Appendix H

Evaluation of Methods of Compliance

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H.1 Introduction

When the State Water Resources Control Board (State Water Board) adopts a rule or regulation requiring the installation of pollution control equipment or establishing a performance standard or a treatment requirement, it must perform specific analyses, as described in Public Resources Code, Section 21159.

> Public Resources Code, Section 21159. (a) An agency listed in Section 21159.4 shall perform, at the time of the adoption of a rule or regulation requiring the installation of pollution control equipment, or a performance standard or treatment requirement, including a rule or regulation that requires the installation of pollution control equipment or a performance standard or treatment requirement pursuant to the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500) of the Health and Safety Code), an environmental analysis of the reasonably foreseeable methods of compliance. In the preparation of this analysis, the agency may utilize numerical ranges or averages where specific data is not available; however, the agency shall not be required to engage in speculation or conjecture. The environmental analysis shall, at minimum, include all of the following:
>
> (1) An analysis of the reasonably foreseeable environmental impacts of the methods of compliance.
>
> (2) An analysis of reasonably foreseeable feasible mitigation measures.
>
> (3) An analysis of reasonably foreseeable alternative means of compliance with the rule or regulation.
>
> (4) For a rule or regulation that requires the installation of pollution control equipment adopted pursuant to the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500) of the Health and Safety Code), the analysis shall also include reasonably foreseeable greenhouse gas emission impacts of compliance with the rule or regulation.
>
> (b) The preparation of an environmental impact report at the time of adopting a rule or regulation pursuant to this division shall be deemed to satisfy the requirements of this section.
>
> (c) The environmental analysis shall take into account a reasonable range of environmental, economic, and technical factors, population and geographic areas, and specific sites.
>
> (d) This section does not require the agency to conduct a project-level analysis.
>
> (e) For purposes of this article, the term "performance standard" includes process or raw material changes or product reformulation.
>
> (f) This section is not intended, and may not be used, to delay the adoption of any rule or regulation for which an analysis is required to be performed pursuant to this section.

In addition, Section 3777 of the State Water Board's CEQA regulations, in part, implements Public Resources Code, Section 21159 by identifying the contents of a draft SED, including an environmental analysis of the reasonably foreseeable methods of compliance. (Cal. Code Regs., tit. 23, § 3777 [hereinafter Section 3777], subd. (b)(4).). This appendix is intended to meet the requirements of Public Resources Code, Section 21159 and Section 3777 of the State Water Board's regulations by identifying the reasonably foreseeable methods of compliance and analyzing the reasonably foreseeable significant adverse environmental impacts associated with the methods of compliance, the reasonably foreseeable mitigation measures that would minimize or avoid any such

impacts, and the reasonably foreseeable alternative methods of compliance that would have less significant adverse environmental effects for the Lower San Joaquin River (LSJR) and southern Delta water quality (SDWQ) alternatives. (*Id*., subd. (a)(1)-(3); Section 3777, subd. (b)(4)). This analysis also takes into account a reasonable range of factors, including economic factors. (Pub. Resources Code, § 21159, subd. (c)). A project-level analysis is not required. (*Id*., subd. (d)). The State Water Board is providing this analysis to disclose potential costs and environmental effects related to the actions the regulated community may take to comply with the LSJR or SDWQ alternatives. The evaluation in this appendix does not address the cost and environmental effects related to future actions the State Water Board would take to impose responsibility for implementing the objectives (e.g., conditioning of water rights, water quality certification through the Federal Energy Regulatory Commission [FERC] process).

Section 21159 (d) specifically states that the public agency is not required to conduct a "project level analysis." Rather, a project-level analysis must be performed by the agencies that are required to implement the objectives. (Pub. Resources Code, § 21159.2). The State Water Board does not specify the actual means by which other entities choose to comply with the revised water quality objectives. Accordingly, the actual environmental effects will necessarily depend on the compliance strategy selected by the regulated entities. Responsible entities may select among the methods of compliance identified in this evaluation, or they may employ another method of compliance with the water quality objectives.

Consistent with Section 21159 and the State Water Board's regulations, this evaluation does not engage in speculation or conjecture but rather considers the reasonably foreseeable environmental impacts of the reasonably foreseeable methods of compliance with the amendments to the Bay-Delta Plan. Any potential environmental impacts depend upon the specific compliance methods, and mitigation selected by the entities responsible for implementing site-specific projects. CEQA may require those entities to conduct a project-level analysis of the method by which they chose to comply.

This evaluation assumes that all responsible entities will conduct, as appropriate, site-specific environmental analyses to evaluate potentially adverse, project-level environmental impacts, alternatives, and mitigation measures. This evaluation also assumes that responsible entities will design, evaluate, and implement studies, pilot projects, management practices, and controls in compliance with all applicable laws, regulations, ordinances, and formally adopted municipal and/or agency codes, standards, and practices. The specific actions that could be undertaken by an entity to comply with the water quality objectives will depend on a number of factors, including feasibility, cost, flexibility, time to implement, location, and likelihood of success. Thus, the specific compliance method that an entity will select is speculative at this point. Nonetheless, the analysis below identifies various likely compliance methods and the reasonably foreseeable significant adverse environmental impacts associated with those potential methods of compliance.

This appendix is also intended to meet the Water Code, Section 13141 requirements. Prior to the implementation of an agricultural water quality control program, the State Water Board must provide an estimate of the total cost of the program together with an identification of potential sources of financing (Wat. Code, § 13141). The LSJR and SDWQ alternatives are not specifically intended to regulate agriculture; however, the associated costs and sources of financing are evaluated in Sections H.3.4, *Agricultural Return Flow Salinity Control* and H.3.5, *Low Lift Pumping Stations*.

H.2 Methods of Compliance for LSJR Alternatives

The regulated community may choose one or a combination of alternative methods of compliance to meet potential changes in flow requirements as a result of the LSJR alternatives. The methods described in this section are aimed at obtaining alternative supplies to replace surface water that may no longer be available due to implementation of an LSJR alternative. This section analyzes the costs and potential environmental effects of the reasonably foreseeable methods for obtaining alternative supplies, through:

- surface water transfers,
- substitution of groundwater for surface water,
- aquifer storage and recovery, or
- recycled water sources.

H.2.1 Alternative Surface Water Supplies

Reductions in surface water diversions are expected as a result approving the LSJR alternatives and the respective program of implementation; therefore, one reasonably foreseeable method to augment a water source is to obtain a new surface water supply from another party. The costs and potential environmental impacts associated with obtaining surface water supplies are evaluated below.

Cost Evaluation

This analysis focuses on the costs to a water purveyor (e.g., irrigation or water supply district) to obtain alternative surface water supplies. For this potential method of compliance, it was assumed that a water purveyor would have either purchased water through contracts, transfers, or implementation of Water Code, Section 1485. The duration and cost for purchasing water are subject to many factors, but a useful indicator of water prices is the Environmental Water Account (EWA) Spot Price. A summary of EWA contract sales are listed in Table H-1, *Environmental Water Account Contract Sales 2002–2004* (USBR 2006a).

Table H-1. Environmental Water Account Contract Sales 2002–2004 (USBR 2006a)

Year	Buyer	Seller	Type	Quantity (AF)	Price ($/AF)	2010 Nominal Price ($/AF)
2004	Westlands WD	Widren WD	CVP	2,990	$1,500	$1,741
2004	Westlands WD	Centinella WD	CVP	2,500	$1,400	$1,625
2003	West Kern WD	Berrenda Mesa WD	SWP	6,000	$1,000	$1,161
2003	Lemoore Naval Military Base	Tulare Lake Basin WSD	SWP	5,000	$2,150	$2,496
2003	Coachella Valley WD	Tulare Lake Basin WSD	SWP	$9,900	$2,150	$2,496
2002	City of Tracy	Banta Carbona ID	CVP	2,500	$1,000	$1,161
2002	City of Tracy	West Side ID	CVP	5,000	$1,000	$1,161
2002	Zone 7	Tulare Lake Basin WSD	SWP	400	$1,600	$1,858
2002	Zone 7	Belridge WSD	SWP	2,219	$1,500	$1,741
					Average	$1,716

Source: USBR 2006a
WD = Water District
ID = Irrigation District
WSD = Water Storage District
CVP = Central Valley Project
SWP = State Water Project
AF = Acre-feet

A water transfer is a change in the way water was originally allocated. A water transfer may change the place of use, the point(s) of diversion, or the purpose of use. A water transfer cannot increase the amount of water a diverter is permitted to use, nor can it change the season when water is diverted. Long-term water transfers can be for any period in excess of one year. Water Code, Section 1735 and the California Code of Regulations, Section 811 et. seq. allow a water right permittee, licensee, or adjudicated water right holder to file a petition for a long-term transfer of water with the State Water Board. A summary of long-term transfers are listed in Table H-2, *Long Term Transfers 1997–2005*. (USBR 2006a).

Table H-2. Long-Term Transfers 1997–2005 (USBR 2006a)

Year	Buyer	Seller	Water Source	Length	Quantity (AFY)	Price ($/AF)	2010 Nominal Price
2003	City of Lodi	Woodridge ID	NOD	40 years	6,000	$200	$238
2003	Cities of Tracy, Lathrop, Manteca, and Escalon	South San Joaquin ID	SOD	30 years	43,090	$191	$228
2003	Newhall Land & Farming Co.	Nickel Family	SOD	30 years	1,600	$475	$566
2000	Contra Costa WD	East Contra Costa ID	NOD	Perma-nent	8,200	$25	$32
2000	Northridge WD	Placer County Water Agency	NOD	15 years	12,000	$435	$565
1997	Metropolitan WD	Arvin Edison WSD	SOD	25 years	50,000	$165	$233
						Average	$310

Source: USBR 2006a
NOD = North of the Delta
SOD = South of Delta
AFY = acre-feet per year

Based on the nominal prices shown in Tables H-1 and H-2, a reasonable cost of $1,716 per acre-foot (AF) is assumed for an EWA contract sale or $310 per AF for a long-term transfer. These cost estimates are based solely on the projected cost of surface water and do not include capital costs (e.g., conveyance of water from source to point of use, etc.), administrative, engineering, or legal costs related to securing the water supply.

Environmental Evaluation

Summary of Potential Action

A new surface water transfer would involve transferring a volume of water from one party to another based upon an agreed upon price and subject to California Water Code and State Water Board regulations.

Potential Environmental Effects

Since the program of implementation would result in conditioning water rights to meet the LSJR alternatives, it is not expected that additional intakes or other construction activities would occur because the overall volume of water in the watersheds available for surface water diversions would be reduced and such transfers would likely use existing infrastructure. Only water that is available under applicable operational restrictions (i.e., water rights) can be transferred, and such transfers would require an analysis of environmental impacts by the agency(ies) selling and transferring water. The State Water Board would be a responsible agency and would review and approve (i.e., issue a Notice of Determination) the environmental analysis. Any transfer deemed to have

significant environmental impacts that could not be mitigated by the State Water Board would not be approved. Therefore, there would be no potentially significant environmental impacts.

H.2.2 Substitution of Surface Water with Groundwater

Reductions in surface water diversions are expected as a result approving the LSJR alternatives and the respective program of implementation; therefore, another reasonably foreseeable method to augment a water source is to obtain more water from groundwater supplies. This would include more pumping from existing wells or the development of new groundwater wells. The costs and potential environmental impacts associated with obtaining more water from groundwater supplies are evaluated below.

Cost Evaluation

Groundwater well characteristics are varied throughout the plan area. Groundwater well data is also private information protected in the State and thus hard to obtain. Major variables in developing groundwater resources include: soil type, intended use, distance to distribution system, design flow, depth to standing water, and pumping plant efficiency (Burt 2011). These variables then determine specific groundwater well characteristics, such as what type of well to construct, what type of pump is needed, and what level of water treatment is needed. Table H-3, *Typical Well Pump Test Data in the San Joaquin Groundwater Basin*, is a description of typical groundwater well characteristics in the plan area.

