

Appendix H

Supporting Materials for Chapter 16

Water Transfers—Applicable Mitigation Measures

H.1 Introduction

The mitigation measures described below in Section H.2 are taken from Chapter 6, Section 6.1 Mitigation Measures to Minimize Water Supply and System Operations Impacts of the San Francisco Public Utilities Commission's (SFPUC's) Water System Improvement Program (WSIP) Final Program Environmental Impact Report (PEIR) (SFPUC 2008). These mitigation measures are meant to reduce biological resource impacts to less than significant from a water transfer with MID/TID as described in Chapter 16, *Evaluation of Indirect Actions and Other Actions* and Appendix L, *City and County of San Francisco Analyses*. The mitigation measures described below in Section H.3 are taken from Chapter 6, Section 6.5 4, Measures that Affect Other Water Sources. These are measures that could be applied to other areas to reduce impacts associated primarily with construction or operation of new facilities or other actions as a result of Measure 5.3.6-4a Avoidance of Flow Changes by Reducing Demand for Don Pedro Water. These measures are similar to mitigation summarized in Table 16-38 for impacts discussed in Section 16.2.2, *Substitution of Surface Water with Groundwater*, Section 16.2.4, *Recycled Water Sources for Water Supply* or Section 16.4.1, *New Source Water Supplies*.

H.2 Potential Mitigation Measures for Upper Tuolumne River Watershed

H.2.1 Fisheries

Overview of Measures 5.3.6-4a, 5.3.6-4b, and 5.3.7-6

The SFPUC will attempt to implement Measure 5.3.6-4a as described below, which could mitigate both Impacts 5.3.6-4 and 5.3.7-6 to a less than significant level. Measure 5.3.6-4a involves some uncertainty because its implementation depends on the SFPUC negotiating and reaching agreement with MID/TID and possibly other water agencies. If Measure 5.3.6-4a proves to be infeasible, the SFPUC will implement Measure 5.3.6-4b to lessen fisheries impacts and Measure 5.3.7-6 to lessen impacts on riparian vegetation.

Avoidance of Flow Changes by Reducing Demand for Don Pedro Reservoir Water

Measure 5.3.6-4a: The SFPUC will pursue a water transfer arrangement with MID/TID and/or other water agencies such that the water acquired is developed through actions that result in reduction of demand on Don Pedro Reservoir as a result of conservation, improved delivery efficiency, inter-agency transfer of conserved water, or use of an alternative supply such as groundwater. The TID and MID would deliver less water from Don Pedro Reservoir. The consequent increase in water storage in Don Pedro Reservoir would offset the reduction in inflow to Don Pedro Reservoir attributable to the WSIP. The release pattern from La Grange Dam

would be the same or similar to the existing condition thus lessening or eliminating Impacts 5.3.6-4 and 5.3.7-6. The actions necessary to reduce demand for Don Pedro Reservoir water may themselves have environmental effects. See Section 6.5 for a review of potential environmental effects associated with the expected actions of this mitigation measure. Further environmental review would be undertaken prior to approving a specific water transfer agreement.

Fishery Habitat Enhancement

Measure 5.3.6-4b: If Measure 5.3.6-4a is not implemented, then the SFPUC will mitigate potential fishery effects on the lower Tuolumne River by implementing (or funding) one of

the following two habitat enhancement actions that are designed to sustain fishery resources under the river's flow regime, which are consistent with the Habitat Restoration Plan for the Lower Tuolumne River Corridor: gravel augmentation/habitat enhancement to provide salmonid spawning and rearing habitat, or isolating or filling a captured former gravel quarry pit along the river that provides habitat for salmonid predators.

The gravel augmentation/habitat enhancement project will be implemented to increase salmonid spawning success and to improve the survival of rearing salmonids in the reach of the river downstream of La Grange Dam. Spawning success will be improved by the addition of suitable gravel to the stream channel. Other habitat features will be created to provide cover for juvenile salmonids and to increase the availability of substrate for macroinvertebrates that would be used as food by rearing juvenile salmon and steelhead. The gravel augmentation/habitat enhancement project will involve the planning, design, permitting, purchase, placement, and monitoring of suitable gravel and associated habitat enhancements at three riffle locations within the spawning reach between Basso Bridge and La Grange Dam. The three locations will meet the criteria for suitable habitat as described

in the Habitat Restoration Plan for the Lower Tuolumne River Corridor. The gravel will preferentially be rounded river rock of native origin that would be sized and pre-washed before placement into the river. The gravel augmentation/habitat enhancement project will also involve the addition of large woody debris and boulders to create increased habitat complexity and diversity at each of the three enhancement sites. After construction of the gravel augmentation/habitat enhancement project, it will be surveyed to establish its baseline condition. A survey of the three sites will be made at a minimum of five-year intervals by a qualified fisheries biologist. The fisheries biologist will determine whether the three sites continue to meet established criteria for salmonid spawning and rearing habitat. If the sites do not meet the criteria, as part of its long-term operations, the SFPUC will make the improvements necessary to return it to the baseline conditions.

As an alternative to the gravel augmentation project, the SFPUC will remove from the lower river channel one of the former gravel quarry pits that has been "captured" by the river and acts as predator zones for fish such as largemouth and striped bass to prey on rearing and emigrating juvenile salmonids. Removal could be accomplished by filling the pit or installing a levee berm around the pit to isolate it permanently from the river channel. The SFPUC could implement this action directly or fund implementation by another entity involved in river restoration.

The performance standard for gravel pit removal would be an established permanent reduction in area of salmonid predator habitat. The SFPUC will monitor the pit removal project at five-year intervals. If floods have eroded the fill or damaged the levees in a manner that restores salmonid predator habitat, the SFPUC will make the necessary repairs. The SFPUC will continue periodic monitoring and repair as part of long-term system operations.

H.2.2 Terrestrial Biological Resources

Controlled Releases to Recharge Groundwater in Streamside Meadows and Other Alluvial Deposits

Measure 5.3.7-2: To mitigate for potential WSIP effects on meadow resources along the Tuolumne River below Hetch Hetchy Reservoir, the SFPUC will manage releases from Hetch Hetchy Reservoir during the spring to recharge groundwater in the riverside meadows in the Poopenaut Valley and streamside alluvial deposits. The goal of the release pattern will be to approximate conditions characteristic of most Sierra meadows, which are mainly wetlands or semi-wetlands supporting a cover of both emergent wetlands plants and upland vegetation (Ratliff, 1982), and which depend on precipitation and upslope flows to recharge the upper soil layers with water (Ratliff, 1985). The performance standard to be achieved by this measure is no net loss of the extent, diversity, and condition of the existing meadow and wetland vegetation types in the Poopenaut Valley.

The SFPUC will manage reservoir releases for this purpose by releasing the expected available volume of water in the reservoir in a pattern that provides flows of a magnitude that inundate the meadows and streamside alluvial deposits for as long as possible. For example, rather than making releases at a constant rate each day (e.g., releasing 1,000 cfs for seven days), the SFPUC could release the same volume of water but with varying cfs rates, creating flow pulses to meet the objective.

As part of this measure the SFPUC will gather baseline data regarding the extent, species composition and condition of the existing meadow vegetation within the Poopenaut Valley. Some of these environmental baseline data may be available as a result of current study efforts in the Poopenaut Valley⁵¹. As needed, the SFPUC will augment this information by carrying out vegetation composition surveys in the meadow before implementing the WSIP and at 5 year intervals after WSIP implementation to assess the efficacy of mitigation releases in maintaining or improving the percentage cover of meadow species as described by Ratliff (1985). The basic methodology for baseline vegetation survey and subsequent mitigation monitoring will be generally accepted quantitative vegetation sampling methods to permit statistical comparison of vegetation composition over time, as well as mapping the meadow vegetation in the Poopenaut Valley. The SFPUC will retain the services of a qualified biologist to assist in shaping the releases from Hetch Hetchy Reservoir in consideration of baseline and future meadow vegetation data. If a significant decline in the extent or diversity of native meadow vegetation occurs, releases will be modified as needed to achieve the mitigating effect of sustaining the existing meadow communities.

¹ In 2006 the SFPUC, National Park Service (and USFWS) began a collaborative study effort in the Poopenaut Valley. The effort has led to geomorphology test releases in May 2006, fieldwork in the channel in 2006 and 2007 to examine sediment transport and deposition relationships with flow. Two transects with ten recording piezometers have been installed across the meadow to measure groundwater recharge and drainage patterns. Supplementary stream staff gages have been installed to allow manual readings during high flows. Surveys have been done of the meadow to define the topography and the location and elevation of the piezometers. Infiltration of water from the stream to the meadow soils will be monitored during high flows to develop a better understanding of groundwater dynamics in the meadow so that reservoir operations, flow pulses, and minimum streamflow releases can be managed to improve meadow conditions within the constraints of water supply and facility limitations.

Avoidance of Flow Changes by Reducing Demand for Don Pedro Reservoir Water

See **Measure 5.3.6-4a** in the Fisheries section, above. This measure also addresses impact 5.3.7-6 Impacts on biological resources along the Tuolumne River below La Grange. The SFPUC will attempt to implement Measure 5.3.6-4a as described above, which could mitigate both Impacts 5.3.6-4 and 5.3.7-6 to a less than significant level. Measure 5.3.6-4a involves some uncertainty because its implementation depends on the SFPUC negotiating and reaching agreement with MID/TID and possibly other water agencies. If Measure 5.3.6-4a proves to be infeasible, the SFPUC will implement Measure 5.3.6-4b to lessen fisheries impacts and Measure 5.3.7-6 to lessen impacts on riparian vegetation.

Lower Tuolumne River Riparian Habitat Enhancement

Measure 5.3.7-6: To mitigate the WSIP effects on riparian vegetation, the SFPUC will both protect and enhance one mile of riparian vegetation along the contemporary floodplain of the lower Tuolumne River. This will include funding the acquisition of fee title to or a conservation easement over riparian land totaling one mile (consisting of one or multiple sites) in order to permanently protect that land, and also funding riparian enhancement and on-going vegetation management to maintain the enhanced riparian values in perpetuity along one mile of river. The enhancement and management may be carried out along one river mile either on the land acquired by the SFPUC as described above or on land already under the permanent management of a public agency or conservation organization.

The SFPUC will implement this measure consistent with the Habitat Restoration Plan for the Lower Tuolumne River Corridor (McBain and Trush, 2000) and in coordination with the Tuolumne River Technical Advisory Committee. The SFPUC will also strive to implement these projects in partnership with those groups currently working to restore riparian floodplains on the lower Tuolumne River.

The SFPUC may implement riparian enhancement in accordance with site locations and plans already developed as part of the Habitat Restoration Plan for the Lower Tuolumne River Corridor or on other appropriate sites along the river. For sites that haven't already had plans developed, a riparian enhancement plan will be prepared for each. The plan shall include, but not be limited to, the following:

- Clearly stated objectives and goals consistent with the Habitat Restoration Plan for the Lower Tuolumne River Corridor (McBain and Trush, 2000).
- Location, size, and type of mitigation actions proposed.
- Documentation of performance and monitoring standards.
- Performance and monitoring standards shall indicate success criteria to be met within
- 5 years for vegetation, removal of exotic species, etc. Adaptive management
- standards shall include contingency measures that shall outline clear steps to be taken if and when it is determined, through monitoring or other means, that the enhancement or restoration techniques are not meeting success criteria.
- Documentation of the necessary long-term management and maintenance requirements, and provisions for sufficient funding.

H.3 Potential Mitigation Measures for Potential Selling Party

The following PEIR mitigation measure would be in this category: Measure 5.3.6-4a (Avoidance of Flow Changes by Reducing Demand for Don Pedro Reservoir Water). At this time, it is unknown what sources of water or water users could be affected by a water transfer arrangement with TID, MID, or other agency or agencies that involves use only of conserved water. Supplemental water could be made available as a result of:

- Water use efficiency and conservation for agricultural, residential and commercial users
- Land use changes, either agricultural to urban, or more water intensive (e.g., pasture) to less intensive (e.g., orchard)
- Conjunctive use of groundwater
- Recycled water
- Tiered water pricing
- Land fallowing of agricultural lands.

In general, the types of potential environmental impacts associated with water transfers from these types of sources include:

- *Land use*: reduced agricultural activity (which could be mitigated through siting measures similar to Measure 4.3-2)
- *Biological resources*: indirect effects on aquatic and/or terrestrial biological resources due to possible reductions in irrigation/drainage system return flows, reductions in discharges of treated wastewater, changes in land use from more water intensive uses to less water intensive uses, or lowered groundwater tables (which could be mitigated through habitat protection/restoration measures similar to Measures 4.6-1a, 4.6-1b, 4.6-2, 4.6-3a, 4.6-3b, and 4.6-4)
- *Water quality and hydrology*: reduced groundwater recharge due to agricultural water conservation practices such as lining irrigation canals or conversion to drip irrigation, or land use changes (which could be mitigated through groundwater protection measures similar to Measure 4.5-2)
- *Agricultural resources*: reduced agricultural activity due to farming; potential conversion of idle agricultural land to other uses (which could be mitigated through measures similar to Measure 4.13-2, avoidance of Prime Farmland)
- *Noise*: increased noise from use of pumps for conjunctive-use groundwater program (which could be mitigated through standard construction measures for noise controls)
- *Energy*: increased use of energy for conjunctive-use groundwater or recycled water programs (similar to Impact 4.15-2 for the Groundwater Projects, SF-2) and Recycled Water Projects, SF-3, which could be mitigated through energy efficiency measures similar to Measure 4.15-2)
- *Air Quality*: increased particulate emissions from on-farm efficiency measures like land leveling (which could be mitigated through standard dust control measures similar to those listed in Measure 4.9-1a)

As indicated above, standard mitigation approaches are available, and implementation of those measures as well as any applicable water quality or biological resource permit conditions could reduce these impacts to less than significant.

Facility Siting Studies

Measure 4.3-2: It is the policy of the SFPUC to construct and operate its facilities on SFPUC-owned lands to the extent feasible. When use of SFPUC-owned land is not feasible, and where additional permanent easement or land acquisition is required, the SFPUC will conduct project-specific facility siting studies and implement these studies' recommendations to avoid or minimize impacts on existing land uses to the maximum extent feasible. Siting studies will identify and evaluate alternative site locations, access roads, building configurations and facility operations to minimize or avoid land use impacts. The studies will also consider existing and planned land uses on and adjacent to proposed facility sites and rights-of-way on non-SFPUC-owned land. To the extent feasible, the SFPUC will implement the recommendations in the siting studies

Site-Specific Groundwater Analysis and Identified Measures

Measure 4.5-2: As part of the project-specific CEQA review for the New Irvington Tunnel project (SV-4), the SFPUC will inventory springs and wells in the area of the planned tunnel and conduct a project-specific analysis of the potential for tunnel dewatering to stop or decrease spring flow, lower groundwater levels in nearby wells, or to otherwise cause adverse effects on groundwater resources and beneficial uses of the groundwater. If a significant impact is identified, then measures such as altering groundwater withdrawal rates and/or providing an alternate water supply for affected users will be implemented to ensure that groundwater resources or beneficial uses are not adversely affected

Wetlands Assessment

Measure 4.6-1a: As part of project-specific CEQA review, a qualified wetland scientist will review project plans, air photos, and topographic maps and conduct a site visit to determine whether wetlands are present and could be affected by the project. If the review shows that wetlands could be affected, the wetland scientist will perform a formal wetland delineation and develop mitigation as per Measure 4.6-1b, below.

