS unit and flagged.

The following measures will be implemented.

- Design restoration projects to avoid the direct, temporary loss of occupied habitat from construction activities for delta button celery, slough thistle, and Suisun thistle. If delta button celery or slough thistle occurs in a floodplain restoration area, restoration projects may be designed to include occupied habitat in the restored floodplain provided ground disturbance is avoided in the occupied habitat and the restoration is designed such that the anticipated level of flooding and scouring is compatible with the life-history needs of the special-status plant species. In tidal restoration areas, Suisun thistle occurrences may experience the indirect effect of tidal damping. This effect will be monitored and adaptively managed to ensure the occurrence is protected from loss.

- 1       • Avoid modeled habitat for vernal pool plants to the maximum extent practicable. Where  
2       practicable, no ground-disturbing activities or alterations to hydrology will occur within 250  
3       feet of vernal pools. As identified in AMM12, DWR will ensure that there will be no adverse  
4       modification of critical habitat for vernal pool plants. No more than 10 wetted acres of vernal  
5       pools will be removed as a result of project activities.
- 6       • Avoid the loss of extant occurrences of all special-status plant species with the exception of the  
7       loss of one occurrence of Heckard's peppergrass and the potential temporal loss of the four  
8       intertidal plant species: Mason's lileaopsis, Suisun marsh aster, Delta tule pea, and delta  
9       mudwort.
- 10      • If an occurrence has more than 10 individuals, no more than 5% of the total number of  
11      individuals in the occurrence will be removed. If an occurrence has 10 or fewer individuals, all  
12      individuals may be removed. Loss of individuals for all occurrences will be offset through  
13      replacement of occupied habitat at a ratio of at least 1:1, to achieve no net loss of occupied  
14      habitat. These requirements do not pertain to Suisun thistle, slough thistle, and delta button  
15      celery, for which no individuals may be removed (see above).
- 16      • To minimize the spread of nonnative, invasive plant species from restoration sites, DWR will  
17      retain a qualified botanist or weed scientist prior to clearing operations to determine if affected  
18      areas contain invasive plants. If areas to be cleared contain invasive plants, then chipped  
19      vegetation material from those areas will not be used for erosion control; in these cases the  
20      material will be disposed of to minimize the spread of invasive plant propagules (e.g., burning,  
21      composting).
- 22      • To minimize the introduction of invasive plant species, construction vehicles and construction  
23      machinery will be cleaned prior to entering construction sites that are in or adjacent to natural  
24      communities other than cultivated lands, and prior to entering any project restoration sites or  
25      conservation lands other than cultivated lands. Vehicles working in or travelling off paved roads  
26      through areas with infestations of invasive plant species will be cleaned before travelling to  
27      other parts of the Plan Area. Cleaning stations will be established at the perimeter of project  
28      activities along construction routes as well as at the entrance to conservation lands. Biological  
29      monitoring will include locating and mapping locations of invasive plant species within the  
30      construction areas during the construction phase and the restoration phase. Infestations of  
31      invasive plant species will be targeted for control or eradication as part of the restoration and  
32      revegetation of temporarily disturbed construction areas.

33      This avoidance and minimization measure does not apply to the routine management, maintenance,  
34      and educational activities of DWR and its partners in the reserve system. DWR will determine  
35      during implementation the most effective and cost-efficient means to minimize the unintentional  
36      spread of invasive plants through vehicle travel.

37      During the planning phase, DWR will ensure that project activities in designated critical habitat  
38      areas for Suisun thistle or soft bird's-beak (2013 Public Draft BDCP Figure 3.C-6 and Figure 3.C-7), if  
39      any, will not result in the adverse modification of any of the primary constituent elements for Suisun  
40      thistle or soft bird's-beak critical habitat. The CDFW Suisun Marsh Unit tracks both of these species  
41      (GIS-mapped) in Suisun. No project activities will take place within designated Suisun thistle or soft  
42      bird's-beak critical habitat areas without prior written concurrence from USFWS that such activities  
43      will not adversely modify any primary constituent elements of Suisun thistle or soft bird's-beak  
44      critical habitat.

Primary constituent elements for Suisun thistle are defined as follows.

- Persistent emergent, intertidal, estuarine wetland at or above the mean high water mark as extended directly across any intersecting channels).
- Open channels that periodically contain moving water with ocean-derived salts in excess of 0.5%.
- Gaps in surrounding vegetation to allow for seed germination and growth.
- Primary constituent elements for soft bird's-beak are defined as follows.
- Persistent emergent, intertidal, estuarine wetland at or above the mean high water mark (as extended directly across any intersecting channels).
- Rarity or absence of plants that naturally die in late spring (winter annuals).
- Partially open spring canopy cover [i.e., photosynthetic photo flux density of approximately 790 nanomoles per square meter per second (nMol/m<sup>2</sup>/s)] at ground level, with many small openings to facilitate seedling germination.

**Responsible Parties:** DWR will be responsible for implementing this AMM.

**Regulating/Permitting Agencies:** USFWS, for actions that are near Suisun thistle or soft bird's-beak critical habitat.

**Location:** Project area

**Timing:** Prior to construction (during project planning phase).

**Monitoring:** During the planning phase, DWR will review project plans to ensure that project activities in designated critical habitat areas for Suisun thistle or soft bird's-beak (2013 Public Draft BDCP Figure 3.C-6 and Figure 3.C-7), if any, will not result in the adverse modification of any of the primary constituent elements for Suisun thistle or soft bird's-beak critical habitat. In tidal restoration areas, Suisun thistle occurrences may experience the indirect effect of tidal damping. DWR will deploy a qualified biological monitor to monitor this effect and perform a complete botanical survey of the project sites as well as special-status plant surveys required for project-specific permit compliance. Biological monitoring will include locating and mapping locations of invasive plant species within the construction areas during the construction phase and the restoration phase.

DWR will deploy a qualified biologist to monitor the implementation of the measures listed above under *Commitment* as appropriate.

**Reporting Requirements:** The complete botanical survey as well as special-status plant survey results will be delivered to DWR for review. . This data will be analyzed by DWR in order to implement the measures listed above under *Commitment* and adaptively manage the project site. After the measures listed above are implemented, the monitor shall file with DWR one or more reports describing how, through implementation of the strategies set forth above, DWR either has avoided impacts to special-status plant species and special-status natural communities or has mitigated impacts to such resources so as to avoid any net loss of habitat acreage, function, and values for specified special-status plants.

## 4.5 Avoidance and Minimization Measure 12: Vernal Pool Crustaceans

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM12 Vernal Pool Crustaceans	DWR and Construction Contractors	Prior to and during construction	Impact BIO-21, BIO-23, BIO-32, BIO-33, BIO-38, BIO-169, BIO-176

**Commitment:** Vernal pool crustacean critical habitat is present in the Plan Area in Conservation Zones 1, 8, and 11. During the planning phase for individual projects, DWR will ensure that tidal natural communities restoration or other ground-disturbing project activities in Conservation Zones 1 and 11 will not result in the adverse modification of primary constituent elements of critical habitat for vernal pool fairy shrimp, conservancy fairy shrimp, and vernal pool tadpole shrimp as defined by USFWS (70 FR 46924–46998; also see 2013 Public Draft BDCP Appendix 3.C, Figures 3.C-1, 3.C-2, and 3.C-3). These activities will occur at least 250 feet from vernal pool crustacean critical habitat containing the primary constituent elements defined below or some lesser distance, if it is determined through project review with concurrence from USFWS that the activities will not result in changes in hydrology or soil salinity that could adversely modify the primary constituent elements of vernal pool crustacean critical habitat. No project activities will take place within designated vernal pool crustacean critical habitat units without prior written concurrence from USFWS that such activities will not adversely modify any primary constituent elements of vernal pool crustacean critical habitat.

Primary constituent elements for vernal pool fairy shrimp are defined as follows (70 FR 46924–46998).

- Topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools described below, providing for dispersal and promoting hydroperiods of adequate length in the pools.
- Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years, thereby providing adequate water for incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.
- Sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding.
- Structure within the pools described above, consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter.

Primary constituent elements for vernal pool tadpole shrimp are the same as above except the minimum period of inundation listed in the second bullet is 41 days instead of 18 days. Primary

constituent elements for conservancy fairy shrimp are also the same as above except the minimum period of inundation listed in the second bullet is 19 days instead of 18 days.

During the planning phase, site-level assessments will be conducted and projects will be designed to avoid modeled habitat for vernal pool crustaceans to the maximum extent practicable. Where practicable, the project will be planned and designed to ensure no ground-disturbing activities or alterations to hydrology will occur within 250 feet of vernal pool crustacean habitat. As identified above, DWR will ensure that there will be no adverse modification of critical habitat for vernal pool crustaceans.

If project activities are to occur in core recovery areas, protocol-level surveys for vernal pool crustaceans will be conducted to determine whether listed branchiopods are present. Surveys will be conducted according to the most recent USFWS guidelines by qualified biologists with the appropriate recovery permit under Section 10(a)(1)(A) of the Endangered Species Act. If conservancy or longhorn fairy shrimps are detected in core recovery areas, projects will be redesigned to ensure that no suitable habitat within these areas is adversely affected, due to the rarity of these species.

Projects will be designed to avoid direct and indirect effects on vernal pool crustacean habitat to the extent possible. No more than 10 wetted acres of vernal pool crustacean habitat will be removed (this cap applies to both temporary and permanent loss). No more than 20 wetted acres will be indirectly affected by project activities (a vernal pool is considered indirectly affected if activities that could cause hydrologic or other alternations to a pool occur within 250 feet of the vernal pool). Where construction occurs within 250 feet of vernal pool crustacean habitat, construction BMPs (AMM2) will be implemented to ensure that construction activities minimize effects on the habitat. Protective fencing will be installed around vernal pool crustacean habitat with signage identifying these areas as containing sensitive biological resources. A biological monitor will ensure that fencing and BMPs are maintained for the duration of construction and that construction personnel are provided the necessary worker awareness training (Environmental Commitment: Conduct Environmental Training and AMM1).

**Responsible Parties:** DWR and its construction contractors.

**Regulating/Permitting Agencies:** No project activities will take place within designated vernal pool crustacean critical habitat units without prior written concurrence from USFWS that such activities will not adversely modify any primary constituent elements of vernal pool crustacean critical habitat. USFWS guidelines will be used when surveying for vernal pool crustaceans.

**Location:** Vernal pool habitats; present in Conservation Zones 1, 8 and 11.

**Timing:** Prior to construction (in the planning phases of the project) and during construction activities.

**Monitoring:** DWR shall review draft and final designs in order to ensure that tidal natural communities restoration or other ground-disturbing project activities in Conservation Zones 1 and 11 will not result in the adverse modification of primary constituent elements of critical habitat for vernal pool fairy shrimp, conservancy fairy shrimp, and vernal pool tadpole shrimp as defined by USFWS. DWR shall deploy survey teams to survey project areas at the planning phase. These surveys will be utilized to avoid impacts to modeled habitat to the maximum extent practicable and their results will be incorporated into construction designs. DWR shall deploy a biological monitor to ensure that fencing and BMPs are maintained for the duration of construction and that construction



personnel are provided the necessary worker awareness training as outlined in the Environmental Commitment, Conduct Environmental Training and AMM1.

**Reporting Requirements:** Biological monitors shall report all monitoring data to DWR upon completion of monitoring activities. DWR shall prepare a report documenting all project areas surveyed in the planning phase and how these surveys were utilized to avoid impacts to modeled habitat to the maximum extent practicable. All data will be compiled and delivered to USFWS. DWR shall receive written concurrence from USFWS prior to any project activities that will take place within designated vernal pool crustacean critical habitat units. After completion of these activities, DWR shall prepare a report explaining how all such activities did not result in any adverse modification of primary constituent elements of critical habitat for vernal pool fairy shrimp, conservancy fairy shrimp, and vernal pool tadpole shrimp.

## 4.6 Avoidance and Minimization Measure 13: California Tiger Salamander

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM13 California Tiger Salamander	DWR	Prior to and during construction of restoration projects	Impact BIO-46, BIO-47

**Commitment:** Designated critical habitat for California tiger salamander is in the Plan Area along the western edge of Conservation Zone 1. This critical habitat unit (Central Population of California Tiger Salamander Central Valley Region, Unit 2) extends along the west side of State Route 113 from the short east-west portion of State Route 113 south of Hay Road on the north to Creed Road on the south. During the planning phase for individual restoration projects, DWR will ensure that tidal natural communities restoration along Lindsey Slough and other project activities near Jepson Prairie will not result in the adverse modification of critical habitat for California tiger salamander in this area. The only construction activities that will affect California tiger salamander critical habitat are those related to restoration projects; construction of the water conveyance facilities will not affect critical habitat for this species. These activities, if planned for areas within designated critical habitat areas, will be designed to avoid adverse modification of the primary constituent elements for the species as defined by USFWS (70 FR 49379–49458).

Tidal restoration and other project activities will occur at least 250 feet from California tiger salamander critical habitat containing the primary constituent elements defined below. A lesser distance is allowed if it is determined through project review and concurrence by USFWS that tidal restoration actions will not result in changes in hydrology or soil salinity that could adversely modify the primary constituent elements of California tiger salamander critical habitat. No project activities will take place within designated California tiger salamander critical habitat areas without prior written concurrence from USFWS that such activities will not adversely modify any primary constituent elements of California tiger salamander critical habitat. Primary constituent elements for California tiger salamander are defined as follows (70 FR 49379–49458).

- 1 • Standing bodies of fresh water, including natural and human-made (e.g., stock) ponds, vernal  
2 pools, and other ephemeral or permanent water bodies that typically support inundation during  
3 winter rains and hold water for a minimum of 12 weeks in a year of average rainfall.
- 4 • Upland habitats adjacent and accessible to and from breeding ponds that contain small mammal  
5 burrows or other underground habitat that California tiger salamander depend upon for food,  
6 shelter, and protection from the elements and predation.
- 7 • Accessible upland dispersal habitat between occupied locations that allow for movement  
8 between such sites.

9 During the planning phase, aquatic habitats in potential work areas will be surveyed (nonprotocol)  
10 for California tiger salamander larvae and eggs. If California tiger salamander larvae or eggs are  
11 found, the project will be designed to avoid and minimize impacts on the aquatic habitat and these  
12 life stages. If the aquatic habitat cannot be avoided, USFWS and CDFW will be contacted and, if  
13 determined to be appropriate, measures will be developed to relocate larvae or eggs to the nearest  
14 suitable aquatic habitat, as determined by the USFWS- and CDFW-approved biologist.

15 AMMs for California tiger salamanders will only be required for projects occurring within suitable  
16 habitat as identified from the habitat modeling and by additional assessments conducted during the  
17 planning phase of construction or restoration projects. A qualified biologist familiar with the species  
18 and its habitat will conduct a field evaluation of suitable upland or aquatic habitat for California tiger  
19 salamander for all project activities that occur within modeled habitat. Because California tiger  
20 salamanders are assumed to only occupy limited to areas of suitable habitat in the Plan Area, USFWS  
21 protocol-level surveys to determine presence are not necessary.

22 If the project does not fully avoid effects on suitable habitat, the following measures will be  
23 implemented.

- 24 • To the extent feasible, construction activities occurring within suitable upland habitat areas  
25 within 1.3 miles of California tiger salamander aquatic habitat will be restricted to the dry  
26 season, July 15 through October 15 (the period can be extended depending on the onset or  
27 cessation of rains), to avoid the period when they are most likely to be moving through upland  
28 areas. If construction activities must occur within suitable tiger salamander habitat during the  
29 wet season, such construction will avoid all suitable aquatic habitat. No construction activities  
30 will be conducted in upland habitat areas where tiger salamanders may occur if there is a  
31 greater than 70% chance of rain based on the National Oceanic and Atmospheric  
32 Administration's National Weather Service forecast or within 48 hours following a rain event  
33 greater than 0.25 inch, unless approved by the monitor. To the extent feasible, earthmoving and  
34 construction activities will cease no less than 30 minutes before sunset and will not begin again  
35 until no less than 30 minutes after sunrise. Except when necessary for driver or pedestrian  
36 safety, artificial lighting at a worksite will be prohibited during the hours of darkness. Where  
37 lighting is necessary, lighting will be directed inwards towards the construction footprint and  
38 will not be cast on California tiger salamander habitat outside of the construction area.
- 39 • A USFWS- and CDFW-approved biologist will determine where exclusion fencing will be  
40 installed to protect California tiger salamander habitat adjacent to the defined project footprint  
41 and to minimize the potential for California tiger salamanders to enter the construction work  
42 area. The perimeter of construction sites will be fenced with amphibian exclusion fencing by  
43 October 15. The California tiger salamander exclusion fencing will be shown on the final

construction plans. Where construction access is necessary, gates will be installed with the exclusion fence.

- Pipes or similar structures will be capped if stored overnight. Excavated holes and trenches will have escape ramps, and any open holes and trenches will be closed with plywood at the end of each work day. The biological monitor and construction foreman will be responsible for checking the exclusion fencing around the work areas daily to ensure that they are intact and upright. This will be especially critical during rain events, when flowing water can easily dislodge the fencing. Any necessary repairs will be immediately addressed. The amphibian exclusion fencing will remain in place for the duration of construction.
- If the fence is compromised during the rainy season, when California tiger salamanders are likely to be active, a survey will be conducted immediately preceding construction activity that occurs in designated tiger salamander habitat or in advance of any activity that may result in take of the species. The biologist will search along exclusion fences and in pipes and beneath vehicles each morning before they are moved. The survey will include a careful inspection of all potential hiding spots, such as along exclusion fencing, large downed woody debris, the perimeter of ponds, wetlands, and riparian areas. Any tiger salamanders found will be captured and relocated to suitable habitat a minimum of 300 feet outside of the work area that has been identified by a qualified biologist and approved by the wildlife agencies prior to commencement of construction.
- Surface-disturbing activities will be designed to minimize or eliminate effects on rodent burrows that may provide suitable aestivation habitat. Areas with a high concentration of burrows will be avoided by surface-disturbing activities to the maximum extent practicable. In addition, when a concentration of burrows is present in a project site, the area will be staked or flagged to ensure that work crews are aware of their location and to facilitate avoidance of the area.

Preconstruction surveys will be implemented after the project planning phase and prior to any ground-disturbing activity.

- No more than 1 week prior to any ground disturbance that could affect potential California tiger salamander habitat, preconstruction surveys for California tiger salamander will be conducted by a USFWS- and CDFW-approved biologist. These surveys will consist of walking surveys of the project limits. The USFWS-approved biologists will investigate potential California tiger salamander cover sites and aquatic habitats, if present. All mammal burrows within the project limits that cannot be avoided will be hand-excavated and collapsed.
- Any California tiger salamander adult found will be captured and immediately relocated to suitable habitat a minimum of 300 feet outside of the work area and predetermined prior to commencement of construction. Prior to and after handling salamanders, the biologist will observe the appropriate decontamination procedures to prevent the spread of chytrid fungus or other pathogens.

**Responsible Parties:** DWR will be responsible for implementing this AMM.

**Regulating/Permitting Agencies:** USFWS, CDFW. No project activities will take place within designated California tiger salamander critical habitat areas without prior written concurrence from USFWS that such activities will not adversely modify any primary constituent elements of California tiger salamander critical habitat.

**Location:** Designated critical habitat for California tiger salamander is present in Critical Habitat Unit 2 in the Plan Area along the western edge of Conservation Zone 1. Critical Habitat Unit 2 extends along the west side of State Route 113 from the short east-west portion of State Route 113 south of Hay Road on the north to Creed Road on the south (Figure 3.C-4). During the planning phase for individual restoration projects, DWR will ensure that tidal natural communities restoration along Lindsey Slough and other project activities near Jepson Prairie will not result in the adverse modification of critical habitat for California tiger salamander in this area.

**Timing:** Before construction of restoration projects; during construction of restoration projects. The only construction activities that will affect California tiger salamander critical habitat are those related to restoration projects; construction of the water conveyance facilities will not affect this species.

**Monitoring:** DWR will deploy a qualified biologist, approved by USFWS and CDFW, and familiar with the species and its habitat to conduct planning level and preconstruction field evaluations of suitable upland or aquatic habitat for California tiger salamander for all project activities that occur within modeled habitat. As needed, during the planning phase, DWR will review all project plans to ensure designs are consistent with the measures listed above under *Commitment*. A biological monitor and construction monitor will be responsible for monitoring implementation of these measures.

**Reporting Requirements:** Any deficiencies in compliance with the above measures as determined appropriate by DWR will be reported to DWR by the biological monitor or construction monitor. DWR will deliver all preconstruction survey data to USFWS and CDFW for review prior to any ground-disturbing activity. After completion of restoration activities with the potential to adversely affect California tiger salamander, DWR shall prepare a report explaining how all such activities did not result in any net adverse modification of primary constituent elements of California tiger salamander critical habitat.

Tidal restoration and other project activities will occur at least 250 feet from California tiger salamander critical habitat containing the primary constituent elements defined below. A lesser distance is allowed if it is determined through project review and concurrence by USFWS that tidal restoration actions will not result in changes in hydrology or soil salinity that could adversely modify the primary constituent elements of California tiger salamander critical habitat.