Table H-3. Typical Well Pump Test Data in the San Joaquin Groundwater Basin

Parameter	Value
Average Input Power	56 kW
Average Weighted Power per Acre-foot Pumped	478 kWh per AF
Average Weighted Total Dynamic Head	260 feet
Average Weighted Flow Rate	1,099 gallons per minute
Average Weighted Depth from Surface to Standing Water Level	189 feet
Average Weighted Motor Horsepower	116 horsepower
Average Weighted Overall Pumping Plant Efficiency	57%

Source: Table is reproduced from data presented by Burt 2011.
Note: All weighted values are weighted by input power (kW).
kW = kilowatt
kWh = kilowatt hour
AF = acre-feet

Groundwater well operations and maintenance costs are highly variable and depend on pump efficiency, depth of the water, cost of electricity, volumetric flow, cost of maintenance, proximity to water distribution system, and staff needed to maintain equipment and facilities. The ideal scenario is one where very efficient pumps (above 70 percent efficiency), require little maintenance and pump from relatively shallow wells.

One of the dominant cost categories in the operations and maintenance budget for groundwater wells is the cost for electricity. Energy costs in the plan area are published annually by the California

Public Utilities Commission (CPUC). The primary electrical service provider in the plan area is Pacific Gas and Electric (PG&E). PG&E's historical electric rates are shown in Table H-4, *Pacific Gas & Electric Average Bundled Rates by Class 2007–2011*, (CPUC 2011).

Table H-4. Pacific Gas & Electric Average Bundled Rates by Class 2007–2011

Rate Payer Class	Cents per kWh					
	2007	2008	2009	2010	2011	Average
Agricultural	12.4	13.2	14.2	14.2	14.6	13.7
Small/Medium Commercial	15.1	14.7	16.4	16.9	16.8	16.0
Large Commercial and Industrial	11.5	10.7	12.4	12.6	12.6	12.0

Source: CPUC 2011

Note: Table is a summary of data presented by the California Public Utilities Commission. Data omitted was for non-pertinent ratepayer classes (e.g. residential) and data from 2000–2006.

kWh = Kilowatt hour

To estimate average electricity costs, average weighted power per AF pumped from Table H-3 is multiplied by the average cost per kilowatt hour (kWh) shown in Table H-4. Based on information presented in these tables, it is reasonably estimated that groundwater pumping electrical costs in the plan area are between $57.36 and $76.48 per AF. This estimate is for a groundwater well with the characteristics in Table H-3. However, pumps that are more efficient or pump from more shallow wells would have a lower electrical cost per AF pumped. Conversely, more inefficient pumps pumping from deeper wells would have a higher cost per AF pumped.

Energy costs may represent 50-75 percent of a water utility's budget (Flex Your Power 2012), and sing the upper end electricity cost calculated above ($76.48 per AF), one can reasonably estimate from this relationship that the total operations and maintenance cost of a groundwater project would be between $101.97 and $152.96 per AF annually.

As part of the California Water Plan Update 1994, the Department of Water Resources (DWR) analyzed agricultural groundwater production costs. This analysis described the average costs at specific locations within a region, including capital, operations, maintenance, and replacement costs. These costs are presented in Table H-5, *Typical Agricultural Groundwater Production Costs by Hydrologic Region*, in 1992 dollars and calculated 2010 dollars (DWR 1994).

Table H-5. Typical Agricultural Groundwater Production Costs by Hydrologic Region

Groundwater Basin	1992 Groundwater Costs ($/AF)	2010 Groundwater Costs ($/AF)
San Joaquin	$30 - $40	$48 - $64
Tulare Lake	$40 - $80	$64 - $127
Sacramento River	$30 - $60	$48 - $95

Source: DWR 1994

Note: From DWR Bulletin 160-93 Table 7-10, California Water Plan Update Oct 1994; costs normalized by State Water Board staff.

AF = acre-feet

Agricultural and municipal groundwater production costs are not the same. Costs to municipal water users will likely be higher due to treatment, permitting, overhead, and labor costs not normally realized by agricultural users. Below is a summary of representative groundwater projects funded by the Proposition 84 Integrated Regional Water Management Implementation Grant Program, Phase 1 (IRWM). These projects generally construct a new groundwater well and the associated facilities to connect the well to a municipal water distribution system. Cost estimates also include soft costs, such as the cost of planning, design, permitting, and administration. These projects were awarded funding in 2011, but costs are represented in 2010 dollars (DWR 2012a).

Table H-6. Example New Groundwater Well Projects Funded by the Department of Water Resources Integrated Regional Water Management Implementation Grant Program, Phase 1

Applicant	Project	Project Cost	Operations & Maintenance Budget [$/year]	Production [AFY]	20-Year Amortized Cost [$/AFY]
City of Sacramento	E.A. Fairbairn Groundwater Well Project	$1,578,454	$240,000	2,250	$142
Sacramento Suburban Water District	Coyle Avenue and Roseview Park Pump Stations and Treatment Systems Project	$5,735,537	$68,000	5,750	$62

Source: DWR 2012a

Note: All projects generally construct new groundwater wells and associated pumps and facilities to pump groundwater. Sacramento Suburban Water District's project proposes to construct two wells (one 2,250 AFY and one 3,500 AFY well).

AFY = acre-feet per year

Within the plan area, there are many water suppliers that rely on groundwater to meet water demands. The City of Merced relies completely on groundwater to meet municipal water demands. The City of Merced operates 22 active groundwater wells, 340 miles of distribution pipelines, 4 major water storage tanks, and supplies 7 billion gallons of water to its customers annually. The City of Merced's 2010–2011 budget for water services and infrastructure was $41,621,784 (Merced 2010). Based on the entire operating budget and total groundwater production, this equates to $1,937.50 per AF.

The City of Merced's groundwater pumping costs represent the high end of costs for this potential method of compliance because these costs include water treatment, maintenance of a significant transmission system, funding a significant capital improvement plan, and 29 staff to plan, manage, operate, and maintain the entire water infrastructure for a city of more than 80,000 people (Merced 2010). Smaller water systems, such as those operated by smaller water suppliers and agricultural users, are likely to be more efficient and cost less per AF produced.

Environmental Evaluation

Summary of Potential Action

While it is unknown exactly how surface water users would respond to a reduction in their surface water supply as a result of the program of implementation which could condition their water rights, it is reasonable to assume that some amount of groundwater would replace some amount of surface water use. This is because irrigation districts currently pump groundwater during dry years to supplement surface water diversions. Additionally, municipalities in the watersheds (except within Stockton East Water District service area) primarily rely on groundwater but augment their supplies with surface water.

Assuming groundwater pumping is increased, it is possible that some irrigators/irrigation districts and some municipalities may need to construct and operate new groundwater wells. New agricultural or municipal groundwater wells and associated pipelines and distribution systems could be constructed and operated by existing irrigation districts (e.g., South San Joaquin Irrigation District, Oakdale Irrigation District, Modesto Irrigation District, Turlock Irrigation District, Merced Irrigation District), water districts (e.g., Stockton East Water District, Central San Joaquin Water Conservation District, City of Merced, City of Modesto, City of Escalon, City of Ripon, City of Lathrop, County of Stockton, Stevinson Water District), or individual agricultural users. Both the irrigation districts and water districts provide water to agricultural users for irrigating agricultural land and municipal users for domestic, municipal and industrial purposes. It is not possible to estimate the location, timing of construction, details of operation, and number of groundwater wells and associated distribution system that may be constructed, if any, in the future. However, it is reasonable to assume that agricultural groundwater wells would be constructed close to the location of use (e.g., agricultural fields). It is likely these would be operated using electricity, though some of them could use diesel. It is assumed municipal groundwater wells would be located within urban or suburban areas to be located near the existing municipal distribution system. They would be operated using electricity and would be required to follow existing drinking water treatment standards for public distribution.

Potential Environmental Effects

Construction of either agricultural groundwater wells for primarily agricultural purposes or municipal groundwater wells for domestic, industrial, and commercial purposes may result in minor, temporary, and highly localized effects typically associated with construction activities, including dust and air quality effects and ground disturbance. Wells would most likely be placed in areas that are already disturbed through agricultural practices or urban development, so the potential natural and cultural resources effects would be minimal.

It is reasonable to assume that any new wells would be professionally installed by municipal water purveyors or agricultural users using best management practices (BMPs) typically used in drilling new wells, thereby eliminating cross-connection of aquifers and related potential effects associated with water quality and hazardous materials. Wells are commonly constructed and operated in both rural and urban areas, are a common land use, and are part of the landscape. Well construction may result in very minor increases in uses of electricity and fuels; however these increases would largely be offset because surface water diversions often involve the use of pumps to lift water into canals, and any reduction in surface water diversions would result in reduced use of electricity and fuels.

Table H-7 summarizes the potential environmental effects associated with new groundwater supplies. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, at the end of this appendix, lists potential mitigation measures associated with the construction or operation of the methods of compliance and is referenced in Table H-7 where appropriate.

Table H-7. Potential Environmental Effects of Substituting Surface Water with Groundwater

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
Aesthetics	• Construction and operation of agricultural wells would not be expected to significantly affect the visual character or quality of agricultural areas because groundwater wells currently exist in agricultural areas and are part of the visual character of agricultural areas. Wells are generally low to the ground and are typically not located in areas where there are sensitive receptors (e.g., recreationists), which would be affected by changes in views or visual character and quality. Furthermore, agricultural wells are not expected to have operational lights that would generate substantial light or glare. • Construction and operation of municipal groundwater wells would not be expected to significantly affect the visual character or quality of municipal areas because groundwater wells are generally low to the ground, may be contained within a small structure to protect above-ground piping infrastructure, and would likely be fenced for security, which could prevent direct views. Operation of municipal groundwater wells may have operational and safety lights. Impacts would depend on the location of sensitive receptors to potential lighting; however, lights would be expected to follow lighting guidelines and lighting plans of local jurisdictions approving the construction and operation of the wells. In addition, municipal groundwater wells would likely be located adjacent to existing municipal water supply infrastructure, which may already have operational and safety lighting and thus may not represent a substantial change to the visual character or quality of an area. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, identifies potential mitigation measures lead agencies (e.g., municipal water purveyors) can and should implement to reduce potentially significant environmental effects associated with lighting.
Agriculture and Forestry Resources	• Construction and operation of new agricultural groundwater wells would be used to support agricultural resources, and any conversion of agricultural land to support the groundwater wells would be expected to be minimal (less than a quarter of an acre per well). • Construction and operation of new municipal groundwater wells would not be expected to be located on lands used for agriculture but rather close to the urban and suburban uses they supply and within proximity to existing water supply infrastructure. If municipal groundwater wells were located on agricultural land, they would be located on relatively small areas of land and thus would represent only a very small fraction of the existing agricultural land to be converted to a nonagricultural use.
Air Quality	• The agricultural or municipal groundwater wells would likely be located in the San Joaquin Valley Air Basin (SJVAB), which generally covers San Joaquin, Stanislaus, Merced, and Madera Counties because the water supplied by the wells would support agricultural and municipal uses in these areas. PM10, PM2.5, and ozone are of particular concern in the basin. The State of California has classified the SJVAB as being a severe nonattainment area for ozone and a nonattainment area for particulate matter (PM10 and PM2.5). The San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted an air quality improvement plan that addresses nitrous oxides (NO_X) and reactive organic gases (ROG), both of which are ozone precursors and contribute to the secondary formation of PM10 and PM2.5. SJVAPCD's published guidelines, Guide for Assessing Air Quality Impacts (SSJVAPCD 2002) do not require the quantification of construction emissions. Rather, the guidelines require implementation of effective and comprehensive feasible control

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion

measures to reduce PM10 emissions (SSJVAPCD 2002). SJVAPCD considers PM10 emissions to be the greatest pollutant of concern when assessing construction-related air quality impacts and has determined that compliance with its Regulation VIII, including implementation of all feasible control measures specified in its Guide for Assessing Air Quality Impacts (SJVAPCD 2002), constitutes sufficient mitigation to reduce construction-related PM10 emissions to less-than-significant levels and minimize adverse air quality effects. All construction projects must abide by Regulation VIII. This would include the implementation of a Dust Control Plan (Siong pers. comm.). Further consultation with SJVAPCD staff indicates that though explicit thresholds for construction-related emissions of ozone precursors are not enumerated in the Guide for Assessing and Mitigating Air Quality Impacts, SJVAPCD considers a significant impact to occur when construction or operational emissions of ROG or NOX exceed 10 tons per year or if PM10 or PM2.5 emissions exceed 15 tons per year (Siong pers. comm.).