Compensation for Wetlands and Other Biological Resources

Measure 4.6-1b: If the wetland delineation indicates that the WSIP project will affect jurisdictional wetlands or aquatic resources, then, in accordance with state and federal permit requirements, the SFPUC will avoid and minimize direct and indirect impacts such as erosion and sedimentation, alteration of hydrology, and degradation of water quality. As a first priority, the SFPUC will implement (1) avoidance measures. For unavoidable impacts, the SFPUC will implement (2) minimization of unavoidable impacts, (3) restoration procedures, and (4) compensatory creation or enhancement to ensure no net loss of wetland extent or function.

In addition to wetlands, the SFPUC will compensate for sensitive riparian and upland habitats and habitats which support key special-status species or other species of concern lost as a result of WSIP project construction and operation. Similar habitat will be identified, protected, restored, enhanced, created and managed off-site² to ensure no net loss of habitat extent or function. For each WSIP project, a qualified biologist will quantify the magnitude and extent of

² Off-site means the compensatory action is located other than within the project construction footprint, but could be on lands already under SFPUC ownership. Measure 4.6-2 addresses compensatory actions to be taken within the construction footprint.

impacts to wetlands, sensitive habitats, and key special-status species and other species of concern, and the SFPUC will develop and implement restoration and/or compensation plans that meet the appropriate regulatory requirements and permit conditions with respect to restoration and/or compensation ratios. Compensation ratios typically range from a minimum of 1:1 for common habitats to 2:1 or higher for rare and sensitive habitats. If individual project requirements of the RWQCB, CDFG, or USFWS differ somewhat from these ratios, they are still intended to achieve the same purpose of full restoration and/or compensation, to mitigate project impacts to less-than-significant levels, and to ensure no net reduction in the populations of any species listed as threatened or endangered by the state or federal resource agencies.

The SFPUC will obtain required permits for each project and comply with applicable environmental regulations addressing sensitive habitats and species. Compensatory lands, including those restored or enhanced as well as those acquired or designated as protected as part of program or project mitigation, will be established in perpetuity with a commitment that such lands will not be used for any purpose that conflicts with the primary purpose of maintaining intact wildlife and plant habitat.

One alternative for implementing off-site habitat compensation is the Habitat Reserve Program (HRP) currently being developed by the SFPUC. The purpose of the HRP is to provide a comprehensive, coordinated approach to mitigation and related regulatory compliance for WSIP projects. This related SFPUC project is described further in Chapter 3.0, Section 3.11. Under the proposed HRP, the SFPUC would proceed as soon as possible with securing (through designation, management agreement, conservation easement, or acquisition of fee title) and improving lands to be used for habitat compensation so that mitigation is underway before or concurrent with habitat loss related to WSIP project activities, further ensuring no net loss of resources. CEQA environmental review for the proposed HRP will commence in 2007 and is targeted for implementation as soon as possible thereafter. Once the HRP is approved and implemented, the SFPUC will use this as one vehicle or method for implementing the mitigation requirements for individual WSIP projects. Otherwise, where appropriate and necessary, the SFPUC will develop and implement appropriate habitat compensation mitigation for individual WSIP projects.

Habitat Restoration/Tree Replacement

Measure 4.6-2: If the biological screening survey identifies sensitive habitats or heritage trees, the following measures, as modified and applied to WSIP projects, will be implemented:

- Temporarily-impacted sensitive habitats (natural communities identified as sensitive by CDFG, and USFWS-designated critical habitat) would be restored to their pre-project condition.
- If specific trees to be removed are designated as heritage trees (or similar local designation), then SFPUC will replace the trees, consistent with requirements in local ordinances. If such heritage trees occur near extensive areas of sensitive habitats, locally collected, native species will be used as replacement trees where possible.
- Where possible, the loss of sensitive habitats will be minimized by coordinating WSIP projects to make repeated use of staging/construction areas and access roads. For example, tunnel spoils could be considered for borrow material for other projects.

Protection Measures during Construction for Key Special-Status Species and Other Species of Concern

Measure 4.6-3a: The following general practice measures, as modified and applied to the WSIP projects, will be implemented if the initial biological screening survey (SFPUC Construction Measure #8) indicates the potential for the presence of key special-status species and other species of concern:

- Preconstruction surveys for key special-status species and other species of concern will be conducted by a qualified biologist to verify their presence or absence. Surveys will occur during the portion of the species' life cycle when the species is most likely to be identified within the appropriate habitat. Key special-status species and other species of concern will be avoided during construction when possible.
- A worker awareness program (environmental education) will be developed and implemented to inform project workers of their responsibilities in regards to sensitive biological resources.
- An environmental inspector will be appointed to serve as a contact for issues that may arise concerning implementation of mitigation measures, and to document and report on adherence to these measures during construction.
- Loss of habitat will be minimized through the following measures: (1) the number and size of access routes and staging areas and the total area of the project activity will be limited to the minimum necessary to achieve the project goal; (2) the introduction or spread of invasive non-native plant species and plant pathogens will be avoided or minimized by developing and implementing a weed control plan; and (3) all areas temporarily disturbed by construction will be revegetated to pre-project or native conditions, as specified in project-specific revegetation plans.

Standard Mitigation Measures for Specific Plants and Animals

Measure 4.6-3b: Table H-1 identifies the key special-status species mitigation measures that the program analysis indicates would apply to each WSIP project. Measures listed in Table H-1 (listed by species) are generic measures and will be modified to fit site-specific conditions and applied to each WSIP project wherever special-status species could be affected by the projects. Surveys required under Measure 4.6-3a will refine the list of species that could be affected by a project. Table H-1 is intended as the minimum necessary actions. In addition to adopting the generic measures, as more site-specific information is available, project-specific CEQA analysis may identify additional measures for key special-status species and additional measures for other species.

Measure 4.6-4 Pipeline and Water Treatment Plant Treated Water Discharge Restrictions

Measure 4.6-4: Planned discharges of regional system water from the WSIP pipelines and water treatment plants (such as crossover facilities) to creeks, rivers or other natural water bodies will be designed to minimize impacts to riparian and aquatic resources to the extent feasible. This will include dechlorination and/or pH adjustment facilities and energy dissipation structures that avoid or reduce bank erosion. In addition, the facilities should include design features to avoid or minimize temperature effects on aquatic resources; or alternatively, whenever possible, planned discharges

should be scheduled to occur in the winter, when stream flows are high and temperatures low in the receiving waters to avoid or minimize temperature effects.

Measure 4.9-1a SJVAPCD Dust Control Measures

Measure 4.9-1a: In the San Joaquin Region, the SJVAPCD has determined that compliance with the following Regulation VIII (Fugitive PM10 Prohibitions) and Regulation IX (Mobile and Indirect Sources, Rule 9510, where applicable) control measures would mitigate PM10 impacts to a less-than-significant level. The SFPUC will include these measures, where applicable, in contract specifications:

- SJVAPCD Basic Control Measures (applies to all construction sites)
 - All disturbed areas, including storage piles that are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover, or vegetative ground cover.
 - All onsite unpaved roads and offsite unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
 - All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
 - When materials are transported offsite, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container shall be maintained.
 - All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.
 - Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
 - Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
 - Any site with 150 or more vehicle trips per day shall prevent carryout and trackout.
- *SJVAPCD Enhanced Control Measures* (also applies when required to mitigate significant PM10 impacts)
 - Traffic speeds on unpaved roads shall be limited to 15 mph.
 - Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.
- *SJVAPCD Additional Control Measures* (also applies to construction sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions)

- Wheel washers shall be installed for all exiting trucks, or all trucks and equipment leaving the site shall be washed off.
- Wind breaks shall be installed at windward side(s) of construction areas.
- Excavation and grading activity shall be suspended when winds exceed 20 mph and, regardless of windspeed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation.
- The area subject to excavation, grading, and other construction activity at any one time shall be limited.
- SJVAPCD Rule 9510, Indirect Source Review, Section 6.1, Construction Equipment Emissions (applies to any project subject to discretionary approval by a public agency that ultimately results in the construction of a new building, facility, or structure or reconstruction of a building, facility, or structure for the purpose of increasing capacity or activity and also involving 9,000 square feet of space).
- 6.1.1: The exhaust emissions for construction equipment greater than fifty (50) horsepower used or associated with the development project shall be reduced by the following amounts from the statewide average as estimated by the ARB:
 - 6.1.1.1: 20% of the total NO_x emissions, and
 - 6.1.1.2: 45% of the total PM₁₀ exhaust emissions.
- 6.1.2: An applicant may reduce construction emissions on-site by using less-polluting construction equipment, which can be achieved by utilizing add-on controls cleaner fuels, or newer lower emitting equipment.
- 6.3: The requirements listed in Section 6.1 above can be met through any combination of on-site emission reduction measures or off-site fees.

Siting Facilities to Avoid Prime Farmland

Measure 4.13-2: The SFPUC will avoid areas identified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance in the siting of facilities for the 40-mgd

Treated Water project (SV-3), Treated Water Reservoirs project (SV-5), and ancillary power supply facilities for the SJPL System project (SJ-3). If avoidance is not feasible, the SFPUC will adopt a permanent set-aside for an equivalent acreage of similarly-valued farmland in the area

Measure 4.15-2: Incorporation of Energy Efficiency Measures

Measure 4.15-2: Consistent with the Energy Action Plan II priorities for reducing energy usage, the SFPUC will ensure that energy efficient equipment is used in all WSIP projects. A repair and maintenance plan will also be prepared for each facility to minimize power use. The potential for use of renewable energy resources (such as solar power) at facility sites will be evaluated during project-specific design.

Standard Construction Measures for Noise Controls

Noise: The contractor will comply with local noise ordinances regulating construction noise to the extent feasible, and will undertake efforts to minimize any noise disruption to nearby neighbors and sensitive receptors during construction.

H.4 References Cited

San Francisco Public Utilities Commission (SFPUC). 2008. *Water System Improvement Program Final Program EIR*. Chapter 6, Mitigation Measures. Available: <http://www.sf-planning.org/index.aspx?page=1829>. Accessed: May 9, 2016.

Attachment 2

Annual Delta Diversion—Environmental Issues

1.0 WS3-1 ANNUAL DELTA DIVERSION – ENVIRONMENTAL ISSUES

Environmental issues associated with construction of the Delta Diversion are discussed below. This analysis assumes that water is taken from the State Water Project, although issues associated with taking water from the Central Valley Project at the Delta-Mendota Canal would be similar. The list of environmental issues was based on the standard CEQA checklist used for Initial Studies, and each issue is discussed, along with mitigation opportunities.

Delta Diversion			
Topic	Potential Effects	Mitigation Opportunities	Comments / References
<i>Aesthetics</i>	<p>Intake The intake and pumping plant would be located where the San Joaquin Pipeline crosses the California Aqueduct. The site would be visible from Blewett Road, which is not designated as a scenic route. The pumping plant would be located in a vacant field west of the aqueduct. Neither facility is expected to degrade the visual character of the area.</p> <p>Pipeline Once construction is completed the buried pipeline would have no visual effects.</p> <p>Treatment Plant The treatment plant would be visually compatible with existing facilities at the Tesla Portal and would not alter the aesthetics of the site.</p>	Design facility to blend with surrounding land uses. Use appropriate architectural treatment and landscaping.	<p>Because the SJPL crosses over the aqueduct, views at the site are already dominated by water supply facilities, and addition of additional structures would not result in a substantial change of the character of the site.</p> <p>www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm</p>
<i>Agriculture</i>	<p>Intake The pumping plant would be constructed on vacant agricultural land adjacent to the aqueduct. This would likely require acquisition of land outside the existing easement, but this land is not currently cultivated.</p> <p>Pipeline The pipeline would be located in the existing Hetch-Hetchy right-of-way, which crosses agricultural lands, but construction would take place in existing easements.</p> <p>Treatment Plant It should be possible to construct the treatment facility entirely within the lands owned by the City at the Tesla Portal.</p>	Construct facilities in such a manner as to minimize any minor disruption to existing agricultural operations.	

Delta Diversion			
Topic	Potential Effects	Mitigation Opportunities	Comments / References
<i>Air Quality</i>	<p>Construction of all facilities would result in short-term generation of dust (PM₁₀).</p> <p>Intake and Treatment Plant Operation would result in indirect impacts associated with generating energy for the pumping plant and treatment facility</p> <p>Pipeline No operational impacts expected.</p>	<p>Comply with air district regulations. Control dust from construction. Minimize energy consumption.</p>	<p>The San Joaquin Valley Air Basin is currently not in compliance with all federal and state air quality standards, and is designated "serious non-attainment" for PM₁₀ (Hsiao et al. 2004).</p>
<i>Biological Resources (Aquatic)</i>	<p>Intake Because water would be taken from the aqueduct, fisheries impacts would be avoided.</p> <p>Pipeline The pipeline would not require any river crossings.</p> <p>Treatment Plant No construction or operational impacts expected.</p>	<p>Mitigation for fisheries impacts would not be necessary for this alternative.</p>	

Delta Diversion			
Topic	Potential Effects	Mitigation Opportunities	Comments / References
<i>Biological Resources (Terrestrial)</i>	<p>Project facilities are located in agricultural lands and ruderal/grassland habitat, which provide habitat for the following species:</p> <ul style="list-style-type: none"> • Swainson's hawk • California tiger salamander • Burrowing owl • San Joaquin kit fox • California red-legged frog 	<p>Conduct preconstruction surveys to verify presence or absence of species. Avoid impacts to special status species to the extent feasible. Specific measures include:</p> <ul style="list-style-type: none"> • Implement mitigation in accordance with the Programmatic Biological Opinion for construction impacts to the California red-legged frog, which would also afford protection for western pond turtle. • Protect California tiger salamander by avoiding aestivation sites or moving aestivation burrows that cannot be avoided; use drift fences and pitfall traps to keep salamanders out of construction areas. • Avoid construction within ¼ mile of Swainson's hawk nests during nesting season (Mar 1 – Sept 15) • Avoid construction within 300 feet of other raptor nests during breeding season (Mar 1 – Jul 30) • Avoid occupied burrowing owl burrows or relocate the owls before the nesting season (relocation can take place from Aug. to Feb.) • Avoid construction disturbance to active kit fox dens, and employ measures to avoid accidental entrapment of kit fox or other animals during construction. 	<p>Mapping of habitats by Hsiao et al. (2004), which also has additional information about species of concern. Additional details regarding standard mitigation can be found in Hsiao et al. (2004)</p>
<i>Biological Resources (Wetlands)</i>	<p>All facilities have the potential to affect wetlands and waters of the U.S. The acreage affected would determine whether the project is eligible for a Nationwide permit or whether an individual permit would be required.</p>	<p>Wetlands must be avoided to the extent feasible. Where wetlands cannot be avoided minimize impacts and provide compensation for any unavoidable impacts. Mitigation ratios would be determined by the Army Corps of Engineers with consultation with USFWS.</p>	

Delta Diversion			
Topic	Potential Effects	Mitigation Opportunities	Comments / References
Cultural Resources	Because most of the facilities would be constructed in existing easements or at existing disturbed sites, the potential to disturb cultural resources is limited. However there is the possibility of encountering previously undiscovered resources during construction.	Complete cultural resource surveys before construction, and avoid any identified resources to the extent feasible. If previously undiscovered resources are encountered during construction stop work and have a qualified archaeologist evaluate the resources and conduct data recovery, as necessary.	
Geology and Soils	Section 5.1.4 discusses geologic and geotechnical issues associated with siting of the project facilities. The potential impacts are summarized here. None of the project facilities would be subject to surface fault rupture hazards, but facilities would be subject to groundshaking. Because there are no river crossings, liquefaction potential would be reduced, but would still need to be evaluated. The project area is generally level and not subject to landslide hazards.	Conduct geotechnical studies (as described in Section 5.1.4) to characterize potential geologic and seismic hazards and to develop appropriate design measures. Design to meet standards in the Uniform Building Code.	
Hazards and Hazardous Materials	Intake No hazardous materials sites are believed to be present at the intake. Pipeline The pipeline alignment crosses one historic leaking underground storage tank sites. Treatment Plant Delivery, storage and use of chemicals at the treatment plant could increase the risk of accidents.	If any contaminated soils or water are encountered during construction, use proper excavation and disposal methods per local, county and state regulations. Prepare an HMMP per county and state requirements, comply with regulations concerning the use, storage and handling of hazardous materials.	Hsiao et al. (2004) contains a map of identified sites.
Hydrology and Water Quality	Operation of the project would not be expected to have adverse effects on water quality. Construction of all elements of the project would have the potential to have adverse short-term effects on quality of storm water runoff. Impacts on hydrology of the Delta and rivers feeding the Delta are unknown and would depending on the location of the seller and conditions of the sale. A detailed evaluation of hydrologic effects would be needed.	Do construction in accordance with a Storm Water Pollution Prevention Plan, which minimizes impacts to storm water runoff.	