If California tiger salamander larvae or eggs are found, the project will be designed to avoid and minimize impacts on the aquatic habitat and these life stages. If the aquatic habitat cannot be avoided, USFWS and CDFW will be contacted and, if determined to be appropriate, measures will be developed to relocate larvae or eggs to the nearest suitable aquatic habitat, as determined by the USFWS- and CDFW-approved biologist.

## 4.7 Avoidance and Minimization Measure 14: California Red-Legged Frog

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM14 California Red Legged Frog	DWR and Construction Contractors	Prior to and during construction	Impact BIO-44, BIO-45

**Commitment:** Designated critical habitat for the California red-legged frog overlaps with portions of Conservation Zones 8 and 11. The construction footprint is outside of this critical habitat for California red-legged frog but restoration and protection activities could take place in these areas. During the planning phase for restoration and protection actions, DWR will ensure that these activities avoid designated critical habitat areas, or if such habitat cannot be avoided, the project activities will not result in the adverse modification of the primary constituent elements of critical habitat for California red-legged frog. No project activities will take place within designated California red-legged frog critical habitat areas without prior written concurrence from USFWS that such activities will not adversely modify any primary constituent elements of California red-legged frog critical habitat.

Primary constituent elements for California red-legged frog are defined as follows (75 FR 12816–12959).

- **Aquatic breeding habitat.** Standing bodies of fresh water (with salinities less than 4.5 parts per thousand), including natural and human-made (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.
- **Aquatic nonbreeding habitat.** Freshwater pond and stream habitat, as described above, that may not hold water long enough for the species to complete its aquatic life cycle but which provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult California red-legged frogs. Other wetland habitats considered to meet these criteria include, but are not limited to, plunge pools within intermittent creeks, seeps, quiet water refugia within streams during high water flows, and springs of sufficient flow to withstand short-term dry periods.
- **Upland habitat.** Upland areas adjacent to or surrounding breeding and nonbreeding aquatic and riparian habitat up to a distance of 1 mile in most cases (i.e., depending on surrounding landscape and dispersal barriers) including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the aquatic, wetland, or riparian habitat. These upland features contribute to filling of aquatic, wetland, or riparian habitats; maintaining suitable periods of pool inundation for larval frogs and their food sources; and providing nonbreeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks, and organic debris (e.g., downed trees, logs, small mammal burrows, or moist leaf litter).
- **Dispersal habitat.** Accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mile of each other, and that support movement between such sites (i.e., uplands that provide habitat connectivity between two or more aquatic habitat areas). Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs over 50 acres in size, or other areas that do not contain those

features identified in the other primary constituent elements described above as essential to the conservation of the species.

During the planning phase, appropriate buffer distances will be established around aquatic habitat to minimize direct and indirect effects on California red-legged frog. If aquatic habitat cannot be avoided, aquatic habitats in potential work areas will be surveyed (nonprotocol) for tadpoles and egg masses. If California red-legged frog tadpoles or egg masses are found, and the aquatic habitat cannot be avoided, USFWS and CDFW will be contacted, and if determined to be appropriate, measures will be developed to relocate tadpoles and eggs to the nearest suitable aquatic habitat, as determined by the USFWS- and CDFW-approved biologist

AMMs for California red-legged frogs will only be required for projects occurring within suitable habitat as identified from the habitat modeling and by additional assessments conducted during the planning phase of construction or restoration projects. A qualified biologist will conduct a field evaluation of suitable upland or aquatic habitat for California red-legged frogs for all project activities that occur within modeled habitat. Surveys within modeled upland habitat will involve identifying suitable aquatic features that may not have been identified during the habitat modeling because the mapping unit was too small. Because California red-legged frogs are assumed to only occupy suitable habitat in the Plan Area, USFWS protocol-level surveys to determine presence are not necessary.

If the project does not fully avoid effects on suitable habitat, the following measures will be required.

- To the extent feasible, initial ground-disturbing activities will not be conducted between November 1 and March 31 in areas identified during the planning stages as providing potential California red-legged frog habitat to avoid the period when they are most likely to be moving through upland areas. When ground-disturbing activities must take place between November 1 and March 31, USFWS-approved biological monitor will conduct daily monitoring for California red-legged frog.
- To the maximum extent feasible, nighttime construction will be minimized or avoided by DWR, as project applicant, when working in suitable California red-legged frog habitat. Because dusk and dawn are often the times when the California red-legged frog is most actively moving and foraging, to the greatest extent feasible, earthmoving and construction activities will cease no less than 30 minutes before sunset and will not begin again prior to no less than 30 minutes after sunrise. Except when necessary for driver or pedestrian safety artificial lighting at a worksite will be prohibited during the hours of darkness when working in suitable California red-legged frog habitat.
- Disturbance to suitable aquatic and upland sites within or near the project footprint will be avoided to the extent feasible, and the loss of aquatic habitat and grassland vegetation will be minimized through adjustments in project design, as practicable.
- A USFWS-approved biologist will determine where exclusion fencing will be installed to protect California red-legged frog habitat adjacent to the defined project footprint and to minimize the potential for California red-legged frogs to enter the construction work area. The perimeter of construction sites will be fenced with amphibian exclusion fencing by November 1. The California red-legged frog exclusion fencing will be shown on the final construction plans. Where construction access is necessary, gates will be installed with the exclusion fence.

- 1       • The biological monitor and construction foreman will be responsible for checking the exclusion  
2       fencing around the work areas daily to ensure that they are intact and upright. This will be  
3       especially critical during rain events, when flowing water can easily dislodge the fencing. Any  
4       necessary repairs will be immediately addressed. The amphibian exclusion fencing will remain  
5       in place for the duration of construction.
- 6       • If the exclusion fence is found to be compromised at any time, a survey will be conducted  
7       immediately preceding construction activity that occurs in designated California red-legged frog  
8       habitat or in advance of any activity that may result in take of the species. The biologist will  
9       search along exclusion fences and in pipes and beneath vehicles before they are moved. The  
10      survey will include a careful inspection of all potential hiding spots, such as along exclusion  
11      fencing, large downed woody debris, the perimeter of ponds, wetlands, and riparian areas. Any  
12      California red-legged frogs found will be captured and relocated to suitable habitat a minimum  
13      of 300 feet outside of the work area that has been identified by a qualified biologist and  
14      approved by the wildlife agencies prior to commencement of construction.
- 15      • Surface-disturbing activities will be designed to minimize or eliminate effects on rodent  
16      burrows that may provide suitable cover habitat for California red-legged frog. Areas with a high  
17      concentration of burrows will be avoided by surface-disturbing activities to the maximum  
18      extent practicable. In addition, when a concentration of burrows is present in a project site, the  
19      area will be staked or flagged to ensure that work crews are aware of their location and to  
20      facilitate avoidance of the area.

21      Preconstruction surveys will be implemented after the project planning phase and prior to any  
22      ground-disturbing activity.

23      No more than 1 week prior to any ground disturbance that could affect potential California red-  
24      legged frog habitat, preconstruction surveys for California red-legged frog will be conducted by a  
25      USFWS- and CDFW-approved biologist. These surveys will consist of walking the project limits. The  
26      USFWS-approved biologists will investigate potential California red-legged frog cover sites and  
27      aquatic habitats, if present. All mammal burrows that cannot be avoided will be hand-excavated and  
28      collapsed.

- 29      • Aquatic habitats in work areas will be surveyed (nonprotocol) for California red-legged frog  
30      adults and metamorphs. Any California red-legged frog adults or metamorphs found will be  
31      captured and held for a minimum amount of time necessary to relocate the animal to suitable  
32      habitat a minimum of 300 feet outside of the work area. Prior to and after handling frogs, the  
33      biologist will observe the appropriate decontamination procedures to ensure against spread of  
34      chytrid fungus or other pathogens.
- 35      • If construction activities will occur in streams, temporary aquatic barriers such as hardware  
36      cloth will be installed both up and downstream of the stream crossing, and animals will be  
37      relocated and excluded from the work area. The qualified USFWS-approved biologists will  
38      establish an adequate buffer on both sides of creeks and around potential aquatic habitat and  
39      will restrict entry during the construction period.

40      **Responsible Parties:** DWR and its construction contractor will be responsible for implementing  
41      this AMM.

42      **Regulating/Permitting Agencies:** CDFW, USFWS. No project activities will take place within  
43      designated California red-legged frog critical habitat areas without prior written concurrence from

USFWS that such activities will not adversely modify any primary constituent elements of California red-legged frog critical habitat.

In the event California red-legged frog tadpoles or egg masses are found, and the aquatic habitat cannot be avoided, USFWS and CDFW will be contacted. If it is determined to be appropriate, measures will be developed to relocate tadpoles and eggs to the nearest suitable aquatic habitat.

**Location:** Designated critical habitat for the California red-legged frog overlaps with portions of Conservation Zones 8 and 11 (Figure 3.C-5).

**Timing:** Before construction; during construction. To the extent practicable, initial ground-disturbing activities will not be conducted between November 1 and March 31 in areas identified during the planning stages as providing potential California red-legged frog habitat to avoid the period when they are most likely to be moving through upland areas.

**Monitoring:** During the planning phase, DWR will review project plans to ensure that project activities avoid designated critical habitat areas, or if such habitat cannot be avoided, the project activities will not result in the adverse modification of the primary constituent elements of critical habitat for California red-legged frog. DWR will deploy a qualified biologist to conduct a field evaluation of suitable upland or aquatic habitat for California red-legged frogs for all project activities that occur within modeled habitat. If the project does not fully avoid effects on suitable habitat, DWR will monitor implementation of the measures listed above under *Commitment*. When ground-disturbing activities must take place between November 1 and March 31, a USFWS-approved biological monitor will conduct daily monitoring for California red-legged frog. A biological monitor and construction monitor will be responsible for monitoring construction activities to ensure they are consistent with the above measures, as appropriate.

**Reporting Requirements:** No project activities will take place within designated California red-legged frog critical habitat areas without prior written concurrence from USFWS. If California red-legged frog tadpoles or egg masses are found, and the aquatic habitat cannot be avoided, USFWS and CDFW will be contacted, and if determined to be appropriate, measures will be developed to relocate tadpoles and eggs to the nearest suitable aquatic habitat, as determined by the USFWS- and CDFW-approved biologist. Any deficiencies in compliance with the above measures will be reported to DWR by the biological monitor or construction monitor. DWR will deliver all preconstruction survey data to USFWS and CDFW for review prior to any ground-disturbing activity. After completion of restoration activities with the potential to adversely affect California red-legged frog, DWR shall prepare a report explaining how all such activities did not result in any adverse modification of the primary constituent elements of California red-legged frog critical habitat.



## 4.9 Avoidance and Minimization Measure 15: Valley Elderberry Longhorn Beetle

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM15 Valley Elderberry Longhorn Beetle	DWR and Construction Contractors	Prior to construction	Impact BIO-35, BIO-36

**Commitment:** During the planning phase, surveys for elderberry shrubs will be conducted in the project areas with suitable habitat by a qualified biologist familiar with the appearance of valley elderberry longhorn beetle exit holes in elderberry shrubs. Elderberry shrubs will be avoided to the maximum extent practicable. Complete avoidance (i.e., no adverse effects) may be assumed when a buffer of at least a 100 feet is established and maintained around elderberry plants containing stems measuring 1 inch or greater in diameter at ground level.

Elderberry shrubs identified within project footprints that cannot be avoided will be transplanted to previously approved conservation areas in the Plan Area. Transplanting and associated compensation will follow the guidance outlined in USFWS's Conservation Guidelines for the Valley Elderberry Longhorn Beetle (U.S. Fish and Wildlife Service 1999). These guidelines also identify ratios of elderberry seedlings and associated native vegetation to plant in conservation areas depending on shrub stem counts and sizes, and landscape position (riparian or savannah).

For shrubs not directly affected by construction but that occur within 100 feet of ground-disturbing activities, the following measures will be implemented.

- Fence and flag all areas to be avoided during construction activities. In areas where encroachment on the 100-foot buffer has been approved by USFWS, provide a minimum setback of at least 20 feet from the dripline of each elderberry plant.
- Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.
- Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.
- Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementation of this AMM.

**Regulating/Permitting Agencies:** USFWS.

**Location:** Any place where elderberry shrubs are located within 100 feet of project footprint.

**Timing:** Prior to construction.

**Monitoring:** DWR will deploy a qualified biologist during the pre-construction planning phase to perform surveys for elderberry shrubs will be conducted in the project areas. DWR will deploy a

qualified biologist to monitor implementation of the above measures under *Commitment* and perform weekly inspections.

**Reporting Requirements:** The biological monitor will report to DWR upon completion of the above measures. The biological monitor will record weekly inspections in the project file. Before a water conveyance construction and restoration project with the potential to adversely affect the Valley Elderberry Longhorn Beetle begins construction, DWR shall prepare a report documenting elderberry shrubs in or within 100 feet of project footprints and the proposed mitigation according to the USFWS guidelines for any impacts to shrubs or explaining how construction activities will avoid impacts to elderberry shrubs. After completion of water conveyance construction and restoration activities, DWR shall prepare a report documenting how construction activities avoided or minimized impacts to elderberry shrubs in or within 100 feet of the project footprints.

## 4.10 Avoidance and Minimization Measure 16: Giant Garter Snake

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM16 Giant Garter Snake	DWR and Construction Contractors	Prior to and during construction	Impact BIO-49, BIO-50

**Commitment:** AMMs for giant garter snakes will only be required for projects and operations and maintenance activities occurring within suitable habitat as identified from the habitat modeling and by additional assessments conducted during the planning phase of construction or restoration projects. A qualified biologist familiar with the species' habitat requirements will conduct a field evaluation of suitable upland or aquatic habitat for giant garter snake for all project activities that occur within modeled habitat. The biologist will identify any aquatic features within modeled habitat that may have been missed during the modeling effort.

If the project or operation and maintenance activity does not fully avoid effects on suitable habitat, the following measures will be required.

- Disturbance to suitable aquatic and upland sites in or near the project footprint will be avoided to the extent feasible, and the loss of aquatic habitat and grassland vegetation will be minimized through adjustments to project design, as practicable.
- To the extent practicable, construction activities will be avoided within 200 feet of the banks of giant garter snake aquatic habitat, particularly in areas with a moderate to high likelihood of giant garter snake occurrence. Ground disturbance will be confined to the minimal area necessary to facilitate construction activities. Giant garter snake habitat will be clearly designated with construction fencing and signage identifying these areas as sensitive.
- A USFWS-approved biologist will determine where exclusion fencing will be installed to protect giant garter snake habitat adjacent to the defined project footprint and to minimize the potential for giant garter snakes to enter the construction work area. The perimeter of construction sites will be fenced with giant garter snake exclusion fencing between May 1 and September 1 (well in advance of snakes seeking overwintering refugia). The giant garter snake exclusion fencing

will be shown on the final construction plans. Where construction access is necessary, gates will be installed with the exclusion fence.

- The biological monitor and construction foreman will be responsible for checking the exclusion fencing around the work areas daily to ensure that they are intact and upright. This will be especially critical during rain events, when flowing water can easily dislodge the fencing. Any necessary repairs will be immediately addressed. The giant garter snake exclusion fencing will remain in place for the duration of construction
- If exclusion fencing is found to be compromised, a survey will be conducted immediately preceding construction activity that occurs in designated giant garter snake habitat or in advance of any activity that may result in take of the species. The biologist will search along exclusion fences and in pipes and beneath vehicles before they are moved. Any giant garter snake found will be captured and relocated to suitable habitat a minimum of 200 feet outside of the work area in a location that is identified by a qualified biologist and approved by USFWS and CDFW prior to commencement of construction.

Preconstruction surveys will be implemented after the project planning phase and prior to any ground-disturbing activity.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this AMM.

**Regulating/Permitting Agencies:** USFWS and CDFW. Any giant garter snake found will be captured and relocated to suitable habitat a minimum of 200 feet outside of the work area in a location that is identified by a qualified biologist and approved by USFWS and CDFW prior to commencement of construction.

**Location:** AMMs for giant garter snakes will only be required for projects and operations and maintenance activities occurring within suitable habitat as identified from the habitat modeling and by additional assessments conducted during the planning phase of construction or restoration projects. To the extent practicable, construction activities will be avoided within 200 feet of the banks of giant garter snake aquatic habitat

**Timing:** Prior to and during construction. The perimeter of construction sites will be fenced with giant garter snake exclusion fencing between May 1 and September 1 (well in advance of snakes seeking overwintering refugia).

**Monitoring:** The biological monitor and construction monitor will be responsible for monitoring implementation of the above measures under *Commitment*. After implementation, the biological monitor and construction foreman will perform weekly inspections of the exclusion fencing to ensure they are intact and upright.

**Reporting Requirements:** The biological monitor will report to DWR any exclusion fencing found to be compromised and DWR will deploy qualified to biologists to immediately survey preceding construction activity as outline above in *Commitment*. DWR will deliver all preconstruction survey data to USFWS and CDFW for review prior to any ground-disturbing activity. After completion of activities with the potential to adversely affect the giant garter snake, DWR shall prepare a report explaining how all such activities either avoided effects on suitable habitat and/or individual snakes or how DWR successfully implemented measures requiring that individual snakes be captured and relocated to suitable habitat a minimum of 200 feet outside of the work area in a location identified by a qualified biologist and approved by USFWS and CDFW.

## 4.11 Avoidance and Minimization Measure 17: Western Pond Turtle

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM17 Western Pond Turtle	DWR	Prior to and during Construction	Impact BIO-52, BIO-53

**Commitment:** AMMs for western pond turtle will only be required for projects occurring within or adjacent to suitable habitat as identified from the habitat modeling and by additional assessments conducted during the project planning phase. A qualified biologist will conduct a field evaluation of suitable upland or aquatic habitat for western pond turtles for all project activities that occur within modeled habitat. See also AMM8 for measures related to dewatering aquatic areas.

If the project does not fully avoid effects on suitable habitat, the following measures will be required.

- The DWR will retain a qualified wildlife biologist to conduct a preconstruction survey within 48 hours of disturbance in aquatic and riparian habitats to determine presence or absence of pond turtles in the construction work area.
- If possible, the surveys will be timed to coincide with the time of day and year when turtles are most likely to be basking and visible (during the cooler part of the day, 8:00 a.m. to 12:00 p.m. during spring, summer, and late summer). Prior to conducting presence/absence surveys the biologist will locate the microhabitats for turtle basking (logs, rocks, brush thickets) and determine a location to quietly observe turtles.
- Each survey will include a 30-minute wait time after arriving onsite to allow startled turtles to return to open basking areas. The survey will consist of a minimum 15-minute observation time per area where turtles could be observed.
- If turtles are observed during a survey, they will be relocated outside of the construction area to appropriate aquatic habitat by a biologist with a valid memorandum of understanding from CDFW authorizing the capture and relocation of turtles and as determined during coordination with CDFW.
- If turtles are present within the project boundary for projects within 1 mile of Stone Lakes National Wildlife Refuge, the refuge manager will be contacted to determine if there is a location in the refuge where the refuge would like to relocate turtle. Turtles will then be captured with traps and relocated accordingly.

**Responsible Parties:** DWR will be responsible for implementation of this AMM.

**Regulating/Permitting Agencies:** CDFW. If turtles are observed during a survey, they will be relocated outside of the construction area to appropriate aquatic habitat by a biologist with a valid memorandum of understanding from CDFW authorizing the capture and relocation of turtles and as determined during coordination with CDFW.

**Location:** AMMs for western pond turtle will only be required for projects occurring within or adjacent to suitable habitat as identified from the habitat modeling and by additional assessments conducted during the project planning phase.

**Timing:** Prior to and during construction.

**Monitoring:** DWR will deploy a qualified biologist to conduct a field evaluation of suitable upland or aquatic habitat for western pond turtles for all project activities that occur within modeled habitat. In the event the project does not fully avoid effects on suitable habitat DWR will implement the measures described above under *Commitment*.

**Reporting Requirements:** Upon completion of the preconstruction survey the qualified wildlife biologist will prepare a preconstruction survey report and deliver it to DWR. DWR will review the report and conduct any subsequent measures required such as relocation of turtles, and notification of CDFW and the refuge manager. After completion of activities with the potential to adversely affect the western pond turtle, DWR shall prepare a report explaining how all such activities either avoided effects on suitable habitat and/or individual turtles or how DWR successfully implemented measures requiring that individual turtles be captured and relocated by a qualified biologist to suitable habitat outside of the construction area pursuant to a valid memorandum of understanding from CDFW or to suitable habitat within the Stone Lakes National Wildlife Refuge as determined by the refuge manager.

## 4.12 Avoidance and Minimization Measure 18: Swainson's Hawk

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM18 Swainson's Hawk	DWR and Construction Contractors	Prior to and during construction	Impact BIO-9, BIO-11, BIO-83, BIO-85, BIO-109, BIO-117, BIO-138

### **Commitment: Preconstruction Surveys**

Preconstruction surveys will be conducted to identify the presence of active nest sites of tree-nesting raptors within 0.25 mile of project sites, staging and storage areas, construction access roads, work areas, and soil stockpile areas where accessible, by a qualified biologist with experience identifying Swainson's hawk. Transportation routes along public roads (roads leading to and from work areas) are considered disturbed, and no surveys or monitoring are required for nests along those roadways unless they are within ¼ mile of work areas. Surveys for nesting Swainson's hawks will be conducted to ensure nesting activity is documented prior to the onset of construction activity. Swainson's hawks nest in the Plan Area between approximately March 15 and September 15. While many nest sites are traditionally used for multiple years, new nest sites can be established in any year. Therefore, construction activity that is planned after March 15 of any year will require surveys during the year of the construction. If construction is planned before March 15 of any year, surveys will be conducted the year immediately prior to the year of construction. If construction is planned before March 15 of any year and subject to prior-year surveys, but is later postponed to after March 15, surveys will also be conducted during the year of construction.