- Construction of new agricultural or municipal groundwater wells would likely result in emissions associated with construction equipment and construction vehicles, as well as fugitive dust emissions from ground disturbance. The quantity, duration, and the intensity of construction activity have an effect on the amount of construction emissions and related pollutant concentrations occurring at any one time. As such, more emissions are typically generated by relatively large amounts of relatively intense construction. However, if construction is delayed or takes place over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix, and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). Since construction of groundwater wells would be limited in duration and activities, it is not expected they would result in potentially significant environmental effects. Furthermore, construction emissions generated would need to comply with the SJVAPCD regulations described above and thus are not expected to exceed thresholds established by SJVAPCD. Lead agencies (e.g., irrigation districts or municipal water purveyors) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects on air quality associated with construction.
- Operation of municipal groundwater wells would likely be electric because of their expected locations in urban and suburban areas and the expected location in close proximity to existing water supply infrastructure. They may use nonelectric back up during intermittent emergency situations. Operations could include facility inspection and maintenance activities and are expected to require similar or less inspection and maintenance than existing municipal groundwater wells. Thus they would generally require very little maintenance once construction is completed and only on an as-needed basis; emissions generated once operational would be minimal and are not anticipated to exceed SJVAPCD thresholds.

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
	• Operation of agricultural wells are also expected to be electric because it often is a cheaper source of power when compared to fuel for agricultural purposes; however if nonelectric wells are used, they could emit air quality pollutants associated with the use of diesel (e.g., PM10). • SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJVAB. Some of these facilities are wastewater treatment facilities, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, painting/coating operations, food processing facilities, feed lots/dairies, and rendering plants (SJVAPCD 2002). Construction and operation of agricultural or municipal groundwater wells would not involve the type of facility identified by SJVAPCD as a known odor source. Consequently, it is expected groundwater wells would not create objectionable odors affecting a substantial number of people.
Biological Resources	• It is expected that construction and operation of agricultural groundwater wells would be in agricultural lands or adjacent to agricultural lands. Agricultural lands generally have a low potential for special-status plant species, animal species, and habitat because they are actively managed and are modified and disturbed regularly by agricultural activities. Furthermore, because agricultural groundwater wells have a relatively small footprint (e.g., less than 1/4 of an acre) it is expected the wells could be located to avoid special-status plant species, animal species, or habitat if needed. Because of this, there is a low potential for construction and operation of agricultural groundwater wells to result in a conflict with local policies or adopted habitat conservation plans or natural community conservation plans. Table H-24 lists potential mitigation measures lead agencies (e.g., irrigation districts) can and should implement in the unlikely circumstance that special-status biological species are present to reduce potentially significant environmental effects on special-status biological resources and habitat. • It is expected that construction and operation of municipal groundwater wells would be in urban and suburban areas to be close to existing municipal water supply systems (e.g., wells, distribution pipelines and infrastructure, and water supply treatment facilities). These areas are expected to have a low potential for special-status plant species, animal species, and habitat to occur because they are typically developed with impervious surfaces that generally do not support the habitat used by these species. Furthermore, because municipal groundwater wells would have a relatively small footprint (e.g., between 1/4 and 1 acre), it is expected the wells could be located to avoid sensitive plant species, animal species, or a habitat if needed. Table H-24 lists potential mitigation measures lead agencies (e.g., municipal water purveyors) can and should implement to reduce potentially significant environmental effects on special-status biological resources and habitat. Therefore, there is a low potential for construction and operation of municipal groundwater wells to conflict with local policies or adopted habitat conservation plans or natural community conservation plants.

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
Cultural Resources	• Construction of agricultural and municipal groundwater wells would result in ground disturbing activities. Ground disturbing activities have the potential to affect significant unknown cultural resources (e.g., buried archeological resources or paleontological resources) if they exist at the groundwater well site. • Construction and operation of agricultural groundwater wells would likely be located in existing agricultural lands or adjacent to active agricultural lands. Active agricultural lands are regularly disturbed, are considered permanently disturbed after a period of time, and thus would have a low potential to have existing unknown significant cultural resources because such cultural resources would likely have been destroyed by previous active agricultural practices. Operation of the agricultural groundwater wells has a very low potential to affect cultural resources because the wells would simply be distributing water to agricultural fields. • Construction and operation of municipal groundwater wells would likely exist in urban and suburban areas adjacent or within close proximity to existing water supply infrastructure. While it is unknown if cultural resources exist, urban and suburban areas also would likely have been previously disturbed, reducing the potential for significant unknown cultural resources to exist. Operation of municipal groundwater wells has a very low potential to affect cultural resources because the wells would simply be distributing potable water in distribution systems. • As described above, it is expected the groundwater well sites would have been previously disturbed. The depth of sediment disturbance would generally be minimal (e.g., less than 5 feet), with the exception of the exact location of each well, which could disturb sediment up to the depth of the well (e.g., 35–400 feet). Therefore, it is highly unlikely human remains, typically buried at depths of 6 feet, would be disturbed during construction. If, in the highly unlikely event human remains are uncovered during construction, compliance with the State Health and Safety Code would be required. As specified by Section 7050.5, no further disturbance would occur until the county coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code 5097.98. If there is such a discovery, excavation or construction would halt in the area of the discovery, the area would be protected, and consultation and treatment would ensue as prescribed by law. If the coroner recognizes the remains to be Native American, he or she would contact the Native American Heritage Commission, which would appoint the Most Likely Descendent. Additionally, if the bones are determined to be Native American, a plan would be developed regarding the treatment of human remains and associated burial objects, and the plan shall be implemented under the direction of the Most Likely Descendent.
Geology and Soils	• There are no impact mechanisms associated with operating agricultural or municipal groundwater wells that could result in an impact on or be affected by: Alquist-Priolo faults, strong seismic shaking, seismic-related ground failure, expansive soils, soil erosion, loss of topsoil, or landslides. Furthermore, changing the volume of groundwater pumped would not substantially increase the number of people exposed to the risk of earthquakes or geologic hazards because it would not draw people to earthquake areas or hazard locations not already frequented. Construction of agricultural or municipal groundwater wells would result in limited ground-disturbing activities that could cause soil erosion or loss of topsoil; however, ground-disturbing activities would be limited in duration and geography. Furthermore, ground-disturbing activities on 1 acre or greater would require the need for preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), as required by the Central Valley Regional Water Quality Control Board (Central Valley Water Board). The SWPPP would require soil and erosion control mechanisms. Table H-24 also lists potential mitigation

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
	measures that lead agencies (e.g., irrigation districts or municipal water purveyors) can and should implement to reduce potentially significant impacts on geologic resources. • The construction and operation of agricultural or municipal groundwater wells would not involve constructing or operating septic tanks and, therefore, septic tanks would not be affected by soils incapable of supporting the use of them or other alternative wastewater disposal systems.
Greenhouse Gas Emissions	• Construction and operation of new agricultural and municipal groundwater wells would likely result in increased use of electricity and fuels. While these could be largely offset by the fact that surface water diversions often involve the use of pumps to lift water into canals, and any reduction in surface water diversions would result in reduced use of electricity and fuels, impacts could also be similar to those described in Chapter 14, *Energy Resources and Climate Change*.
Hazards and Hazardous Materials	• Construction of agriculture or municipal groundwater wells would be short term in nature and may involve the limited transport, storage, use, and disposal of hazardous materials such as fuel and lubricating grease for motorized heavy equipment. Some examples of typical hazardous materials handling are fueling and servicing construction equipment on the site, and transporting fuels, lubricating fluids, solvents, and bonding adhesives. These types of materials are not acutely hazardous, and storage, handling, and disposal of these materials is regulated by local, county, and state laws. Furthermore, the quantities of these materials used during construction would be minimal (e.g., less than 100 gallons) because construction would be limited in duration. Therefore, if a spill occurred, it could be readily and easily contained. Table H-24 also lists potential mitigation measures that lead agencies (e.g., irrigation districts or municipal water purveyors) can and should implement to reduce potentially significant impacts related to construction activities and hazardous materials. • Operation of new agricultural wells would likely not use hazardous materials because agricultural well water does not need to be treated or meet those water quality standards similar to drinking water wells. • Operation of new municipal groundwater wells could use a disinfection system, which could require the routine transport, use, storage, and disposal of hazardous materials, such as chlorine, sodium hypochlorite, or ammonia. Depending on the location of the new municipal groundwater wells, these materials could be used within 1/4 mile of a school because municipal groundwater wells would likely be within urban and suburban areas to serve existing water users. These materials are commonly used by water purveyors to disinfect groundwater prior to release in the distribution system and comply with safe drinking water standards. Sodium hypochlorite (solution of 12.5 percent) is a nonflammable and noncombustible liquid and, therefore, has no potential for explosion (HASA MSDS 2011). Its primary potential routes of entry to humans is dermal (skin contact), and it can cause skin and eye irritation or burns (HASA MSDS 2011). It is unlikely to be inhaled and is not typically anticipated to be ingested; however, vapor may cause irritation to the upper respiratory tract if inhaled (HASA MSDS. 2011). It is not listed by the Occupational Safety and Health Administration (OSHA) as a carcinogen (HASA MSDS 2011). Ammonia (solution of 29 percent) is a noncombustible, nonflammable liquid and, therefore, has no potential for explosion (MSDS 2011). However, ammonia vapors are released if the chemical is heated (MSDS 2011). Primary potential routes of entry to humans are dermal (skin) contact and respiratory (breathing). Ammonia vapors are known to be a strong irritant to the eyes, skin, and respiratory tract (MSDS 2011). Generally, municipal wells that use these types of chemicals have double containment systems and are located in a

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
	spill containment area as required by local fire departments for the management and handling of these types of chemicals. Furthermore, they would likely be in a locked building, and the water purveyors would be expected to conduct regularly scheduled inspection and maintenance of disinfection systems as they currently do on other municipal wells. Because of these precautionary design features, it is highly unlikely a spill of the sodium hypochlorite or ammonia would occur. However, in the unlikely event of a spill, the primary hazard to humans would be direct contact with skin and respiratory irritation as it currently is with the existing disinfection system. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipal water purveyors) can and should implement to reduce potentially significant impacts related to operational activities and hazardous materials. • The U.S. Department of Transportation (USDOT), the Federal Highway Administration, and the Federal Railroad Administration are the three entities that regulate the transport of hazardous materials at the federal level. The Hazardous Materials Transportation Act governs the transportation of hazardous materials. The regulations under this act are promulgated by the USDOT and enforced by the U.S. Environmental Protection Agency (USEPA). Therefore, all hazardous material deliveries would be tracked, and vehicles would be required to use roadways approved for the transportation of hazardous materials. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipal water purveyors) can and should implement to reduce potentially significant impacts related to operational activities and hazardous materials. • As specified in California Code of Regulations, Title 19, Division 2, Chapter 4.5, Articles 1–11, all businesses that handle specific quantities of hazardous materials are required to prepare a California Accidental Release Prevention Program Risk Management Plan (CalARP RMP). The CalARP RMP is the state equivalent of the federal RMP. CalARP RMPs include the preparation of an offsite consequence analysis of worst-case release of the stored chemicals and the preparation of emergency response plans, including coordination with local emergency response agencies. CalARP RMPs are required to be updated at least every 5 years and when there are significant changes to the stored chemicals. Furthermore, water purveyors using these types of chemicals for their disinfection systems would be subject to the Hazardous Materials Release Response Plans and Inventory Act (also known as the Business Plan Act), which requires an entity or business using hazardous materials to prepare a business plan describing the facility, inventory, emergency response plans, and training programs. These plans must be submitted to the local Certified Unified Program Agency (CUPA) (e.g., San Joaquin County, Stanislaus County, or Merced County, or local fire departments). Water purveyors must also comply with the CalARP Program and prepare an RMP if required per CalARP. The RMP is a detailed analysis of the potential accident factors and mitigation measures that can be implemented to reduce accident potential. The RMP may include items such as safety information, hazard review, operating procedures, emergency response plan, training requirements, and compliance audits. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipal water purveyors) can and should implement to reduce potentially significant impacts related to operational activities and hazardous materials.