Delta Diversion			
Topic	Potential Effects	Mitigation Opportunities	Comments / References
<i>Land Use and Planning</i>	<p>Intake The intake and pumping station are in an agricultural area.</p> <p>Pipeline The pipeline crosses large areas of agricultural land but would be located primarily within the existing easement for the SJPL.</p> <p>Treatment Plant Addition of new facilities within the Tesla Portal site would be consistent with existing uses.</p>	Comply with adopted plans, policies and regulations. Locate facilities consistent with land use and zoning designations.	
<i>Mineral Resources</i>	None of the facilities would be expected to interfere with extraction of mineral resources. Facilities would be located within existing easements or public facilities sites.	No mitigation is expected to be required.	
<i>Noise</i>	<p>Intake The intake and pumping station do not appear to have nearby sensitive receptors.</p> <p>Pipeline Sensitive receptors include nine residences east of Tesla Portal subject that would be to peak construction noise levels above 69 dBA with controls.</p> <p>Treatment Plant There appear to be no receptors close enough to be affected by construction or operational noise.</p>	<p>Construction noise impacts are minimized by the short-term duration of exposure (less than two weeks at any given receptor along the pipeline). Limit construction to daytime hours, and implement noise controls.</p> <p>To mitigate for operational noise use mufflers on equipment and install noise attenuation where applicable. Design facilities to meet applicable noise standards of affected jurisdictions.</p>	Hsiao et al. (2004) identify receptors along the SJPL. Detailed noise control measures are presented there.
<i>Population and Housing</i>	The facilities are an element of the Water Supply Improvement Program, one of whose purposes is to meet “customer purchase requests through the years 2030, which increase by 35 mgd to 300 mgd over the current mgd, requiring an increase in average annual water delivery of 25 mgd from the regional water system.” There is no proposal to expand the service area of the SFPUC, but the increase in water supply would meet the needs of planned growth within the current service area. The effects of this alternative would be the same as other alternatives.	Planned growth in the service area would be subject to growth management provisions of applicable general plans.	City of San Francisco 2005 (Notice of Preparation for Water Supply Improvement Program).

Delta Diversion			
Topic	Potential Effects	Mitigation Opportunities	Comments / References
Public Services	None of the facilities would be expected to require new or altered police, fire, schools or road maintenance services.	Coordinate construction with police and fire departments to ensure that emergency access is available at all times.	
Recreation	<p>Intake Intake construction would take place at an existing public facilities site, and is thus not expected to interfere with recreation.</p> <p>Pipeline Construction would take place in public right-of-ways and easements and is thus generally not expected to interfere with recreation. However, jacking pits for the I-580 crossing would need to be located on a private golf course.</p> <p>Treatment Plant Construction would take place at an existing public facilities site, and is thus not expected to interfere with recreation.</p>	Pipeline construction would take place within an existing easement at the golf course. Coordinate construction with the golf course operators.	
Transportation /Traffic	<p>Pipeline Pipeline construction would take place in the existing SJPL easement, requiring crossing of Interstate 580.</p> <p>Intake and Treatment Plant Traffic disruption during construction would be limited to construction trucks on local roads, and would be minimal.</p>	Prepare traffic plans for all construction within roadways. Minimize disruption at I-580 crossing by using bore-and-jack or other tunneling techniques.	
Utilities and Service Systems	<p>Intake The pumping plant would require electrical service, but no other utility requirements are expected.</p> <p>Pipeline No utility requirements are expected.</p> <p>Treatment Plant The treatment plant and pump station at the Tesla Portal would require additional electrical service at that site. No other new utilities are expected to be required at the site.</p>	Coordinate electrical needs with service providers.	

REFERENCES

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Hsiao, Joyce, Barbara Leitner, Valerie Geier and Mary McDonald. 2004. Technical Memorandum – San Joaquin Pipeline No. 4- Environmental Considerations, April 9, 2004

National Oceanic and Atmospheric Administration Fisheries Service (National Marine Fisheries Service). 2005a. Endangered and Threatened Species: Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California; Final Rule (50 CFR Part 226), September 5, 2005

National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries). 2005b. Central Valley Chinook Salmon Current Stream Habitat Distribution Table. National Oceanic and Atmospheric Administration Fisheries Service, Southwest Regional Office, Long Beach, CA. <http://swr.ucsd.edu/hcd/dist2.htm>

Attachment 3

**Water Supply Desalination—Applicable Mitigation and
Construction Measures**

H.1 Introduction

Table H-1 below was modified from Table 6.3, Impact and Mitigation Summary for Facility Construction and Operation of San Joaquin Region Projects, in Section 6.6, Summary Tables of All Impacts and Mitigation Measures of the San Francisco Public Utilities Commission's (SFPUC's) Water System Improvement Program (WSIP) Final Program Environmental Impact Report (PEIR) (SFPUC 2008). In Table H-1, mitigation measures are identified for those impacts that were determined to be potentially significant or significant as a result of constructing and operating an advanced disinfection facility as part of the WSIP. In addition, applicable SFPUC Construction Measures are also identified. Where no mitigation or construction measures are noted, impacts were determined to be less than significant, and therefore would not require mitigation.

The WSIP advanced disinfection project would provide for the planning, design, and construction of a new advanced disinfection facility for the Hetch Hetchy water supply to comply with the new federal drinking water regulatory requirements contained in the Long Term 2 Enhanced Surface Water Treatment Rule. The types of impacts, mitigation measures and standard construction measures for minimizing impacts identified in Table H-1 are relevant or applicable to the construction of a desalination plant on Mallard Slough (discussed in Chapter 16, *Evaluation of Other Indirect and Additional Actions*, of this recirculated SED), as part of the Bay Area Regional Desalination Plant (BARDP). The conceptual analysis of the BARDP in the WSIP PEIR indicates that the programmatic impact analysis for the WSIP program includes impact analysis and mitigation measures for the construction and operation of generic facility types, including pipelines, pump stations, and treatment facilities and that much of this information is applicable to the regional desalination plant and associated facilities. As such, impacts that are likely not to occur and mitigation measures that would not be needed during construction and operation of the desalination plant at Mallard Slough and associated facilities were not included in Table H-1.

The desalination plant and associated facilities could require mitigation measures not identified in the table below which would be determined during project-level environmental review when more detailed siting, design, construction and operation information is available. For example, potentially significant impacts on water quality and aquatic resources could occur due to disposal of brine concentrate, a waste product from the desalination process. However, the WSIP PEIR did not identify potential mitigation for this type of possible water quality impact because the BARDP was in the conceptual planning phase.

Narrative descriptions of the SFPUC Construction Measures and mitigation measures that could be applied to reduce construction- and operation-related impacts are provided in Sections H.2 and H.3, respectively.

Table H-1. Mitigation Measures and San Francisco Public Utility Commission’s Construction Measures for the Water System Improvement Program’s Advanced Disinfection Project

PEIR Mitigation Measures	SFPUC Construction Measures
4.3 Land Use and Visual Quality	
Impact 4.3-1: Temporary disruption or displacement of existing land uses during construction	
None required	No. 1: Neighborhood Notice No. 3: On-Site Air and Water Quality Measures during Construction No. 5: Traffic No. 6: Noise No. 10: Project Site
Impact 4.3-2: Permanent displacement or long-term disruption of existing land uses	
None required	
Impact 4.3-3: Temporary construction impacts on scenic vistas or visual character	
No. 10: Project Site	
Impact 4.3-4: Permanent adverse impacts on scenic vistas or visual character	
4.3-4a: Architectural Design 4.3-4b: Landscaping Plans 4.3-4c: Landscape Screens 4.3-4d: Minimize Tree Removal	None applicable
Impact 4.3-5: New permanent sources of light glare	
4.3-5: Reduce Lighting Effects	None applicable
4.4 Geology, Soils, and Seismicity	
Impact 4.4-1: Slope instability during construction	
None required	No. 2: Seismic and Geotechnical Studies

PEIR Mitigation Measures	SFPUC Construction Measures
Impact 4.4-2: Erosion during construction	
None required	No. 3: On-Site Air and Water Quality Measures during Construction
Impact 4.4-3: Substantial alteration of topography	
None required	No. 10: Project Site
Impact 4.4-4: Squeezing ground and subsidence during tunneling	
N/A	None applicable
Impact 4.4-5: Surface fault rupture	
None required	No. 2: Seismic and Geotechnical Studies
Impact 4.4-6: Seismically induced groundshaking	
None required	No. 2: Seismic and Geotechnical Studies
Impact 4.4-7: Seismically induced ground failure, including liquefaction and settlement	
None required	No. 2: Seismic and Geotechnical Studies
Impact 4.4-8: Seismically induced landslides or other slope failures	
None required	No. 2: Seismic and Geotechnical Studies
Impact 4.4-9: Expansive or corrosive soils	
4.4-9: Characterize Extent of Expansive and Corrosive Soil	No. 2: Seismic and Geotechnical Studies

PEIR Mitigation Measures	SFPUC Construction Measures
4.5 Surface Water Hydrology and Water Quality	
Impact 4.5-1: Degradation of water bodies as a result of erosion and sedimentation or a hazardous materials release during construction	
None required	No. 3: On-Site Air and Water Quality Measures During Construction
Impact 4.5-2: Depletion of groundwater resources	
None required	None applicable
Impact 4.5-3a: Degradation of water quality due to construction dewatering discharges	
None required	No. 4: Groundwater
Impact 4.5-3b: Degradation of water quality due to construction-related discharges of treated water	
None required	None applicable
Impact 4.5-4: Flooding and water quality impacts associated with impeding or redirecting flood flows	
N/A	None applicable
Impact 4.5-5: Degradation of water quality and increased flows due to discharges to surface water during operation	
N/A	None applicable
Impact 4.5-6: Degradation of water quality as a result of alteration of drainage patterns or an increase in impervious surfaces	
None required	No. 10: Project Site
4.6 Biological Resources	
Impact 4.6-1: Impacts on wetlands and aquatic resources	
4.6-1a: Wetlands Assessment 4.6-1b: Compensation for Wetlands and Other Biological Resources	No. 8: Biological Resources
Impact 4.6-2: Impact on sensitive habitats, common habitats, and heritage trees	
4.6-2: Habitat Restoration/Tree Replacement Biological Resources Measure 4.6-1b	No. 8: Biological Resources

PEIR Mitigation Measures	SFPUC Construction Measures
Impact 4.6-3: Impact on key special-status species – direct mortality and/or habitat effects	
4.6-3a: Protection Measures During Construction for Key Special-Status Species and Other Species of Concern 4.6-3b: Standard Mitigation Measures for Key Special-Status Plants and Animals Biological Resources Measure 4.6-1b	No. 8: Biological Resources
Impact 4.6-4: Water discharge effects on riparian and/or aquatic resources	
None required	None applicable
Impact 4.6-5: Conflict with adopted conservation plans or other approved biological resources plans	
N/A	None applicable
4.7 Cultural Resources	
Impact 4.7-1: Impacts on paleontological resources	
4.7-1: Suspend Construction Work if Paleontological Resource is Identified	No. 9: Cultural Resources
Impact 4.7-2: Impacts on archaeological resources	
4.7-2a: Archaeological Testing, Monitoring, and Treatment of Human Remains 4.7-2b: Accidental Discovery Measures	No. 9: Cultural Resources
Impact 4.7-3: Impacts on historical significance of a historic district or a contributor to a historic district	
4.7-3: Protection of Historic Districts Cultural Resources Measures 4.7-4a thru 4.7-4f	None applicable

PEIR Mitigation Measures	SFPUC Construction Measures
Impact 4.7-4: Impacts on the historical significance of individual facilities resulting from demolition or alteration	
4.7-4a: Alternatives Identification and Resource Relocation 4.7-4b: Historical Resources Documentation 4.7-4c: Secretary of the Interior’s Standards for Treatment of Historic Properties 4.7-4d: Historic Resources Survey and Redesign 4.7-4e: Historic Resources Protection Plan 4.7-4f: Pre-construction Surveys and Vibration Monitoring	No. 9: Cultural Resources
Impact 4.7-5: Impacts on adjacent historic architectural resources	
None required	No. 9: Cultural Resources
4.8 Traffic, Transportation, and Circulation	
Impact 4.8-1: Temporary reduction in roadway capacity and increased traffic delays	
None required	No. 5: Traffic
Impact 4.8-2: Short-term traffic increases on roadways	
Traffic, Transportation, and Circulation Measure 4.8-1a Traffic, Transportation, and Circulation Measure 4.8-1b	No. 5: Traffic
Impact 4.8-3: Impaired access to adjacent roadways and land uses	
None required	No. 5: Traffic
Impact 4.8-4: Temporary displacement of on-street parking	
None required	No. 5: Traffic
Impact 4.8-5: Increased traffic safety hazards during construction	
Traffic, Transportation, and Circulation Measure 4.8-1a	No. 5: Traffic
Impact 4.8-6: Long-term traffic increases during facility operation	
None applicable. None required	None applicable