The survey protocol established in Table 4-1 below is modified from the recommended timing and methodology for Swainson's hawk nesting surveys in the Central Valley (Swainson's Hawk Technical Advisory Committee 2000). This protocol will be used to detect active nests for Swainson's hawk

unless the methodology is modified with written approval from CDFW. If active nests are found, appropriate avoidance and minimization measures will be implemented as described herein. If no activity is found, then construction can proceed with no restrictions until the following breeding season. Survey results will be provided to CDFW by phone or e-mail no less than 5 days prior to commencement of construction activities, and in a written report within 30 days after commencement of construction activities. The designated biologist will include the location of any known nest trees (occupied within one or more of the last five years) present within  $\frac{1}{4}$  mile of the construction footprint.

Removal of known nest trees will be avoided to the maximum extent feasible. In the event that a nest tree (defined as a tree that has been used for nesting at least once in the last 3 years) needs to be removed for project related activities, CDFW will be notified in writing of the location of the nest tree and timing of removal. No trees with occupied nests will be removed until the nest is vacated. The tree replacement protocol described below will be followed to offset affected nest sites. This protocol may be modified with written CDFW authorization.

The designated biologist will survey potential Swainson's hawk nest trees and monitor occupied Swainson's hawk nests as described below. When proposed construction will occur within 0.25 mile of known nest trees, construction activities will be limited to outside the breeding season if feasible, or until the tree site is determined to be inactive.

Where construction activities cannot be restricted to more than 0.25 mile of an occupied nest site, activities will be restricted during the period of egg-laying to post-hatching to the extent feasible. If construction activities must occur in that time frame, construction will be initiated prior to egg-laying to the extent feasible. This will allow time for Swainson's hawks to acclimate to disturbance before eggs are laid, reducing the potential for abandonment. If construction activities must begin after egg-laying is initiated, a 650-foot radius no-activity buffer will be established at least until eggs have hatched.

When construction activities will occur within 0.25 mile of an occupied Swainson's hawk nest, a 650-foot-radius nondisturbance buffer will be established around each occupied hawk nest tree. To the greatest extent feasible, no construction activity will be allowed to occur within the buffer while a Swainson's hawk nest is occupied. A nest is considered occupied from the time the nest is being constructed until the young leave the nest, or until the nesting attempt fails and the nest is abandoned. Occupied nests will be monitored to track progress of nesting activities. The buffer will be clearly delineated with fencing or other conspicuous marking. CDFW will be notified if construction activities must take place within 650 feet of an occupied nest site (tree), and additional protection measures will be implemented as described below.

Where construction will occur within 0.25 mile of an occupied Swainson's hawk nest tree, the following monitoring plan will be implemented. If a nesting bird monitoring and management plan is prepared by a designated biologist, and approved by CDFW, it will prevail where it differs from the measures below.

- Five days and three days prior to the initiation of construction at any site where a nest is within 0.25 mile of construction activities, a CDFW-approved biologist (designated biologist) will observe the subject nest(s) for at least 1 hour and until normal nesting behavior can be determined. Nest status will be determined and normal nesting behaviors documented, which may be used to compare to the hawks' activities once construction begins. The results of

preconstruction monitoring will be reported to CDFW within 24 hours of completing each survey.

- Where a Swainson's hawk occupied nest occurs less than 325 feet from construction activities, the designated biologist will observe the nest periodically throughout the day where covered activities occur to ensure the hawks are engaged in normal nesting behavior.
- Where a Swainson's hawk occupied nest occurs between 325 to 650 feet from construction, the designated biologist will observe the nest for at least 2 hours per construction day where covered activities occur to ensure the hawks are involved with normal nesting behavior.
- Where a Swainson's hawk occupied nest occurs between 650 to 1,300 feet from construction, the designated biologist will observe the nest for at least 3 days per construction week to ensure the hawks are involved with normal nesting behavior and to check the status of the nest.

Physical contact with an active nest tree will be prohibited from the time of egg laying to fledging, unless CDFW consents in writing to the contact. Construction personnel outside of vehicles will be restricted to greater than 650 feet, or the length of the buffer approved in writing by CDFW, from the nest tree unless construction activities require them to be closer. All personnel will be out of the line of sight of the occupied nest during breaks if within 650 feet of the nest (as stated above, activities will only occur within 650 feet of a nest with written approval by CDFW).

If during construction the designated biologist determines that a nesting Swainson's hawk within 1/4 mile of the project is disturbed by project activities, to the point where there reproductive failure could occur, the designated biologist will immediately notify the Construction Supervisor and Program Environmental Manager. The Program Environmental Manager will contact CDFW, and it will be determined by the parties whether additional protection measures can be implemented. Potential nest abandonment and failure may be indicated if Swainson's hawk exhibits distress and/or abnormal nesting behavior such as swooping/stooping at construction equipment or personnel, excessive vocalization [distress calls] or agitation directed at construction equipment or personnel, failure to remain on nest, or failure to deliver prey items for an extended time period. Additional protection measures will remain in place until the Swainson's hawk behavior has normalized. The designated biologist will notify CDFW if nests or nestlings are abandoned and if the nestlings are still alive to determine appropriate actions for salvaging the eggs or returning nestlings to the wild.

In addition to the measures described above, the following measures will also be implemented for activities for which the extent and location of the activity has not yet been fully planned.

- Geotechnical exploration activities will fully avoid Swainson's hawk nesting habitat.
- Geotechnical exploration will not be conducted within 1/4 mile of an occupied Swainson's hawk nest.
- Transmission line activities will minimize loss of Swainson's hawk nesting habitat and will avoid occupied nests.

**Table 4-1. Timing and Methodology for Swainson's Hawk Nesting Surveys**

Survey Dates	Survey Time	Number of Surveys	Methodology
First week of April	Sunrise to 12:00 p.m.; 4:00 p.m. to sunset	1	Position the surveyor at 50 to 200 feet from suitable nesting habitat with a clear view of trees and surrounding area. Scan all trees for a minimum of 2 hours within 0.25 mile of the project boundary. Observe perching, nest building, mating, courtship, and other prenesting behaviors to identify a nest or nesting activity area.
Second week of April	Sunrise to 12:00 p.m.; 4:00 p.m. to sunset	1	Repeat the above survey in areas not determined to be occupied during the first survey. Attempt to confirm nest locations within nesting activity areas.
Third week of April	Sunrise to 12:00 p.m.; 4:00 p.m. to sunset	1	Repeat the above survey in areas not determined to be occupied during the first and second survey. In cases where a nest site was not identified within a nesting activity area during the first two surveys, approach the nesting activity area carefully to locate nests. If a nest is not found where there is reasonable certainty of nesting activity, rely on observations of courtship, mating, nest building, and other behaviors to define a nesting area and establish a buffer.
June 10 through July 15	Sunrise to 12:00 p.m.; 4:00 p.m. to sunset	3 surveys spaced at least 3 days apart	Inspect all previously identified nests for activity status. Walk and scan all other suitable nest trees within 0.25 mile of the project boundary for nests not found during the initial survey.

### ***Nesting Habitat Replacement***

The following measures will be implemented to minimize effects on the Swainson's hawk populations that could otherwise result from loss of nesting habitat during the first 10 years of project construction, before most of the restored riparian natural community has matured. Nesting habitat is limited throughout much of the Plan Area, consisting mainly of intermittent riparian, isolated trees, small groves, tree rows along field borders, roadside trees, and ornamental trees near rural residences. Removal of nest trees and nesting habitat could further reduce this limited resource and reduce or restrict the number of active Swainson's hawks within the Plan Area until restored riparian habitat is sufficiently developed. To account for this potential loss of nesting habitat within the first 10 years, the following additional measures will be implemented.

### ***Tree Replacement with Saplings***

Planting trees as potential nesting habitat for Swainson's hawk is addressed in EC7 Riparian Natural Community Restoration and EC11 Natural Communities Enhancement and Management. While those measures address the overall long-term restoration of nesting habitat and the enhancement of conservation lands for this species, the following measures specifically address the removal of nest trees or nesting habitat during construction and provide a mechanism to compensate for this loss in order to minimize the short-term effects on Swainson's hawk populations.

- Five trees (5-gallon-container size) will be planted on the conservation lands for every known and potential Swainson's hawk nest tree (20 feet or taller) removed by construction. Of the replacement trees planted, a variety of native tree species will be planted to provide trees with differing growth rates, maturation, and life span.



- Replacement trees will be planted with the mature trees to recreate nest sites, within conservation lands in areas that support high-value Swainson's hawk foraging habitat to increase nest sites, or within riparian plantings as a component of the requirement for riparian restoration where they are in close proximity to suitable foraging habitat. Replacement trees that are incorporated into the riparian restoration will not be clustered in a single region of the Plan Area, but will be distributed throughout the lands protected as foraging habitat for Swainson's hawk.
- The survival success of the planted trees described in (a) and (b) above will be monitored annually for a period of 10 years to assure survival and appropriate growth and development. Success will be measured as an 80% survival rate at 5 and 10 years after planting. Plantings will subsequently be monitored every 5 years until their continued survival and growth is verified. For every tree lost during the first 10-year time period, a replacement tree will be planted immediately upon the detection of failure. All necessary planting requirements and maintenance (i.e., fertilizing, irrigation) to ensure success will be provided. Trees will be irrigated for a minimum of the first 5 years after planting, and then gradually weaned off the irrigation during a period of approximately 2 years. If larger stock is planted, the number of years of irrigation will be increased accordingly. If the 80% establishment success cannot be met, protection of three mature nest trees can substitute for each failed nest tree transplant.

#### ***Tree Replacement with Mature Trees***

To further and more directly minimize the effects of loss of nesting habitat, a program to plant mature trees will be implemented. Planting larger, mature trees, including transplanting trees scheduled for removal, and supplemented with additional saplings, is expected to accelerate the development of potential replacement nesting habitat.

- To compensate for the temporal loss of available Swainson's hawk nest sites (defined as a 125-acre area where more than 50% of suitable nest trees (20 feet or taller) within the 125-acre block are removed) five mature native trees (at least 20 feet in height) will be transplanted to an appropriate location. Mature trees can be replaced with either nursery trees or trees scheduled to be removed by construction. To determine the number of replacement trees required, a grid of 125-acre blocks will be placed over each component of project footprint in which trees are to be removed, and the grid will be fixed in a manner that places the most complete squares of the grid in the project footprint (i.e., the grid will be adjusted so that, to the extent possible, entire squares rather than portions of squares will overlap with the project footprint).
- The mature trees will be transplanted at a location that otherwise supports suitable habitat conditions for Swainson's hawk. This could be around project facilities (while taking into consideration potential effects of noise and visual disturbance from facility operation), on new conservation lands, existing conservation lands, or excess DWR land, as long as DWR controls the property. These trees will be transplanted as close as biologically feasible to the affected nest site (e.g., near the newly constructed intake facilities), unless such location would have low long-term conservation value due to factors such as threat of seasonal flooding or sea level rise, in which case the trees may be planted elsewhere on conservation lands.
- DWR may substitute transplanting of mature nest trees with protection of three suitable nest trees for each mature nest tree that would be transplanted.
- Replacement nest sites must be ½ mile or more apart and must be at least ½ mile from active nest trees.

- 1 • As with the sapling trees, the mature replacement trees will be monitored and maintained for 10  
2 years to ensure survival and appropriate growth and development. Success will be measured  
3 using an 80% survival rate at 5 and 10 years after planting. In addition, 15 (5-gallon-container  
4 size) trees will be planted at each mature tree replacement site to provide longevity to the nest  
5 site. These 15 trees may be part of the trees committed to the project by item (a) included above  
6 as long they meet the survival criteria described in item (c) of Section 3B.4.18.3, *Tree*  
7 *Replacement with Saplings*.
- 8 • Swainson's hawk foraging habitat will be protected within 3 miles of a known Swainson's hawk  
9 tree and within 50 miles of the project footprint on land not subject to threat of seasonal  
10 flooding, construction disturbances, or other conditions that would reduce the foraging value of  
11 the land.
- 12 • To reduce temporal impacts resulting from the loss of mature nest trees, the plantings described  
13 above will occur prior to or concurrent with the loss of trees.

14 **Responsible Parties:** DWR and its construction contractors will be responsible for implementing  
15 this AMM.

16 **Regulating/Permitting Agencies:** CDFW.

17 **Location:** Within a 0.25 mile buffer around project sites, staging and storage areas, transportation  
18 routes, work areas, and soil stockpile areas

19 **Timing:** Before construction; during construction. Swainson's hawks nest in the Plan Area between  
20 approximately March 15 and September 15. While many nest sites are traditionally used for  
21 multiple years, new nest sites can be established in any year. Therefore, construction activity that is  
22 planned after March 15 of any year will require surveys during the year of the construction. If  
23 construction is planned before March 15 of any year, surveys will be conducted the year  
24 immediately prior to the year of construction. If construction is planned before March 15 of any year  
25 and subject to prior-year surveys, but is later postponed to after March 15, surveys will also be  
26 conducted during the year of construction. See also, Table 4-1 for timing of surveys.

27 **Monitoring:** Physical contact with an active nest tree will be prohibited from the time of egg laying  
28 to fledging, unless CDFW consents to the contact. Construction personnel outside of vehicles will be  
29 restricted to greater than 650 feet, or the length of the buffer approved by CDFW, from the nest tree  
30 unless construction activities require them to be closer. If personnel must approach closer than 100  
31 feet of an active nest tree for more than 15 minutes while adults are brooding, the nesting adults will  
32 be monitored for stressed behavior. If stressed behavior is identified, personnel will leave the area  
33 until behavior normalizes. If personnel must approach closer than 150 feet for more than 1 hour, the  
34 same applies. Any other necessary distance of approach within the designated buffer will be  
35 monitored as determined by the designated biologist. All personnel will be out of the line of sight of  
36 the nest during breaks.

37 **Reporting Requirements:** Reporting will be conducted prior to construction to identify active nest  
38 sites. If required to meet conditions of this measure, biological monitors will monitor during  
39 construction and report consistent with the terms of this Avoidance and Minimization Measure (18).  
40 After completion of activities with the potential to adversely affect nests used by the Swainson's  
41 hawk, DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully  
42 implemented the pertinent requirements of this Avoidance and Minimization Measure (18).

## 4.13 Avoidance and Minimization Measure 20: Greater Sandhill Crane

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM20 Greater Sandhill Crane	DWR and Construction Contractors	Prior to, during, and after construction	Impact BIO-58, BIO-68, BIO-69, BIO-70, BIO-71, BIO-72, BIO-77, BIO-84, BIO-88, BIO-92, BIO-101, BIO-106, BIO-110, BIO-114, BIO-118, BIO-122, BIO-126, BIO-131, BIO-135, BIO-139, BIO-149, BIO-182

**Commitment:** If conveyance construction and restoration are to occur during greater sandhill crane wintering season (September 15 through March 15) in the Greater Sandhill Crane Winter Use Area (2013 Public Draft BDCP Appendix 2.A, Figure 2.A-19-2), the following avoidance and minimization measures will be implemented.

### **Timing:**

- Construction will be minimized during the sandhill crane wintering season to the extent practicable in light of project schedule and cost and logistical considerations. For example, construction of some project facilities such as vent shafts may be accelerated so that they occur outside of the crane wintering season. The loudest construction activities, such as pile driving, that need to occur for only limited time periods should be scheduled for periods outside the crane wintering season to the extent practicable.
- To the extent feasible, construction that cannot be completed prior to commencement of the wintering season will be started before September 15 or after March 15, such that no new sources of noise or other major disturbance that could affect cranes will be introduced after the cranes arrive at their wintering grounds.

### ***Bird Strike Hazard***

**Performance Standard:** No take, as defined by Section 86 of the California Fish and Game Code, of greater sandhill crane associated with new facilities.

The project will be implemented in a manner that will not result in take of greater sandhill cranes as defined by Section 86 of the California Fish and Game Code. This performance standard will be accomplished by one of, or any combination of, the following:

- Design the transmission line alignment to minimize risk. When locating powerlines, choose specific site locations that are in low risk zones or outside of the Greater Sandhill Crane Winter Use Area.
- Remove, relocate or underground existing lines. Reduce the number of existing lines in risk zones to offset placement of new lines in risk zones. Prioritize elimination or reduction of existing lines and avoidance of new lines in the highest risk zones.
- Underground new lines in high-risk zones of the greater sandhill crane winter use area.
- Use natural gas generators in lieu of transmission lines in high-risk zones of the greater sandhill crane winter use area to provide power for the construction of the water conveyance facilities.

- 1 • Install bird strike diverters on existing lines in high-risk zones. Bird strike diverters will be

2 placed on existing lines within the crane use area. The length of existing line to be fitted with

3 bird strike diverters will be equal to the length of new transmission lines constructed as a result

4 of the project, in an area with the same or higher greater sandhill crane strike risk to provide a

5 net benefit to the species. Bird diverters will also be required on all new lines. For optimum

6 results, the recommended spacing distance for bird flight diverters is 15 to 16.5 feet (4.5 to 5

7 meters) (Avian Power Line Interaction Committee 1994). Bird strike diverters will be installed

8 on project and existing transmission lines in a configuration that research indicates will reduce

9 bird strike risk by at least 60% or more. Bird strike diverters placed on new and existing lines

10 will be periodically inspected and replaced as needed until or unless the project or existing line

11 is removed, or are otherwise no longer a strike risk for greater sandhill cranes. The most

12 effective and appropriate diverter for minimizing strikes with greater sandhill crane on the

13 market according to best available science will be selected.
- 14 • Manage habitat to shift cultivated land roost site locations away from risk zones created by new

15 transmission lines. This can be accomplished by not flooding past or current roosting sites

16 located in the vicinity of the new transmission line, thereby eliminating the sites' attractiveness

17 as roosting habitat; and establishing new roost site equal or greater in size at new location in a

18 lower risk zone but within 1 mile of the affected site. The relocated cultivated land roost site will

19 be established prior to commencement of the wintering season that occurs prior to construction

20 of new transmission lines. The existing cultivated land roost site will be flooded during the

21 wintering season prior to construction; it will not be flooded during the wintering season that

22 occurs during the year construction begins. A wildlife agency-approved, qualified biologist

23 familiar with crane biology will design the new roost site and direct implementation of the roost

24 site establishment.
- 25 • Final transmission line design will be determined in coordination with the wildlife agencies and

26 wildlife agency-approved, qualified biologist familiar with crane biology (as described above),

27 to achieve the performance standard and ensure the measures described herein are

28 incorporated.

### 29 ***Powerline Plan and Analysis***

30 Prior to powerline construction, the wildlife agency-approved, qualified crane biologist familiar with

31 crane biology will coordinate with DWR to develop a plan for achieving the performance standard

32 (no take of greater sandhill crane associated with the new facilities) using one or a combination of

33 the measures described above. The plan will include an analysis, using the method described in

34 BDCP Appendix 5.J, Attachment 5.J.C, Analysis of Potential Bird Collisions at Proposed BDCP

35 Powerlines, of the 2013 Public Draft BDCP to demonstrate that this standard has been met for the

36 final transmission line alignment. The best available science will be used to estimate bird strike

37 reduction associated with powerline diverters installed on existing lines in highest risk zones for the

38 species and to design and implement roost site surveys as described in Section 3B.4.20.6 of the 2013

39 Public Draft BDCP, Surveys to Inform Avoidance and Minimization. To ensure greater sandhill crane

40 habitat loss is avoided and minimized to the maximum extent practicable, wildlife agency staff will

41 be involved in discussions with the powerline provider regarding technical constraints on powerline

42 placement and undergrounding. The final powerline plan and analysis will be subject to review and

43 approval by the wildlife agencies prior to its implementation to ensure that birdstrike risk is

44 minimized and take, as defined by Section 86 of the California Fish and Game Code, is avoided.

45 Powerline construction will be implemented consistent with this plan.

## **Required Measures**

Consistent with the performance standard of no take of greater sandhill crane associated with new facilities, the following measures will also be implemented to minimize bird strike hazard. While any combination of the measures described under Performance Standard, above, may be implemented to meet the performance standard, all of the following measures are required.

- During the final powerline design process, undergrounding of all new permanent powerlines will be comprehensively evaluated with respect to cost, operational risks, bird strike risks, and other relevant factors.
- Upon approval by the power providers, bird diverters will be installed on all new temporary and permanent powerlines, following Avian Power Line Interaction Committee protocols. These diverters will be maintained for the entire period that the lines are in place. This may contribute toward meeting the performance standard of no take of greater sandhill crane associated with the new facilities (described above).
- All new above-ground powerlines will be at least 300 feet from all crane roost sites. This can be accomplished through alignment design or through crane roost site relocation. For relocation of cultivated land roost sites, both the existing<sup>23</sup> and new roost site will be flooded a year prior to construction; and the existing roost site will not be flooded during the wintering season that occurs during the year construction begins. For relocation of wetland roost sites, the relocated site will be flooded one year prior to construction; and during construction, both roosting sites will be flooded. A wildlife agency-approved, qualified biologist familiar with crane biology will design new roost sites and direct implementation of roost site establishment. Potential sites will be identified and monitored prior to establishment. Relocated roost sites will be maintained until construction is complete in the affected region.
- New<sup>24</sup> permanent powerlines will be placed outside of areas with a bird strike risk index of 1.0 or greater as shown on Figure 2 in, Appendix 5.J, Attachment 5J.C, Analysis of Potential Bird Collisions at Proposed BDCP Powerlines, of the 2013 Public Draft BDCP.
- Use of construction equipment greater than 50 feet in height will be minimized to the extent practicable in light of project schedule and cost and logistical considerations.