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
	• It would be highly unlikely that a well for potable water purposes would be drilled on a hazardous materials site because prior to drilling the well, the lead agency (e.g., water purveyors) would need to do subsurface studies to determine the location of the well and would test the soil and groundwater for contamination. Construction and operation of new agricultural or municipal groundwater wells would not be a hazard or provide safety concerns to airports due to the low profile of the wells. • Construction and operation of new agricultural or municipal groundwater wells would not physically interfere with an adopted emergency response plan because they would not be located in roadways, and groundwater wells would not expose people or structures to wildland fires.
Hydrology and Water Quality	• Construction of agricultural or municipal groundwater wells could result in temporary changes to drainage, erosion, or runoff associated with typical construction activities, such as grading or preparation of land. Operation of agricultural groundwater wells or municipal wells would likely not modify drainages, increase erosion, or increase runoff because they would likely not result in substantial increases in impervious surfaces (e.g., concrete or cement), which are typically associated with modification of drainages, erosion, and runoff. Furthermore, as discussed earlier in this table (Geology and Soils), for soil disturbance of over 1 acre, water purveyors would be required to prepare and implement a SWPPP. Table H-24 also lists potential mitigation measures that lead agencies (e.g., irrigation districts or municipal water purveyors) can and should implement to reduce potentially significant impacts on hydrology and water quality. • The location of agricultural and municipal groundwater wells are unknown, but if they are located in a flood hazard area, the wells and any structure protecting the wells would be relatively low profile; thus, they would have very low potential to impede or redirect flood flows. Furthermore, the wells would not substantially increase the number of people exposed to the risk of flooding because they would not draw people to flood hazard locations. Construction of agricultural and municipal wells would not result in flooding or otherwise cause flooding. • Well construction is regulated by the Department of Water Resources (DWR 2012b). The legislature authorized the establishment of well standards (DWR Bulletins 74–81 and 74–90) and regulations pertaining to the construction, alteration, and destruction of wells. California Water Code, Section 13750.5 requires that those responsible for the construction, alteration, or destruction of water wells, cathodic protection wells, groundwater monitoring wells, or geothermal heat exchange wells possess a C-57 Water Well Contractor's License. This license is issued by the Contractors State License Board. California Water Code, Section 13751 requires that anyone who constructs, alters, or destroys a water well, cathodic protection well, groundwater monitoring well, or geothermal heat exchange well must file with DWR a report of completion within 60 days of the completion of the work. Furthermore, most counties and some cities have adopted ordinances to protect groundwater quality (e.g., where groundwater wells would likely be drilled in San Joaquin, Stanislaus, and Merced Counties). These ordinances require permits to be issued before a well can be drilled or modified. Thus, proper well drilling procedures are established to avoid cross connections between aquifers. This avoidance ensures the wells and the aquifers are appropriately protected and do not result in groundwater contamination. Construction would not result in a substantial depletion of groundwater supply because it would not use substantial amounts of water; construction of a single well only requires the water to drill it and the water to test it prior to operation. (DWR 2012b.)

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
	• The California Department of Public Health regulates drinking water supplies in the state of California, including municipal groundwater wells. Drinking water related statutes are from the Education Code, Food and Agricultural Code, the Government Code, the Health and Safety Code, the Public Resources Code, and the Water Code. Regulations are from Title 17 and Title 22 of the California Code of Regulations. The California Department of Public Health permits all water purveyors in the state with water supply permits. Therefore, municipal wells are not expected to results in a reduction or change in water quality.
	• Groundwater wells are typically not located on the side of steep slopes, so new agricultural or municipal groundwater wells would be located in areas of flat relief. Therefore, the locations would not support mudflows, which typically need very steep slopes and large amounts of precipitation to occur. Furthermore, the wells would not be adjacent to the ocean and, therefore, would not be affected by tsunamis.
	• Increases in groundwater pumping could occur; however, these impacts on groundwater and geologic resources would be similar to those as discussed in Chapter 9, *Groundwater Resources*.
Land Use and Planning	• Construction and operation of agricultural or municipal groundwater wells would not physically divide an established community because wells and well fields are generally relatively small in scale (e.g., less than 1 acre) and would likely be located in existing vacant land (e.g.7, existing agricultural lands and/or areas owned/operated by water purveyors).
	• Agriculture and municipal infrastructure, such as groundwater wells, are typically allowed in different land use designations (e.g., public facilities, residential, industrial) and different zoning designations. If the groundwater wells were inconsistent with applicable land use plans, policies, or regulations, an amendment or variant from the local jurisdiction approving the discretionary action associated with the groundwater wells would be required by the project proponent prior to project approval and construction. If no discretionary action were to occur as a result of the construction or operation of the groundwater wells, then it is assumed it would not result in a conflict with local land use plans, policies or regulations.
	• Potential conflictss with habitat conservation plans, natural community conservation plans, or other plans, policies and regulations protecting biological species and resources are evaluated in Biological Resources.
Mineral Resources	• Construction and operation of agriculture or municipal groundwater wells would have a very low potential to result in the removal or inability to access state or locally designated mineral resource areas. This is because the groundwater well sites would be relatively small, and they are expected to be located either within or in close proximity to agricultural lands or within urban and suburban areas. Furthermore, if the groundwater wells are located within a state or locally designated mineral resource area, the drilling and operation of a groundwater well would not permanently remove access to a mineral resource as there would be other locations around the groundwater well that could provide access to the mineral resource.

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
Noise	• Construction of agricultural groundwater wells could generate temporary noise. There is a very low probability that sensitive receptors (e.g., residential homes, hospitals, schools) would be located within close proximity to experience the temporary noise generated by the drilling of a groundwater well because these wells would be constructed either within agricultural lands or immediately adjacent to the lands. Furthermore, construction of these wells would not result in groundborne vibrations because vibrations are typically associated with pile driving or heavy industrial processes, and construction of groundwater wells do not require these types of activities. • Construction of municipal groundwater wells could generate temporary noise. It is likely new municipal wells would be drilled in areas with suitable land use designations and zoning for infrastructure (e.g., agriculture or public facilities). However, the location of any new well would be speculative and it is unknown if they would be located near receptors sensitive to noise (e.g., residential homes, hospitals, etc.). Table H-24 lists potential mitigation measures that lead agencies (e.g., municipal water purveyors) can and should implement to reduce potentially significant impacts related to noise. • The operation of agricultural groundwater or municipal groundwater wells may generate temporary noise when the groundwater well is pumping. However, the wells do not pump continuously. Furthermore, it is anticipated there would be a very low probability that sensitive receptors (e.g. residential homes, hospitals, schools) would be located within close proximity to experience the temporary operating noise generated. Municipal groundwater wells are often enclosed in some type of small low-profile structure and/or enclosed by a fence that would act to mute the temporary operating noise of the well. However, the location of any new agricultural or municipal well would be speculative and it is unknown if it would be located near receptors sensitive to noise (e.g., residential homes, hospitals, schools, parks). Table H-24 lists potential mitigation measures that lead agencies (e.g., irrigation districts or municipal water purveyors) can and should implement to reduce potentially significant impacts related to noise. • The construction and operation of agricultural or municipal groundwater wells would not bring people within close proximity to an airport or expose people to airport noise.
Population and Housing	• The construction and operation of agricultural or municipal groundwater wells would not involve the construction of new homes or businesses, the extension of roads, or other actions that may induce substantial property growth in an area. Furthermore, they would not develop any amenities (e.g., malls, amusement parks, hotels, recreation areas) that would attract people to the plan area. Finally, they would be constructed and operated to replace a water source that was reduced (e.g. surface water) rather than increasing capacity to serve new water supply users. • The construction and operation of agricultural or municipal groundwater wells would not displace substantial numbers of people and necessitate the construction of replacement housing elsewhere because they would be in relatively small, isolated areas and likely be located on existing vacant land (e.g., within or in close proximity to agricultural lands or within or adjacent to existing drinking water supply infrastructure).

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
Public Services	• The need for additional public services (e.g., fire protection, police protection, libraries, schools) or the deterioration of existing public services typically results from an increase in population. As a location's population increases, the need for additional or new public services and public service facilities generally increases. As discussed above, the construction and operation of agricultural or municipal groundwater wells would not involve an increase in population or housing. In addition, these projects would not include proposals for new housing, and thus would not generate students or increase demands for school services or facilities.
Recreation	• Recreational facilities are not typically located in agricultural fields, and thus the construction and operation of an agricultural groundwater well would not result in impacts on or lead to the construction of recreational facilities. • The location of the construction and operation of new municipal groundwater wells is unknown at this time; however, they would likely be located within close proximity to existing municipal wells or existing municipal distribution systems so that potable water can be distributed. If recreational facilities were located within very close proximity to the construction location, construction of municipal wells may affect the recreational facilities (e.g., construction noise, dust); however, it is expected that construction would be limited in duration (e.g., less than 3 months) and limited in space because municipal wells typically have small dimensions. Construction and operation of municipal groundwater wells would not increase the use of existing parks or recreational facilities and does not result in the construction of actual recreational facilities.
Transportation and Traffic	• Construction of agricultural groundwater or municipal groundwater wells could result in some additional trips associated with construction workers. Agricultural wells would likely be located in agricultural lands or adjacent to agricultural lands and generally these areas do not experience traffic congestion. Municipal groundwater wells may be located in urban and suburban areas that could already experience some congestion. However, the temporary increased traffic during construction would have a low probability of exceeding a local or regional road threshold because of the relatively few trips anticipated and the relatively short construction time. Table H-24 lists potential mitigation measures that lead agencies (e.g., irrigation districts or municipal water purveyors) can and should implement to reduce potentially significant transportation and traffic impacts related to construction. • Operation of agricultural groundwater wells would not generate additional trips beyond those required to maintain and farm the active agricultural lands. Municipal groundwater wells may generate maintenance trips, but it is likely they would not be a substantial addition to the trips already being incurred by the road system by water purveyors who maintain wells.

Potential Environmental Effects of Substituting Surface Water with Groundwater	
Resource	Discussion
Utilities and Service Systems	• Construction and operation of agricultural or municipal groundwater wells would not exceed wastewater treatment requirements of the Central Valley Water Board because the wells would not involve the discharge of treated effluent from a wastewater treatment plant (WWTP). Additionally, because a well does not involve wastewater treatment, a well would not require the construction of a WWTP and thus would not result in a determination by the wastewater treatment provider that it has inadequate capacity to serve. • Construction and operation of agricultural or municipal groundwater wells could involve the construction of water treatment facilities in the form of wellhead treatment at municipal wells; environmental effects associated with this are discussed in this table for all resources (i.e., Aesthetics through Transportation and Traffic). Table H-24 lists potential mitigation measures that lead agencies (e.g., irrigation districts or municipal water purveyors) can and should implement to reduce potentially significant impacts on all environmental resources. • The construction and operation of agricultural or municipal groundwater wells would not need the construction of additional stormwater drains because the amount of impervious surfaces that could generate stormwater runoff is anticipated to be very small. • The construction and operation of agricultural or municipal groundwater wells is not expected to generate substantial volumes of solid waste and would comply with all state requirements regulating solid waste.

H.2.3 Aquifer Storage and Recovery

Reductions in surface water diversions are expected as a result of approving the LSJR alternatives and the respective program of implementation; therefore, another reasonably foreseeable method to augment a water source is to utilize more aquifer storage and recovery. Aquifer storage and recovery is the process of storing surface water in a groundwater basin so it is available for extraction and beneficial use later. This process augments groundwater basins by effectively allowing storage of any excess available surface water so it can be used later when it would otherwise be unavailable. Typical storage components are gravity recharge basins or injection wells that move water under pressure from the surface to an underground aquifer. Typical water extraction components are wells that pump groundwater from the aquifer and send the water to an existing treatment plant or directly into a distribution system for beneficial use. Aquifer storage and recovery may also be a source of water for underground storage and surface water diverted under a specific basis of right. The costs and potential environmental impacts associated with obtaining more water from aquifer storage and recovery are evaluated below.

Cost Evaluation

Table H-8 identifies recently funded groundwater recharge projects. These projects are from the IRWM. The costs identified in Table H-8 include planning, design, permitting, land acquisition/rights of way, construction, and administrative costs in 2010 dollars (DWR 2012a).