PEIR Mitigation Measures	SFPUC Construction Measures
4.9 Air Quality	
Impact 4.9-1: Construction emissions of criteria pollutants	
4.9-1a: SJVAPCD Dust Control Measures 4.9-1b: SJVAPCD Exhaust Control Measures	No. 3: On-Site Air and Water Quality Measures during Construction
Impact 4.9-2: Exposure to diesel particulate matter during construction	
None required	None applicable
Impact 4.9-3: Exposure to emissions (possibly including asbestos) from tunneling	
N/A	None applicable
Impact 4.9-4: Air pollutant emissions during project operation	
None required	None applicable
Impact 4.9-5: Odors generated during project operation	
None required	None applicable
Impact 4.9-6: Secondary emissions at power plants	
None required	None applicable
Impact 4.9-7: Conflict with implementation of applicable regional air quality plans addressing criteria air pollutants and state goals for reducing GHG emissions	
N/A	None applicable
4.10 Noise and Vibration	
Impact 4.10-1: Disturbance from temporary construction-related noise increases (PSU)	
4.10-1a: Noise Controls 4.10-1b: Vacate SFPUC Caretaker's Residence at Tesla Portal	No. 6: Noise

PEIR Mitigation Measures	SFPUC Construction Measures
Impact 4.10-2: Temporary noise disturbance along construction haul routes	
4.10-2a: Limit Hourly Truck Volumes 4.10-2b: Restrict Truck Operations	None applicable
Impact 4.10-3: Disturbance due to construction-related vibration (PSU)	
None required	None applicable
Impact 4.10-4: Disturbance due to long-term noise increases	
None required	No. 6: Noise
4.11 Public Services and Utilities	
Impact 4.11-1: Potential temporary damage to or disruption of existing regional or local public utilities	
None required	No. 1: Neighborhood Notice
Impact 4.11-2: Temporary adverse effects on solid waste landfill capacity	
4.11-2: Waste Reduction Measures	None applicable
Impact 4.11-3: Impacts related to compliance with statutes and regulations related to solid waste	
Public Services and Utilities Measure 4.11-2	None applicable
Impact 4.11-4: Impacts related to the relocation of utilities	
Public Services and Utilities Measures 4.11-1a thru 4.11-1h	No. 1: Neighborhood Notice
4.12 Recreational Resources	
Impact 4.12-1: Temporary conflicts with established recreational uses during construction	
N/A	N/A
Impact 4.12-2: Conflicts with established recreational uses due to facility siting and project operation	
N/A	None applicable

PEIR Mitigation Measures	SFPUC Construction Measures
4.13 Agricultural Resources	
Impact 4.13-1: Temporary conflicts with established agricultural resources	
N/A	N/A
Impact 4.13-2: Conversion of farmlands to non-agricultural uses	
N/A	None applicable
4.14 Hazards	
Impact 4.14-1: Potential to encounter hazardous materials in soil and groundwater	
None required	No. 4: Groundwater No. 7: Hazardous Materials
Impact 4.14-2: Exposure to naturally occurring asbestos	
N/A	None applicable
Impact 4.14-3: Risk of fires during construction	
None required	None applicable
Impact 4.14-4: Gassy conditions in tunnels	
N/A	None applicable
Impact 4.14-5: Exposure to hazardous building materials	
N/A	None applicable
Impact 4.14-6: Accidental hazardous materials release from construction equipment	
None required	No. 3: On-site Air and Water Quality Measures During Construction
Impact 4.14-7: Increased use of hazardous materials during operation	
None required	None applicable

PEIR Mitigation Measures	SFPUC Construction Measures
Impact 4.14-8: Emission or use of hazardous materials within ¼ mile of a school	
N/A	None applicable
4.15 Energy	
Impact 4.15-1: Construction-related energy use	
Air Quality Measures 4.9-1b and 4.9-1d	None applicable
Impact 4.15-2: Long-term energy use during operation	
4.15-2: Incorporation of Energy Efficiency Measures	None applicable
N/A = Not applicable because the impact does not apply to the advanced disinfection project PSU = potentially significant and unavoidable impact	

H.2 SFPUC Construction Measures

The SFPUC standard construction measures are aimed at minimizing disruptions to surrounding neighborhoods, resources, and land uses during any SFPUC construction, maintenance, or repair activity or project that requires CEQA review. As required by the SFPUC, each project must include the SFPUC standard construction measures in the construction contract or project implementation procedures, as appropriate. Some of the SFPUC standard construction measures may not be appropriate for certain kinds of projects, but each of the measures must be addressed, either by explaining why the measure is not applicable to the particular site, undertaking the activities listed, or undertaking further investigation and developing a more detailed work plan to address the issue (SFPUC 2008).

1. *Neighborhood Notice:* The SFPUC will provide reasonable advance notification to the businesses, owners and residents of adjacent areas potentially affected by the Water System Improvement Program (WSIP) projects about the nature, extent and duration of construction activities. Interim updates should be provided to such neighbors to inform them of the status of the construction.

Where schools would be affected, the SFPUC will coordinate with school facility managers to schedule construction for time periods with the least impact on school activities and facilities to ensure student safety and to minimize disruption to educational and recreational uses of the school property.

2. *Seismic and Geotechnical Studies:* Projects will incorporate review of existing information and, if necessary, new engineering investigations to provide relevant geotechnical information about the particular site and project, including a characterization of the soils at the site, and the potential for subsidence and other ground failure. Construction will address any recommendations by such geotechnical reports to ensure seismic stability and reliability of the proposed project. All SFPUC projects must be designed for seismic reliability and minimum potential water loss and property damage. All components of the water system improvement program must be designed to continue water service during a major earthquake.
3. *On-Site Air and Water Quality Measures during Construction:* All construction contractors must take measures to minimize fugitive dust and dirt emissions resulting from the construction, and implement measures to minimize any construction effects on local air and water quality, including a local storm drain system or watercourse. These measures could include preparation of a Stormwater Pollution Prevention Plan (SWPPP), if required by the California Regional Water Quality Control Board. At a minimum, construction contractors should undertake the following measures, as applicable, to minimize any adverse effects:
 - Erosion and sedimentation controls tailored to the site and project
 - Dust control plan
 - Placement of straw rolls around each of the nearby stormwater inlets;
 - Preservation of existing vegetation;
 - Installation of silt fences;
 - Use of wind erosion control (e.g., – geotextile or plastic covers on stockpiled soil);

- Sweeping of nearby streets at least once a day; and/or;
 - Stabilization of site ingress/egress locations to minimize erosion.
 - Spraying the disturbed areas of the site, or any stockpiled soil, with water to minimize fugitive dust emissions.
4. *Groundwater:* If groundwater is encountered during any excavation activities, the construction contractor shall prepare a dewatering plan so that water is discharged to the stormwater system in compliance with the local standards and discharge permit requirements.
 5. *Traffic:* Each contractor shall prepare a traffic control plan which will minimize the impacts on traffic and on-street parking on any streets affected by construction of the proposed project. As appropriate, SFPUC or the contractor will consult with local traffic and transit agencies.
 6. *Noise:* The contractor will comply with local noise ordinances regulating construction noise to the extent feasible, and will undertake efforts to minimize any noise disruption to nearby neighbors and sensitive receptors during construction.
 7. *Hazardous Materials:* Appropriate measures will be implemented to characterize and dispose of hazardous materials should they be encountered during excavation and construction. Contract specifications will mandate full compliance with all applicable local, state and federal regulations related to the identification, transportation and disposal of hazardous materials/soils. As necessary, a spill prevention and countermeasure plan will be prepared.

A qualified environmental professional will conduct any necessary site assessment. The site assessment would include a regulatory database review to identify permitted hazardous materials and environmental cases in the vicinity of each project no more than three months before construction, and a review of appropriate standard information sources to determine the potential for soil or groundwater contamination to occur. Follow-up sampling would be conducted as necessary to characterize soil and groundwater quality prior to construction and, if needed, site investigations or remedial activities would be performed in accordance with applicable laws. The environmental professional would prepare a report documenting the activities performed, summarize the results and make recommendations for appropriate handling of any contaminated materials during construction. A contingency plan would also be prepared identifying measures to be taken should unanticipated contamination be identified during construction. Construction contractors will conduct asbestos and lead abatement in accordance with established regulations.

8. *Biological Resources:* As an initial matter, SFPUC project managers will screen the project site and area to determine whether biological resources may be affected by construction activities. In the event further investigation is necessary, the SFPUC will comply with all requirements for investigation, analysis and protection of biological resources. A qualified biologist must conduct any required biological screening survey. The biologist will review standard information sources to determine special status species with the potential to occur on the project site. The biologist would carry out a site survey by walking or driving over the project site, as appropriate, to note the general resources and whether any habitat for special-status species is present. The biologist would then document the survey with a brief letter report or memo, setting forth the date of the visit, whether habitat for special-status species is present, providing a map or description showing where sensitive areas exist within the site, and identifying any appropriate avoidance measures.

9. *Cultural Resources:* As an initial matter, SFPUC project managers will screen the project site and area to determine whether cultural resources, including archaeological and other historical resources, may be affected by construction activities. In the event further investigation is necessary, the SFPUC will comply with all requirements for investigation, analysis and protection of cultural resources.

CEQA considers paleontological resources to be “cultural resources.” Any screening for cultural resources would include screening for archaeological, paleontological and historic resources. For projects requiring excavation, deep grading, well drilling or tunneling into geologic material at sites identified as having high potential for encountering paleontological resources, a state-registered professional geologist or qualified professional paleontologist will conduct a site-specific evaluation of the paleontological sensitivity. The assessment will include a report of findings for the SFPUC.

A qualified archaeologist, historian or paleontologist will conduct all cultural resources survey and screening work. Screening surveys for cultural resources would include a cultural resources records search to be conducted at the appropriate office member of the California Historical Resources Information System. A field survey will be conducted if determined necessary after the cultural resources records search. Any impacts on identified cultural resources will be avoided to the extent feasible.

Any initial historic resource screening will identify historic resources on the project site as well as adjacent to the project site.

It is possible that project work may affect accidentally discovered buried or submerged cultural resources. Any contractor must distribute the Planning Department archaeological resource “ALERT” sheet to any person involved in soil-disturbing activities. If there is any indication of an archaeological or a paleontological resource during the soils disturbing activity of the project, the contractor shall immediately suspend any soils disturbing activities in the area and notify the SFPUC of such discovery. The SFPUC will then work with the Planning Department’s Environmental Review Officer to determine what additional measures should be implemented, based on reports from a qualified archaeological or paleontological consultant.

10. *Project Site:* The SFPUC will conduct construction activities on SFPUC-owned lands to the extent feasible and minimize the need for use of non-SFPUC-owned land during construction. In cases where construction easement or staging areas are needed on non-SFPUC land, the SFPUC will restore these areas to their prior condition so that the owner may return them to their prior use, unless otherwise arranged with the property owner. The site will be maintained to be clean and orderly. Construction staging areas will be sited away from public view where possible. Nighttime lighting will be directed away from residential areas.

Upon project completion, the construction contractor will return the SFPUC project site to its general condition before construction, including re-grading of the site and re-vegetation of disturbed areas.

H.3 Description of Mitigation Measures

This section provides a description of all mitigation measures identified in Table H-1 for potentially significant and mitigable impacts, by resource, as presented in Chapter 6, Section 6.3 of the WSIP PEIR.

H.3.1 Land Use and Visual Resources

Architectural Design

Measure 4.3-4a: The design of permanent new, above-ground facilities will consider the existing visual character of the site and surrounding area, including the visibility of facilities and related structures from scenic highways and scenic roads. Structures will be designed to incorporate building features and design elements that are compatible with the surroundings.

Landscaping Plans

Measure 4.3-4b: The SFPUC will prepare and implement landscaping plans to restore project sites to their pre-construction condition such that short-term construction disturbance does not result in long-term visual impacts. To retain the existing visual character of the site and surrounding area, disturbed areas will be recontoured and revegetated and recontoured to pre-construction condition. Landscape vegetation will include noninvasive, and where possible, native grasses, shrubs, and trees similar to existing landscaping. The SFPUC will monitor landscape plantings annually for five years after project completion to ensure that sufficient ground coverage has developed and will implement additional measures, such as replanting or modifying irrigation systems, as determined necessary.

Landscape Screens

Measure 4.3-4c: In addition to revegetation of disturbed areas, the landscaping plans will include new plantings and landscape berms to screen views of new structures and equipment from scenic roads to the extent possible, provided that such landscaping does not affect security of SFPUC facilities.

Minimize Tree Removal

Measure 4.3-4d: The SFPUC will minimize or avoid the removal of existing trees that currently screen existing and proposed sites of WSIP facilities by modifying the proposed alignments of new temporary and permanent roads to the extent feasible. The SFPUC will consult with a qualified arborist regarding the minimum buffer zones required to prevent root damage to remaining trees and to provide the SFPUC with any necessary maintenance requirements for remaining trees. Also, the arborist will develop and assist the SFPUC in implementing an appropriate landscaping plan (see Measure 4.3-4b, above), including tree replacement, that is compatible with project operation and maintenance.

Reduce Lighting Effects

Measure 4.3-5: To the extent possible, all permanent exterior lighting will incorporate cutoff shields and non-glare fixture design. All permanent exterior lighting will be directed onsite and downward. In addition, new lighting will be oriented to ensure that no light source is directly visible from neighboring residential areas and will be installed with motion-sensor activation. In addition, highly reflective building materials and/or finishes will not be used in the designs for proposed structures, including fencing and light poles. Vegetation selected for landscaping will be selected, placed and maintained to minimize offsite light and glare in surrounding areas as part of the landscaping plans described in Measure 4.3-4b.

H.3.2 Geology, Soils and Seismicity

Characterize Extent of Expansive and Corrosive Soil

Measure 4.4-9: If the screening analysis conducted in accordance with SFPUC Construction Measure #2 identifies a potential for expansive or corrosive soils, the site-specific geotechnical investigation will include a characterization of the presence and extent of expansive and corrosive soil at the project facility site. The results and recommendations of the investigation will be incorporated into the final project design.

H.3.3 Biological Resources

Wetlands Assessment

Measure 4.6-1a: As part of project-specific CEQA review, a qualified wetland scientist will review project plans, air photos, and topographic maps and conduct a site visit to determine whether wetlands are present and could be affected by the project. If the review shows that wetlands could be affected, the wetland scientist will perform a formal wetland delineation and develop mitigation as per Measure 4.6-1b, below.

Compensation for Wetlands and Other Biological Resources

Measure 4.6-1b: If the wetland delineation indicates that the WSIP project will affect jurisdictional wetlands or aquatic resources, then, in accordance with state and federal permit requirements, the SFPUC will avoid and minimize direct and indirect impacts such as erosion and sedimentation, alteration of hydrology, and degradation of water quality. As a first priority, the SFPUC will implement (1) avoidance measures. For unavoidable impacts, the SFPUC will implement (2) minimization of unavoidable impacts, (3) restoration procedures, and (4) compensatory creation or enhancement to ensure no net loss of wetland extent or function.

In addition to wetlands, the SFPUC will compensate for sensitive riparian and upland habitats and habitats which support key special-status species or other species of concern lost as a result of WSIP project construction and operation. Similar habitat will be identified, protected, restored, enhanced, created and managed off-site¹ to ensure no net loss of habitat extent or function. For each WSIP project, a qualified biologist will quantify the magnitude and extent of ~~impacts to~~ impacts on wetlands, sensitive habitats, and key special-status species and other species of concern, and the SFPUC will develop and implement restoration and/or compensation plans that meet the appropriate regulatory requirements and permit conditions with respect to restoration and/or compensation ratios. Compensation ratios typically range from a minimum of 1:1 for common habitats to 2:1 or higher for rare and sensitive habitats. If individual project requirements of the RWQCB, CDFG, or USFWS differ somewhat from these ratios, they are still intended to achieve the same purpose of full restoration and/or compensation, to mitigate project impacts to less-than-significant levels, and to ensure no net reduction in the populations of any species listed as threatened or endangered by the state or federal resource agencies.