See also AMM30 Transmission Line Design and Alignment Guidelines.

## **Effects on Greater Sandhill Crane Foraging and Roosting Habitat Resulting from Water Conveyance Features**

The following measures will be implemented to avoid and minimize effects on greater sandhill crane resulting from implementation of the final design of the water conveyance features.

<sup>23</sup> “Existing” roost habitat is that which is designated by the crane roost model at the time of water conveyance plan finalization. The crane roost model will be based on recent survey data as described in Section 3B.4.20.6, *Surveys to Inform Avoidance and Minimization*.

<sup>24</sup> New powerlines are those that did not previously exist, that is, if a powerline is replaced along the same alignment as one that previously existed, then that is not considered a “new” powerline, but a “replacement” powerline.

### Foraging Habitat

- Minimize direct loss of foraging habitat. Water conveyance facility final design will minimize pile driving and general construction-related loss of greater sandhill crane foraging habitat to the extent practicable.
- Minimize pile driving and general construction-related combined noise effects on foraging habitat. DWR will minimize the area of crane foraging habitat to be affected during the day (from 1 hour after sunrise to 1 hour before sunset) by construction noise exceeding 50 dBA Leq (1 hour)<sup>25</sup>. Combined pile driving and general construction-related noise levels will be estimated prior to commencement of construction using the methods described in Appendix 11F of the FEIR/FEIS, BDCP Appendix 5.J, Attachment 5J.D, Indirect Effects of Construction of the BDCP Conveyance Facility on Greater Sandhill Crane, incorporating site-specific information related to equipment to be used and existing noise barriers such as levees. Artificial noise barriers may be installed to decrease noise levels at foraging habitat below 50 dBA Leq (1 hour). However, the visual effects of noise barriers on sandhill cranes are unknown; therefore, all other options to reduce noise will be implemented before installing noise barriers in close proximity to crane habitat.
- Enhance foraging habitat to avoid loss of foraging values that could otherwise result from unavoidable noise-related effects. DWR will enhance 0.1 acre of foraging habitat for each acre of foraging habitat to be indirectly affected within the 50 dBA Leq (1 hour) construction noise contour. The enhanced foraging habitat will be established one crane wintering season (September 1 to March 15) prior to construction and will be maintained until the activities causing the indirect noise effect is completed. The enhanced habitat will consist of corn fields that will not be harvested, and will be managed to maximize food availability to greater sandhill cranes (e.g., corn stalks will be knocked down or mulched to make grain available to foraging cranes). A management plan for the enhanced habitat will be completed prior to establishing the habitat, in coordination with a biologist with at least 5 years of experience managing greater sandhill crane habitat on cultivated lands, or experience directing such management. The enhanced habitat will be located outside the construction-related 50 dBA Leq (1 hour) noise contour and within 1 mile of the affected habitat.

### Roosting Habitat

Preconstruction surveys will be conducted for greater sandhill crane temporary and permanent roost sites within 0.75 mile of the construction area boundary where access is available. Surveys will be conducted during the winter prior to project implementation, over multiple days within the survey area by a qualified biologist with experience observing the species. Alternatively, roost sites within 0.75 mile of the construction area boundary can be identified by a qualified greater sandhill crane biologist familiar with roost sites in the Plan Area. If a greater sandhill crane roost site is located within 0.75 mile of the construction area boundary, then to the extent practicable, nighttime (1 hour before sunset to 1 hour after sunrise) project activities will be relocated to maintain a 0.75-mile nondisturbance buffer. If this is not practicable, the following measures will be implemented to avoid and minimize effects on roosting greater sandhill cranes.

- Avoid direct construction-related loss of roost sites. Activities will be designed to avoid direct loss of crane roost sites. This can be accomplished by siting activities outside identified crane

<sup>25</sup> 50 decibels averaged over a 1-hour period.

roost sites or by relocating the roost site if it consists of cultivated lands (roost sites that consist of wetlands rather than cultivated lands will not be subject to relocation). A cultivated land roost site can be relocated by not flooding the site where the impact will occur during years when construction will occur and by establishing a new roost site equal or greater in size at a new location away from the disturbance (outside the 50 dBA Leq [1 hour] pile driving and general construction noise contour) but within 1 mile of the affected site. The relocated roost site will be established one year prior to construction activities affecting the original roost site. A qualified biologist familiar with crane biology will design the new roost site and direct implementation of the roost site establishment. Potential sites will be identified and monitored prior to establishment. Relocated roost sites will be maintained until construction is complete in the affected region. Combined pile driving and general construction-related noise levels will be estimated prior to commencement of construction using the methods described in BDCP Appendix 5.J, Attachment 5J.D, Indirect Effects of Construction of the BDCP Conveyance Facility on Greater Sandhill Crane (see Appendix 11F of the FEIR/FEIS), incorporating site-specific information related to equipment to be used and existing noise barriers such as levees.

- Avoid and minimize pile driving and general construction-related noise effects on roost sites. Activities within 0.75 mile of crane roosting habitat will reduce pile driving and general construction noise during nighttime hours (from 1 hour before sunset to 1 hour after sunrise) such that pile-driving and general construction noise levels do not exceed a combined 50 dBA Leq (1 hour) at the nearest temporary or permanent roosts during periods when the roost sites are available (flooded). This can be accomplished by limiting construction activities that could result in pile-driving and general construction noise levels above 50 dBA Leq (1 hour) at the roost site to day time only (from 1 hour after sunrise to 1 hour before sunset); siting nighttime project activities at a sufficient distance from crane roost sites to ensure that pile-driving and general construction noise levels do not exceed a combined 50 dBA Leq (1 hour) at the roost site; relocating cultivated land or wetland roost sites as described above; and/or installing noise barriers between roost sites within the 50 dBA Leq (1 hour) contour and the pile-driving and general construction noise source areas, such that construction noise levels at the roost site do not exceed 50 dBA Leq (1 hour). The installation of noise barriers will be used only if the first three options cannot be implemented to the extent that noise levels do not exceed 50 dBA Leq (1 hour) at the roost site.

If the roost site to be indirectly affected within the 50 dBA Leq (1 hour) pile-driving and general construction combined noise contour is a wetland site rather than cultivated land, then the existing wetland site will not be removed. A new, cultivated land roost site will be temporarily established at a new location away from the disturbance (outside the 50 dBA Leq (1 hour) noise contour) but within 1 mile of the affected site, at a ratio of 1 acre created for each acre of temporary or permanent roost site within the pile-driving and general construction 50 dBA Leq (1 hour) noise contour. The new roost site will be established prior to commencement of the wintering season that occurs prior to construction of new powerlines affecting the original roost site, and will be maintained until the activities creating the indirect disturbance are completed. A qualified biologist familiar with crane biology will design the new roost site and direct implementation of the roost site establishment.

### ***Measures to Avoid and Minimize Potential Effects from Lighting and Visual Disturbance***

DWR will implement the following measures to avoid and minimize potential lighting and visual effects that could result from construction or operation and maintenance.

- Route truck traffic to reduce headlight impacts in roosting habitat.
- Install light barriers to block the line-of-sight between the nearest roosting areas and the primary nighttime construction light source areas.
- Operate portable lights at the lowest allowable wattage and height, while in accordance with the National Cooperative Highway Research Program's Report 498: Illumination Guidelines for Nighttime Highway Work.
- Screen all lights and direct them down toward work activities and away from the night sky and nearby roost sites. A biological construction monitor will ensure that lights are properly directed at all times.
- Limit the number of nighttime lights used to the greatest extent practicable in light of worker safety requirements.
- Install a vegetation screen or other noise and visual barrier along the south side of Hood Franklin Road along the length of Stone Lake National Wildlife Refuge's property to reduce disturbance to sandhill cranes. The noise and visual barrier will be a minimum of 5 feet high (above the adjacent elevated road, if applicable) and will provide a continuous surface impenetrable by light. This height may be obtained by installing a temporary structure, such as fencing (e.g., chain link with privacy slats) or a semipermanent structure, such as a concrete barrier (e.g., a roadway median barrier or architectural concrete wall system) retrofitted with an approved visual screen, if necessary, to meet the required height. This barrier will not be installed immediately adjacent to crane foraging habitat, and placement will be coordinated with a qualified crane biologist approved by the wildlife agencies.

#### ***Staten Island Performance Standard***

- Because of the density of greater sandhill cranes wintering on Staten Island and the importance of Staten Island to the existing population of the greater sandhill crane in the Plan Area, the final placement of conveyance facilities and RTM at this site will be minimized to the extent practicable, except where the use of RTM on the island affirmatively contributes to the sustainability of the population. Project-related construction will not result in a net decrease in crane use on Staten Island as determined by deriving greater sandhill crane use days for the entire winter period<sup>26</sup>. This standard will be achieved through some combination of the following (and including the above required avoidance and minimization measures for water conveyance facilities).
- Minimize and/or shift the footprint of activities on Staten Island. The RTM footprint identified on Staten Island is a worst-case scenario. It is expected that the RTM footprint on Staten Island will need to be reduced substantially from shown on the current conveyance facility footprint in order to meet the Staten Island performance standard. Some combination of the following measures will be implemented to achieve this reduction.

<sup>26</sup> Expected loss of crane use will be estimated by using data on crane use days/acre by habitat type on Staten Island from past studies and future monitoring before construction begins (using averages among available years). These will be used to predict the number of lost crane use days within the footprint of the habitat loss and within the 50 dBA  $L_{eq}$  (1 hour) pile-driving and general construction noise contour. Preproject crane surveys will provide additional data on crane use day densities per habitat type to improve the prediction. Use day densities will be used to guide decisions regarding crop habitat needed to be maintained on Staten Island to maintain this performance standard during construction.



- Stockpile RTM higher than 6 feet to reduce the amount of land affected by RTM stockpiles.
- Remove RTM from Staten Island periodically during construction to minimize the RTM footprint.
- Stage the storage and reuse of RTM such that the size of the storage area is minimized at any given time.
- Reduce RTM storage areas and associated activities during the crane wintering season.
- Prioritize placement of facilities and RTM in areas of low or no crane use. For example, the very northern end of Staten Island is an area of low crane use that would be a high priority for placement of facilities and RTM.
- Minimize noise, lighting, and visual disturbances during construction (See measures described above for water conveyance facilities).
- Minimize construction activity and RTM storage during the crane wintering season to the extent practicable.
- Supplemental feeding/foraging habitat enhancement. The enhanced habitat will consist of corn fields that will not be harvested, and will be managed to maximize food availability to greater sandhill cranes. A management plan for the enhanced habitat will be completed prior to establishing the habitat, in coordination with a qualified crane biologist (with at least 5 years of experience managing greater sandhill crane habitat on cultivated lands, or experience directing such management). The enhanced habitat will be located outside the construction-related 50 dBA Leq (1 hour) noise contour and within 1 mile of the affected habitat.
- Maintain flooding and irrigation capacity. Stage water facility construction activities on Staten Island such that they do not disrupt flooding and irrigation to the extent that greater sandhill crane habitat will be reduced during the crane wintering season.
- In determining any long-term uses of RTM on Staten Island, priority will be given to uses that are consistent with the sustainability of greater sandhill crane habitat on the island. RTM will be moved off the island after short-term use or storage unless a determination is made that long-term use of the RTM on Staten Island will not be detrimental to the crane population on the island.

Prior to construction on Staten Island, the qualified, wildlife agency–approved crane biologist will coordinate with DWR to develop a strategy for achieving the Staten Island performance standard using a combination of the measures described above, and prepare a plan based on the final construction design on Staten Island that includes all avoidance and minimization measures necessary for achieving the performance standard. This plan will be subject to review and approval by the wildlife agencies prior to its implementation. All avoidance and minimization measures will be in place, consistent with the plan, prior to project construction on Staten Island.

### ***Surveys to Inform Avoidance and Minimization***

The modeling method used to inform the placement of diverters on existing lines in high-risk zones of the greater sandhill crane winter use area and to evaluate the acres of foraging and roosting habitat affected by the 50 dB noise contour requires spatially explicit roosting and foraging habitat and population density models. The GIS-based methods used to determine the total effected and compensatory habitat will be performed once, at the time of water conveyance facilities plan finalization. The greater sandhill crane roosting and survey data used to evaluate habitat loss, and to

identify lands in fulfillment of minimization requirements, at the time of water conveyance facilities plan finalization will be no more than two wintering seasons old at the time of the evaluation. This allows for avoidance and minimization requirements to be quantified using up-to-date information. DWR chooses to phase avoidance and minimization quantification along with construction phasing, the roosting and foraging habitat and population data must be updated so that it is never more than five years old. The greater sandhill crane roosting and foraging habitat and population models will be updated using on-the-ground surveys performed by a wildlife agency-approved, qualified biologist familiar with crane biology and experienced with crane population-level survey techniques. The greater sandhill crane foraging habitat model can be updated using agricultural land-use data or a combination of land-use and survey data.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this AMM.

**Regulating/Permitting Agencies:** CDFW

**Location:** Greater Sandhill Crane Winter Use Area

**Timing:** AMMs will be implemented if project activities are to occur during greater sandhill crane wintering season (September 15 through March 15) in the Greater Sandhill Crane Winter Use Area (2013 Public Draft BDCP Appendix 2.A, Figure 2.A-19-2).

**Monitoring:** DWR will be responsible for reviewing project designs to ensure the measures described herein are incorporated. DWR will also incorporate the above measure into contracts with construction contractors as appropriate. A construction monitor will monitor implementation of appropriate measures by DWR and perform inspections post-implementation.

DWR will deploy a wildlife agency-approved, qualified crane biologist familiar with crane biology to manage all surveys and construction monitoring required as part of this mitigation measure. DWR will consult with the crane biologist during the design phase to incorporate measures during design. In coordination with DWR, the crane biologist will develop a monitoring plan for surveys to be conducted before, during, and after construction. Prior to powerline construction, the crane biologist familiar will coordinate with DWR to develop a plan for achieving the performance standard (no take of greater sandhill crane associated with the new facilities) using one or a combination of the measures described above. The crane biologist will also coordinate with DWR to develop a strategy for achieving the Staten Island performance standard using a combination of the measures described above, and prepare a plan based on the final construction design on Staten Island that includes all avoidance and minimization measures necessary for achieving the performance standard.

During construction the crane biologist will manage a team of qualified biologists to monitor construction activities for compliance with appropriate measures as well as inspect completed construction activities to ensure incorporation of effective avoidance measures.

**Reporting Requirements:** Survey plans developed by DWR and the crane biologist will determine site-specific reporting requirements for all survey efforts. All plans will be developed by DWR in consultation with the wildlife agencies. After completion of activities with the potential to cause take of greater sandhill crane and/or a temporary loss of the value of foraging and/or roosting habitat due to unavoidable noise effects, DWR shall prepare a report explaining how all such activities were implemented consistent with the requirements of this AMM (20). The report shall explain, at a minimum, the following: how take of greater sandhill cranes, as defined by Section 86 of the

California Fish and Game Code, was avoided; how DWR minimized the effects of noise on foraging habitat and enhanced any foraging habitat indirectly affected within the 50 dBA Leq (1 hour) construction noise contour at a ratio of 0.1 acre enhanced per 1.0 acre affected; how DWR avoided and minimized effects on roost sites and created an acre of new temporary cultivated land roosting habitat for every acre of existing roosting habitat indirectly affected within the 50 dBA Leq (1 hour) construction noise contour; and how construction activities within Staten Island were conducted so as to avoid a net decrease in crane use on Staten Island as determined by deriving greater sandhill crane use days for the entire winter period.

## 4.14 Avoidance and Minimization Measure 21: Tricolored Blackbird

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM21 Tricolored Blackbird	DWR and Construction contractors	Prior to and during Construction	Impact BIO-87, BIO-89

**Commitment:** Prior to implementation of project activities, a qualified biologist with experience surveying for and observing tricolored blackbird will conduct a preconstruction survey to establish use of suitable habitat by tricolored blackbird colonies. Surveys will be conducted in suitable habitat within 1,300 feet of proposed construction areas, where access allows, during the nesting season (generally March 15 to July 31) 1 year prior to, and then again the year of, construction. During each year, surveys will be conducted monthly in March, April, May, June, and July. If construction is initiated at a site during the nesting season, 3 surveys will be conducted within 15 days of construction with one of the surveys within 5 days of the start of construction. The CDFW Suisun Marsh Unit tracks tricolored blackbird colonies yearly in Suisun Marsh as part of the University of California, Davis /USFWS tricolored blackbird portal project; these records will also be searched and staff at the portal project consulted for recent colony information. If active tricolored blackbird nesting colonies are identified, minimization requirements and construction monitoring will be required.

Project activities will avoid active tricolored blackbird nesting colonies and associated habitat during the breeding season (generally March 15–July 31). Avoidance measures will include relocating project activities away from the nesting colonies and associated habitat to the maximum extent practicable.

Projects (construction and restoration) will be designed to avoid construction activity to the maximum extent practicable up to 1,300 feet, but not less than a minimum of 300 feet, from an active tricolored blackbird nesting colony. This minimum buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance as determined by a biologist experienced with tricolored blackbird.

Project activities potentially affecting a nesting colony will be monitored by a qualified biologist to verify that the activity is not disrupting the colony. If it is, the activity will be modified, as practicable, by either delaying construction until the colony abandons the site or until the end of the breeding season, whichever occurs first, temporarily relocating staging areas, or temporarily

rerouting access to the construction site. DWR technical staff will consult with the fish and wildlife agencies and evaluate exceptions to the minimum nondisturbance buffer distance on a case-by-case basis.

Prior to initiation of construction within 300 feet of suitable roosting habitat, a CDFW-approved biologist with experience surveying for and observing tricolored blackbirds will conduct preconstruction surveys to establish use of roosting habitat by tricolored blackbird colonies. Surveys will be conducted in suitable habitat where access is available within 300 feet of proposed construction areas during the nonbreeding season (generally August 1 to March 14) 1 year prior to, and then again the year of, construction. If construction is initiated at a site during the nonbreeding season, 3 surveys will be conducted within 15 days prior to construction with one of the surveys within 5 days prior to the start of construction.

Construction and restoration projects will also be designed, in consultation with CDFW, to avoid construction activity within at least 300 feet from occupied active tricolored blackbird roosting habitat. This minimum buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active roosting site, or where there is sufficient topographic relief to protect the roosting site from excessive noise or visual disturbance, or where sound curtains are used, as determined by a CDFW-approved biologist experienced with tricolored blackbird.

Covered activities that are within 300 feet of occupied roosting habitat will be monitored by a CDFW-approved biologist familiar with tricolored blackbird behavior patterns to verify that the activity is not disrupting the roosting birds. If it is, the activity will be modified, as practicable, by delaying construction until the blackbirds are no longer using the roosting site, temporarily relocating staging areas, temporarily rerouting access to the construction site, or use of sound curtains. The CDFW-approved biologist will evaluate the nondisturbance buffer distance on a case-by-case basis.

Geotechnical exploration activities and transmission line activities will fully avoid tricolored blackbird nesting and roosting habitat.

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this AMM.

**Regulating/Permitting Agencies:** CDFW and USFWS as needed.

**Location:** Surveys will be conducted in suitable habitat within 1,300 feet of proposed construction areas. Project activities potentially affecting a nesting colony will be monitored by a qualified biologist to verify that the activity is not disrupting the colony. Avoidance measures will be implemented in areas where construction will occur near marsh habitat.

**Timing:** Prior to and during construction. Project activities must avoid active tricolored blackbird nesting colonies and associated habitat during the breeding season (generally March 15–July 31).

**Monitoring:** During the design phase, DWR will review all project designs to ensure construction activity avoids, to the maximum extent practicable, up to 1,300 feet, but not less than a minimum of 300 feet, from an active tricolored blackbird nesting colony. If active tricolored blackbird nesting colonies are identified within 1300 feet of construction areas, minimization requirements and construction monitoring will be required. Project activities potentially affecting a nesting colony will be monitored by a qualified biologist to verify that the activity is not disrupting the colony. If it is,

the activity will be modified, as practicable, by either delaying construction until the colony abandons the site or until the end of the breeding season, whichever occurs first, temporarily relocating staging areas, or temporarily rerouting access to the construction site. DWR technical staff will oversee the construction monitoring and coordinate with the fish and wildlife agencies and evaluate exceptions to the minimum nondisturbance buffer distance on a case-by-case basis.

**Reporting Requirements:** Monitoring results will be collected by qualified biologist and reported to DWR technical staff. DWR will report any project activities which could potentially affect a nesting colony to CDFW and USFWS. After completion of activities with the potential to adversely affect tricolored blackbird nesting colonies and associated habitat, DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully avoided such active nesting colonies and associated habitat during the breeding season.