Table H-8. Groundwater Recharge Projects Funded by the Department of Water Resources Integrated Regional Water Management Implementation Grant Program, Phase 1

Applicant	Project	Project Cost	Operations & Maintenance Budget [$/year]	Production [AFY]	20-Year Amortized Cost [$/AFY]
Joshua Basin Water District	Joshua Basin Water District Recharge Basin and Pipeline	$8,028,000	$75,000	2,000	$238
Consolidated Irrigation District	South and Highland Basin Project	$4,627,000	$164,500	2,500	$158

Source: DWR 2012a

AFY = acre-feet per year

Environmental Evaluation

Summary of Potential Action

A standard aquifer storage and recovery approach could utilize existing irrigation canals and existing agricultural fields (primarily during the off-irrigation season of October–March, when the canals and fields have capacity) to release an unspecified volume of water such that it would percolate through the unlined canals and soil in the fields to recharge the groundwater. It is expected there would be no construction associated with this type of aquifer storage approach

because existing canals and agricultural fields are suitable for allowing water to percolate into the ground and existing groundwater wells would be suitable for extraction. Excess surface water would be used to recharge the aquifer in certain months or water year types. It is anticipated that this type of standard aquifer storage and recovery approach could be instituted by agreements between irrigation districts and their members who privately own agricultural land or irrigation districts, members who own agricultural land, and local governments, local water purveyors, or groundwater management districts.

Another aquifer storage and recovery approach could also be established using active groundwater recharge with storage components, such as wells that move water under pressure from the surface to an underground aquifer, and extraction components, such as wells that pump groundwater from the aquifer and send the water to an existing treatment plant or directly into a distribution system for beneficial use. Assuming active groundwater recharge is used, the activities and infrastructure associated with an aquifer storage and recovery program would be similar to the activities described in Section H.2.2, *Substitution of Surface Water with Groundwater*. Although aquifer storage projects sometimes include infiltration basins specifically designed and constructed to facilitate rapid infiltration to underground storage, constructing infiltration basins would likely remove agricultural land from production and, therefore, is not an anticipated method of compliance and the environmental effects of constructing infiltration basins are not analyzed.

Summary of Potential Environmental Effects

Development of a more standard aquifer storage and recovery program would further reduce any changes in groundwater levels and would not be anticipated to require new facilities to recover the stored water.

Development of an active groundwater recharge approach would result in impacts similar to those identified in Section H.2.2, *Substitution of Surface Water with Groundwater*, and Table H-7, *Potential Environmental Effects of Substituting Surface Water with Groundwater*. This is because active groundwater recharge would require the construction and operation of groundwater wells and distribution pipeline, resulting in similar environmental effects to those described in Table H-7 for the construction and operation of municipal groundwater wells.

Potential environmental effects associated with the development of a standard aquifer storage and recovery approach are described in Table H-9, *Potential Environmental Effects of Aquifer Storage and Recovery*. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, at the end of this appendix, lists potential mitigation measures associated with the development of this method of compliance and is referenced in the table below where appropriate.

Table H-9. Potential Environmental Effects of Aquifer Storage and Recovery

Potential Environmental Effects of Aquifer Storage and Recovery	
Resource	Discussion
Aesthetics	• Aquifer storage would not necessarily involve a physical alteration to existing agricultural lands or canals. It could change the volume of water in canals and on agricultural lands during the winter season. This would not represent a substantial degradation to the visual character or quality of agricultural lands because viewers are frequently subjected to change under active agricultural practices. Aquifer storage and recovery is not anticipated to involve lights or glare.
Agriculture and Forestry Resources	• Aquifer storage would involve adding water to canals or flooding agricultural lands in the winter. The agricultural lands are already used for agricultural purposes, and using them for groundwater recharge during the winter would not modify or remove them from production as it would still be possible to farm them during the irrigation season (generally April–September). Additionally, the groundwater recharge would support agricultural lands because the recharge would allow the pumping of groundwater for irrigating agricultural fields during the irrigation season.
Air Quality	• Aquifer storage and recovery is not expected to affect air quality because aquifer storage would not include activities (e.g., construction activities) that generate air quality emissions. Changing the timing and/or volume of water in existing canals and agricultural fields would not have the potential to generate air quality emissions. While there may be some energy required as part of lift pumps and stations, the additional energy would not be beyond what is currently experienced when operating the canals. • SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJVAB. Some of these facilities are wastewater treatment facilities, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, painting/coating operations, food processing facilities, feed lots/dairies, and rendering plants. Construction and operation of an aquifer storage and recovery project would not involve the type of facility identified by SJVAPCD as a known odor source (SJVAPCD 2002). Consequently, it is expected aquifer storage and recovery would not create objectionable odors affecting a substantial number of people.
Biological Resources	• Aquifer storage would likely occur during wet years when there is extra water and during the winter when fish spawning is generally not occurring. Therefore, aquifer storage is not anticipated to affect special-status fish species or their habitat or the migration of such species. Therefore, aquifer storage is not anticipated to conflict with local policies or ordinances protecting special-status fish species or adopted habitat conservation plans or natural community conservation plans.

Potential Environmental Effects of Aquifer Storage and Recovery	
Resource	Discussion
	• An aquifer storage and recovery project is expected to flood agricultural lands that might not otherwise be flooded during certain times of year (e.g., nonactive agricultural seasons, such as the winter). Additionally, it could use existing canals that may have additional capacity during the irrigation season, typically April–September. Agricultural lands generally have a low potential for special-status plant species, animal species, and habitat because they are actively managed and are modified and disturbed regularly by agricultural activities. Furthermore, the flooding of agricultural fields during the nonactive agricultural seasons would be expected to provide habitat to bird species that might be migrating during this time, so it is expected to provide a benefit to migrating bird species. Therefore, aquifer storage is not anticipated to conflict with local policies or ordinances protecting biological resources or conflict with an adopted habitat conservation plan or natural community conservation plan.
Cultural Resources	• Aquifer storage and recovery assumes no construction and therefore no ground disturbance. Aquifer storage and recovery would use existing canals and fields and result in flooding such that water could percolate into the ground and recharge existing groundwater basins. This is expected to change the volume of water in existing irrigation canals and fields. There is a very low potential for cultural resources to exist in these locations due to excessive and regular disturbance of land in the agricultural fields and due to the primary use of the canals to convey irrigation water.
	• Since aquifer storage and recovery would have no ground disturbing activities, it would not result in disturbance of unknown or known human remains.
Geology and Soils	• There are no impact mechanisms associated with changing the volume of water in a canal or on agricultural land that could result in an impact on or be affected by: Alquist-Priolo faults, strong seismic shaking, seismic-related ground failure, unstable geologic units, expansive soils, or landslides. Furthermore, changing the volume of water in a canal or on agricultural land would not substantially increase the number of people exposed to the risk of earthquakes or geologic hazards because it would not draw people to earthquake areas or hazard locations not already frequented.
	• The purpose of aquifer storage would be to keep the water in the canals and agricultural lands such that it would percolate into the groundwater; thus, excessive amounts of water that could result in soil erosion would not be released, and the water released would be of an appropriate volume and timing to allow for groundwater recharge. Therefore, water erosion and runoff is unlikely to occur.
	• Aquifer storage and recovery would not involve constructing or operating septic tanks and, therefore, septic tanks would not be affected by soils incapable of supporting the use of them or other alternative wastewater disposal systems.
Greenhouse Gas Emissions	• It is not expected that aquifer storage and recovery would generate greenhouse gas emissions because it would not involve physical changes (i.e., construction) and is not expected to result in activities that would generate greenhouse gases. While there may be some energy required as part of lift pumps and stations, the additional energy would not be beyond what is currently experienced when operating the canals.

Potential Environmental Effects of Aquifer Storage and Recovery	
Resource	Discussion
Hazards and Hazardous Materials	• Aquifer storage and recovery would not involve transporting, using, or disposing of hazardous materials nor would it emit hazardous emissions because water and changing the volume of water in different areas is not considered hazardous. Aquifer storage and recovery has no potential to affect airports or airport safety because it would not result in building structures near airports or flooding airports. Aquifer storage and recovery would not involve the building of structures, so there would be no wildland fire threat to people or structures. Canals and fields are located in agricultural areas that typically do not have emergency response plans or emergency evacuation plans. Aquifer storage would not use hazardous materials but only require a change in the timing or location of water; therefore, it would not result in the reasonably foreseeable upset or accident conditions associated with hazardous materials.
Hydrology and Water Quality	• While aquifer storage could result in a change in drainage such that inundation of agricultural lands may occur more frequently, aquifer storage would likely not generate more runoff because holding water for infiltration is designed such that agricultural lands hold the water so it can percolate into the groundwater basin. The appropriate amount of water would be applied so it would not generate runoff. Aquifer storage and recovery would not involve the construction or operation of new structures; it is anticipated it would use existing infrastructure to release surface water during wet years into agricultural lands and canals that would not be altered to increase infiltration rates. It would inundate agricultural lands otherwise not inundated, but the release would be controlled by design because the purpose would be to recharge in the area of release and not to flood other areas. Therefore, aquifer storage is not expected to result in flooding or result in a flood risk to people or structures. • Aquifer storage would be located in areas of flat relief because active agricultural lands and canals are typically not located on the side of steep slopes. Therefore, the locations would not support mudflows, which typically need very steep slopes and large amounts of precipitation to occur. Furthermore, these areas would not be adjacent to the ocean and, therefore, they would not be affected by tsunamis.
Land Use and Planning	• Aquifer storage and recovery is not expected to physically divide an established community because the canals and agricultural lands already exist. It is anticipated that aquifer storage and recovery would support agricultural land use and zoning designations as it would not remove agricultural land from production. If aquifer storage and recovery was inconsistent with local land use plans, policies, or regulations, and required a discretionary action by a local government agency, it would obtain an amendment or variant from the local jurisdiction prior to operation. • Potential conflicts with habitat conservation plans, natural community conservation plans, or other plans, policies and regulations protecting biological species and resources are evaluated in Biological Resources.
Mineral Resources	• Aquifer storage would not result in the removal or inability to access state or locally designated mineral resource areas because aquifer storage would be located within existing canals and agricultural use areas. Furthermore, if existing canals and agricultural uses are located in a mineral resource area, the periodic flooding of agricultural lands would not permanently remove access to a mineral resource as there would be other locations and times of year that could provide access to the mineral resource.

Potential Environmental Effects of Aquifer Storage and Recovery	
Resource	Discussion
Noise	• Aquifer storage would require releasing volumes of water into existing canals to flood agricultural lands during the winter. This activity would not generate temporary or permanent noise or groundborne vibrations. This activity would not bring people within close proximity to an airport or expose people to airport noise.
Population and Housing	• Aquifer storage and recovery would not involve the construction of new homes or businesses, the extension of roads, or other actions that may induce substantial property growth in an area. Furthermore, it would not develop any amenities (e.g., malls, amusement parks, hotels, recreation areas) that would attract people to the plan area. Finally, it would be operated to replace a water source that was reduced (e.g. surface water) rather than increasing capacity to serve new water supply users. • Aquifer storage and recovery would not displace substantial numbers of people and necessitate the construction of replacement housing elsewhere because the change in volume of water (and timing of water release) would occur in existing canals and agricultural lands and not where people currently reside.
Public Services	• The need for additional public services (e.g., fire protection, police protection, libraries, schools) or the deterioration of existing public services typically results from an increase in population. As a location's population increases, the need for additional or new public services and public service facilities generally increases. As discussed above, aquifer storage and recovery would not involve an increase in population or housing. In addition, these actions would not include proposals for new housing and thus would not generate students or increase demands for school services or facilities.
Recreation	• Recreational facilities are not typically located in agricultural fields; thus, aquifer storage under agricultural lands would not result in impacts on recreational facilities or lead to the construction of recreational facilities.
Transportation and Traffic	• Aquifer storage and recovery would not require construction and, therefore, there would be no construction trips generated. Aquifer storage and recovery would also not require operation and maintenance trips beyond those that may be currently conducted because it would use existing canals and existing agricultural lands.
Utilities and Service Systems	• Aquifer storage and recovery would not involve the need for utilities or service system because it would not require the construction or operation of wastewater or water supply facilities. It would not result in the generation of solid waste or require energy.

H.2.4 Recycled Water Sources

Reductions in surface water diversions are expected as a result approving the LSJR alternatives and the respective program of implementation; therefore, method to augment a water source is to use recycled water. Recycled water is wastewater treated to an acceptable water quality standard at a wastewater treatment plant (WWTP) and then distributed and used for another purpose. Typically, recycled water costs less than potable water because it does not meet the same water quality standards. For example, a farmer can purchase treated wastewater effluent at a discount to irrigate alfalfa for a dairy instead of purchasing potable water or pumping groundwater. Thus more potable water could be available for other beneficial uses (e.g., municipal uses). The costs and potential environmental impacts associated with obtaining more water from groundwater supplies are evaluated below.