¹ Off-site means the compensatory action is located other than within the project construction footprint, but could be on lands already under SFPUC ownership. Measure 4.6-2 addresses compensatory actions to be taken within the construction footprint.

The SFPUC will obtain required permits for each project and comply with applicable environmental regulations addressing sensitive habitats and species. Compensatory lands, including those restored or enhanced as well as those acquired or designated as protected as part of program or project mitigation, will be established in perpetuity with a commitment that such lands will not be used for any purpose that conflicts with the primary purpose of maintaining intact wildlife and plant habitat.

One alternative for implementing off-site habitat compensation is the Habitat Reserve Program (HRP) currently being developed by the SFPUC. The purpose of the HRP is to provide a comprehensive, coordinated approach to mitigation and related regulatory compliance for WSIP projects. This related SFPUC project is described further in Chapter 3.0, Section 3.11. Under the proposed HRP, the SFPUC would proceed as soon as possible with securing (through designation, management agreement, conservation easement, or acquisition of fee title) and improving lands to be used for habitat compensation so that mitigation is underway before or concurrent with habitat loss related to WSIP project activities, further ensuring no net loss of resources. CEQA environmental review for the proposed HRP will commence in 2007 and is targeted for implementation as soon as possible thereafter. Once the HRP is approved and implemented, the SFPUC will use this as one vehicle or method for implementing the mitigation requirements for individual WSIP projects. Otherwise, where appropriate and necessary, the SFPUC will develop and implement appropriate habitat compensation mitigation for individual WSIP projects.

Habitat Restoration/Tree Replacement

Measure 4.6-2: If the biological screening survey identifies sensitive habitats or heritage trees, the following measures, as modified and applied to WSIP projects, will be implemented:

- Temporarily-impacted sensitive habitats (natural communities identified as sensitive by CDFG, and USFWS-designated critical habitat) would be restored to their pre- project condition.
- If specific trees to be removed are designated as heritage trees (or similar local designation), then SFPUC will replace the trees, consistent with requirements in local ordinances. If such heritage trees occur near extensive areas of sensitive habitats, locally collected, native species will be used as replacement trees where possible.
- Where possible, the loss of sensitive habitats will be minimized by coordinating WSIP projects to make repeated use of staging/construction areas and access roads. For example, tunnel spoils could be considered for borrow material for other projects.

Protection Measures during Construction for Key Special-Status Species and Other Species of Concern

Measure 4.6-3a: The following general practice measures, as modified and applied to the WSIP projects, will be implemented if the initial biological screening survey (SFPUC Construction Measure #8) indicates the potential for the presence of key special-status species and other species of concern:

- Preconstruction surveys for key special-status species and other species of concern will be conducted by a qualified biologist to verify their presence or absence. Surveys will occur during the portion of the species' life cycle when the species is most likely to be identified within the appropriate habitat. Key special-status species and other species of concern will be avoided during construction when possible.

- A worker awareness program (environmental education) will be developed and implemented to inform project workers of their responsibilities in regards to sensitive biological resources.
- An environmental inspector will be appointed to serve as a contact for issues that may arise concerning implementation of mitigation measures, and to document and report on adherence to these measures during construction.
- Loss of habitat will be minimized through the following measures: (1) the number and size of access routes and staging areas and the total area of the project activity will be limited to the minimum necessary to achieve the project goal; (2) the introduction or spread of invasive non-native plant species and plant pathogens will be avoided or minimized by developing and implementing a weed control plan; and (3) all areas temporarily disturbed by construction will be revegetated to pre-project or native conditions, as specified in project-specific revegetation plans.

Standard Mitigation Measures for Specific Plants and Animals

Measure 4.6-3b: Table H-1 identifies the key special-status species mitigation measures that the program analysis indicates would apply to each WSIP project. Measures listed in Table H-1 (listed by species) are generic measures and will be modified to fit site-specific conditions and applied to each WSIP project wherever special-status species could be affected by the projects. Surveys required under Measure 4.6-3a will refine the list of species that could be affected by a project. Table H-1 is intended as the minimum necessary actions. In addition to adopting the generic measures, as more site-specific information is available, project-specific CEQA analysis may identify additional measures for key special-status species and additional measures for other species.

H.3.4 Cultural Resources

Suspend Construction Work if Paleontological Resource is Identified

Measure 4.7-1: This mitigation measure builds on SFPUC Construction Measure # 9 for cultural resources, which requires that construction work will be suspended immediately if there is any indication of a paleontological resource. When a paleontological resource (fossilized invertebrate, vertebrate, plant or micro-fossil) is discovered at any of the project sites, an appointed representative of the SFPUC will notify a qualified paleontologist, who will document the discovery as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in Section 15064.5 of the CEQA Guidelines. When a fossil is found during construction, excavations within 50 feet of the find will be temporarily halted or diverted until the discovery is examined by a qualified paleontologist, in accordance with Society of Vertebrate Paleontology standards (SVP 1995, 1996, as cited in SFPUC 2008). The paleontologist will notify the SFPUC to determine procedures to be followed before construction is allowed to resume at the location of the find. If the SFPUC determines that avoidance is not feasible, the paleontologist will prepare an excavation plan for mitigating the effects of the project.

Archaeological Testing, Monitoring, and Treatment of Human Remains

Measure 4.7-2a: SFPUC Construction Measure #9 for cultural resources requires that a pre-construction screening be conducted by a qualified archaeologist. Based on the results of this screening, the Environmental Review Officer (ERO) shall determine if implementation of an archaeological testing or archaeological monitoring program or both is the appropriate strategy for

avoidance of potential adverse ~~effects to~~ effects on significant archaeological resource. For those projects that require a federal permit and compliance with the NHPA, Section 106, the ERO will review the SHPO-approved requirements in the permit conditions and consider protective approaches that limit undue duplication of efforts.

Archaeological Testing Program. The archaeological consultant shall prepare and submit to the ERO for review and approval an archaeological testing plan (ATP). The archaeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archaeological resource(s) that potentially could be adversely affected by the proposed project, the testing method to be used, and the locations recommended for testing. The purpose of the archaeological testing program will be to determine to the extent possible the presence or absence of any expected archaeological resources and to identify and to preliminarily evaluate the integrity and significance of the resource.

At the completion of the archaeological testing program, the archaeological consultant shall submit a written report of the findings to the ERO. If based on the archaeological testing program the archaeological consultant finds that significant archaeological resources may be present, the ERO in consultation with the archaeological consultant shall determine if additional measures are warranted. Additional measures that may be undertaken include additional archaeological testing, archaeological monitoring, preparation of an archaeological research design and treatment plan, or an archaeological data recovery program.

Archaeological Monitoring Program. The archaeological consultant shall prepare and submit to the ERO for review and approval an archaeological monitoring plan (AMP). The archaeological monitoring program shall be conducted in accordance with the approved AMP. The AMP shall specify what project activities in areas sensitive for buried resources shall be archaeologically monitored. Project activities that may require monitoring may include the installation of pipelines and crossover facilities and certain soils-altering activities such as grading and access road construction associated with construction or improvement of water storage facilities. The archaeological monitoring program shall include the following:

- All project contractors shall be advised to be on the alert for evidence of the presence of the expected resource(s), of how to identify the evidence of the expected resource(s), and of the appropriate protocol in the event of apparent discovery of an archaeological resource;
- The archaeological monitor(s) shall be present on the project site according to a schedule agreed upon by the archaeological consultant and the ERO until the ERO has, in consultation with project archaeological consultant, determined that project construction activities are unlikely to have effects on significant archaeological deposits;
- The archaeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis;
- If an intact archaeological deposit is encountered, all soils-disturbing activities within the area specified in the AMP of the deposit shall cease. The archaeological monitor shall be empowered to temporarily redirect demolition/excavation/pile driving/construction activities and equipment until the deposit is evaluated. The archaeological consultant shall immediately notify the ERO of the encountered archaeological deposit. The archaeological consultant shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, and present the findings of this assessment to the ERO.

Whether or not significant archaeological resources are encountered, the archaeological consultant shall submit a written report of the findings of the monitoring program to the ERO.

Additional Requirements: the following requirements, as applicable, are requisite in implementation of either an archaeological testing or monitoring program.

Archaeological Data Recovery Program. The archaeological data recovery program shall be conducted in accord with an archaeological data recovery plan (ADRP). The archaeological consultant, project sponsor, and ERO shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. The archaeological consultant shall submit a draft ADRP to the ERO. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archaeological resource is expected to contain. That is, the ADRP will identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practical.

The scope of the ADRP shall include the following elements:

- Field Methods and Procedures. Descriptions of proposed field strategies, procedures, and operations.
- Cataloguing and Laboratory Analysis. Description of selected cataloguing system and artifact analysis procedures.
- Discard and Deaccession Policy. Description of and rationale for field and post-field discard and deaccession policies.
- Interpretive Program. Consideration of an on-site/off-site public interpretive program during the course of the archaeological data recovery program.
- Security Measures. Recommended security measures to protect the archaeological resource from vandalism, looting, and non-intentionally damaging activities.
- Final Report. Description of proposed report format and distribution of results.
- Curation. Description of the procedures and recommendations for the curation of any recovered data having potential research value, identification of appropriate curation facilities, and a summary of the accession policies of the curation facilities.

Human Remains and Associated or Unassociated Funerary Objects. The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity shall comply with applicable State laws. This shall include immediate notification of the coroner of the county within which the project is located and in the event of the coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (Pub. Res. Code Sec. 5097.98). The archaeological consultant, project sponsor, and MLD shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines. Sec. 15064.5(d).) The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or

unassociated funerary objects. State law allows 24 hours to reach agreement on these matters. If the MLDs do not agree on the reburial method, the Project will follow Section 5097.98(b) of the California Public Resources Code which states, “the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance.”

Final Archaeological Resources Report. The archaeological consultant shall submit a Draft Final Archaeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archaeological resource and describes the archaeological and historical research methods employed in the archaeological testing/monitoring/data recovery program(s) undertaken. Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report. Once approved by the ERO, copies of the FARR shall be distributed as follows: the relevant California Historical Resources Information System Information Center shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the Information Center. The Major Environmental Analysis division of the Planning Department (MEA) shall receive three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for evaluation under National Register of Historic Places/California Register of Historical Resources criteria. The SFPUC shall receive copies of the FARR as requested in number. In instances of high public interest in or the high interpretive value of the resource, the ERO may require a different final report content, format, and distribution than that presented above.

Accidental Discovery Measures

Measure 4.7-2b: SFPUC Construction Measure # 9 for cultural resources requires that construction activities be suspended immediately if there is any indication of an archaeological resource.

To avoid any potential adverse effect from the proposed project on accidentally discovered buried or submerged historical resources as defined in CEQA Guidelines Section 15064.5(a)(c), the project sponsor shall distribute the Planning Department archaeological resource “ALERT” sheet to the project prime contractor; to any project subcontractor (including demolition, excavation, grading, foundation, pile driving, etc. firms); or utilities firm involved in soil disturbing activities within the project site. Prior to any soil disturbing activities being undertaken, each contractor is responsible for ensuring that the “ALERT” sheet is circulated to all field personnel including, machine operators, field crew, pile drivers, supervisory personnel, etc. The project sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the responsible parties (prime contractor, subcontractor(s), and utilities firm) to the ERO confirming that all field personnel have received copies of the “ALERT” sheet.

If the ERO determines that an archaeological resource may be present within the project site, the project sponsor shall retain the services of a qualified archaeological consultant. The archaeological consultant shall advise the ERO as to whether the discovery is an archaeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archaeological resource is present, the archaeological consultant shall identify and evaluate the archaeological resource. The archaeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, the ERO may require, if warranted, specific additional measures to be implemented by the project sponsor.

Measures might include: preservation in situ of the archaeological resource; an archaeological monitoring program; or an archaeological testing program. If an archaeological monitoring program or archaeological testing program is required, it shall be consistent with the MEA guidelines for such programs. The ERO may also require that the project sponsor immediately implement a site security program if the archaeological resource is at risk from vandalism, looting, or other damaging actions.

The project archaeological consultant shall submit a Final Archaeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archaeological resource and describing the archaeological and historical research methods employed in the archaeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report. Once approved by the ERO, copies of the FARR shall be distributed as follows: the relevant California Historical Resources Information System Information Center shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the Information Center. The MEA shall receive three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. The SFPUC shall receive copies of the FARR as requested in number. In instances of high public interest in or the high interpretive value of the resource, the ERO may require a different final report content, format, and distribution than that presented above.

Protection of Historic Districts

Measure 4.7-3: The city's water system facilities affected by WSIP facility projects will be assessed by a qualified historian for their potential contribution to an historic district, following the guidelines identified under Impact 4.7-3. To qualify as an historic district, each resource within that potential district would need to be reliant upon the other resources within the district to be historically significant. Impacts on one resource within the potential district may or may not affect the others, and this conclusion would determine the ultimate significance of the impact.

If an historic district would be affected by one or more proposed WSIP facility projects, the SFPUC, in consultation with the ERO, will develop mitigation measures for effects with attention to the potential district as a whole, with utmost effort made to maintain the district's function, appearance, cohesive site organization, and ability to convey historic significance. Appropriate measures may also include but not be limited to: refinement of facility sites to minimize effects on district appearance and site organization as well as visual screening efforts to reduce the impact of adding new facilities or otherwise modifying the landscape.

Should an historic district be identified at the project level, it should be recorded as such, using the four National/California Register criteria of significance to explain its historical importance as a cohesive group of resources. The district should be documented by completing the State of California Department of Parks and Recreation 523 forms, using a 523D (District) form as an umbrella record to unify the 523A (Primary Record) and 523B (Building, Structure, Object) forms completed for each individual resource within the potential district, and submitting them to SHPO.

Alternatives Identification and Resource Relocation

Measure 4.7-4a: If a project proposes to demolish or remove a historical resource, including individual historic resources and/or historic districts, the SFPUC will attempt to identify feasible project alternatives that eliminate or reduce the need for demolition or removal to the greatest

extent possible. The SFPUC will pursue and implement these project alternatives to the extent feasible, consistent with the goals and objectives of the WSIP.

Relocation of a resource will always be preferable to demolition, although relocation might not mitigate impacts to a less-than-significant level. If preservation of the affected historical resource at the current site is determined to be infeasible, the structure shall, if feasible, be stabilized and relocated to other nearby sites appropriate to their historic setting and general environment. This may not be possible in some cases, like in the replacement of Calaveras Dam (if it were identified as a historical resource for the purposes of CEQA). After relocation, the resource shall be treated according to preservation, rehabilitation, or restoration standards, as appropriate, that follow the Secretary of the Interior's Standards. This will ensure that the building, structure, object, site, or district retains historic integrity and its historic significance (Measure 4.7-4c). If the affected historical resource can neither be preserved at its current site nor moved to an alternative site and is to be demolished, the SFPUC shall consult with local historical societies and governmental agencies regarding salvage of materials from the affected historical resource for public information or reuse in other locations. Demolition may proceed only after any significant historic features or materials have been identified, preserved (as feasible), and their removal completed.