## 4.15 Avoidance and Minimization Measure 22: Suisun Song Sparrow, Yellow-Breasted Chat, Least Bell's Vireo, Western Yellow-Billed Cuckoo

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM22 Suisun Song Sparrow, Yellow-Breasted Chat, Least Bell's Vireo, Western Yellow-Billed Cuckoo	DWR	Prior to and during construction	Impact BIO-75, BIO-78, BIO-95, BIO-98, BIO-104, BIO-107

**Commitment:** Preconstruction surveys of potential breeding habitat for the Suisun song sparrow, yellow-breasted chat, least Bell's vireo, and western yellow-billed cuckoo will be conducted within 500 feet project activities where access is available. At least five surveys will be conducted in suitable habitats within 30 days of the onset of construction, with the last within 3 days of the onset of construction, by a qualified biologist with experience surveying and observing these species and familiar with their vocalizations.

If an active nest site is present, a 250-foot nondisturbance buffer will be established around chat nest sites and a 500-foot nondisturbance buffer around least Bell's vireo, Suisun song sparrow, and western yellow-billed cuckoo nest sites during the breeding season (generally, late February through late August for yellow-breasted chat, least Bell's vireo, and western yellow-billed cuckoo, and early April through late August for Suisun song sparrow).

Disturbance to previous least Bell's vireo nesting sites (for up to 3 years since known nest activity) will also be avoided during the breeding season unless the disturbance is to maintain public safety. Least Bell's vireo uses previous nesting sites, and disturbance during the breeding season may preclude birds from using existing unoccupied nest sites.

The required buffer may be reduced in areas where barriers or topographic relief are sufficient protect the nest from excessive noise or other disturbance. DWR technical staff will coordinate with the fish and wildlife agencies and evaluate exceptions to the minimum nondisturbance buffer distance on a case-by-case basis.

If occupied nests are identified, a qualified biologist will monitor construction activities in the vicinity of all active yellow-breasted chat, least Bell's vireo, western yellow-billed cuckoo, and Suisun song sparrow nests to ensure that project activities do not affect nest success.

To the extent feasible, the contractor will employ best practices to reduce construction noise during daytime and evening hours (7:00 a.m. to 10:00 p.m.) such that construction noise levels do not exceed 60 dBA  $L_{eq}$  (1 hour) at the nearest western yellow-billed cuckoo migratory habitat during migration periods. Limit construction during nighttime hours (10:00 p.m. to 7:00 a.m.) such that construction noise levels do not exceed 50 dBA  $L_{max}[1]$  at the nearest residential land uses. Limit pile driving to daytime hours (7:00 a.m. to 7:00 p.m.). Locate, store, and maintain portable and stationary equipment 300 feet away from suitable western yellow-billed cuckoo habitat during migration periods, and 300 feet from active breeding sites. Employ preventive maintenance including practicable methods and devices to control, prevent, and minimize noise. Except where equipment must cross through riparian zones, route truck traffic to at least 300 feet from suitable western yellow-billed cuckoo migratory habitat during migration periods. Limit trucking activities (e.g., deliveries, export of materials) to the hours of 7:00 a.m. to 10:00 p.m. within 300 feet of cuckoo migration habitat during migration periods. Screen all lights and direct them down toward work activities away from migratory habitat. A biological construction monitor will ensure that lights are properly directed at all times. Operate portable lights at the lowest allowable wattage and height, while in accordance with the National Cooperative Highway Research Program's Report 498: *Illumination Guidelines for Nighttime Highway Work*.

**Responsible Parties:** DWR will be responsible for implementing this AMM.

**Regulating/Permitting Agencies:** CDFW as needed.

**Location:** Within 500 feet of construction activities that occur in potential breeding habitat for Suisun song sparrow, yellow-breasted chat, least Bell's vireo, and western yellow-billed cuckoo.

**Timing:** Before construction; during construction. If an active nest site is present, a 250-foot nondisturbance buffer will be established around chat nest sites and a 500-foot nondisturbance buffer around least Bell's vireo, Suisun song sparrow, and western yellow-billed cuckoo nest sites during the breeding season (generally, late February through late August for yellow-breasted chat, least Bell's vireo, and western yellow-billed cuckoo, and early April through late August for Suisun song sparrow).

**Monitoring:** DWR will deploy qualified biological monitors to conduct preconstruction surveys for the Suisun song sparrow, yellow-breasted chat, least Bell's vireo, and western yellow-billed cuckoo. If an active nest site is present DWR will review all project designs to ensure a 250-foot nondisturbance buffer will be established around chat nest sites and a 500-foot nondisturbance buffer around least Bell's vireo, Suisun song sparrow, and western yellow-billed cuckoo nest sites during the breeding season. DWR technical staff will oversee the construction monitoring and coordinate with the fish and wildlife agencies and evaluate exceptions to the minimum nondisturbance buffer distance on a case-by-case basis.

If occupied nests are identified, a qualified biologist will be on-site daily to monitor construction activities in the vicinity of all active yellow-breasted chat, least Bell's vireo, western yellow-billed cuckoo, and Suisun song sparrow nests to ensure that project activities do not affect nest success.

**Reporting Requirements:** Preconstruction survey data will be reported to DWR for review and incorporation into project design. If active nest sites are present DWR will report such findings to

CDFW. After completion of activities with the potential to adversely affect potential breeding habitat for the Suisun song sparrow, yellow-breasted chat, least Bell's vireo, and western yellow-billed cuckoo, DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Avoidance and Minimization Measure (22).

## 4.16 Avoidance and Minimization Measure 23: Western Burrowing Owl

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM23 Western Burrowing Owl	DWR and Construction Contractors	Prior to and during construction	Impact BIO-91, BIO-93

### **Commitment:**

AMMs for western burrowing owl will only be required for water conveyance construction, restoration, and operations and maintenance activities occurring within suitable habitat as identified from habitat assessments conducted in advance of initiating ground disturbing and staging activities. This AMM incorporates survey, avoidance, and minimization guidelines taken primarily from CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012). For the BDCP alternatives, also see AMM37 for measures to avoid and minimize recreation-related effects on this species.

### **Preconstruction Surveys**

Western burrowing owl surveys will be required within and adjacent to (within 500 feet) water conveyance work areas and restoration sites where suitable habitat has been identified during habitat assessment surveys where access is available. Surveys will be conducted during the breeding season that precedes construction.

Four survey visits will be conducted with at least one site visit between February 15 and April 15 and a minimum of three survey visits, at least three weeks apart, between April 15 and July 15, with at least one visit after June 15. Surveys will be conducted between 10:00 am and two hours before sunset. A qualified biologist will survey the project area and record and map all burrowing owl observations and burrows that may be occupied (as indicated by tracks, feathers, egg shell fragments, pellets, prey remains, cast pellets, whitewash, or decoration) on the project site. The surveys will be conducted while walking transects throughout the entire project footprint, plus all accessible areas within a 500-foot radius of the project footprint. The centerlines of these transects will be spaced 15 to 60 feet apart and will vary in width to account for changes in terrain and vegetation that can preclude complete visual coverage of the area. For example, in hilly terrain with patches of tall grass, transects will be closer together, while in open areas with little vegetation they can be 60 feet apart. Surveyors will stop at least every 300 feet along each transect to scan the entire visible area for presence of burrowing owls. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas.

In addition, preconstruction surveys will be conducted with one occurring 14 days prior to ground breaking and/or staging activities and another within 24 hours of these activities. These surveys will

confirm whether owls identified during the breeding season surveys are still present or whether the site has since become occupied by burrowing owls.

### ***Avoidance and Minimization***

To the extent feasible, burrowing owls will be avoided by relocating work areas with flexible locations, such as geotechnical exploration sites and restoration sites. Within the construction footprint where ground disturbance cannot avoid burrowing owls, owls will be relocated during the nonbreeding season and burrows will be excavated.

If an active burrow is identified near a work area and work cannot be conducted outside of the nesting season (February 1 to August 31), a qualified biologist will establish a no-activity buffer that extends a minimum of 250 feet around the burrow. If burrowing owls are present at the site during the nonbreeding season (September 1 through January 31), a qualified biologist will establish a no-activity zone that extends a minimum of 150 feet around the burrow.

If the appropriate no-activity buffer for breeding or nonbreeding burrowing owls cannot be established, a wildlife biologist experienced in burrowing owl behavior will evaluate site-specific conditions and, in consultation with CDFW, recommend a smaller buffer that still minimizes the potential to disturb the owls (and still allows reproductive success during the breeding season). The site-specific buffer will be established by taking into consideration the type and extent of the proposed activity occurring near the occupied burrow, the duration and timing of the activity, the sensitivity and habituation of the owls to existing conditions, and the dissimilarity of the proposed activity to background activities. If an appropriate buffer cannot be established around the active owl burrows, actions will be taken to exclude the owls from the site per the requirements below.

A biological monitor will be present during all construction activities occurring within any reduced buffers. If during the breeding season there is any change in owl nesting and foraging behavior as a result of construction activities, the biological monitor will work with construction personnel and the Environmental Manager to provide additional protections to reduce disturbance, such as adding visual and sound curtains; any modifications to the standard protections will be in consultation with CDFW.

If monitoring indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in use by owls, the no-activity buffer may be removed. If necessary because the burrow cannot be avoided by construction activity, the biologist will excavate and collapse the burrow to prevent reoccupation.

### ***Burrowing Owl Relocation***

No exclusion of burrowing owls will occur during the breeding season. If burrowing owls are present within the construction footprint and cannot be avoided during the nonbreeding season (generally September 1 through January 31), they will be relocated through passive relocation, with or without burrow exclusion. Passive relocation will be used when 1) there is a sufficient amount of suitable habitat adjacent to the work area to support nesting and foraging, 2) there are compatible land use practices in the area and 3) the area is preferably currently under or proposed for conservation.

Passive relocation will be conducted during the nonbreeding season; however passive relocation techniques may be used during the breeding season (February 1 through August 30) if a qualified biologist, coordinating with CDFW, determines through site surveillance that the burrow is not



occupied by a breeding pair, young, or eggs. To the extent feasible, passive relocation will be first be considered without the use of exclusion devices in order to avoid and minimize harassment of owls.

### *Passive Relocation without Exclusion*

Prior to relocating owls, all potential burrowing owl burrows in suitable nesting habitat and within the project footprint and 75 feet around the footprint, will be surveyed for owl use, and excavated if no owls are found. If occupied burrows are found, two natural or artificial burrows will be provided for each occupied burrow in the above define survey area, at least 250 feet from the construction footprint. Artificial burrows will be installed following the methods in Barclay (2008) and Johnson et al (2010). Sites used for artificial burrows will either be properties currently used for or proposed for conservation. After constructing the artificial burrows, the owls will be given 60 days to relocate on their own. The project area will be monitored weekly for up to 60 days to determine whether the owls have left the burrow and to attempting to confirm occupancy at the artificial or other nearby burrows. The formerly occupied burrows will then be excavated. Whenever possible, burrows will be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe (at least 3 inches in diameter) will be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

### *Passive Relocation with Exclusion*

If the burrowing owls found in the above survey area do not relocate on their own through the above methodology, passive relocation will be accomplished by installing one-way doors (e.g., modified dryer vents). The one-way doors will be left in place for a minimum of 48 hours and be monitored twice daily to ensure that the owls have left the burrow. The burrow will be excavated using hand tools, and a section of flexible plastic pipe (at least 3 inches in diameter) will be inserted into the burrow tunnel during excavation to maintain an escape route for any animals that may be inside the burrow.

**Responsible Parties:** DWR and the construction contractors will be responsible for implementing this AMM.

**Regulating/Permitting Agencies:** CDFW.

**Location:** Western burrowing surveys will be required where burrowing owl habitat (or sign) is encountered within and adjacent to (within a 500-foot radius) a project area.

**Timing:** Before construction; during construction. AMMs differ if occurring during the breeding season (February 1-August 31) versus the non-breeding season (September 1-January 31<sup>st</sup>).

**Monitoring:** A qualified biologist will monitor the site consistent with the requirements described in the AMM to ensure that buffers are enforced and owls are not disturbed. The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffers, and protocols in the event that a burrowing owl flies into an active construction zone. DWR technical staff will oversee the construction monitoring and coordinate with the fish and wildlife agencies and evaluate exceptions to the minimum nondisturbance buffer distance on a case-by-case basis.

**Reporting Requirements:** DWR will document the results of preconstruction surveys. After completion of activities with the potential to adversely affect potential western burrowing owl habitat, DWR shall prepare a report explaining how, in carrying out such activities, DWR

successfully implemented the pertinent requirements of this Avoidance and Minimization Measure (23).

## 4.17 Avoidance and Minimization Measure 24: San Joaquin Kit Fox

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM24 San Joaquin Kit Fox	DWR	Prior to and during construction	Impact BIO-162, BIO-163

**Commitment:** To avoid direct effects of project activities on San Joaquin kit fox, the following measures will be implemented. This AMM is based on USFWS's Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during Ground Disturbance (U.S. Fish and Wildlife Service 2011).

San Joaquin kit fox surveys will only be required for projects (including but not limited to establishment of trails and other recreational facilities) occurring within suitable habitat as identified from the habitat modeling and by additional assessments conducted during the planning phase of construction and restoration projects. A qualified biologist will conduct a field evaluation to identify suitable breeding or denning habitat for kit fox for all project activities that occur in noncultivated lands in Conservation Zone 8. If the project overlaps with, or is within 250 feet of suitable kit fox habitat, preconstruction surveys will be required.

Within 14 to 30 days prior to ground disturbance related to project activities, a qualified biologist with experience surveying for and observing the species will conduct a preconstruction survey in areas identified by the habitat assessment as being suitable breeding or denning habitat. The biologist will survey the project footprint and the area within 250 feet beyond the footprint to identify known or potential San Joaquin kit fox dens. Adjacent parcels under different land ownership will not be surveyed unless access is granted within the 250-foot radius. The biologists will conduct these searches by systematically walking 30- to 100-foot-wide transects throughout the survey area; transect width will be adjusted based on vegetation height and topography (California Department of Fish and Game 1990). The biologist will conduct walking transects such that 100% visual coverage of the project footprint is achieved. Dens will be classified in one of the following four den status categories.

- **Potential den.** Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is sufficient to conclude that it is being used or has been used by a kit fox. Potential dens comprise any suitable subterranean hole or any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for kit fox use. If a potential den is found, the biologist will establish a 50-foot buffer using flagging.
- **Known den.** Any existing natural den or artificial structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records; past or current radiotelemetry or spotlighting data; kit fox sign such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a kit fox.

- 1     • **Natal or pupping den.** Any den used by kit foxes to whelp and/or rear their pups. Natal/  
2     pupping dens may be larger with more numerous entrances than dens occupied exclusively by  
3     adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the  
4     den and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A  
5     natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared,  
6     is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish  
7     between the two; therefore, for purposes of this definition, either term applies. If a natal den is  
8     discovered, a buffer of at least 200 feet will be established using fencing.
- 9     • **Atypical den.** Any artificial structure that has been or is being occupied by a San Joaquin kit fox.  
10    Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings. If  
11    an atypical den is discovered, the biologist will establish a 50-foot buffer using flagging.

12    The following measures will be implemented to avoid or minimize direct effects of project activities  
13    on San Joaquin kit fox:

- 14    • The biologist will flag all potential small mammal burrows within 50 feet of the project site to  
15    alert biological and work crews of their presence. Disturbance to all San Joaquin kit fox dens will  
16    be avoided, to the extent possible. Limited destruction may be allowed, if avoidance is not a  
17    reasonable alternative, provided the following procedures are observed.
- 18    • If a suitable San Joaquin kit fox den is discovered in the project footprint, the den will be  
19    monitored for 4 days by a USFWS- and CDFW-approved biologist using a tracking medium or an  
20    infrared beam camera to determine if the den is currently being used.
- 21    • Unoccupied dens will be destroyed immediately to prevent subsequent use. The den will be fully  
22    excavated by hand, filled with dirt, and compacted to ensure that San Joaquin kit foxes cannot  
23    reenter or use the den during the construction period.
- 24    • If an active or natal or pupping den is found, USFWS and CDFW will be notified immediately. The  
25    den will not be destroyed until the pups and adults have vacated and then only after further  
26    coordination with USFWS and CDFW.
- 27    • If kit fox activity is observed at the den during the initial monitoring period, den use will be  
28    actively discouraged, as described below, and monitoring will continue for an additional 5  
29    consecutive days from the time of the first observation to allow any resident animals to move to  
30    another den. For dens other than natal or pupping dens, use of the den can be discouraged by  
31    partially plugging the entrance with soil such that any resident animal can easily escape. Once  
32    the den is determined to be unoccupied it may be excavated under the direction of the biologist.  
33    Alternatively, if the animal is still present after 5 or more consecutive days of plugging and  
34    monitoring, the den may have to be excavated by hand when, in the judgment of a biologist, it is  
35    temporarily vacant (i.e., during the animal's normal foraging activities). If at any point during  
36    excavation a kit fox is discovered inside the den, the excavation activity will cease immediately  
37    and monitoring of the den, as described above, will be resumed. Destruction of the den may be  
38    completed when, in the judgment of the biologist, the animal has escaped from the partially  
39    destroyed den.
- 40    • Construction and operational requirements from Standardized Recommendations for Protection  
41    of the San Joaquin Kit Fox prior to or during Ground Disturbance (U.S. Fish and Wildlife Service  
42    2011) or the latest guidelines will be implemented.
- 43    • Noise will be minimized to the extent possible at the work site to avoid disturbing kit foxes.

- If suitable dens are identified in the project footprint or within a 250-foot buffer, exclusion zones around each den entrance or cluster of entrances will be demarcated. The configuration of exclusion zones will be circular, with a radius measured outward from the den entrance(s). No project activities will occur within the exclusion zones. Exclusion zone radii for atypical dens and suitable dens will be at least 50 feet and will be demarcated with four to five flagged stakes. Exclusion zone radii for known dens will be at least 100 feet and will be demarcated with staking and flagging that encircle each den or cluster of dens but do not prevent access to the den by the foxes.
- Written results of the surveys will be submitted to USFWS within 5 calendar days of the completion of surveys and prior to the beginning of ground disturbance and/or construction activities likely to affect San Joaquin kit foxes.

**Responsible Parties:** DWR will be responsible for implementing this AMM.

**Regulating/Permitting Agencies:** USFWS and CDFW.

**Location:** DWR will deploy a qualified biologist to conduct a field evaluation to identify suitable breeding or denning habitat for kit fox for all project activities that occur in noncultivated lands in Conservation Zone 8. AMM's will be required if the project overlaps with, or is within 250 feet of suitable kit fox habitat.

**Timing:** Before construction; during construction.

**Monitoring:** If a suitable San Joaquin kit fox den is discovered in the project footprint, the den will be monitored for 4 days by a USFWS- and CDFW-approved biologist. If kit fox activity is observed at the den during the initial monitoring period, den use will be actively discouraged, as described below, and monitoring will continue for an additional 5 consecutive days from the time of the first observation to allow any resident animals to move to another den. For dens other than natal or pupping dens, use of the den can be discouraged by partially plugging the entrance with soil such that any resident animal can easily escape. Once the den is determined to be unoccupied it may be excavated under the direction of the biologist. Alternatively, if the animal is still present after 5 or more consecutive days of plugging and monitoring, the den may have to be excavated by hand when, in the judgment of a biologist, it is temporarily vacant (i.e., during the animal's normal foraging activities). If at any point during excavation a kit fox is discovered inside the den, the excavation activity will cease immediately and monitoring of the den, as described above, will be resumed. Destruction of the den may be completed when, in the judgment of the biologist, the animal has escaped from the partially destroyed den.

**Reporting Requirements:** Written results of San Joaquin kit fox surveys will be submitted to USFWS within 5 calendar days of the completion of surveys and prior to the beginning of ground disturbance and/or construction activities likely to affect San Joaquin kit foxes. After completion of activities occurring within suitable San Joaquin kit fox habitat as identified from habitat modeling and by additional assessments conducted during the planning phase of construction and restoration projects, DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Avoidance and Minimization Measure (24).

## 4.18 Avoidance and Minimization Measure 25: Riparian Woodrat and Riparian Brush Rabbit

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM25 Riparian Woodrat and Riparian Brush Rabbit	DWR and Construction Contractors	Prior to and during construction	Impact BIO-152, BIO-153

**Commitment:** AMMs for riparian woodrat and riparian brush rabbit will only be required for projects occurring within suitable habitat as identified from the habitat modeling and by additional assessments conducted during the planning phase of construction or restoration projects. A qualified biologist will conduct a field evaluation of suitable habitat for both species for all project activities that occur within Conservation Zone 7. One known population of riparian brush rabbit occurs in the Plan Area (in Conservation Zone 7); no known populations of riparian woodrat occur in the Plan Area. If the project does not fully avoid effects on suitable habitat, the following measures will be required.