Cost Evaluation

The complexity and cost of a recycled water project depends on many factors, such as the level of treatment at the WWTP, the desired water quality for the second beneficial use, the volume of recycled water needed, and the distance from where recycled water is treated to where recycled water is used. Some categories of recycled water projects are listed in detail below.

Landscape Irrigation

Recycled water could be used to offset potable water used to irrigate parks, commercial campus landscapes, ornamental ponds, golf courses, recreational sports fields, botanical gardens, freeway medians, and other spaces where humans will not have direct contact with recycled water. To construct a landscape irrigation project, a wastewater treatment agency would likely need to determine potential recycled water users, determine the required water quality to meet recycled water demand, determine the volume of recycled water needed, secure agreements with potential recycled water users, increase treatment at the WWTP, and construct a recycled water distribution system (with pumps). Landscape irrigation recycled water projects typically cost between $400–$2,100/AF, including capital, operations, and maintenance (WRF 2011).

Agricultural Irrigation

Similar to landscape irrigation, recycled water could be used to offset potable water used to grow crops. Due to permitting requirements, most recycled water used for agricultural irrigation is for nonhuman consumptive crops (e.g., alfalfa grown for a dairy). Recycled water used for human consumptive crops is required to be treated to a higher water quality than recycled water used on nonhuman consumptive crops. The process to construct an agricultural irrigation recycled water project is similar to a landscape irrigation recycled water project and typically costs assume similar project components.

Direct Potable Reuse

Recycled water could be used to replace potable water for domestic use. Technology is available to take WWTP effluent and clean it to drinking water standards. Direct potable reuse is practiced in areas where supply water is extremely scarce, such as Singapore, Namibia, and remote communities in the American West (WRF 2011). Major concerns for direct potable reuse are: public perception,

balancing water chemistry, engineered storage buffers, blending with other water sources, and multiple barriers to ensure public safety (WRF 2011). Direct potable reuse projects typically cost $700–$1,200/AF, including capital, operations, and maintenance (WRF 2011).

Process Water

Recycled water could be used by the commercial, institutional, or industrial (CII) sector as process water. Some processes, such as water used in cooling towers at power plants, could use recycled water to offset their need for potable water. Water quality is a concern for CII users because the recycled water is likely used in systems designed for use with potable water, or highly treated potable water. Use of water of less quality may damage CII process equipment, reducing the economic feasibility of using recycled water. Constructing a process water recycled water project is the same as explained above under Landscape Irrigation, but more treatment is likely needed at the WWTP. Process water recycling projects typically cost the same as direct potable reuse projects due to the need for higher water quality.

Environmental Evaluation

Summary of Potential Action

The location, timing of construction, and details of the modifications to existing WWTPs and respective distribution system to support the development of recycled water sources, cannot be known at this time. It is assumed these modifications would be carried out by the municipalities and/or wastewater treatment service providers in the plan area. Municipalities and/or wastewater treatment service providers include, but are not limited to: City of Ceres, City of Merced, City of Manteca, City of Ripon, City of Riverbank, City of Turlock, or City of Stockton. Whether the wastewater treatment facilities are modified depends on a number of variables that are unknown at this time, such as the market available for the use of recycled water, future agreements reached between the wastewater treatment service providers and the potential end users of the recycled water or existing water districts (if they are the end users), and the availability of funding.

For purposes of this discussion, it is assumed construction and operation would occur within the footprint of an existing WWTP or within very close proximity because recycling wastewater needs to be integrated into the existing wastewater treatment stream. It is also assumed WWTPs are located within close proximity to receiving waters (e.g., creeks or rivers) because WWTPs typically discharge treated effluent into receiving waters. Finally, it is assumed WWTPs are located in more urbanized areas adjacent to industrial and urban uses because (1) they must be located in an area to serve their existing municipal customers, and (2) they are typically considered public facilities that are generally located on lands designated and zoned for public facilities and industrial uses. The distribution system for recycled wastewater distribution would likely be constructed and operated within existing rights of way of roads and would be located below ground surface adjacent to existing utility lines at depths of 3–8 feet. The new lines would likely be in municipal service district areas and generally within urban areas.

The operation of any modification to existing WWTPs cannot be known at this time because it depends on the type of wastewater treatment currently conducted at a WWTP, the availability of resources (e.g., funding and space), and the management of the WWTP by the local wastewater treatment special district or municipality. However, for the purposes of this discussion, it is assumed the operation of the WWTP would occur in conjunction with the existing normal operation of a

WWTP and would not result in a substantial increase in the volume of treated effluent discharged because the effluent would be distributed to recycled water users. Furthermore, it is not expected the operation of recycled water facilities would result in a substantial increased number of employees because they would be located within the existing wastewater treatment facilities, and it is anticipated the existing employees of the wastewater treatment facilities would operate the recycled water facilities.

Potential Environmental Effects

Construction of any recycled water facilities would likely result in temporary, and localized effects typically associated with similar activities including air quality effects and ground disturbance. Increased use of recycled water (e.g., landscape irrigation) may result in some runoff into local waterways; however, the quality of recycled water for such uses is highly regulated and approaches potable quality. In addition, increased use of recycled water will result in an equivalent decrease in discharge of lower quality treated effluent, thereby resulting in no net effect related to local waterways.

Treatment facilities to produce recycled water are typically relatively energy intensive; however the overall increased electrical load would be extremely small compared to the existing electrical load of the service area. Therefore it is unlikely to require the construction of major new power generation or transmission facilities, and therefore any potential air quality and greenhouse gas emissions would be minor. The operation of such facilities may require a slight increase in chemical transport and storage, but as the facilities would likely be constructed within or adjacent to existing wastewater treatment facilities, the increase would be negligible compared to existing chemical use and transport at these locations.

It is likely that such facilities would be constructed in areas that are already disturbed by urban development, and most facilities would be located within existing facility footprints and rights-of-way. In addition, because such facilities are publicly-owned and subject to CEQA and other environmental regulations, depending on site-specific conditions, any new recycled water projects would undergo the appropriate level of CEQA and other required regulatory compliance at the time they are proposed.

Table H-10 summarizes the potential environmental effects associated with developing recycled water sources. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance,* at the end of this appendix, lists potential mitigation measures associated with the construction or operation of the methods of compliance and is referenced in Table H-10 where appropriate.

Table H-10. Potential Environmental Effects of Developing Recycled Water Sources

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
Aesthetics	• Construction and operation of recycled water facilities would not be expected to significantly affect the visual character or quality of areas because they would be located within the existing footprint of WWTPs or within close proximity and would be similar in size and scale as the existing facilities of the WWTP. Construction and operation of recycled water facilities may have operational and safety lights. Impacts would depend on the location of sensitive receptors to potential lighting; however, lights would be expected to follow lighting guidelines and lighting plans of local jurisdictions approving the construction and operation of the recycled water facilities. In addition, the recycled water facilities would likely be located adjacent to wastewater facilities and infrastructure that may already have operational and safety lighting. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, identifies potential mitigation measures lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant environmental effects associated with lighting.
Agriculture and Forestry Resources	• Construction and operation of recycled water facilities would not be expected to be located on lands used for agriculture but rather within the footprint of existing WWTPs or within very close proximity such that the recycled water facilities can use the existing wastewater treatment stream. Additionally, it is expected that agricultural uses would be able to use the recycled water source to replace surface water diversions, which would potentially offset any consequence to agricultural land that might be indirectly affected by the recycled water facilities.
Air Quality	• Recycled water facilities would likely be located in the San Joaquin Valley Air Basin (SJVAB), which generally covers San Joaquin, Stanislaus, Merced, and Madera Counties. Particulate matter (PM10 and PM2.5) and ozone are of particular concern in the basin. The State of California has classified the SJVAB as being a severe nonattainment area for ozone and a nonattainment area for PM10 and PM2.5. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted an air quality improvement plan that addresses nitrous oxide (NO_X) and reactive organic gases (ROG), both of which are ozone precursors and contribute to the secondary formation of PM10 and PM2.5. • SJVAPCD's published guidelines, *Guide for Assessing Air Quality Impacts* (SJVAPCD 2002) do not require the quantification of construction emissions. Rather, the guidelines require implementation of effective, comprehensive, and feasible control measures to reduce PM10 emissions (SJVAPCD 2002). SJVAPCD considers PM10 emissions to be the greatest pollutant of concern when assessing construction-related air quality impacts and has determined that compliance with its Regulation VIII, including implementation of all feasible control measures specified in its *Guide for Assessing Air Quality Impacts* (SJVAPCD 2002), constitutes sufficient mitigation to reduce construction-related PM10 emissions to less-than-significant levels and minimize adverse air quality effects. All construction projects must abide by Regulation VIII. Since the publication of the district's guidance manual, the district has revised some of the rules comprising Regulation VIII. Guidance from district staff indicates that implementation of a Dust Control Plan would satisfy all of the requirements of SJVAPCD Regulation VIII (Siong pers. comm.). Further consultation with SJVAPCD staff indicates that, though explicit thresholds for construction-related emissions of ozone precursors are not enumerated in the *Guide for Assessing and Mitigating Air Quality Impacts*, SJVAPCD considers it a significant impact when construction or operational emissions of ROG or NO_X exceed 10

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion

tons per year or if PM10 or PM2.5 emissions exceed 15 tons per year (Siong pers. comm.).

- Prior to a project dealing with a stationary source of emissions (such as a WWTP) is required to receive an Authority to Construct (ATC) from SJVAPCD. The project is subject to the requirements of SJVAPD Rule 2201. As stated under Section 1.0 and 1.2 of Rule 2201[1]:

  > *The purpose of this rule is to provide for the following: 1.1 The review of new and modified Stationary Sources of air pollution and to provide mechanisms including emission trade-offs by which Authorities to Construct such sources may be granted, without interfering with the attainment or maintenance of Ambient Air Quality Standards; No net increase in emissions above specified thresholds from new and modified Stationary Sources of all nonattainment pollutants and their precursors.*

- This rule applies to new stationary sources and all modifications to existing stationary sources that are subject to permit requirements and after construction may emit one or more affected pollutant. The requirements of this rule go in effect on the date the application is determined to be complete by the Air Pollution Control Officer.
- Construction of recycled water facilities would likely result in emissions associated with construction equipment and construction worker truck trips, as well as fugitive dust emissions from ground disturbance. The quantity, duration, and the intensity of construction activity have an effect on the amount of construction emissions and related pollutant concentrations occurring at any one time. As such, more emissions are typically generated by relatively large amounts of relatively intense construction. However, if construction is delayed or takes place over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix, and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). Depending on the level of activities and amount of infrastructure built, construction of recycled water facilities could exceed thresholds established by SJVAPCD and would be required to implement measures to help reduce or minimize construction-related emissions. Furthermore, construction emissions generated would need to comply with the SJVAPCD regulations described above. Lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with construction emissions and air quality.

[1] Sources whose primary function is permitted by the SJVAPCD through Rules 2010 and 2201 are not subject to SJVAPCD Rule 9510 (Indirect Source Review). Projects subject to Rule 9510 are required to quantify and reduce indirect (i.e., mobile source emissions), area-source (e.g., space heating, landscaping, and maintenance), and construction exhaust emissions.

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
	• Operation of recycled water facilities would likely be electric because of their expected locations in urban and suburban areas and the expected location in close proximity to existing wastewater treatment infrastructure. They may use nonelectric backup only for intermittent emergency circumstances. Operations could include facility inspection and maintenance activities and are expected to be similar to or less than inspection and maintenance of existing wastewater treatment facilities. The need for additional energy could result in increased criteria pollutant emissions at other power facilities. However, the power facilities that would compensate for the additional power are already built and permitted to emit a maximum amount of criteria pollutants. These facilities are required to offset additional power generation by the use of pollution credit. Therefore, if additional emissions are generated, they would be generated by facilities that are permitted to do so. Lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with operational emissions and air quality. • SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJVAB. Some of these facilities are wastewater treatment facilities, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, painting/coating operations, food processing facilities, feed lots/dairies, and rendering plants. Construction and operation of recycled water facilities would not involve the type of facility identified by SJVAPCD as a known odor source (SJVAPCD 2002). The recycled wastewater facilities would be located at the wastewater treatment facility but would not produce additional odors beyond what currently may be produced at the wastewater treatment facility. This is because the recycled water process typically uses the existing volume of wastewater that is already treated to secondary levels (as required by state law). The recycled water process further processes the wastewater to meet recycled water quality standards. Therefore, the additional processing of the secondary treated wastewater does not produce any additional odors because the odors are typically generated during primary treatment and biosolids production. Furthermore, many WWTPs contain odors by enclosing primary treatment and biosolids production and scrubbing odor-generating emissions. Consequently, it is expected recycled water facilities would not create objectionable odors affecting a substantial number of people.
Biological Resources	• It is expected that construction and operation of recycled water facilities would be in urban and suburban areas within the footprint of existing wastewater treatment plants (WWTPs). These areas are expected to have a very low potential for special-status plant species, animal species, and habitat, and are unlikely to support special-status biological resources because they are typically industrial facilities with buildings and primarily impervious surfaces. Table H-24 lists potential mitigation measures lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant environmental effects of construction and operations on special-status biological resources. Since there is a low potential for special-status plant species, animal species, and habitat to exist, it is not expected that construction and operation would conflict with local policies protecting biological resources or conflict with provisions of an adopted habitat conservation plan or natural community conservation plan.