Representative features such as aqueduct/pipe sections, valves subject to replacement, decorative elements, or plaques/inscriptions from buildings or other portions of structures demolished as a part of the WSIP projects could be preserved and displayed. Most of these types of structures are of sufficient size that they would form "monumental" commemorative structures. For example, an original pipeline valve replaced by modern equipment might be mounted and displayed on publicly accessible SFPUC property with informative placards. Such displays, if located in other jurisdictions, might be subject to those jurisdiction's requirements related to public art, safety, and liability considerations.

Historical Resources Documentation

Measure 4.7-4b: Documentation of a historical resource, including resources identified as contributors to a historic district or as individually significant, prior to demolition or removal is a standard mitigation measure. Such documentation is often tied to meeting the documentation standards of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER). The publication Recording Historic Structures: Historic American Buildings Survey/Historic American Engineering Record (Burns 1989, as cited in SFPUC 2008, page 6-27) provides four levels of documentation corresponding to the level of importance of the historic resource to be documented. For the purpose of this PEIR, the standards for photography in Documentation Levels III and IV have been modified to allow for the use of digital photographs instead of large-format negatives.

Documentation Level I:

1. Drawings: a full set of measured drawings depicting existing or historic conditions.
2. Photographs: photographs with large-format negatives of exterior and interior views; photocopies with large-format negatives of select existing drawings or historic views where available. Photographs would follow the HABS/HAER Photographic Specifications.
3. Written data: history and description.

Documentation Level II:

1. Drawings: select existing drawings, where available, should be photographed with large-format negatives or photographically reproduced on Mylar.
2. Photographs: photographs with large-format negatives of exterior and interior views, or historic views, where available. Photographs would follow the HABS/HAER Photographic Specifications.
3. Written data: history and description.

Documentation Level III:

1. Drawings: sketch plan.
2. Photographs: digital photographs of exterior and interior views.
3. Written data: architectural data form.

Documentation Level IV:

1. Drawings: sketch plan.
2. Photographs: digital photographs of exterior and interior views.
3. HABS/HAER inventory cards.

Digital photography will follow the standards in the National Register of Historic Places and National Historic Landmarks Survey, Photo Policy Expansion, March 2005 (Table VV). Digital image files would be burned to archival-quality disks, such as the eFilm Archival Gold CD-R or DVD-R; or MAM-A Mitsui Gold Archive CD-R or DVD-R.

The SFPUC will prepare, or retain a consultant to prepare, documentation of historical resources prior to any construction work associated with demolition or removal. The appropriate level of documentation will be selected by a qualified professional who meets the standards for history, architectural history, and/or architecture (as appropriate) set forth by the Secretary of the Interior (Secretary of the Interior's Professional Qualification Standards, 36 CFR 61) in consultation with a preservation specialist assigned by the San Francisco Planning Department and the local jurisdiction if deemed appropriate by the Planning Department. In addition to the four levels of documentation listed above, salvage and/or interpretive display may also be required if determined appropriate. The professional in history, architectural history and/or architecture (as appropriate) will prepare the documentation and submit it for review and approval by the Planning Department's preservation specialist. One set of the documentation will be archived at each of the following repositories: San Francisco Planning Department, SFPUC, the History Room of the San Francisco Public Library and the Water Resources Center Archive at the University of California Berkeley. Additional dissemination of documentation to local historical societies or historic preservation organizations may be appropriate. The San Francisco Planning Department will identify additional appropriate recipients of historical documentation during the project-level analysis.

Secretary of the Interior's Standards for Treatment of Historic Properties

Measure 4.7-4c: Compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties would reduce potential impacts associated with the alteration or modification of a historical resource (including historic districts and individually eligible resources) to a less-than-significant level. (In accordance with CEQA Section 15064.5(b)(3), a project that follows the

Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior’s Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings is generally considered to have impacts of a less-than-significant level.)

The SFPUC will prepare materials describing and depicting the proposed project, including but not limited to plans, drawings, and photographs of existing conditions (digital, following the standards in Measure 4.7-4a as well as proposed project plans, drawings, specifications, and description). Prepared materials will be submitted to the San Francisco Planning Department. The Planning Department will review the proposed project, for compliance with the Secretary of the Interior’s Standards for the Treatment of Historic Properties.

If a project is determined to be inconsistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties, the SFPUC will pursue and implement redesign of the project to the extent feasible, consistent with the goals and objectives of the WSIP, such that consistency with the standards is achieved.

Historic Resources Survey and Redesign

Measure 4.7-4d: The SFPUC will undertake a historic resources survey within a designated area of potential effect that encompasses the proposed project to identify and evaluate potential historical resources, including districts, which may exist within or partially within the project’s study area or area of potential effect. The survey will be conducted by a qualified professional who meets the Secretary of the Interior’s Professional Qualification Standards for architectural history, history, or architecture (36 CFR 61).

If a survey identifies one or more historical resources in the projects’ study area, or area of potential effect (i.e., historically significant resources), the qualified professional will then assess the impact the project may have on those historical resources. If the project will cause a substantial adverse change to a historical resource, the SFPUC will prepare materials describing and depicting the proposed project, including but not limited to plans, drawings, and photographs of existing conditions (digital, following the standards in Measure 4.7-1a) as well proposed project plans, drawings, specifications, and description. Prepared materials will be submitted to the San Francisco Planning Department. The San Francisco Planning Department will assign a preservation specialist to review the proposed project, for compliance with the Secretary of the Interior’s Standards for the Treatment of Historic Properties.

If a project is determined to be inconsistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties, the SFPUC will pursue and implement redesign of the project to the extent feasible, consistent with the goals and objectives of the WSIP, such that consistency with the standards is achieved.

Historic Resources Protection Plan

Measure 4.7-4e: A qualified historian will prepare a plan that specifies procedures for protecting historical resources and a monitoring method to be employed by the contractor while working near these resources. At a minimum, the plan will address the operation of construction equipment near adjacent historical resources, storage of construction materials away from adjacent resources, and education/training of construction workers about the significance of the historical resources.

Preconstruction Surveys and Vibration Monitoring

Measure 4.7-4f: If vibration-related impacts could impact historical resources, one or more geotechnical investigations by a California-licensed geotechnical engineer will be included as part of the proposed project. The SFPUC and its contractors will follow the recommendations of the final geotechnical reports regarding any excavation and construction for the project. The SFPUC will ensure that the construction contractor conducts a preconstruction survey of existing conditions and monitors the adjacent buildings for damage during construction, if recommended by the geotechnical engineer. Any preconstruction surveys and construction monitoring would include the services of a professional meeting the Secretary of the Interior's Professional Qualification Standards for architecture.

H.3.5 Traffic, Transportation, and Circulation

Traffic Control Plan Measures

Measure 4.8-1a: SFPUC Construction Measure #5 for traffic requires each contractor to prepare a traffic control plan to minimize traffic and on-street parking impacts on any streets affected by construction of the proposed program. SFPUC and construction contractor(s) will prepare and implement a traffic control plan, and coordinate with Caltrans and local jurisdictions, as appropriate, for affected roadways and intersections. Each project may require the implementation of different measures, depending on the project's site-specific construction details, the characteristics of the transportation network, and daily and peak hour vehicle, pedestrian and bicycle volumes. As applicable, elements of the traffic control plan could include, but are not necessarily limited to, the following:

- Circulation and detour plans will be developed to minimize impacts on local street circulation. Flaggers and/or signage will be used to guide vehicles through and/or around the construction zone.
- Truck routes designated by cities and counties will be identified in the traffic control plan. Haul routes that minimize truck traffic on local roadways and residential streets will be utilized to the extent possible.
- Sufficient staging areas will be provided for trucks accessing construction zones to minimize disruption of access to adjacent land uses, particularly at entries to onsite pipeline construction within residential neighborhoods.
- Access to driveways and private roads will be maintained by using steel trench plates. If access must be restricted for brief periods, property owners will be notified in advance.
- Construction vehicle movement will be controlled and monitored through the enforcement of standard construction specifications by onsite inspectors.
- Along major arterials, truck trips will be scheduled outside of the peak morning and evening commute hours to the extent possible.
- Lane closures will be limited during peak hours to the extent possible. Outside of allowed working hours or when work is not in progress, roads will be restored to normal operations, with all trenches covered with steel plates.

- Where possible, pipeline construction work in roadways will be limited to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. Parking may be prohibited if necessary to facilitate construction activities or traffic movement. If the work zone width will not allow a 10-foot-wide paved travel lane, then the road will be closed to through-traffic (except emergency vehicles), and detour signing on alternative access roads will be used.
- Pedestrian and bicycle access and circulation will be maintained during project construction where safe to do so. If construction activities encroach on a bicycle lane, warning signs will be posted that indicate bicycles and vehicles are sharing the lane.
- Detours will be included for bicycles and pedestrians in all areas potentially affected by project construction.
- All equipment and materials will be stored in designated contractor staging areas on or adjacent to the worksite, in such a manner to minimize obstruction of traffic.
- Locations will be identified for parking by construction workers, either within the construction zone or, if necessary, at a nearby location with transport provided between the parking location and the worksite.
- Roadside safety protocols will be implemented. Advance “Road Work Ahead” warning signs and speed control (including signs informing drivers of state-legislated double fines for speed infractions in a construction zone) will be provided to achieve required speed reductions for safe traffic flow through the work zone.
- Construction will be coordinated with facility owners or administrators of sensitive land uses such as police and fire stations (including all fire protection agencies), transit stations, hospitals, and schools. Facility owners or operators will be notified in advance of the timing, location, and duration of construction activities and the locations of detours and lane closures.
- Construction will be coordinated with local transit service providers, including temporary relocation of bus routes or bus stops in work zones as necessary.
- Roadway right-of-ways will be repaired or restored to their original conditions or better upon completion of construction.
- To the extent applicable, the traffic control plan will conform to the California Manual on Uniform Traffic Control Devices for Streets and Highways: Part 6 Temporary Traffic Control and Caltrans’ 2006 Standard Plans.

Coordination of Individual Traffic Control Plans

Measure 4.8-1b: To the extent that the adopted SFPUC Construction Measure #5 does not contain such provisions already, or the provisions are not required for a project as a result of local encroachment or right-of-way permit conditions, the contract specifications for individual contracts within a single WSIP project will include the following:

- In the event that more than one construction contract is issued for work along existing or new pipelines, and where construction could occur within and/or across multiple streets in the same vicinity, the SFPUC and construction contractor(s) will coordinate the traffic control plans in order to mitigate the impact of traffic disruption. The coordinated plan will include measures that address overlapping construction schedules and activities, truck arrivals and departures, lane closures and detours, and the adequacy of on-street staging requirements.

H.3.6 Air Quality

SJVAPCD Dust Control Measures

Measure 4.9-1a: In the San Joaquin Region, the SJVAPCD has determined that compliance with the following Regulation VIII (Fugitive PM10 Prohibitions) and Regulation IX (Mobile and Indirect Sources, Rule 9510, where applicable) control measures would mitigate PM10 impacts to a less-than-significant level. The SFPUC will include these measures, where applicable, in contract specifications:

SJVAPCD Basic Control Measures (applies to all construction sites)

- All disturbed areas, including storage piles that are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover, or vegetative ground cover.
- All onsite unpaved roads and offsite unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
- When materials are transported offsite, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container shall be maintained.
- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.
- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
- Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
- Any site with 150 or more vehicle trips per day shall prevent carryout and trackout.

SJVAPCD Enhanced Control Measures (also applies when required to mitigate significant PM10 impacts)

- Traffic speeds on unpaved roads shall be limited to 15 mph.
- Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.

SJVAPCD Additional Control Measures (also applies to construction sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions)

- Wheel washers shall be installed for all exiting trucks, or all trucks and equipment leaving the site shall be washed off.

- Wind breaks shall be installed at windward side(s) of construction areas.
- Excavation and grading activity shall be suspended when winds exceed 20 mph and, regardless of windspeed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation.
- The area subject to excavation, grading, and other construction activity at any one time shall be limited.

SJVAPCD Rule 9510, Indirect Source Review, Section 6.1, Construction Equipment Emissions (applies to any project subject to discretionary approval by a public agency that ultimately results in the construction of a new building, facility, or structure or reconstruction of a building, facility, or structure for the purpose of increasing capacity or activity and also involving 9,000 square feet of space).

- 6.1.1: The exhaust emissions for construction equipment greater than fifty (50) horsepower used or associated with the development project shall be reduced by the following amounts from the statewide average as estimated by the ARB:
 - 6.1.1.1: 20% of the total NO_x emissions, and
 - 6.1.1.2: 45% of the total PM₁₀ exhaust emissions.
- 6.1.2: An applicant may reduce construction emissions on-site by using less- polluting construction equipment, which can be achieved by utilizing add-on controls cleaner fuels, or newer lower emitting equipment.
- 6.3: The requirements listed in Section 6.1 above can be met through any combination of on-site emission reduction measures or off-site fees.

SJVAPCD Exhaust Control Measures

Measure 4.9-1b: To limit exhaust emissions within the San Joaquin Region, the SJVAPCD specifies the following exhaust controls for heavy-duty equipment (scrapers, graders, trenchers, earthmovers, etc.). The SFPUC will include these measures, where applicable, in contract specifications:

- Alternative-fueled or catalyst-equipped diesel construction equipment shall be used.
- Idling time (e.g., 10-minute maximum) shall be minimized.
- The hours of operation of heavy-duty equipment and/or the amount of equipment in use shall be limited.
- Fossil-fueled equipment shall be replaced with electrically driven equivalents (provided they are not run via a portable generator set).
- Construction shall be curtailed during periods of high ambient pollutant concentrations; this may include ceasing construction activity during the peak hour of vehicular traffic on adjacent roadways.
- Activity management (e.g., rescheduling activities to reduce short-term impacts) shall be implemented.

H.3.7 Noise and Vibration

Noise Controls

Measure 4.10-1a: SFPUC Construction Measure #6 for noise requires compliance with local noise ordinances to the extent feasible. Many of these ordinances restrict hours when construction can occur, but do not specify noise limits for construction noise. For most projects, the SFPUC will conduct construction activities during the daytime hours to the extent feasible. However, if nighttime construction cannot be avoided, noise generated by these activities will be required to comply with applicable noise ordinance nighttime limits or not exceed 50-dBA sleep interference criterion (with windows open at night) to the extent feasible.