- Assess habitat suitability for both species and, if habitat is considered potentially occupied and cannot be avoided, conduct protocol-level surveys according to the USFWS (no date [b]) *Draft Habitat Assessment Guidelines and Survey Protocol for the Riparian Brush Rabbit and the Riparian Woodrat*.
- If occupied riparian woodrat or riparian brush rabbit habitat is present in project site, redesign project to the extent possible to avoid occupied habitat. Design tidal natural communities restoration projects (EC4 *Tidal Natural Communities Restoration*) to completely avoid permanent or temporary loss of occupied riparian brush rabbit and riparian woodrat habitat. If occupied riparian woodrat or riparian brush rabbit habitat is present in the construction facility corridor, consider reducing the corridor width to avoid occupied riparian habitat and, if feasible, tunnel beneath the occupied riparian corridor.
- If occupied riparian woodrat or riparian brush rabbit habitat cannot be avoided, avoid mortality through implementation of a trapping and relocation program. Develop the program in coordination with USFWS, and relocate to site approved by USFWS prior to construction activities.
- Floodplain restoration projects will be designed to minimize the removal of mature oaks in areas providing suitable habitat for the riparian woodrat.
- DWR will implement the following measures to avoid and minimize noise and lighting related effects on the species: Establish a 1,200-foot nondisturbance buffer between any project activities and suitable habitat. Establish a 1,200-foot buffer between any lighting and pile driving and suitable habitat. Screen all lights and direct them down toward work activities away from potential occupied habitat. A biological construction monitor will ensure that lights are properly directed at all times. Operate portable lights at the lowest allowable wattage and height, while in accordance with the National Cooperative Highway Research Program's Report 498: Illumination Guidelines for Nighttime Highway Work. Limit construction during nighttime hours (10:00 p.m. to 7:00 a.m.) such that construction noise levels do not exceed 50 dBA  $L_{max}$  at the nearest residential land uses. Limit pile driving to daytime hours (7:00 a.m. to 6:00 p.m.).

**Responsible Parties:** DWR and its construction contractors will be responsible for implementing this Avoidance and Minimization Measure.

**Regulating/Permitting Agencies:** Develop the program in coordination with USFWS, and relocate to site approved by USFWS prior to construction activities.

**Location:** AMMs for riparian woodrat and riparian brush rabbit will only be required for projects occurring within suitable habitat as identified from the habitat modeling and by additional assessments conducted during the planning phase of construction or restoration projects.

**Timing:** This AMM will be implemented before and during the construction phase of the project.

**Monitoring:** DWR will deploy a qualified biologist to conduct a field evaluation of suitable habitat for both species for all project activities that occur within Conservation Zone 7. If the project does not fully avoid effects on suitable habitat DWR will monitor inclusion of the measures described above in *Commitment* into project designs. DWR technical staff will oversee the construction monitoring and coordinate with the fish and wildlife agencies and evaluate exceptions to the minimum nondisturbance buffer distance on a case-by-case basis.

**Reporting Requirements:** A written report summary of the field evaluations conducted prior to construction will be delivered to DWR and USFWS within 5 days of completing the surveys. The biological monitor will report to DWR any deficiencies in compliance with this AMM during construction. Any deficiencies will be recorded in the project file. After completion of activities occurring within suitable habitat for either the riparian woodrat or the riparian brush rabbit as identified from habitat modeling and by additional assessments conducted during the planning phase of construction and restoration projects, DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Avoidance and Minimization Measure (25).

## 4.19 Avoidance and Minimization Measure 34: Construction Site Security

Environmental Commitment/AMM	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM34: Construction Site Security	DWR	During and after construction	Impact UT-1, UT-8, BIO-176

**Commitment:** All security personnel will receive environmental training similar to that of onsite construction workers so that they understand the environmental conditions and issues associated with the various areas for which they are responsible at a given time. Security operations and field personnel will be given the emergency contact phone numbers of environmental response personnel for rapid response to environmental issues resulting from vandalism or incidents that occur when construction personnel are not onsite. Security operations will also maintain a contact list of backup support from city police, county sheriffs, California Highway Patrol, water patrols (such as the Contra Costa County Marine Patrol), helicopter response, and emergency response (including fire departments, ambulances/emergency medical technicians). The appropriate local and regional contact list will be made available to security personal by DWR, as will the means to make that contact via landline phones, cell phones, or radios.

**Responsible Parties:** DWR will be responsible for implementation of this AMM.

**Regulating/Permitting Agencies:** N/A for this AMM.

**Location:** This AMM will be implemented at each site-specific construction site for the project, including staging and equipment storage areas.

**Timing:** Implementation will occur during and after construction.

**Monitoring:** DWR will be responsible for implementation of this AMM and arranging environmental training to onsite construction workers. DWR will appoint a designated agency to oversee implementation and monitoring of the Private patrol security operators.

**Reporting Requirements:** Security operations and field personnel will provide DWR with all appropriate licenses from the California Bureau of Security and Investigative Services. Private patrol security operators will report to DWR at the completion of environmental training similar to that of onsite construction workers for all security operations and field personnel. Private patrol security operators will also report to DWR if at any time 24-hour onsite security personnel are not present and construction sites are not being monitored.

## 4.20 Avoidance and Minimization Measure 38: California Black Rail

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM38 California Black Rail	DWR	Prior to and during construction	Impact BIO-57, BIO-59, BIO-60

**Commitment:** Preconstruction surveys for California black rail will be conducted where potentially suitable habitat for this species occurs within 500 feet of work areas where access is available. Potentially suitable habitat includes tidal and non-tidal seasonal or perennial wetlands at least 2 acres in size with any kind of vegetation types consistent with black rail use in the Delta, as determined by field evaluations conducted by a qualified biologist with experience surveying for black rail, over 10 inches high, whether or not the patch in question was mapped as modeled habitat. Surveys will be initiated sometime between January 15 and February 1. A minimum of four surveys will be conducted. The survey dates will be spaced at least 2 to 3 weeks apart and will be scheduled so that the last survey is conducted no more than two weeks before April 15. This will allow the surveys to encompass the time period when the highest frequency of calls is likely to occur. These surveys will involve the following protocols (based on Evens et al. 1991), or other CDFW-approved survey methodologies that may be developed using new information and best-available science, and will be conducted by biologists with the qualifications stipulated in the CDFW-approved methodologies.

- Listening stations will be established at 300 foot intervals throughout potential black rail habitat that will be affected by project activities. Listening stations will be placed along roads, trails, and levees to avoid trampling.
- California black rail vocalization recordings will be played at each station, and playing will cease immediately once a response is detected.

- Each listening station will be occupied for 6 minutes, including 1 minute of passive listening, 1 minute of “grr” calls followed by 30 seconds of “ki-ki-krrr” calls, then followed by another 3.5 minutes of passive listening.
- Each survey will include a survey at sunrise and a survey at sunset.
- Sunrise surveys will begin 60 minutes before sunrise and conclude 75 minutes after sunrise (or until presence is detected).
- Sunset surveys will begin 75 minutes before sunset and conclude 60 minutes after sunset (or until presence is detected).
- Surveys will not be conducted when tides are greater than National Geodetic Vertical Datum or when sloughs and marshes are more than bankfull.
- California black rail vocalizations will be recorded on a data sheet. A GPS receiver and compass will be used to identify surveys stations, angles to call locations, and call locations and distances. The call type, location, distance from listening station, and time will be recorded on a data sheet.

The project will be implemented in a manner that will not result in take of California black rail as defined by Section 86 of the California Fish and Game Code. If California black rail is present in the immediate construction area, the following measures will apply during construction activities.

- To avoid the loss of individual California black rails, activities within 500 feet of potential habitat will not occur within 2 hours before or after extreme high tides (6.5 feet or above, as measured at the Golden Gate Bridge). During high tide, protective cover for California black rail is sometimes limited, and activities could prevent them from reaching available cover.
- To avoid the loss of individual California black rails, activities within 500 feet of tidal marsh areas and managed wetlands will be avoided during the rail breeding season (February 1 – August 31), unless surveys are conducted to determine that no rails, are present within the 500 ft buffer.
- If breeding California black rail is determined to be present, activities will not occur within 500 feet of an identified calling center (or a smaller distance if approved by CDFW). If the intervening distance between the rail calling center and any activity area is greater than 200 feet and across a major slough channel or substantial barrier (e.g., constructed noise barrier) it may proceed at that location within the breeding season.
- If California black rail are determined to be present in habitat that must be disturbed, vegetation will be removed during the non-breeding season (September 1 – January 31) to encourage them to leave the area. Vegetation removal will be completed carefully using hand tools or vegetation removal equipment that is approved by a CDFW-approved biologist. The biologist will search vegetation immediately in front of the removal equipment, and will stop removal if rails are detected. Vegetation removal will resume when the rail leaves the area.
- If construction activities require removal of potential California black rail habitat, whether or not rails have been detected there, vegetation will be removed during the non-breeding season (September 1 – January 31). Vegetation removal will be completed carefully using hand tools or vegetation removal equipment that is approved by a CDFW-approved biologist. The biologist will search vegetation immediately in front of the removal equipment, and will stop removal if rails are detected. Vegetation removal will resume when the rail leaves the area.



- Exception: Inspection, maintenance, research, or non-construction monitoring activities may be performed during the California black rail breeding season (February 1 – August 31) in areas within or adjacent to breeding habitat (within 500 feet) with CDFW approval and under the supervision of permitted CDFW- approved biologist.
- If the construction footprint is within 500 feet of a known calling center, noise reduction structures such as temporary noise reducing walls, will be installed at the edge of construction footprint, as determined by an on-site CDFW-approved biologist. Noise-causing construction will begin during the non-breeding season (September 1 – January 31) so that rails can acclimate to noise and activity prior to initiating nests.

**Responsible Parties:** DWR will be responsible for implementation of this AMM.

**Regulating/Permitting Agencies:** These surveys will involve the following protocols (based on Evens et al. 1991), or other CDFW-approved survey methodologies that may be developed using new information and best-available science, and will be conducted by biologists with the qualifications stipulated in the CDFW-approved methodologies.

**Location:** Preconstruction surveys for California black rail will be conducted where potentially suitable habitat for this species occurs within 500 feet of work areas. Potentially suitable habitat includes tidal and non-tidal seasonal or perennial wetlands at least 2 acres in size with any kind of vegetation types consistent with black rail use in the Delta over 10 inches high, whether or not the patch in question was mapped as modeled habitat.

**Timing:** Surveys will be initiated sometime between January 15 and February 1. A minimum of four surveys will be conducted. The survey dates will be spaced at least 2 to 3 weeks apart and will be scheduled so that the last survey is conducted no more than two weeks before April 15.

**Monitoring:** DWR will oversee preconstruction surveys for California black rail. Upon completion of the survey, DWR will review the survey data as well as survey protocol to ensure compliance with the survey methods and timeframes outlined above in *Commitment*. If California black rail is present, DWR will monitor inclusion of the above measures through periodic reviews of project designs in the design phase. During construction, DWR will deploy a qualified biologist to monitor construction activities in the vicinity of the identified California black rail habitat and execute inspections as required. DWR technical staff will oversee the construction monitoring and coordinate with the fish and wildlife agencies and evaluate exceptions to the minimum nondisturbance buffer distance on a case-by-case basis.

**Reporting Requirements:** After completion of activities occurring within suitable habitat for California black rail, DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Avoidance and Minimization Measure (38).

## 4.22 Avoidance and Minimization Measure 39: White-Tailed Kite

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM39 White-Tailed Kite	DWR and Construction Contractors	Prior to and during construction	Impact BIO-100, BIO-102

### **Commitment:**

#### ***Preconstruction Surveys***

Preconstruction surveys will be conducted to identify the presence of active nest sites of tree nesting raptors within 0.25 mile of project sites, staging and storage areas, construction access roads, work areas, and soil stockpile areas where accessible, by a qualified biologist with experience identifying white-tailed kite nests. Transportation routes along public roads (roads leading to and from work areas) are considered disturbed, and no surveys or monitoring are required for nests along those roadways unless they are within ¼ mile of work areas. Surveys for nesting white-tailed kites will be conducted within 30 days prior to construction to ensure nesting activity is documented prior to the onset of construction activity during the nesting season. White-tailed kites nest in the Plan Area between approximately March 15 and September 15. While many nest sites are traditionally used for multiple years, new nest sites can be established in any year. Therefore, construction activity that is planned after March 15 of any year will require surveys during the year of the construction. If construction is planned before March 15 of any year, surveys will be conducted the year immediately prior to the year of construction. If construction is planned before March 15 of any year and subject to prior-year surveys, but is later postponed to after March 15, surveys will also be conducted during the year of construction.

Construction will be restricted to the greatest extent possible during the nesting season where nest sites occur within 0.25 miles of construction activities, unless an already existing suitable buffer between the construction activity and the nest site is identified by a CDFW-approved biologist. Surveys for white-tailed kite nests and nesting activity will follow a protocol approved by CDFW. If active nests are found or nesting activity is identified within 0.25 miles of construction activities appropriate avoidance and minimization measures will be implemented as described below and in consultation with CDFW. Results of the surveys will be documented and submitted to CDFW no more than 5 days prior to beginning project activities.

Removal of known nest trees will be avoided to the maximum extent feasible. In the event that a known nest tree needs to be removed for project related activities, CDFW will be notified in writing of the location of the known nest tree and timing of removal. No trees with occupied nests will be removed until the nest is vacated. The tree replacement protocol described below will be followed to offset affected nest sites, or may be modified with written authorization from CDFW.

The CDFW-approved biologist will conduct a second survey of potential nesting trees and active nests, and monitor white-tailed kite nests no more than 72 hours prior to construction. If no nesting activity is found, then construction can proceed with no restrictions.

Where construction activities within 0.25 miles of an active nest cannot feasibly be avoided, construction will be initiated prior to egg-laying to the extent possible. If eggs and or young are

present in the nest, work will be restricted until a CDFW-approved biologist determines that white-tailed kites have acclimated to disturbance and exhibit normal nesting behavior.

A 650-foot-radius nondisturbance buffer will be established around each active white-tailed kite nest site. No construction activity will be allowed to occur in the buffer while a nest site is occupied by white-tailed kite during the breeding season. The buffer size may be modified based on the field examination and determination by the CDFW-approved biologist of conditions that may minimize disturbance effects, including line-of-sight, topography, land use, type of disturbance, existing ambient noise and disturbance levels, and other relevant factors, as authorized by CDFW. The buffer will be clearly delineated with fencing or other conspicuous marking. Active nests will be monitored to track progress of nesting activities. Entry into the buffer will be granted when the CDFW-approved biologist determines that the young have fledged and are capable of independent survival or the nest has failed and the nest site is no longer active.

Where it is infeasible to avoid construction within 0.25 mile of an active white-tailed kite nest identified in preconstruction surveys, at a minimum the following measures will be implemented as part of a nesting bird monitoring and management plan that will be approved by CDFW. The final plan may include additional measures that are specific to site conditions.

Five days and three days prior to the initiation of construction at any site where a nest is within 650 feet of construction, the designated Biological Monitor will observe the subject nest(s) for at least 1 hour and until normal nesting behavior can be determined. Nest status will be determined and normal nesting behaviors observed, which may be used to compare to the nesting activities once construction begins. The results of preconstruction monitoring will be reported to CDFW within 24 hours of each survey.

Where pre-project surveys have identified an occupied white-tailed kite nest less than 325 feet from construction, the Biological Monitor will observe the nest periodically throughout the day where covered activities occur to ensure the white-tailed kites demonstrate normal nesting behavior.

Where pre-project surveys have identified an occupied white-tailed kite nest between 325 to 650 feet from construction, the Biological Monitor will observe the nest for at least 2 hours per construction day where covered activities occur to ensure the white-tailed kites demonstrate normal nesting behavior.

Where pre-project surveys have identified an occupied white-tailed kite nest between 650 to 1,300 feet from construction, the Biological Monitor will observe the nest for at least 3 days per construction week to ensure the white-tailed kites demonstrate normal nesting behavior and to check the status of the nest.

During construction or ongoing operation and maintenance activities, physical contact with an active nest tree is prohibited from the time of egg laying to fledging, unless approved by CDFW. Construction personnel outside of vehicles must remain at least 650 feet, or the length of a buffer approved by CDFW, from the nest tree unless construction activities require them to be closer.

All personnel will remain out of the line of sight of an occupied white-tailed kite nest during breaks if within 650 feet of the nest (as stated above, activities will only occur within 650 feet of a nest with written approval by CDFW).

The project will be implemented in a manner that will not result in take of white-tailed kite as defined by Section 86 of the California Fish and Game Code. If during construction monitoring, the

designated biologist determines that a nesting white-tailed kite within 650 feet of construction is disturbed by construction activities, to the point where reproductive failure could occur, the designated biologist will immediately notify the Construction Supervisor and Program Environmental Manager. The Program Environmental Manager will contact CDFW, and it will be determined by the parties whether additional protection measures can be implemented. Potential nest abandonment and failure may be indicated if white-tailed kite exhibits distress and/or abnormal nesting behavior such as swooping/stooping at construction equipment or personnel, excessive vocalization [distress calls] or agitation directed at construction equipment or personnel, failure to remain on nest or failure to deliver prey items for an extended time period. Additional protection measures will remain in place until the white-tailed kite behavior has normalized.

### ***Nesting Habitat Replacement***

The following measures will be implemented to minimize near-term effects on the white-tailed kite populations that could otherwise result from loss of nesting habitat during the first 10 years of the permit term, before most of the restored riparian natural community has matured. Nesting habitat is limited throughout much of the Plan Area, consisting mainly of intermittent riparian, isolated trees, small groves, tree rows along field borders, roadside trees, and ornamental trees near rural residences. Removal of nest trees and nesting habitat could further reduce this limited resource and reduce or restrict the number of active white-tailed kites within the Plan Area until restored riparian habitat is sufficiently developed. To account for this potential near-term loss of nesting habitat, the following additional measures will be implemented.

### ***Tree Replacement with Saplings***

Planting trees as potential nesting habitat for white-tailed kite is addressed in *CM7 Riparian Natural Community Restoration* and *CM11 Natural Communities Enhancement and Management*. While those measures address the overall long-term restoration of nesting habitat and the enhancement of conservation lands for these species, the following measures specifically address the removal of nest trees or nesting habitat during construction and provide a mechanism to compensate for this loss in order to minimize the near-term effects on white-tailed kite populations.

- a) Five trees (5-gallon-container size) will be planted on conservation lands for every known and potential white-tailed kite nest tree (20 feet or taller) removed by construction. Of the replacement trees planted, a variety of native tree species will be planted to provide trees with differing growth rates, maturation, and life span.
- b) Replacement trees will be planted with the mature trees to recreate nest sites, within the conservation lands in areas that support high-value white-tailed kite foraging habitat to increase nest sites or within the riparian plantings as a component of the requirement for riparian restoration where they are in close proximity to suitable foraging habitat. Replacement trees that are incorporated into the riparian restoration will not be clustered in a single region of the Plan Area, but will be distributed throughout the lands protected as foraging habitat for white-tailed kite.

The survival success of the planted trees described in (a) and (b) above will be monitored annually for a period of 10 years to assure survival and appropriate growth and development. Success will be measured as an 80% survival rate at 5 and 10 years after planting. Plantings will subsequently be monitored every 5 years to verify their continued survival and growth. For every tree lost during the 10-year time period, a replacement tree will be planted immediately upon the detection of failure.

All necessary planting requirements and maintenance (i.e., fertilizing, irrigation) to ensure success will be provided. Trees will be irrigated for a minimum of the first 5 years after planting, and then gradually weaned off the irrigation during a period of approximately 2 years. If larger stock is planted, the number of years of irrigation will be increased accordingly. If the 80% establishment success cannot be met, protection of three mature nest trees can substitute for each failed nest tree attempt.

### ***Tree Replacement with Mature Trees***

To further and more directly minimize the effects of near-term loss of nesting habitat for white-tailed kite, a program to plant mature trees will be implemented. Planting larger, mature trees, including transplanting trees scheduled for removal, and supplemented with additional saplings, is expected to accelerate the development of potential replacement nesting habitat.

- a) To compensate for the temporal loss of available white-tailed kite nest sites (defined as a 125-acre area where more than 50% of suitable nest trees (20 feet or taller) within the 125-acre block are removed), five mature native trees (at least 20 feet in height) will be transplanted at an appropriate location. Mature trees can be replaced with either nursery trees or trees scheduled to be removed by construction. To determine the number of replacement trees required, a grid of 125-acre blocks will be placed over each component of project footprint in which trees are to be removed, and the grid will be fixed in a manner that places the most complete squares of the grid in the project footprint (i.e., the grid will be adjusted so that, to the extent possible, entire squares rather than portions of squares will overlap with the project footprint).
- b) The mature trees will be transplanted at a location that otherwise supports suitable habitat conditions for white-tailed kite. This could be around project facilities (while taking into consideration potential effects of noise and visual disturbance from facility operation), on new conservation lands, other existing conservation lands, or excess DWR land, as long as DWR controls the property. These trees will be transplanted as close as biologically feasible to the affected nest site (e.g. near the newly constructed intake facilities), unless such location would have low long-term conservation value due to factors such as threat of seasonal flooding or sea level rise, in which case the trees may be planted elsewhere on conservation lands.
- c) DWR may substitute transplanting of mature nest trees with protection of three suitable nest trees for each mature nest tree that would be transplanted.
- d) Replacement nest sites must be ½ mile or more apart and must be at least ½ mile from active nest trees.
- e) As with the sapling trees, the mature replacement trees will be monitored and maintained for 10 years to ensure survival and appropriate growth and development. Success will be measured using an 80% survival rate at 5 and 10 years after planting. In addition, 15 (5-gallon-container size) trees will be planted at each mature tree replacement site to provide longevity to the nest site. These 15 trees may be part of the trees committed to the project by item (a) included above as long they meet the survival criteria described in item (d) of Section 3B.4.39.3, *Tree Replacement with Saplings*.
- f) To reduce temporal impacts resulting from the loss of mature nest trees, the plantings described above will occur prior to or concurrent with the loss of trees

**Responsible Parties:** DWR and its construction contractors will be responsible for implementation of this AMM.

**Regulating/Permitting Agencies:** A nesting bird monitoring and management plan will be approved by CDFW.

**Location:** Preconstruction surveys will be conducted to identify the presence of active nest sites of tree nesting raptors within 0.25 mile of project sites, by a CDFW-approved biologist with experience identifying white-tailed kite nests

**Timing:** Surveys of the construction sites and all staging and storage areas, transportation routes, work areas, and soil stockpile areas will be conducted within 30 days prior to construction to ensure nesting activity is documented prior to the onset of construction activity during the nesting season. White-tailed kites nest in the Plan Area between approximately March 15 and September 15. While many nest sites are traditionally used for multiple years, new nest sites can be established in any year. Therefore, construction activity that is planned after March 15 of any year will require surveys during the year of the construction. If construction is planned before March 15 of any year, surveys will be conducted the year immediately prior to the year of construction. If construction is planned before March 15 of any year and subject to prior-year surveys, but is later postponed to after March 15, surveys will also be conducted during the year of construction. The CDFW-approved biologist will conduct a second survey of potential nesting trees and active nests, and monitor white-tailed kite nests no more than 72 hours prior to construction.