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
	• It is expected that operation of recycled wastewater facilities would not result in any increased volume of treated effluent discharged or a change in the quality of the treated effluent discharged as a result of the recycling process that could affect special-status fish species. This is because the recycled water would be distributed to end users and be counter to the principle of recycling wastewater to then discharge it from the wastewater facility. Therefore, it is not expected to affect special-status fish species or the migration of such species. • Use of recycled water by consumers (e.g., golf courses or industrial processes) could result in runoff entering receiving water and potentially affecting aquatic resources. However, consumers are required to have management plans to control runoff and reduce receiving water inflow. Specifically the applicable regional water quality control board is required by the California Code of Regulations, Title 22, Division 4, to issue a Master Water Recycling Permit that includes specific requirements for the use of recycled water (SDRWQCB 2009). Furthermore, the quality of recycled water for such uses is highly regulated by the regional water quality control boards and the California Department of Public Health by regulations or laws such as the Health and Safety Code (Division 104, Part 12, Chapter 4, Article 7, § 116551) and approaches potable quality (CDPH 2011).
Cultural Resources	• Construction and operation of recycled water facilities would likely exist in urban and suburban areas adjacent or within close proximity to existing wastewater treatment facilities and infrastructure. While it is unknown if cultural resources exist in these locations, these areas would have likely been previously disturbed during the construction of the existing wastewater treatment facilities, thus reducing the potential for significant unknown cultural resources to exist. Operation of recycled water facilities would have a very low potential to affect cultural resources because operation would consist of distributing recycled water in pipes (generally located underground). • Construction and operation of the distribution system to distribute recycled water would include laying pipeline generally along the rights-of-way of existing roads. Construction of the distribution system has the potential to encounter significant unknown buried cultural resources because it cannot be predicted with certainty whether significant unknown buried cultural deposits are currently present or absent within these sediments. At this time, however, no specific projects have been proposed, and the actual future distribution system alignments are unknown. Even so, given that most of the construction would occur within highly developed public rights-of-way where much of the sediments have been previously disturbed, the potential to encounter significant buried cultural resources is greatly reduced. Therefore, there is a very low potential for unknown cultural resources to be located in these areas. Lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with construction on cultural resources should unknown significant cultural resources be discovered during construction.

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
	• As described above, it is expected the wastewater treatment sites would be previously disturbed. Therefore, it is highly unlikely human remains, typically buried at depths of six feet, would be disturbed during construction. If, in the highly unlikely event human remains are uncovered during construction compliance with the State Health and Safety Code would be required. As specified by Section 7050.5, no further disturbance would occur until the county coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code 5097.98. If such a discovery occurs, excavation or construction would halt in the area of the discovery, the area would be protected, and consultation and treatment would occur as prescribed by law. If the coroner recognizes the remains to be Native American, he or she would contact the Native American Heritage Commission, who shall appoint the Most Likely Descendent. Additionally, if the bones are determined to be Native American, a plan would be developed regarding the treatment of human remains and associated burial objects, and the plan shall be implemented under the direction of the Most Likely Descendent.
Geology and Soils	• There are no impact mechanisms associated with recycled water facilities that could result in an impact on or be affected by: Alquist-Priolo faults, strong seismic shaking, seismic-related ground failure, expansive soils, soil erosion, loss of topsoil, or landslides. Furthermore, any new facilities would be constructed using the latest geotechnical information for the site specific conditions. Finally, recycled water facilities would not bring people to the risk of earthquakes or geologic hazards, meaning the operation of the recycled water facilities would not substantially increase the number of people exposed to the risk of earthquakes or geologic hazards because it would not draw people to earthquake areas or hazard locations not already frequented. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts related to geology and soils associated with construction.
	• The construction and operation of recycled water facilities would not involve constructing or operating septic tanks and therefore septic tanks would not be affected by soils incapable of supporting the use of them or other alternative wastewater disposal systems.
	• Construction of recycled water facilities and the distribution system would result in limited ground-disturbing activities that could cause soil erosion or loss of topsoil; however, ground-disturbing activities would be limited in duration and geography. Furthermore, ground-disturbing activities of 1 acre or greater would require the need for preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), as required by the Central Valley Water Board. The SWPPP would require soil and erosion control mechanisms. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts related to soil erosion and stormwater runoff and erosion associated with construction.
	• Increases in groundwater pumping are not expected to occur under the construction and operation of recycled water facilities or the distribution system and may actually result in replenishment of groundwater resources or a reduction of the groundwater pumping because the recycled water would be used as an alternative source of water.

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
Greenhouse Gas Emissions	• Construction and operation of recycled water facilities would likely result in increased use of electricity and fuels. Furthermore, the recycled water process is an energy-intensive process. However, the overall increased electrical load would be extremely small compared to the existing electrical load. Therefore, it is unlikely to require the construction of major new power generation or transmission facilities, and any potential air quality and greenhouse gas emissions would be minor. Furthermore, one of the ways to offset greenhouse gas emissions is to implement water recycling practices or policies; thus, constructing and operating water recycling facilities would support this. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts on greenhouse gas emissions.
Hazards and Hazardous Materials	• Construction of recycled water facilities would be short term and may involve the limited transport, storage, use, and disposal of hazardous materials such as fuel and lubricating grease for motorized heavy equipment. Some examples of typical hazardous materials handling are fueling and servicing construction equipment on the site and transporting fuels, lubricating fluids, solvents, and bonding adhesives. These types of materials are not acutely hazardous, and storage, handling, and disposal of these materials is regulated by local, county, and state laws. Furthermore, the quantities of these materials used during construction would be small (e.g., less than 100 gallons) because construction would be limited in duration. Therefore, if a spill occurred, it could be readily and easily contained. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts associated with hazardous materials during construction. • Operation of recycled water facilities could use chemicals during the wastewater treatment process, which could require the routine transport, use, storage, and disposal of hazardous materials, such as chlorine gas, sulfur dioxide, and aqueous ammonia. These materials are commonly used by WWTPs during their treatment process to comply with effluent discharge standards set by the Central Valley Water Board. These chemicals are considered corrosive and represent inhalation, ingestion, and contact hazards. WWTPs are required to have hazardous materials inventory (HMI) statements and a consolidated contingency plan, as well as a federal risk management plan (RMP) and a California Accidental Release Prevention Program (CalARP) RMP, to properly manage and control these hazardous materials per federal RMP regulations (40 CFR Part 68) and the federal Occupational Safety and Health Administration's (OSHA) Process Safety Management regulations (29 CFR Part 1910.119). The RMPs include the preparation of an offsite consequence analysis of worst-case release of the stored chemicals, and preparation of emergency response plans, including coordination with local emergency response agencies. The RMPs are required to be updated at least every 5 years and when there are significant changes to the quantities of stored chemicals. In addition, The Hazardous Materials Release Response Plans and Inventory Act (also known as the Business Plan Act) requires a business using hazardous materials to prepare a Business Plan describing the facility, inventory, emergency response plans, and training programs. The local Certified Unified Program Agency (e.g., San Joaquin County, Stanislaus County, or Merced County or local fire departments) and (U.S.) Environmental Protection Agency (USEPA) have authority over the management of hazardous materials at WWTPs. Depending on the location of the WWTP, these materials could be used within 1/4 mile of a school because WWTPs would likely be within urban and suburban areas to serve the service area. Per existing regulations, the CalARP RMP would be updated accordingly to reflect the additional volume of chemicals that might be transported, used, or disposed of as a result of the recycled water facilities. Added

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
	transport, use, or disposal of chemicals would also require implementation of a revised CalARP RMP. As part of revising the CalARP RMP, the wastewater facilities would evaluate if current containment systems would be adequate for the additional truck deliveries and make any necessary modifications. Furthermore, Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts associated with hazardous materials during operation. • Recycled water is not considered a hazardous waste (e.g., material that is corrosive, flammable, reactive, etc.). Furthermore, there are many regulations which regulate the release, use, and management of recycled water to protect public health and the environment. For example, purple pipe systems are required for new recycled water distribution systems so that the systems are appropriately connected to the end use (e.g., landscaping). Therefore, people would not be exposed to hazards or hazardous materials as a result of the use of recycled water. • Construction and operation of recycled water would not be a hazard or provide a safety concern to airports because recycled water facilities would be constructed and operated within the existing footprint of wastewater treatment facilities or within close proximity. Furthermore, distribution system would be underground. • Construction and operation of recycled water facilities and distribution systems would not physically interfere with an adopted emergency response plan since they would be located within existing facilities and the existing rights-of-way of roads. During construction of the distribution facilities, road shoulders or lanes may be closed, but traffic construction workers would be employed to direct and control traffic as is typical during work that occurs in the rights-of-way along roads. • Construction and operation of recycled water facilities would not involve the construction of housing or an increase in population and thus would not expose people or structures to wildland fires.
Hydrology and Water Quality	• Construction of recycled water facilities could result in temporary changes to drainages, erosion, or runoff associated with typical construction activities, such as grading or preparation of land. As discussed earlier in this table (Geology and Soils), soil disturbance of over 1 acre would require wastewater treatment special districts or municipalities to prepare and implement a SWPPP. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts on hydrology and water quality. • It is likely that the recycled water facilities would be located in a flood hazard area because wastewater treatment facilities are typically located adjacent to rivers and streams so they can discharge treated effluent into receiving waters. However, because the recycled waste facilities would be located within the existing wastewater treatment footprint, the addition of the recycled water facilities would not substantially add to the existing structures such that flood flows would be impeded or redirected. Furthermore, the recycled water facilities would not substantially increase the number of people exposed to the risk of flooding because they would not draw people to flood hazard locations. Construction of recycled water facilities would not result in flooding or otherwise cause flooding. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts on hydrology and water quality.

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
	• The recycled wastewater facility would have to comply with all recycling wastewater regulations to prevent degradation of water quality in receiving waters. Furthermore, it is not anticipated that the recycled water facility would actually discharge the recycled water into receiving waters because the water would be distributed to users in the service area for their use. The users of the recycled water (e.g., golf courses) would have to prepare plans and undergo inspections by the municipality operating the WWTP and prepare management plans to control runoff and limit inflow into receiving waters.
	• Construction of recycled water facilities would not result in depletion of groundwater or interfere with groundwater recharge because they would generally take place within existing facility footprints and would not need substantial volumes of water. Furthermore, operation of recycled water facilities could increase actual groundwater recharge if it is used to inject into groundwater basins. Users of recycled water (e.g., golf courses) may reduce their use of groundwater because they would have an alternative source of water by using the recycled water.
	• Construction and operation of recycled wastewater facilities would be located in areas of flat relief because these types of facilities are typically not located on the side of steep slopes. Therefore, the locations would not support mudflows, which typically need very steep slopes and large amounts of precipitation to occur. Furthermore, these areas would not be adjacent to the ocean and, therefore, they would not be affected by tsunamis.
Land Use and Planning	• Construction and operation of recycled water facilities would not physically divide an established community because they would likely be located in the existing footprint of the wastewater facility.
	• Construction and operation of recycled water facilities would be take place on the footprint of an existing WWTP or within close proximity and thus would not conflict with land use designations or zoning because WWTPs are typically located in areas that are for public facilities or industrial uses. If the recycled water facilities were inconsistent with applicable land use plans, policies, and regulations, an amendment or variant from the local jurisdiction approving the discretionary action associated with the recycled water facilities would be required by the project proponent prior to project approval and construction. If no discretionary action were to occur as a result of the construction or operation of the recycled water facilities, it is assumed it would not result in a conflict with local land use plans, policies and regulations.
	• Potential conflictss with habitat conservation plans, natural community conservation plans, or other plans, policies and regulations protecting biological species and resources are evaluated in Biological Resources.
Mineral Resources	• Construction and operation of recycled water facilities would have a very low potential to result in the removal or inability to access state or locally designated mineral resource areas. This is because the recycled water facility site(s) would be within existing WWTPs. Furthermore, if the recycled water facilities (or distribution pipelines) are located within a state or locally designated mineral resource area, construction and operation of the recycled water facilities would not permanently remove access to a mineral resource as there would be other locations around the facilities that could provide access to the mineral resource.