To ensure that construction noise impacts are mitigated to a less-than-significant level, all WSIP projects located within 500 feet of any noise-sensitive receptors (e.g., residences, schools, childcare centers, churches, hospitals, and nursing homes) will be required to implement appropriate noise controls to reduce daytime construction noise levels to meet the 70-dBA daytime speech interference criterion to the extent feasible. For nighttime construction, all WSIP projects located within 3,000 feet of any noise-sensitive receptors will be required to implement appropriate noise controls to maintain noise levels at or below any applicable ordinance nighttime noise limits or the 50-dBA nighttime sleep interference criterion to the extent feasible. Such controls could include any of the following, as appropriate:

- Best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) will be used for all equipment and trucks in order to minimize construction noise impacts. If feasible, construction equipment noise will not exceed the mitigated noise levels listed in Table 4.10-4 (see measure below for limits on impact equipment).
- If impact equipment (e.g., jack hammers, pavement breakers, and rock drills) is used during project construction, hydraulically or electric-powered equipment will be used wherever feasible to avoid the noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed-air exhaust will be used (a muffler can lower noise levels from the exhaust by up to about 10 dBA). External jackets on the tools themselves will be used, where feasible, which could achieve a reduction of 5 dBA. Quieter procedures, such as drilling rather than impact equipment, will be used whenever feasible.
- Pile holes will be pre-drilled wherever feasible to reduce potential noise and vibration impacts. Where feasible, sonic or vibratory pile drivers will be used instead of impact pile drivers (sonic pile drivers are only effective in some soils).
- Pile driving activities shall be prohibited during the evening and nighttime hours (7 p.m. to 7 a.m.).
- Operation of equipment requiring use of back-up beepers will be avoided near sensitive receptors to the extent feasible during nighttime hours (10 p.m. to 7 a.m.).
- Stationary noise sources will be located as far from sensitive receptors as feasible. If they must be located near receptors, adequate muffling (with enclosures where feasible and appropriate) will be used to ensure local noise ordinance limits are met to the extent feasible. Enclosure opening or venting will face away from sensitive receptors. If any stationary equipment (e.g.,

ventilation fans, generators, dewatering pumps) is operated beyond the time limits specified by the pertinent noise ordinance, this equipment will conform to the affected jurisdiction's pertinent day and night noise limits to the extent feasible.

- Material stockpiles as well as maintenance/equipment staging and parking areas will be located as far as feasible from residential and school receptors.
- Wherever feasible, pipeline alignments will be located at least 100 feet away from sensitive receptors.
- Where pipeline construction zones are within 100 feet of school classrooms or childcare facilities, pipeline construction activities (or at least the noisier phases of construction) will be scheduled on weekend or school vacation days to the extent feasible, avoiding weekday hours when schools are in session. If construction must occur when school is in session, interior noise levels in classrooms will not exceed 60 dBA if possible to avoid speech interference problems, which would allow for a maximum exterior noise level of 70 to 80 dBA, depending on whether windows are open or closed.
- Given the long duration of construction activities at tunnel shafts/portals and proposed nighttime activities, tunnel-related construction activities will be designed to comply with nighttime noise limits specified in local noise ordinances. Measures that could be implemented to comply with these limits include: using quiet ventilation fans (pure tone components of fan noise will be considered), using line power instead of generators, erection of temporary sound barriers, restricting heavy equipment operation during the nighttime hours, using nonmetallic containers in the muck removal system to prevent clanging/banging noises, limiting controlled detonations in the tunnel shaft/portal vicinities to the daytime hours, retrofitting windows/doors of affected homes, and/or prohibiting use of backup alarms on equipment during the nighttime hours.
- Where controlled detonation activities will occur, surrounding cities and residents should be notified of the blasting schedule, indicating the time range when blasting could occur (hours and duration).
- Proposed jack-and-bore pits will be located as far from sensitive receptors as technically feasible. If ventilation fans, dewatering pumps, or generators are required as part of this type of pipeline crossing, such equipment will comply with daytime and nighttime noise limits specified in pertinent noise ordinances to the extent feasible (also see Measure 4.9-1d in Section 4.9, Air Quality, for additional restrictions on generator operation).
- Wherever necessary, temporary or permanent noise barriers will be erected to maintain construction noise levels at or below the 70-dBA daytime speech interference criterion and the 50-dBA nighttime sleep interference criterion.
- A designated project liaison will be responsible for responding to noise complaints during the construction phases. The name and phone number of the liaison will be conspicuously posted at construction areas and on all advanced notifications. This person will take steps to resolve complaints, including periodic noise monitoring, if necessary. Results of noise monitoring will be presented at regular project meetings with the project contractor, and the liaison will coordinate with the contractor to modify any construction activities that generated excessive noise levels to the extent feasible.

- A reporting program will be required for each project that documents complaints received, actions taken to resolve problems, and effectiveness of these actions.

Vacate SFPUC Caretaker's Residence at Tesla Portal

Measure 4.10-1b: The SFPUC caretaker's residence at Tesla Portal will be vacated during construction of the Advanced Disinfection (SJ-1) and Tesla Portal Disinfection (SJ-5) projects as well as those portions of the SJPL System (SJ-3) and SJPL Rehabilitation (SJ-4) projects located at Tesla Portal.

Limit Hourly Truck Volumes

Measure 4.10-2a: In addition to SFPUC Construction Measure #6 for noise, which requires compliance with local noise ordinances to the extent feasible, haul and delivery truck routes for all WSIP projects will avoid local residential streets and will follow local designated truck routes to the extent feasible. Total project-related haul and delivery truck volumes on any particular haul truck route will be limited to 80 trucks per hour.

Restrict Truck Operations

Measure 4.10-2b: Haul and delivery trucks will be prohibited from operating within 200 feet of any residential uses during the nighttime hours (10 p.m. to 7 a.m.). If there are receptors, but they are beyond 200 feet from the haul route, limited truck operations will be allowed during the more sensitive nighttime hours, but noise generated by these operations cannot exceed the 50-dBA sleep interference criterion at the closest receptors. If trucks must operate during these hours and residential uses are located within 200 feet of the haul route, deliveries will be made to staging areas outside residential areas, then transferred to the construction site during daytime hours (7 a.m. to 7 p.m.).

Vacate SFPUC Land Manager's Residence

Measure 4.10-2c: To minimize nighttime noise impacts, the SFPUC Land Manager's residence adjacent to Alameda East Portal will be vacated during off-site truck operations associated with the New Irvington Tunnel project (SV-4), if truck operations occur during the nighttime hours (10 p.m. to 7 a.m.) and are estimated to exceed the 50-dBA sleep interference criterion at this residence.

H.3.8 Public Services and Utilities

Notify Neighbors of Potential Utility Service Disruption

Mitigation 4.11-1a: As part of the neighborhood notice, the SFPUC will notify residents and businesses in project area of potential utility service disruption two to four days in advance of construction.

Locate Utility Lines Prior to Excavation

Measure 4.11-1b: Prior to excavation, the SFPUC or its contractors will locate overhead and underground utility lines, such as natural gas, electricity, sewer, telephone, fuel, and water lines, that may be encountered during excavation work prior to opening an excavation.

Confirmation of Utility Line Information

Measure 4.11-1c: The SFPUC or its contractors will find the exact location of underground utilities by safe and acceptable means. Information regarding the size, color, and location of existing utilities must be confirmed before construction activities commence.

Safeguard Employees from Potential Accidents Related to Underground Utilities

Measure 4.11-1d: While any excavation is open, the SFPUC or its contractors will protect, support, or remove underground utilities as necessary to safeguard employees.

Notify Local Fire Departments

Measure 4.11-1e: The SFPUC or its contractors will notify local fire departments any time damage to a gas utility results in a leak or suspected leak, or whenever damage to any utility results in a threat to public safety.

Emergency Response Plan

Mitigation 4.11-f: The SFPUC will develop an emergency response plan in the event of a leak or explosion prior to commencing construction activities.

Prompt Reconnection of Utilities

Measure 4.11-2g: The SFPUC or its contractors will promptly reconnect any disconnected utility lines.

Coordinate Final Construction Plans with Affected Utilities

Measure 4.11-1h: The SFPUC or its contractors will coordinate final construction plans and specifications with affected utilities.

Waste Reduction Measures

Measure 4.11-2: The following requirements will be incorporated into contract specifications for each WSIP project:

The contractor(s) will obtain any necessary waste management permits prior to construction and will comply with conditions of approval attached to project implementation. As part of the waste management permit process, the contractor(s) will submit a solid waste recycling plan to the affected agencies. Elements of the plan will likely include, but are not necessarily limited to, the following:

- Identification of the types of debris that will be generated by the project and identify how all waste streams will be handled.
- Actions to reuse or recycle construction debris and clean excavated soil to the extent possible.
- Actions to divert at least 50% of inert solids (asphalt, brick, concrete, dirt, fines, rock, sand, soil, and stone) from disposal in a landfill.

H.3.9 Energy Resources

Incorporation of Energy Efficiency Measures

Measure 4.15-2: Consistent with the Energy Action Plan II priorities for reducing energy usage, the SFPUC will ensure that energy efficient equipment is used in all WSIP projects. A repair and maintenance plan will also be prepared for each facility to minimize power use. The potential for use of renewable energy resources (such as solar power) at facility sites will be evaluated during project-specific design.

H.4 References Cited

~~Burns, J. 1989. Recording Historic Structures: Historic American Buildings Survey/Historic American Engineering Record, Washington, D.C.: The American Institute of Architects Press. As cited in San Francisco Public Utilities Commission (SFPUC). 2008. *Water System Improvement Program Final Program EIR*. Chapter 6, Mitigation Measures, 6-27 pp.~~

San Francisco Public Utilities Commission (SFPUC). 2008. *Water System Improvement Program Final Program EIR*. Chapter 6, Mitigation Measures. Available: <http://www.sf-planning.org/index.aspx?page=1829>. Accessed: May 9, 2016.

Attachment 4
**Environmental Considerations for South Delta
Low Head Pump System**



Memorandum

Date:	April 7, 2011
To:	Robert Pedlar California Department of Water Resources, Bay-Delta Office 1416 Ninth Street Sacramento, CA 95814
From:	Gregg Roy, Jennifer Pierre, and Lesa Erecius
Subject:	Environmental Considerations for South Delta Low Head Pump System

The following information was compiled to address your request for information about the potential environmental requirements associated with the placement of temporary or permanent pump systems at select sites in the south Delta to encourage flow to improve water quality. The information is presented separately for the permanent and temporary pump systems and is further divided into an overall discussion of the potential impacts and mitigation, and a specific discussion about permitting approach.

Summary

The analysis of environmental considerations has been based on current requirements of the Title 14, Chapter 3, of the California Code of Regulations and Division 13, of the California Public Resource Code (CEQA Guidelines), our extensive experience working in the south Delta for the temporary barriers project (TBP) and the South Delta Improvements Project, various site visits over the years, and review of conceptual drawings and modeling outputs provided by DWR. Both permanent and temporary pumping systems are considered to be a modification of the currently implemented TBP and environmental considerations of this modification would require minor modifications to existing permits and mitigation obligations.

Overall, the permanent systems would require that DWR provide mitigation for the footprint of the new pumping systems in addition to the mitigation already in place for the TBP. This could be accomplished at a bank, such as was done at Kimball Island for the TBP. The temporary pumping systems would not require additional mitigation for species, but the installation and removal of these systems each year could result in air quality effects that could require mitigation above and beyond what is currently require for the TBP. However, some components of the temporary facilities would be left in place year-round on the crown of the levee to ease installation in subsequent years and minimize construction-related effects.

Project Description and Purpose

The Low Head Pump Salinity Control Study would consist of installing temporary pump systems, or permanent pumping systems near the Middle River (MR), Grant Line Canal (GLC) and/or Old River at Tracy (ORT) temporary barriers.

The purpose of the project is to improve water circulation and quality in the interior southern Delta for the purpose of improving flows and controlling salinity to comply with the State Water Resources Control Board's agricultural salinity standards for the South Delta.

Project Alternatives

As part of the Low Head Pump Salinity Control Study, four alternative locations, for either permanent or temporary pump system placement in July through October, are being considered: MR; GLC, ORT, or MR and ORT. Additionally, under each of these alternatives, different pumping rates are being considered: 250, 500, or 1000 cubic feet per second [cfs]).

Middle River Pumping

Under this alternative, pump systems would be installed, either permanently or temporarily, with intake downstream and discharge upstream of the MR barrier (MRB) and run 24 hours per day at 250, 500, or 1000 cfs while the temporary barriers are in place.

Grant Line Canal Pumping

Under this alternative, pump systems would be installed, either permanently or temporarily, with intake downstream and discharge upstream of the GLC barrier and run 24 hours per day at 250, 500, or 1000 cfs while the temporary barriers are in place.

Old River at Tracy Pumping

Under this alternative, pump systems would be installed, either permanently or temporarily, with intake downstream and discharge upstream of the ORT barrier and run 24 hours per day at 250, 500, or 1000 cfs while the temporary barriers are in place.

Middle River and Old River Pumping

Under this alternative, pump systems would be installed, either permanently or temporarily, with intake downstream and discharge upstream of the MRB and with intake downstream and discharge upstream of the ORT barrier. All pumps would run simultaneously 24 hours per day at 125, 250, or 500 cfs while the temporary barriers are in place.

Environmental Considerations

Permanent Pump Systems

This section provides a summary assessment of the environmental impacts and permitting requirements for the low-head permanent pump system.

Impacts and Potential Mitigation Obligations

This section provides a summary of the potential environmental impacts (physical and biological) that may occur if the permanent low-head pump system is constructed and operated. The results of this assessment are shown in Table 1.

Also shown for comparison in Table 1 are potential impacts and mitigation commitments for a temporary pump system. Environmental considerations for a temporary pump system are presented on Page 13. These impacts could change as more detailed information regarding construction and operation of the pump system is developed. The impacts included in Table 1 assume the following regarding construction and operation of the permanent pump system:

- Project construction would require up to a year;
- Project construction would require the temporary installation of a cofferdam and dewatering within the cofferdam;
- Pump system would be operated 24 hours per day from July 1 to October 31;
- Pump system operation would require a high voltage power source. This power would need to be brought in from the nearest Western Area Power Administration (WAPA) service lines, which could be several miles or more from the MR, ORT and GLC barrier sites. As such, it would be necessary to install multiple power poles and tie in to existing WAPA lines;
- To the extent possible, staging areas used for construction of the MR, ORT, and/or GLC barriers would also be used for the installation of the permanent pump system at these locations. However, it may be necessary to establish new or additional staging areas, as would be the case for pump system installation at GLC under the 1000 cfs pumping scenario, for example, and this has been taken into account in assessing impacts;
- With the exception of water conveyance pipelines, most of the pump systems would be confined to the crown and landside of the levee; and
- All of the MR permanent pump systems would require channel dredging for the intakes to meet flow requirements.