**Monitoring:** Upon completion of preconstruction surveys, the CDFW-approved biologist will provide survey data to DWR in order to review the survey data as well as survey protocol to ensure compliance with the survey methods and timeframes outlined above in *Commitment*. If white-tailed kite nests and nesting activities are identified, DWR will monitor inclusion of the above measures through periodic reviews of project designs in the design phase. During construction, DWR will deploy a qualified biologist to monitor construction activities daily in the vicinity of the identified white-tailed kite habitat and execute inspections as required. DWR technical staff will oversee the construction monitoring and coordinate with the fish and wildlife agencies and evaluate exceptions to the minimum nondisturbance buffer distance on a case-by-case basis. Tree replacements will be monitored by a qualified arborist as well as the biological monitor who will ensure tree planting is consistent with the methods outlined in this AMM.

**Reporting Requirements:** Results of the surveys will be documented and submitted to CDFW no more than 5 days prior to beginning project activities. The nesting bird monitoring and management plan will be developed and approved by CDFW prior to beginning construction. If, as outlined above in *Commitment*, the biological monitor has to stop the project activity due to disturbance of a nesting white-tailed kite, the biological monitor will notify and consult with CDFW to normalize the white-tailed kite prior to commencing construction activities. Any physical contact with an active nest tree without prior approval of CDFW will be reported to DWR and CDFW immediately. After completion of activities with the potential to adversely affect nests used by the white-tailed kite, DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Avoidance and Minimization Measure (AMM 39).

# Chapter 5

## Environmental Commitments (Modified BDCP Conservation Measures)

### 5.1 Environmental Commitments Modified from BDCP Conservation Measures

As a non-HCP alternative, Alternative 4A achieves compliance with federal and state endangered species laws through Section 7 of the ESA and Section 2081 of CESA, rather than through ESA Section 10 and NCCPA Section 2835. As such, different terminology has been adopted to reflect the difference in permitting strategies under state and federal endangered species laws. These repackaged and limited elements of the original BDCP Conservation Measures are instead referred to as “Environmental Commitments” (ECs). As noted, these Environmental Commitments are actions primarily intended to satisfy CEQA, CESA Section 2081, and ESA Section 7. To minimize confusion, they are numbered to track the parallel BDCP Conservation Measures: Environmental Commitments 3, 4, 6, 7, 8, 9, 10, 11, 12, 15, and 16, as summarized in Table 5-1.

**Table 5-1. Environmental Commitments under Alternative 4A**

Environmental Commitment 3: Natural Communities Protection and Restoration	
Valley/Foothill Riparian	103 acres
Grassland	1,060 acres
Vernal Pool Complex and Alkali Seasonal Wetland Complex	188 acres
Nontidal Marsh	119 acres
Cultivated Lands	11,870 acres
Total:	Up to 13,340 acres
Environmental Commitment 4: Tidal Natural Communities Restoration	
Environmental Commitment 6: Channel Margin Enhancement	Up to 4.6 levee miles
Environmental Commitment 7: Riparian Natural Community Restoration	Up to 271 acres
Environmental Commitment 8: Grassland Natural Community	Up to 2,092 acres
Environmental Commitment 9: Vernal Pool and Alkali Seasonal Wetland Complex Restoration	Up to 48 acres
Environmental Commitment 10: Nontidal Marsh Restoration	Up to 832 acres
Environmental Commitment 11: Natural Communities Enhancement and Management	At sites protected or restored under Environmental Commitments 3–10
Environmental Commitment 12: Methylmercury Management	At sites restored under Environmental Commitment 4
Environmental Commitment 15: Localized Reduction of Predatory Fishes	At north Delta intakes and at Clifton Court Forebay
Environmental Commitment 16: Nonphysical Fish Barrier	At Georgiana Slough

In some cases, resource restoration and protection principles have been added to provide additional detail regarding implementation of the Environmental Commitments (see Table 5-2). These principles serve to highlight and identify specific actions that will be used in selecting lands for protection and restoration and in implementing natural community restoration; and they provide specific management guidance for these lands to maximize the benefit to both common and rare plants and animals. In the context of the Draft BDCP, these were often characterized as biological goals and objectives. As part of the ESA Section 7 consultation process, these elements may function (and be referred to) as “conservation measures” for mitigation purposes. However, for the purposes of the Final EIR/FEIS, these activities are considered part of the alternative and are not defined as “mitigation measures” in order to avoid confusion with those measures proposed for the purposes of CEQA and NEPA compliance.

**Table 5-2. Terrestrial Biology Resource Restoration and Protection Principles for Implementing Environmental Commitments.**

Resource <sup>27</sup>	Resource Restoration and Protection Principles
Landscape Level	<p>L1 - Increase the size and connectivity of the reserve system by acquiring lands adjacent to and between existing conservation lands.</p> <p>L2 - Protect and improve habitat linkages that allow terrestrial species to move between protected habitats within and adjacent to the project area.</p> <p>L3 - Increase native species diversity and relative cover of native plant species, and reduce the introduction and proliferation of nonnative species.</p>
<b>Natural Communities</b>	
Valley/Foothill Riparian	<p>VFR1 - Restore, maintain, and enhance riparian areas to provide a mix of early-, mid- and late-successional habitat types with a well-developed understory of dense shrubs.</p> <p>VFR2 - Maintain a single contiguous patch of 100 acres of mature riparian forest in either CZ 4 or CZ 7.</p> <p>VFR3 - The mature riparian forest intermixed with a portion of the early- to mid-successional riparian vegetation will be a minimum patch size of 50 acres and minimum width of 330 feet.</p>
Vernal Pool/Alkali Seasonal Wetland Complex	<p>VP/AW1 - Protect existing vernal pool complex in the greater Byron Hills area primarily in core vernal pool recovery areas identified in the <i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i> (U.S. Fish and Wildlife Service 2005).</p> <p>VP/AW2 - Restore vernal pool and alkali seasonal wetland complex to achieve no net loss of wetted acreage.</p> <p>VP/AW3 - Increase the size and connectivity of protected vernal pool and alkali seasonal wetland complex in the greater Byron Hill area.</p> <p>VP/AW4 - Provide appropriate seasonal flooding characteristics for supporting and sustaining vernal pool and alkali seasonal wetland complex species.</p> <p>VP/AW5 - In grasslands surrounding protected and created vernal pools and alkali seasonal wetlands complex, increase the extent, distribution, and density of native perennial grasses intermingled with other native species, including annual grasses, geophytes, and other forbs.</p>

<sup>27</sup> Only species that required specific restoration guidelines were included in this table. Some of the natural community level resource guidelines benefit some species and there are also specific AMMs that address other species needs.



Resource <sup>27</sup>	Resource Restoration and Protection Principles
	<p>VP/AW6 - In grasslands surrounding protected and created vernal pool and alkali seasonal wetlands, increase burrow availability for burrow-dependent species.</p> <p>VP/AW7 - In grasslands surrounding protected and restored vernal pool and alkali seasonal wetlands, increase prey abundance and accessibility, especially small mammals and insects, for grassland-foraging species.</p>
Grassland	<p>G1 - Restore grasslands to connect fragmented patches of protected grassland and to provide upland habitat.</p> <p>G2 - Protect up to six acres of stock ponds and other aquatic features within protected grasslands to provide aquatic breeding habitat for native amphibians and aquatic reptiles.</p> <p>G3 - Restore and sustain a mosaic of grassland vegetation alliances, reflecting localized water availability, soil chemistry, soil texture, topography, and disturbance regimes, with consideration of historical states.</p> <p>G4 - Increase the extent, distribution, and density of native perennial grasses intermingled with other native species, including annual grasses, geophytes, and other forbs.</p> <p>G5 - Increase burrow availability for burrow-dependent species.</p> <p>G6 - Increase prey abundance and accessibility, especially of small mammals and insects, for grassland-foraging species.</p> <p>G7 - Maintain and enhance aquatic features in grasslands to provide suitable inundation depth and duration and suitable composition of vegetative cover to support breeding for covered amphibian and aquatic reptile species.</p> <p>G8 - Protect grassland on the landward side of levees adjacent to restored floodplain to provide flood refugia and foraging habitat for riparian brush rabbit.</p> <p>G9 - Create or protect high-value upland giant garter snake habitat adjacent to the nontidal perennial aquatic habitat being restored and created.</p> <p>G10 - Protect 647 acres of grassland in the Byron Hills area.</p>
Cultivated Lands	<p>CL1 - Maintain and protect the small patches of important wildlife habitats associated with cultivated lands that occur in cultivated lands within the reserve system, including isolated valley oak trees, trees and shrubs along field borders and roadsides, remnant groves, riparian corridors, water conveyance channels, grasslands, ponds, and wetlands.</p> <p>CL2 - Target cultivated land conservation to provide connectivity between other conservation lands</p>
<b>Wildlife Species</b>	
Valley Elderberry Longhorn Beetle	<p>VELB1 - Mitigate impacts on elderberry shrubs by creating valley elderberry longhorn beetle habitat consistent with the U.S. Fish and Wildlife Service valley elderberry longhorn beetle conservation guidelines (provided in BDCP Appendix 3.F) and planting elderberry shrubs in high-density clusters.</p> <p>VELB2 - Site valley elderberry longhorn beetle habitat restoration within drainages immediately adjacent to or in the vicinity of sites confirmed to be occupied by valley elderberry longhorn beetle.</p>
Western Pond Turtle	<p>WPT1 - Create and protect nontidal marsh consisting of a mosaic of nontidal perennial aquatic and nontidal freshwater emergent wetland natural communities, which will include suitable habitat characteristics for western pond turtle.</p>

Resource <sup>27</sup>	Resource Restoration and Protection Principles
Giant Garter Snake	<p>GG1 - Created aquatic habitat for the giant garter snake will be connected to the protected rice land or equivalent-value habitat.</p> <p>GG2 - Protect giant garter snakes on restored and protected nontidal marsh and adjacent uplands and from incidental injury or mortality by establishing 200-foot buffers between protected giant garter snake habitat and roads (other than those roads primarily used to support adjacent cultivated lands and levees). Establish giant garter snake reserves at least 2,500 feet from urban areas or areas zoned for urban development.</p> <p>GG3 - Protect, restore, and/or create rice land or equivalent-value habitat (e.g., perennial wetland) for the giant garter snake in Conservation Zones 4 and/or 5.</p> <p>GG4 - Create or protect high-value upland giant garter snake habitat adjacent to the nontidal perennial aquatic habitat being restored and created.</p> <p>GG5 - Create connections from the Coldani Marsh/White Slough subpopulation to other areas in the giant garter snake's historical range in the Stone Lakes vicinity by protecting 255 acres of rice land or equivalent-value habitat (e.g., perennial wetland) for the giant garter snake in CZ 4 and/or CZ 5. Any portion of the 255 acres may consist of muted tidal freshwater emergent wetland and may overlap with the 160 acres of tidally restored freshwater emergent wetland if it meets specific giant garter snake habitat criteria.</p>
California Black Rail	<p>CBR1 - At the ecotone that will be created between restored tidal wetlands and transitional uplands (Environmental Commitment 4), provide for at least 13.5 acres of California black rail habitat (<i>Schoenoplectus</i> and <i>Typha</i>-dominated tidal and nontidal freshwater emergent wetland in patches greater than 0.55 acres at a location subject to CDFW approval) consisting of shallowly inundated emergent vegetation at the upper edge of the marsh (within 164 feet [50 meters] of upland refugia habitat) with adjacent riparian or other shrubs that will provide upland refugia, and other moist soil perennial vegetation. If feasible, create the 13.5 acres of tidal habitat in a single patch in a location that is contiguous with occupied California black rail habitat.</p> <p>CBR2 - Create topographic heterogeneity in restored tidal wetlands (Environmental Commitment 4).</p>
Greater Sandhill Crane	<p>GSC1 - Protect high- to very high-value habitat for greater sandhill crane (see Table 12-4A-28 in Chapter 12, <i>Terrestrial Biological Resources</i>), with at least 80% maintained in very high-value types in any given year. This protected habitat will be within 2 miles of known roosting sites in Conservation Zones 3, 4, 5, and/or 6 and will consider sea level rise and local seasonal flood events, greater sandhill crane population levels, and the location of foraging habitat loss. Patch size of protected cultivated lands will be at least 160 acres.</p> <p>GSC2 - Create at least 320 acres of managed wetlands (part of the nontidal wetland restoration acreage) in minimum patch sizes of 40 acres within the Greater Sandhill Crane Winter Use Area in CZs 3, 4, 5, or 6, with consideration of sea level rise and local seasonal flood events. The wetlands will be located within 2 miles of existing permanent roost sites and protected in association with other protected natural community types (excluding nonhabitat cultivated lands) at a ratio of 2:1 upland to wetland to provide buffers around the wetlands.</p> <p>GSC3 - Create at least two 90-acre wetland complexes within the Stone Lakes National Wildlife Refuge project boundary. The complexes will be no more than 2 miles apart and will help provide connectivity between the Stone Lakes and Cosumnes River Preserve greater sandhill crane populations. Each complex will consist of at least three wetlands totaling at least 90 acres of greater sandhill crane roosting habitat, and will be protected in association with other protected natural community types (excluding nonhabitat cultivated lands) at a ratio of at</p>

Resource <sup>27</sup>	Resource Restoration and Protection Principles
	<p>least 2:1 uplands to wetlands (i.e., two sites with at least 90 acres of wetlands each). One of the 90-acre wetland complexes may be replaced by 180 acres of cultivated lands (e.g., cornfields) that are flooded following harvest to support roosting cranes and provide highest-value foraging habitat, provided such substitution is consistent with the long-term conservation goals of Stone Lakes National Wildlife Refuge for greater sandhill crane.</p> <p>GSC4 - Create an additional 95 acres of roosting habitat within 2 miles of existing permanent roost sites. The habitat will consist of active cornfields that are flooded following harvest to support roosting cranes and that provide highest-value foraging habitat. Individual fields will be at least 40 acres and can shift locations throughout the Greater Sandhill Crane Winter Use Area, but will be sited with consideration of the location of roosting habitat loss and will be in place prior to roosting habitat loss.</p>
Swainson's Hawk	<p>SH1 - Conserve 1 acre of Swainson's hawk foraging habitat for each acre of lost foraging habitat in minimum patch sizes of 40 acres.</p> <p>SH2 - Protect Swainson's hawk foraging habitat with at least 50% in very high-value habitat (see Table 12-4A-35 in Chapter 12, <i>Terrestrial Biological Resources</i>) production and above -1 foot above mean sea level.</p>
Tricolored Blackbird	<p>TB1 - Protect and manage occupied or recently occupied (within the last 15 years) tricolored blackbird nesting habitat located within 3 miles of high-value foraging habitat in Conservation Zones 1, 2, 8, or 11. Nesting habitat will be managed to provide young, lush stands of bulrush/cattail emergent vegetation and prevent vegetation senescence.</p> <p>TB2 - Protect high- to very high-value breeding-foraging habitat within 5 miles of occupied or recently occupied (within the last 15 years) tricolored blackbird nesting habitat. At least 130 acres will be within 3 miles of the 38 acres of nontidal wetland nesting habitat protected.</p> <p>TB3 - Protect moderate-, high-, or very high-value cultivated lands as nonbreeding foraging habitat, at least 50% of which is of high or very high value.</p> <p>TB4 - Nonbreeding roosting habitat mitigation needs assumed to be met through early-successional riparian (blackberry) and tidal (scirpus) restoration.</p>
Riparian Brush Rabbit	<p>RBR1 - Of the protected valley/foothill riparian natural community, protect and maintain 19 acres of early- to mid-successional riparian habitat that meets the ecological requirements of the riparian brush rabbit and that is within or adjacent to or that facilitates connectivity with existing occupied or potentially occupied habitat.</p> <p>RBR2 - Restore and maintain 19 acres of early- to mid-successional riparian brush rabbit habitat that meets the ecological requirements of the riparian brush rabbit and that is within or adjacent to or that facilitates connectivity with existing occupied or potentially occupied habitat.</p> <p>RBR3 - Create and maintain high-water refugia in the 19 acres of restored riparian brush rabbit habitat and the 19 acres of protected riparian brush rabbit habitat, through the retention, construction and/or restoration of high-ground habitat on mounds, berms, or levees, so that refugia are no further apart than 65 feet (20 meters).</p> <p>RBR4 - In protected riparian areas that are occupied by riparian brush rabbit, monitor for and control nonnative predators that are known to prey on riparian brush rabbit.</p> <p>RBR5 - Of the 1,060 acres of grasslands protected, protect 227 acres of grasslands on the landward side of levees adjacent to restored floodplain to provide flood refugia and foraging habitat for riparian brush rabbit.</p>

Resource <sup>27</sup>	Resource Restoration and Protection Principles
<b>Plant Species</b>	
Vernal Pools Species	VPS1 - Protect at least two currently unprotected occurrences of alkali milk-vetch in the Altamont Hills or Jepson Prairie core recovery areas.
Alkali Seasonal Wetland Species	ASWS1 - Protect two currently unprotected occurrences of San Joaquin spearscale in Conservation Zones 1, 8, or 11.
Tidal Wetland Species	TWS1 - No net loss of Mason's lilaeopsis and delta mudwort occurrences within restoration sites. TWS2 - No net loss of Delta tule pea and Suisun Marsh aster occurrences within restoration sites.

## 5.2 Environmental Commitment 3: Natural Communities Protection and Restoration

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Natural Communities Protection and Restoration	DWR	Prior to, during, and after construction	Impact BIO-3, BIO-5, BIO-8, BIO-9, BIO-11, BIO-12, BIO-14, BIO-15, BIO-17, BIO-18, BIO-20, BIO-21, BIO-23, BIO-24, BIO-25, BIO-28, BIO-29, BIO-31, BIO-35, BIO-184

**Commitment:** In order to meet the commitments set forth in Tables 5-1 and 5-2, this action would consist of the acquisition of lands for protection and restoration of natural communities and habitat for special-status species in perpetuity. This action would entail protection of natural communities and cultivated land. This protection and restoration would mitigate for the loss of terrestrial species habitat associated with construction of the water conveyance facilities.

### *Restoration and Protection Site Management Plans*

DWR will prepare and implement a management plan for each listed species habitat restoration and protection site. Management plans may be for an individual parcel or for multiple parcels that share common management needs. DWR will conduct surveys to collect the information necessary to assess the ecological condition and function of conserved species habitats and supporting ecosystem processes, and based on the results, will identify actions necessary to achieve the desired habitat condition at each site.

Management plans will be prepared in consultation with CDFW, NMFS, and USFWS, consistent with their authority, and submitted to those agencies for approval after designation of each site for mitigation purposes. This schedule is designed to allow time for site inventories and identification of appropriate management techniques. During the interim period, management of the site will occur using best practices and based on successful management at the same site prior to acquisition or based on management at other similar sites. The plans will be working documents that are updated and revised as needed to incorporate new acquisitions suitable for coverage under the same management plan and to document changes in management approach that have been agreed to by

Reclamation, DWR, and the appropriate wildlife agency or agencies (CDFW, NMFS, and USFWS), consistent with their authority.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW, NMFS, and USFWS

**Location:** Specific restoration sites would be selected on the basis of their availability, suitability for restoration, biological value, and practicability considerations. It is anticipated that lands used for habitat restoration actions would primarily be those that are currently in public ownership or those that are acquired in fee title because restoration activities have a high potential to preclude other land uses. Lands acquired for the protection and maintenance of existing habitat functions may be acquired through conservation easements that specify permitted land uses and practices in sufficient detail to maintain the intended habitat functions of the acquired lands, although enhancements may also be implemented on conservation easement lands as opportunities arise.

**Timing:** Before, during, and after construction.

**Monitoring:** DWR, through the Adaptive Management Program, will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Environmental Commitment. .