Table 1. Potential Impacts—Low Head Pump Salinity Control Study (Permanent vs. Temporary Pump Systems)

Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
AESTHETICS		
Temporary Changes in Views during Project Construction	Temporary Changes in Views during Project Construction/Removal	<i>This potential impact would be less than significant and therefore would not require mitigation.</i>
Create a New Source of Light or Glare	Create a New Source of Light or Glare	<ul style="list-style-type: none"> • Construct structures with low-sheen and non-reflective surface materials (PP¹) Apply minimum lighting standards (PP,TP²)
Temporary Changes in Nighttime Lighting in the Proposed Project Area during Project Operation	Temporary Changes in Nighttime Lighting in the Proposed Project Area during Project Operation	<ul style="list-style-type: none"> • Apply minimum lighting standards (PP, TP)
Permanent Changes in Views	Permanent Changes in Views	<ul style="list-style-type: none"> • Reduce visibility of new structures (PP, TP) • Construct structures with low-sheen and non-reflective surface materials (PP, TP)
AGRICULTURAL RESOURCES		
Temporary Conversion of Prime Farmland during Construction/Installation	Temporary Conversion of Prime Farmland during Construction/Installation	<ul style="list-style-type: none"> • Return disturbed areas to pre-project conditions (PP, TP)
Permanent Conversion of Prime Farmland		<i>Project is not expected to result in substantial conversion of prime farmland</i>
AIR QUALITY		
Conflict with Applicable Air Quality Plan or Regulation	Conflict with Applicable Air Quality Plan or Regulation	<i>Project would not result in population and/or employment growth, and therefore it is not inconsistent with applicable air quality plans. This potential impact would be less than significant and therefore would not require mitigation.</i>
Generation of Criteria Pollutants during Project Construction	Generation of Criteria Pollutants during Project Installation/Removal	<i>This potential impact would likely be less than significant and therefore would not require mitigation.</i>

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Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
Generation of Criteria Pollutants during Project Operation	Generation of Criteria Pollutants during Project Operation	<ul style="list-style-type: none"> • Utilize aqueous diesel fuel (PP, TP) • Install a Diesel Particulate Filter (PP, TP) • Utilize a diesel oxidation catalyst (PP, TP) • Install other after-treatment products (PP, TP) • Require the pump system be electric or alternatively fueled (PP, TP)
Generation of Criteria Pollutants during Project Construction or Operation, Resulting in a Cumulative Air Quality Impact	Generation of Criteria Pollutants during Project Construction or Operation, Resulting in a Cumulative Air Quality Impact	<ul style="list-style-type: none"> • Utilize aqueous diesel fuel (PP, TP) • Install a Diesel Particulate Filter (PP, TP) • Utilize a diesel oxidation catalyst (PP, TP) • Install other after-treatment products (PP, TP) • Require the pump system be electric or alternatively fueled (PP, TP)
Generation of Diesel Particulate Matter Emissions during Project Construction or Operation, Resulting in an Increased Health Risk	Generation of Diesel Particulate Matter Emissions during Project Construction/Removal or Operation, Resulting in an Increased Health Risk	<ul style="list-style-type: none"> • Utilize aqueous diesel fuel (PP, TP) • Install a Diesel Particulate Filter (PP, TP) • Utilize a diesel oxidation catalyst (PP, TP) • Install other after-treatment products (PP, TP) • Require the pump system be electric or alternatively fueled (PP, TP) • Locate pump system as far from sensitive receptors as possible (PP, TP)
Generation of Odors during Project Construction and Operations	Generation of Odors during Project Installation/Removal and Operations	<ul style="list-style-type: none"> • Locate the pump systems as far from sensitive receptors as possible (PP, TP) • Encase the pump system (may be specified for noise) (PP, TP) • Require the pump system be electric or alternatively fueled (PP, TP)

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Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
BIOLOGICAL RESOURCES		
Disturbance of Active Swainson's Hawk Nests	Disturbance of Active Swainson's Hawk Nests	<ul style="list-style-type: none"> • Conduct surveys to locate Swainson's hawk nest sites (PP, TP) • Minimize Project-Related Disturbances within ¼ Mile of Active Swainson's Hawk Nest Sites (PP, TP)
Loss or Disturbance of Raptor Nests	Loss or Disturbance of Raptor Nests	<ul style="list-style-type: none"> • Conduct Surveys to Locate Raptor Nest Sites (PP, TP) • Minimize Project-Related Disturbances within ¼ Mile of Active Nest Sites (PP, TP)
Loss or Disturbance of Migratory Bird Nests	Loss or Disturbance of Migratory Bird Nests	<ul style="list-style-type: none"> • Avoid and Minimize Effects on Nesting Birds (PP, TP)
Potential Injury or Mortality of Western Pond Turtle	Potential Injury or Mortality of Western Pond Turtle	<ul style="list-style-type: none"> • Conduct preconstruction surveys (PP, TP) • Install Exclusion Fencing for Western Pond Turtle (PP, TP)
Loss or Disturbance of Western Pond Turtle Habitat <i>(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)</i>	Loss or Disturbance of Western Pond Turtle Habitat <i>(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)</i>	<ul style="list-style-type: none"> • Install Exclusion Fencing for Western Pond Turtle (PP, TP)

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Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
Loss or Disturbance of Special-Status Plants		<ul style="list-style-type: none"> • Conduct preconstruction surveys • Locations of special-status plants in proposed construction areas will be recorded using a global positioning system unit and flagged • Establish an adequate buffer area to exclude activities that would directly remove or alter the habitat of an identified special-status plant population or result in indirect adverse effects on the species • Install a temporary, plastic mesh-type construction fence (Tensor Polygrid or equivalent) at least 1.2 meters (4 feet) tall around any established buffer areas to prevent encroachment by construction vehicles and personnel. A qualified biologist will determine the exact location of the fencing
Pile-driving Effects on Fish		<ul style="list-style-type: none"> • Conduct pile driving with a vibratory driver (PP)
Decreased Water Quality and Increased Aquatic Habitat Disturbance During Project Construction <i>(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)</i>	Decreased Water Quality and Increased Aquatic Habitat Disturbance During Project Construction/Removal	<ul style="list-style-type: none"> • Implement Turbidity Monitoring During Construction (PP) • Implement Turbidity Monitoring During Construction/Removal (TP)
Fish Harassment and Displacement During Project Construction	Fish Harassment and Displacement During Project Construction/Removal	<ul style="list-style-type: none"> • Environmental Awareness Program for Construction Personnel (PP,TP)
Fish Harassment and Displacement During Project Operation	Fish Harassment and Displacement During Project Operation	<i>This potential impact would likely be less than significant and therefore would not require mitigation.</i>

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Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
CULTURAL RESOURCES		
Damage to or Destruction of As-Yet-Unidentified Cultural Resources, Including Human Remains		<ul style="list-style-type: none"> Stop Work and Evaluate the Significance of Inadvertent Discoveries; Devise Treatment Measures as Needed (PP)
GEOLOGY AND SOILS		
Accelerated Erosion during Project Construction	Accelerated Erosion during Project Construction and Removal	<ul style="list-style-type: none"> Prepare and implement a SWPPP (PP, TP)
Potential Structural Damage from Development on Materials Subject to Liquefaction		<i>This potential impact would be less than significant and therefore would not require mitigation.</i>
Potential Structural Damage from Development on Expansive Soils		<i>This potential impact would be less than significant and therefore would not require mitigation.</i>
GREENHOUSE GAS EMISSIONS		
Generation of GHG Emissions from Project Construction	Generation of GHG Emissions from Project Construction/Removal	<i>This potential impact would likely be less than significant and therefore would not require mitigation.</i>
Generation of GHG Emissions from Project Operation	Generation of GHG Emissions from Project Operation	<ul style="list-style-type: none"> Require the pump system be electric or alternatively fueled (PP, TP)
Conflict with Applicable GHG Reduction Plan or Regulation	Conflict with Applicable GHG Reduction Plan or Regulation	<ul style="list-style-type: none"> Require the pump system be electric or alternatively fueled (PP, TP)
HAZARDS AND HAZARDOUS MATERIALS		
Inadvertent Release of Hazardous Materials during Project Construction and Operation	Release of Hazardous Materials during Project Construction, Operation and Removal	<ul style="list-style-type: none"> Prepare and implement a Hazardous Materials Management Program (PP, TP)
HYDROLOGY AND WATER QUALITY		
Accelerated Erosion During Project Construction	Accelerated Erosion during Project Construction and Removal	<ul style="list-style-type: none"> Prepare and implement SWPPP (PP, TP) Implement Turbidity Monitoring During Construction (PP) Implement Turbidity Monitoring During Construction and Removal (TP)

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Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
Inadvertent Release of Hazardous Materials to Adjacent Water Body during Construction	Inadvertent Release of Hazardous Materials to Adjacent Water Body during Construction/Removal	<ul style="list-style-type: none"> Prepare and implement a Hazardous Materials Management Program (PP, TP)
LAND USE AND PLANNING		
Conflict with Existing Zoning for Agricultural Use <i>(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)</i>	Conflict with Existing Zoning for Agricultural Use <i>(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint of delivery pipeline would increase)</i>	<ul style="list-style-type: none"> Avoid agricultural lands to the greatest extent possible (PP, TP)
Incompatible with Existing Adjacent Land Uses <i>(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)</i>	Incompatible with Existing Adjacent Land Uses <i>(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint of pipeline would increase)</i>	<ul style="list-style-type: none"> Avoid agricultural lands to the greatest extent possible (PP, TP)
MINERAL RESOURCES		
None		
NOISE		
Exposure of Noise-Sensitive Land Uses to Project Construction Noise	Exposure of Noise-Sensitive Land Uses to Project Construction/Removal Noise	<ul style="list-style-type: none"> Employ noise-reducing construction measures (PP, TP)
Exposure of Noise-Sensitive Land Uses to Project Operation Noise	Exposure of Noise-Sensitive Land Uses to Project Operation Noise	<ul style="list-style-type: none"> Employ noise-reducing operational measures (PP, TP)
POPULATION AND HOUSING		
None		
PUBLIC SERVICES		
None		
RECREATION		
None		

Environmental Considerations for South Delta Low Head Pump System

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Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
TRANSPORTATION/TRAFFIC		
Temporary Increase in Traffic during Construction	Temporary Increase in Traffic during Construction/Removal	<i>This potential impact would be less than significant and therefore would not require mitigation.</i>
UTILITIES AND SERVICE SYSTEMS		
Generation of Solid Waste during Project Construction		<i>This potential impact would be less than significant and therefore would not require mitigation.</i>
Increase in Power Consumption during Project Operation	Increase in Power Consumption during Project Operation	<i>This potential impact would be less than significant and therefore would not require mitigation.</i>
Temporary Disruption of Electricity Service		<ul style="list-style-type: none"> • Coordinate power outages and notify potentially affected utility users of the temporary loss of electricity.
Disruption to Underground Utility Lines during Excavation Activities		<ul style="list-style-type: none"> • Existing underground utility lines at excavation sites will be identified prior to construction and underground utility lines will be avoided or relocated in coordination with the utility company or service provider.
¹ PP: permanent pump system ² TP: temporary pump system		

Permitting Process

Assuming the impacts described above, Table 2 provides an overview of the environmental permits that may be required for the construction and operation of the permanent pump system. The actual permits that would be required and the time to acquire them would depend on the actual estimated effects of the final proposal and coordination with resource and regulatory agencies. This also assumes that there would be no need to re-consult on the CVP/SWP Long Term Operations BOs (OCAP) primarily because there are no expected increased effects on federally-listed species resulting from the proposed annual July through October system operation. However, the NMFS and FWS may require that re-consultation is necessary to address the minor changes in the project description of the BOs that would occur as a result of modifying the TBP. As described above, the estimates included in Table 2 assume that the pump system would be included as an amended project description for the temporary barriers, similar to previous modifications (i.e., MRB raise). As such, permit documents would be abbreviated and would indicate that implementation of the pump system would be a modified component of the overall TBP. Should this be unacceptable to the regulatory agencies, timeline to obtain these permits would likely increase.

Table 2. Regulatory Compliance Permits and Approvals for Permanent Pump System

Authority/Agency	Permit/Approval	Timeline	Trigger
U.S. Army Corps of Engineers	Clean Water Act Section; 404/ Rivers and Harbors Act, Section 10	NWP: up to 3 months IP: up to 8 months ¹	Work within waters of the United States; Construction of any structure in or over any navigable water of the United States, or any other work affecting the course, location, condition, or physical capacity of these waters.
California Department of Water Resources	CEQA	Addendum: 1 month Supplemental IS/MND: 4 months	Potential impacts to the physical environment
U.S. Fish and Wildlife Service	ESA Take Permit (Section 7 consultation)	9 months ²	Potential effects on delta smelt or its designated critical habitat
National Marine Fisheries Service	ESA Take Permit (Section 7 consultation) Magnusson-Stevens Act, EFH Consultation	12 months ²	Potential take of steelhead, winter-run and spring-run Chinook salmon, green sturgeon or effects to designated critical habitat
California Department of Fish and Game	Incidental Take Permit	9 months ²	Potential take of delta smelt, longfin smelt, spring-run Chinook salmon, or Swainson's hawk
California Department of Fish and Game	Streambed Alteration Agreement	6 months	Construction activity within waterside hinges of the levee
Central Valley Regional Water Quality Control Board	Section 401 Certification or Waiver	Up to 12 months ³	Work within waters of the United States
San Joaquin Valley Air Pollution Control District	Emission Reduction Credit Lease	Up to 5 months	Particulate and exhaust emission impacts beyond established thresholds

ESA = federal Endangered Species Act.

CESA = California Endangered Species Act.

EFH = Essential Fish Habitat.

¹ If an individual permit is required, NEPA documentation may also be required.

² This timeline assumes that no re-consultation on OCAP is necessary.

³ This timeline assumes the RWQCB does not issue a permit until NMFS and FWS issue BOs

Temporary Pump System

This section provides a summary of the environmental impacts and permitting requirements for the low-head temporary pump system. The description of environmental considerations for the temporary pump system assumes these pumps would be placed on the levee adjacent to the barrier(s) during the irrigation season while the agricultural barriers are in place. There would be no permanent fill associated with the pump system and any in-water structures would be removed upon removal of the barriers. Some components of the pump facilities may be left in place on the crown of the levee to facilitate ease of installation in subsequent years.

Summary of Impacts and Potential Mitigation Obligations

Table 1 provides a summary of the potential environmental impacts that may occur if the temporary low-head pump system is constructed and operated; potential mitigation obligations are also included. These impacts could change as more detailed information regarding construction and operation of the pump system is developed. The impacts included in Table 1 assume the following regarding construction and operation of the temporary pump system:

- Installation of the pump system would occur in the spring and would require up to 90 days the first year. After the first installation, subsequent annual installation would likely require less time because some infrastructure may remain in place after the pump system is removed;
- Pump system would be operated 24 hours per day from July 1 to October 31;
- To the extent possible, staging areas used for construction of the MR, ORT, and/or GLC barriers would also be used for installation of the temporary pumps at these locations; and
- Skid-mounted pumps would be located along the levee crown and hooked up, via temporary water conveyance pipes. Water conveyance pipes would be located on the waterside of the levee and would be designed to avoid entrainment of fish that could be present between July and October.
- All in-water features would be removed and re-installed each year.

Permitting Process

Based on preliminary discussions with the U.S. Army Corps of Engineers and California Department of Fish and Game, it is assumed that the placement and operation of temporary pump systems would not require permits for federal Clean Water Act, California Fish and Game Code Section 1602, or other in-water effects regulated by these agencies. Based on this input and assuming that there would be no need to re-consult on OCAP, it is assumed that consultation under the federal Endangered Species Act (ESA) would also not be required primarily because there are no expected increased effects on federally-listed species during the proposed annual July through October operation period. As such, the only potential effects are related primarily to noise and pollutant emissions that would occur when the pump systems are placed and operated (Table 3). However,

the NMFS and FWS may require that re-consultation is necessary to address the minor changes in the project description of the BOs that would occur as a result of modifying the TBP. If this were to occur, the permitting requirements for the temporary pump system would likely be the same as those described above for the permanent pump system.

Table 3. Regulatory Compliance Permits and Approvals for Temporary Pump System

Authority/Agency	Permit/Approval	Trigger
California Department of Fish and Game	Incidental Take Permit	Potential effects on Swainson's hawk
San Joaquin Valley Air Pollution Control District	Emission Reduction Credit Lease	Particulate and exhaust emission impacts beyond established thresholds

ESA = federal Endangered Species Act.
CESA = California Endangered Species Act.