## 5.3 Environmental Commitment 4: Tidal Natural Communities Restoration

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Tidal Natural Communities Restoration	DWR	Prior to, during, and after construction	Impact BIO-3, BIO-5, BIO-6, BIO-9, BIO-60, BIO-66, BIO-173, BIO-184

**Commitment:** In order to meet the commitments set forth in Tables 5-1 and 5-2, this action would consist of the restoration of tidal natural communities and transitional uplands. This analysis assumes that none of these acres of tidal restoration will be done in the Suisun Marsh area. Tidal habitat restoration would mitigate for the physical loss of aquatic habitat associated with construction of the north Delta intake facilities. Actual acreage may change based on further discussions with NMFS, USFWS, and CDFW pertaining to the actual value of the current habitat and/or the appropriate ratio of mitigation or based on footprint changes. The minimum ratio applied to tidal wetland mitigation is 1:1.

### *Restoration and Protection Site Management Plans*

DWR will prepare and implement a management plan for each listed species habitat restoration and protection site. Management plans may be for an individual parcel or for multiple parcels that share common management needs. DWR will conduct surveys to collect the information necessary to

assess the ecological condition and function of conserved species habitats and supporting ecosystem processes, and based on the results, will identify actions necessary to achieve the desired habitat condition at each site.

Management plans will be prepared in collaboration with CDFW, NMFS, and USFWS, consistent with their authority, and submitted to those agencies for approval within 2 years of designation of each site for mitigation purposes. This schedule is designed to allow time for site inventories and identification of appropriate management techniques. During the interim period, management of the site will occur using best practices and based on successful management at the same site prior to acquisition or based on management at other similar sites. The plans will be working documents that are updated and revised as needed to incorporate new acquisitions suitable for coverage under the same management plan and to document changes in management approach that have been agreed to by Reclamation, DWR, and the appropriate wildlife agency or agencies (CDFW, NMFS, and USFWS), consistent with their authority.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW, USFWS, NMFS

**Location:** It is anticipated that lands used for habitat restoration actions would primarily be those that are currently in public ownership or those that are acquired in fee title because restoration activities have a high potential to preclude other land uses. Lands acquired for the protection and maintenance of existing habitat functions may be acquired through conservation easements that specify permitted land uses and practices in sufficient detail to maintain the intended habitat functions of the acquired lands, although enhancements may also be implemented on conservation easement lands as opportunities arise.

**Timing:** Before, during, and after construction

**Monitoring:** DWR, through the Adaptive Management Program, will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Environmental Commitment.

## 5.4 Environmental Commitment 6: Channel Margin Enhancement

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Channel Margin Enhancement	DWR	Prior to, during, and after construction.	Impact AQUA-42, AQUA-60, AQUA-78, AQUA-96, AQUA-111, AQUA-200, AQUA-201, BIO-9, BIO-184

**Commitment:** In order to meet the commitments set forth in Tables 5-1 and 5-2, this action would consist of the enhancement of channel margin habitat. This would mitigate for the loss of salmonid habitat associated with construction and operations of the north Delta intake facilities.

### *Restoration and Protection Site Management Plans*

DWR will prepare and implement a management plan for each listed species habitat restoration and protection site. Management plans may be for an individual parcel or for multiple parcels that share common management needs. DWR will conduct surveys to collect the information necessary to assess the ecological condition and function of conserved species habitats and supporting ecosystem processes, and based on the results, will identify actions necessary to achieve the desired habitat condition at each site.

Management plans will be prepared in collaboration with CDFW, NMFS, and USFWS, consistent with their authority, and submitted to those agencies for approval within 2 years of designation of each site for mitigation purposes. This schedule is designed to allow time for site inventories and identification of appropriate management techniques. During the interim period, management of the site will occur using best practices and based on successful management at the same site prior to acquisition or based on management at other similar sites. The plans will be working documents that are updated and revised as needed to incorporate new acquisitions suitable for coverage under the same management plan and to document changes in management approach that have been agreed to by Reclamation, DWR, and the appropriate wildlife agency or agencies (CDFW, NMFS, and USFWS), consistent with their authority.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW, USFWS, NMFS

**Location:** Sacramento River, Steamboat and Sutter Sloughs, or other locations agreed upon by NMFS and DFW

**Timing:** Before, during, and after construction.

**Monitoring:** DWR, through the Adaptive Management Program, will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Environmental Commitment.

## **5.5 Environmental Commitment 7: Riparian Natural Community Restoration**

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Riparian Natural Community Restoration	DWR	Before, during, and after construction	Impact BIO-9, BIO-11, BIO-35, BIO-184

**Commitment:** In order to meet the commitments set forth in Tables 5-1 and 5-2, this action would consist of the restoration of riparian natural communities. This would mitigate for the loss of terrestrial species habitat associated with construction of the water conveyance facilities.

*Restoration and Protection Site Management Plans*

DWR will prepare and implement a management plan for each listed species habitat restoration and protection site. Management plans may be for an individual parcel or for multiple parcels that share common management needs. DWR will conduct surveys to collect the information necessary to assess the ecological condition and function of conserved species habitats and supporting ecosystem processes, and based on the results, will identify actions necessary to achieve the desired habitat condition at each site.

Management plans will be prepared in collaboration with CDFW, NMFS, and USFWS, consistent with their authority, and submitted to those agencies for approval within 2 years of designation of each site for mitigation purposes. This schedule is designed to allow time for site inventories and identification of appropriate management techniques. During the interim period, management of the site will occur using best practices and based on successful management at the same site prior to acquisition or based on management at other similar sites. The plans will be working documents that are updated and revised as needed to incorporate new acquisitions suitable for coverage under the same management plan and to document changes in management approach that have been agreed to by Reclamation, DWR, and the appropriate wildlife agency or agencies (CDFW, NMFS, and USFWS), consistent with their authority.

**Responsible Parties:** DWR will implement the required mitigation commensurate to the level of the actual effect to the listed species, provided that effects remain below the allowable take limits.

**Regulating/Permitting Agencies:** CDFW, NMFS, and USFWS

**Location:** It is anticipated that lands used for habitat restoration actions would primarily be those that are currently in public ownership or those that are acquired in fee title because restoration activities have a high potential to preclude other land uses. Lands acquired for the protection and maintenance of existing habitat functions may be acquired through conservation easements that specify permitted land uses and practices in sufficient detail to maintain the intended habitat functions of the acquired lands, although enhancements may also be implemented on conservation easement lands as opportunities arise.

**Timing:** Before, during, and after construction.

**Monitoring:** DWR, through the Adaptive Management Plan, will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Environmental Commitment.



## 5.7 Environmental Commitment 8: Grassland Natural Community Restoration

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Grassland Natural Community Restoration	DWR	Prior to, during and after construction	Impact BIO-29

**Commitment:** In order to meet the commitments set forth in Tables 5-1 and 5-2, this action would consist of the restoration of grassland habitat. This would mitigate for the loss of terrestrial species habitat associated with construction of the water conveyance facilities

### *Restoration and Protection Site Management Plans*

DWR will prepare and implement a management plan for each listed species habitat restoration and protection site. Management plans may be for an individual parcel or for multiple parcels that share common management needs. DWR will conduct surveys to collect the information necessary to assess the ecological condition and function of conserved species habitats and supporting ecosystem processes, and based on the results, will identify actions necessary to achieve the desired habitat condition at each site.

Management plans will be prepared in collaboration with CDFW, NMFS, and USFWS, consistent with their authority, and submitted to those agencies for approval within 2 years of designation of each site for mitigation purposes. This schedule is designed to allow time for site inventories and identification of appropriate management techniques. During the interim period, management of the site will occur using best practices and based on successful management at the same site prior to acquisition or based on management at other similar sites. The plans will be working documents that are updated and revised as needed to incorporate new acquisitions suitable for coverage under the same management plan and to document changes in management approach that have been agreed to by Reclamation, DWR, and the appropriate wildlife agency or agencies (CDFW, NMFS, and USFWS), consistent with their authority.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW and USFWS

**Location:** It is anticipated that lands used for habitat restoration actions would primarily be those that are currently in public ownership or those that are acquired in fee title because restoration activities have a high potential to preclude other land uses. Lands acquired for the protection and maintenance of existing habitat functions may be acquired through conservation easements that specify permitted land uses and practices in sufficient detail to maintain the intended habitat functions of the acquired lands, although enhancements may also be implemented on conservation easement lands as opportunities arise.

**Timing:** Before, during, and after construction.

**Monitoring:** DWR, through the Adaptive Management Program, will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Environmental Commitment.

## 5.8 Environmental Commitment 9: Vernal Pool and Alkali Seasonal Wetland Complex Restoration

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Vernal Pool and Alkali Seasonal Wetland Complex Restoration	DWR	Prior to, during, and after construction	Impact BIO-18, BIO-20, BIO-21, BIO-23, BIO-28, BIO-184

**Commitment:** In order to meet the commitments set forth in Tables 5-1 and 5-2, this action would consist of the restoration of vernal pool and alkali seasonal wetland complex. This would mitigate for the loss of species habitat associated with construction of the water conveyance facilities.

### *Restoration and Protection Site Management Plans*

DWR will prepare and implement a management plan for each listed species habitat restoration and protection site. Management plans may be for an individual parcel or for multiple parcels that share common management needs. DWR will conduct surveys to collect the information necessary to assess the ecological condition and function of conserved species habitats and supporting ecosystem processes, and based on the results, will identify actions necessary to achieve the desired habitat condition at each site.

Management plans will be prepared in collaboration with CDFW, NMFS, and USFWS, consistent with their authority, and submitted to those agencies for approval within 2 years of designation of each site for mitigation purposes. This schedule is designed to allow time for site inventories and identification of appropriate management techniques. During the interim period, management of the site will occur using best practices and based on successful management at the same site prior to acquisition or based on management at other similar sites. The plans will be working documents that are updated and revised as needed to incorporate new acquisitions suitable for coverage under the same management plan and to document changes in management approach that have been agreed to by Reclamation, DWR, and the appropriate wildlife agency or agencies (CDFW, NMFS, and USFWS), consistent with their authority.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW, USFWS, NMFS

**Location:** Specific restoration sites would be selected on the basis of their availability, suitability for restoration, biological value, and practicability considerations. It is anticipated that lands used for habitat restoration actions would primarily be those that are currently in public ownership or those that are acquired in fee title because restoration activities have a high potential to preclude other land uses. Lands acquired for the protection and maintenance of existing habitat functions may be acquired through conservation easements that specify permitted land uses and practices in

sufficient detail to maintain the intended habitat functions of the acquired lands, although enhancements may also be implemented on conservation easement lands as opportunities arise.

**Timing:** Before, during, and after construction.

**Monitoring:** DWR, through the Adaptive Management Program, will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Environmental Commitment.

## 5.9 Environmental Commitment 10: Nontidal Marsh Restoration

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Nontidal Marsh Restoration	DWR	Prior to, during, and after construction	Impact BIO-12, BIO-14, BIO-15, BIO-17, BIO-24, BIO-25, BIO-184

**Commitment:** In order to meet the commitments set forth in Tables 5-1 and 5-2, this action would consist of the restoration of nontidal marsh. This would mitigate for the loss of species habitat associated with construction of the water conveyance facilities.

### *Restoration and Protection Site Management Plans*

DWR will prepare and implement a management plan for each listed species habitat restoration and protection site. Management plans may be for an individual parcel or for multiple parcels that share common management needs. DWR will conduct surveys to collect the information necessary to assess the ecological condition and function of conserved species habitats and supporting ecosystem processes, and based on the results, will identify actions necessary to achieve the desired habitat condition at each site.

Management plans will be prepared in collaboration with CDFW, NMFS, and USFWS, consistent with their authority, and submitted to those agencies for approval within 2 years of designation of each site for mitigation purposes. This schedule is designed to allow time for site inventories and identification of appropriate management techniques. During the interim period, management of the site will occur using best practices and based on successful management at the same site prior to acquisition or based on management at other similar sites. The plans will be working documents that are updated and revised as needed to incorporate new acquisitions suitable for coverage under the same management plan and to document changes in management approach that have been agreed to by Reclamation, DWR, and the appropriate wildlife agency or agencies (CDFW, NMFS, and USFWS), consistent with their authority.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW, USFWS, NMFS

**Location:** Sites that are not expected to be affected by sea level rise will be selected for restoration. Sites will also be selected to avoid areas that experience local seasonal flood events that may be incompatible with the habitat management needs for greater sandhill crane. Specific restoration sites would be selected on the basis of their availability, suitability for restoration, biological value, and practicability considerations. It is anticipated that lands used for habitat restoration actions would primarily be those that are currently in public ownership or those that are acquired in fee title because restoration activities have a high potential to preclude other land uses. Lands acquired for the protection and maintenance of existing habitat functions may be acquired through conservation easements that specify permitted land uses and practices in sufficient detail to maintain the intended habitat functions of the acquired lands, although enhancements may also be implemented on conservation easement lands as opportunities arise.

**Timing:** Before, during, and after construction

**Monitoring:** DWR, through the Adaptive Management Program, will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Environmental Commitment.

## 5.10 Environmental Commitment 11: Natural Communities Enhancement and Management

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Natural Communities Enhancement and Management	DWR	Prior to, during, and after construction	Impact BIO-3, BIO-5, BIO-6, BIO-8, BIO-11, BIO-14, BIO-17, BIO-20, BIO-23, BIO-25, BIO-28, BIO-29, BIO-31, BIO-76, BIO-180, BIO-181, BIO-184, , BIO-186

**Commitment:** This action would apply to all protected and restored habitats under Alternative 4A. Implementation of this action would support mitigation for the loss of terrestrial species habitat associated with construction of the water conveyance facilities.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW, USFWS, NMFS

**Location:** At sites protected or restored under Environmental Commitments 3–10

**Timing:** Before, during and after construction.

**Monitoring:** DWR will review all Restoration and Protection Site Management Plans to ensure inclusion of the enhancement and management actions outlined above in *Commitment*. Monitoring of these actions included in will occur as part of the monitoring and research program implemented for EC 3-10. DWR will oversee monitoring and research programs to confirm enhancement and

management actions are applied successfully to each restoration and protections site and effectively enhance natural communities for covered species.

**Reporting Requirements:** Fulfillment of compliance monitoring and reporting requirements is solely the responsibility of DWR and their contractors. DWR will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the project, and will provide results to NMFS and the USFWS at their request.

## 5.11 Environmental Commitment 12: Methylmercury Management

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Methylmercury Management	DWR	Prior to, during, and after construction	Impact AQUA-8, AQUA-26, AQUA-44, AQUA-62, AQUA-80, AQUA-98, AQUA-116, AQUA-118, AQUA-134, AQUA-152, AQUA-170, AQUA-188, AQUA-206, BIO-6, BIO-50, BIO-59, BIO-67, BIO-71, BIO-74, BIO-78, BIO-89, BIO-102, BIO-111, BIO-119, BIO-123, BIO-136, BIO-144, BIO-150, BIO-167, BIO-183, PH-7

**Commitment:** This action would minimize conditions that promote production of methylmercury in restored tidal wetland areas and its subsequent introduction to the foodweb, and to listed species in particular.

**Responsible Parties:** DWR Mercury Monitoring and Evaluation Section and Methylmercury TMDL programs

**Regulating/Permitting Agencies:** Central Valley Water Board, U.S. Environmental Protection Agency, California Department of Toxic Substances Control

**Location:** At sites restored under Environmental Commitment 4

**Timing:** The timing and phasing of implementing CM12 will be contingent upon the timing and phasing of individual restoration projects developed under the Alternative 4A.

**Monitoring:** For each restoration project under EC4 Tidal Natural Communities Restoration, a project-specific methylmercury management plan will be developed. In each of the project-specific methylmercury management plans developed under EC12, relevant findings and mercury control measures identified as part of TMDL Phase I control studies will be considered and integrated into restoration design and management plans. DWR, in conjunction with the Methylmercury TMDL program, will provide for a programmatic quality assurance/quality control (QA/QC) program that will specify sampling procedures, analytical methods, data review requirements, a QA/QC manager, and data management and reporting procedures. Each project-specific plan will be required to comply with these procedures to ensure consistency and a high level of data quality.

Each project-specific methylmercury management plan will describe, at a minimum, the application or infeasibility of each of the methylmercury mitigation measures. Thus, when considering implementing any mercury mitigation measure, the potential for nonbeneficial effects and interference with the overall objectives of the restoration project must be fully considered for each

of the mitigation measures for each site individually. Wetland systems represent complex interactions among a multitude of physical and biological conditions that are in constant flux. EC12 is intended to evolve as it is informed by new research results over time that will inform selection and implementation of mitigation measures.

DWR will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** Fulfillment of compliance monitoring and reporting requirements is solely the responsibility of DWR and their contractors. DWR will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the PA, and will provide results to NMFS and the USFWS at their request and to the Central Valley Water Board and USEPA as outlined in the project-specific methylmercury management plans.

## 5.12 Environmental Commitment 15: Localized Reduction of Predatory Fishes (Predator Control)

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Localized Reduction of Predatory Fishes (Predator Control)	DWR	Prior to, during, and after construction	Impact AQUA-42, AQUA-60, AQUA-78, AQUA-96, AQUA-111, AQUA-200, AQUA-201

**Commitment:** This action would reduce populations of predatory fishes at locations of high predation risk (i.e., predation hotspots) associated with construction and operation of the proposed water conveyance facilities. Implementation of this action would be consistent with the revised description of Conservation Measure 15 (see Appendix 11F, *Substantive BDCP Revisions*); however, for the purposes of Alternatives 4A, this action would be applied only to the reach of the Sacramento River adjacent to the north Delta intakes and to Clifton Court Forebay. EC15 would remove predator refuge habitat and reduce predator abundance in the construction areas. At a minimum, EC15 will target the removal of an amount of predator refuge commensurate with the amount that may be created by construction of water conveyance facilities. These measures are expected to fully mitigate any indirect effect on predation rates associated with construction and operations.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW, USFWS, NMFS, and public water agencies

**Location:** Sacramento River adjacent to the north Delta intakes and to Clifton Court Forebay

**Timing:** Before, during, and after construction.

**Monitoring:** DWR, through the Adaptive Management Program, will track and ensure compliance monitoring is conducted in accordance with provisions of all permits and authorizations provided to the California WaterFix.

**Reporting Requirements:** After completion of activities DWR shall prepare a report explaining how, in carrying out such activities, DWR successfully implemented the pertinent requirements of this Environmental Commitment.

## 5.13 Environmental Commitment 16: Nonphysical Fish Barriers

Environmental Commitment	Responsible Party/Parties	Timing	Associated Resource Area Impact
Nonphysical Fish Barriers	DWR	Prior to, during, and after construction	Impact AQUA-42, AQUA-60, AQUA-78, AQUA-96, AQUA-111, AQUA-200, AQUA-201

**Commitment:** This action would be implemented to address effects related to survival of outmigrating juvenile salmonids by installing a nonphysical barrier at Georgiana Slough to redirect fish away from channels and river reaches in which survival is lower than in alternate routes. Implementation of this action would be consistent with the revised description of Conservation Measure 16 (see Appendix 11F, *Substantive BDCP Revisions*); however, for the purposes of Alternative 4A, this action would be applied only to Georgiana Slough. This commitment would mitigate for effects on salmonid survival associated with operation of north Delta intakes and associated flows.

**Responsible Parties:** DWR

**Regulating/Permitting Agencies:** CDFW, USFWS, NMFS, USACE

**Location:** Georgiana Slough

**Timing:** It is anticipated that design and permitting for the initial barrier installations will take approximately 2 years, with installation and operation beginning the following year. Construction and removal would likely be similar to the pilot studies undertaken in 2011, 2012, and 2014, (see biological opinions by USFWS [2011, 2012, 2014] and NMFS [2011, 2012, 2014]), with the exception of timing, which would occur during the typical in-water work window<sup>1</sup> in order to minimize the potential for adverse effects to listed fishes<sup>28</sup>. The FEIR/FEIS analysis includes operation of the proposed barrier, however, construction of the barrier will be subject to a separate Section 7 consultation to be performed prior to the initiation of NDD operations.

**Monitoring:** Implementation of this Environmental Commitment by DWR would be informed through effectiveness monitoring that would be conducted as described in the California WaterFix BA. Monitoring would include studies to evaluate the effectiveness of nonphysical barriers using tagged juvenile salmonids. The studies would document the interaction of tagged fish with nonphysical barriers and the effectiveness of nonphysical barriers at directing fish toward preferred migration routes/channels and away from channels or migration routes that have higher mortality associated with either predation and/or entrainment.

<sup>28</sup> Construction of the NPBs in the pilot studies occurred during winter.

1       Uncertainty regarding the potential attraction of predators to nonphysical barriers and the  
2       effectiveness of barriers under certain conditions (i.e., in high flow areas, areas with complex  
3       bathymetry or cover, or other areas that may have physical conditions that may limit their  
4       effectiveness) will be resolved as this Environmental Commitment is implemented on an individual  
5       project level. Thus evaluating the potential attraction of predators and the effectiveness of  
6       nonphysical barriers under various conditions would also be part of the monitoring to be completed  
7       as part of this Environmental Commitment. Changes, should any be warranted based upon the  
8       results of monitoring and evaluating the effectiveness of nonphysical barriers, would be approved  
9       through the adaptive management decision making process, and implemented through subsequent  
10      annual work plans.

11      **Reporting Requirements:** Fulfillment of compliance monitoring and reporting requirements is  
12      solely the responsibility of DWR and its contractors. DWR will track and ensure compliance  
13      monitoring is conducted in accordance with provisions of all permits and authorizations provided to  
14      the PA, and will provide results to NMFS and the USFWS at their request.



## Chapter 6

# References

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