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
Noise	• Construction of recycled water facilities could generate temporary noise or groundborne vibrations if pile driving is used. It is likely that recycled water facilities would be constructed in areas with suitable land use designations and zoning for infrastructure (e.g., public facilities or industrial) and thus would be unlikely to have sensitive receptors (e.g., residential homes, hospitals, schools) to noise within close proximity. If sensitive receptors were adjacent to construction activities and experienced construction noise, construction would be temporary and would be required to follow existing local noise ordinances limiting the timing of construction (e.g., generally Mondays– Fridays, sometimes Saturdays, 7am–6pm, excluding federal holidays and Sundays). Furthermore, Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts related to noise. • The operation of recycled water facilities may generate temporary noise during operation. However, the facilities would likely not run continuously as there are peak hours during the day (e.g., early in the morning and the evening) when wastewater is primarily generated. Additionally, the existing WWTPs already generate intermittent noise (e.g., from alarm bells, pumps, and generators). Furthermore, it is anticipated there would be a very low probability that sensitive receptors (e.g. residential homes, hospitals, schools) would be located within close proximity to experience the operating noise generated because it is anticipated that the WWTPs would be located in areas with similar land uses (e.g., other public facilities or industrial facilities). Finally, most of the wastewater treatment facilities are enclosed within buildings that can act to mute the operating noise. Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts related to noise. • Construction of the distribution system would likely exceed noise standards established in local general plans or noise ordinances. This construction would generally occur within public rights-of-way along roads. However, it is speculative to know where distribution lines could be located; they could be located in residential neighborhoods or within immediate proximity to other sensitive receptors (e.g., hospitals, schools, parks). However, Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts related to noise. • Once operational, the distribution system would be located underground and would be used to transport recycled water to end users. This would not result in any noise as it is not expected that new pumping stations or generators would be part of operating the distribution system. Therefore, the operation of the distribution system would not exceed standards established by a local general plan or noise ordinance. • The construction and operation of recycled water facilities would not bring people within close proximity to an airport or expose people to airport noise.

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
Population and Housing	• The construction and operation of recycled water facilities would not involve the construction of new homes or businesses, the extension of roads, or other actions that may induce substantial property or population growth in an area. Furthermore, it would not develop any amenities (e.g., malls, amusement parks, hotels, recreation areas) that would attract people to the plan area. Finally, the facilities would be constructed and operated to replace a water source that was reduced (e.g. surface water) rather than increasing capacity to serve new users. • The construction and operation of recycled water facilities would not displace substantial numbers of people and necessitate the construction of replacement housing elsewhere because the facilities would be located in the existing footprint of WWTPs, and the distribution system would be located in the rights-of-way of existing roads. Thus, no homes or people would be displaced.
Public Services	• The need for additional public services (e.g., fire protection, police protection, libraries, schools) or the deterioration of existing public services typically results from an increase in population. As a location's population increases, the need for additional or new public services and public service facilities generally increases. As discussed above, the construction and operation of recycled wastewater facilities would not involve an increase in population or housing. In addition, these actions would not include proposals for new housing and thus would not generate students or increase demands for school services or facilities.
Recreation	• Construction of recycled water facilities would likely occur within the footprint or immediately adjacent to existing wastewater facilities. These facilities are typically located adjacent to receiving waters and in industrial or urban areas to provide wastewater service to the urban, suburban, and industrial users of the wastewater system. So it is unlikely recreational facilities would be located in areas where wastewater facilities currently exist. However, if recreational facilities were located within very close proximity, construction of recycling facilities may affect them; however, it is unlikely that there would be significant effects on recreational facilities because construction would be temporary and limited. Construction and operation of recycled water facilities would not increase the use of existing parks or recreational facilities and does not result in the construction of actual recreational facilities. Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant indirect impacts related to construction (noise, air quality, etc.) on recreational resources.
Transportation and Traffic	• Construction of recycled water facilities could result in some additional trips associated with construction workers. Wastewater Treatment facilities may be located in urban and suburban areas that could already experience some congestion. However, the temporary increased traffic during construction could exceed local or regional road trip thresholds as it is unknown the number of construction trips that might be needed. Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant transportation and traffic impacts related to construction. • Operation of recycled water facilities would not generate additional trips beyond those required to maintain the existing WWTP as operation of the new facilities would unlikely result in a substantial increase in the number of employees, thus the amount of traffic generated on a daily basis would not increase.

Potential Environmental Effects of Developing Recycled Water Sources	
Resource	Discussion
Utilities and Service Systems	• Construction and operation of recycled water facilities would not be expected to exceed wastewater treatment requirements of the Central Valley Water Board because it would not involve the discharge of treated effluent from a WWTP. It would be contrary to the purpose of developing recycled water sources as a replacement for other water sources if the wastewater treatment facility discharged the recycled water into receiving waters and did not deliver it to potential users (e.g., golf courses or irrigation districts). Additionally, it would not result in a determination by the wastewater treatment provider that it has inadequate capacity to meet the service area's demand because the wastewater facility would continue to treat wastewater and the recycled water facilities would not increase the actual volume of wastewater generated in the service area. • Construction and operation of recycled water facilities involves construction at wastewater treatment facilities; environmental effects are discussed earlier in this table (Aesthetics through Transportation and Traffic). Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts related to all environmental resources. • The construction and operation of recycled water facilities would not need the construction of additional stormwater drains because the facilities would likely be built within the footprint of existing wastewater treatment facilities, which currently have impervious surfaces that generate runoff, thus it is expected that existing stormwater infrastructure would be used. • Construction and operation of recycled water facilities is not expected to generate a substantial increase in solid waste. WWTPs currently generate solid waste in the form of biosolids and other byproducts of the treatment stream. While recycled water facilities may also have some byproduct, it is anticipated it would be similar to the type and amount currently generated by the wastewater treatment facility. Generally, this type of solid waste is not considered hazardous, and the disposal of it follows all regulations and guidelines of solid waste at normal landfills. Furthermore, Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts.

H.3 Methods of Compliance for SDWQ Alternatives

To achieve compliance with the numeric salinity objectives identified in the SDWQ alternatives, it is possible that the Central Valley Water Board may implement changes in the existing National Pollution Discharge Elimination System (NPDE) permits for point-source dischargers into the southern Delta (e.g., WWTPs). The changes to the NPDES permits may set the effluent discharge standards of the WWTPs to match the numeric objective (e.g., 1.0 dS/m or 1.4 dS/m). If these changes to NPDES permits were to occur, it is possible that service providers would undertake certain modifications. The regulated community (e.g., service providers) may choose to do one or a combination of many actions to achieve compliance with potential NPDES permit changes as a result of the SDWQ alternatives. The reasonably foreseeable methods of compliance that service providers may take to reduce salinity are:

- developing new source water supplies such that they have less salt;
- implementing salinity pretreatment programs that require industrial or commercial facilities or residential salinity source controls, which would reduce the amount of salts that are discharged to the sewer system;
- implementing salinity removal at the WWTP to remove salts via desalination before treated effluent is discharged to the southern Delta;
- implementing salinity removal through agricultural return flow salinity control before treated effluent is discharged to the southern Delta; or
- implementing low lift pumping stations in the southern Delta.

As a result of the SDWQ alternatives, it is possible that the Central Valley Water Board may implement a total maximum daily load (TMDL) for salinity in the southern Delta. If one were to be established, it may require agricultural users to reduce agricultural discharges to the southern Delta. If a TMDL were to be established, agricultural dischargers may possibly implement agricultural return flow salinity controls, such as changing the timing of the release of current discharges into the southern Delta or storing the agricultural discharge in evaporation ponds. The program of implementation for the SDWQ alternatives requires additional studies and monitoring of the southern Delta circulation and water levels. It is possible that additional studying and monitoring would determine the need for modifications of the temporary barriers. If this determination is made by the State Water Board, DWR may be required to install low lift pumping stations at the temporary barriers as a method of compliance.

The cost and environmental impacts of the actions associated with the methods of compliance by service providers, agricultural users, and DWR may implement are evaluated below. It should be noted that the regulated community could implement one, more than one, or none of the methods of compliance evaluated. Because it is unknown which members of the regulated community would decide on which method(s) of compliance, for the purposes of this discussion, the methods of compliance are analyzed separately.

H.3.1 New Source Water Supplies

Water supplies with high salinity content can contribute to elevated salinity discharges to the southern Delta. Generally, water purveyors in the plan area (e.g., the Cities of Tracy, Manteca, and Modesto) rely on a combination of surface water and groundwater to meet potable water demand. Groundwater is typically more saline than surface water in the San Joaquin Basin. All things being equal, by reducing reliance on groundwater for potable water demand, salinity discharged to the southern Delta would decrease.

Cost Evaluation

One method to reduce salinity discharges is to use more high water quality water (i.e., surface water) to meet water demands. To use more surface water, a water purveyor may need to enlarge existing structures (water intake, treatment facility, and pipelines and pumps), or build new structures.

One comparable project is the Davis-Woodland Water Supply Project (DWWSP). The DWWSP will construct a surface water intake, water treatment plant, pump stations, storage tanks, and associated transmission lines to develop 45,000 acre-feet per year (AFY) of new, high quality water resources on the Sacramento River. The DWWSP is in the planning and design phases at time of publication of this Substitute Environmental Document and is anticipated to start construction in 2014. The estimated project costs are detailed in Table H-11, *Design and Construction Costs for the Davis-Woodland Water Supply Project and Delta Water Supply Project* (WDCWA 2011).

The City of Stockton is nearing completion of its Delta Water Supply Project (DWSP) which will divert water pursuant to Water Code, Section 1485. Water Code, Section 1485 allows any municipality disposing of treated wastewater into the San Joaquin River (SJR) to seek a water right to divert a like amount of water, less losses, from the river downstream of the point of its wastewater discharge. The DWSP will develop 33,600 AFY of new water resources in the Delta. The DWSP is constructing a new surface water intake, water treatment plant, pump stations, and pipelines. The estimated project costs are also detailed in Table H-11 (Price pers. comm.).

Table H-11. Design and Construction Costs for the Davis-Woodland Water Supply Project and Delta Water Supply Project

Cost Category	DWWSP (millions)	DWSP (millions)
Design and Construct Intake	$15.6	$22.3
Design and Construct Treatment Facilities and Pipelines	$236.9	$176.6
Project Administration *	$33.1	$14.2
Other Local Costs **	$51.4	$21.6
Total	$337	$234.7

Source: Price pers. Comm.

* Project Administration includes environmental and construction permitting, land acquisitions, rights of way, pre-design, agency administration and contingency, program management, water rights permits, and water supply acquisition.

** Other Local Costs includes costs to the water purveyor not included in the project, but necessary to integrate the project into the existing infrastructure.

All Costs in 2010 dollars.

DWWSP = Davis-Woodland Water Supply Project

DWSP = Delta Water Supply Project

Comparing these two projects, it would generally cost $337–$234.7 million to plan, design, manage, and construct the required facilities to develop 33,600–45,000 AFY of new surface water resources in the Delta.

Environmental Evaluation

Summary of Potential Action

Procuring and providing alternate low-salinity water source(s) to water users in a service area would reduce the salinity in the potable water used, ultimately lowering the salinity in the wastewater and treated effluent discharged from the WWTP. This action would require municipalities and/or water districts that serve customers in the southern Delta to obtain a new source of low-salinity water (e.g., purchasing surface water diversions from senior surface water users) and would likely require modifications to existing water supply distribution system(s) or the construction and operation of new water supply distribution system(s). The water supply distribution system(s) would take the new source of low-salinity water and distribute it within the water district service area. Municipalities and/or water districts with service areas within the southern Delta or that provide water to customers who ultimately discharge treated effluent into the southern Delta and could implement changes to their distribution system(s) include: the City of Manteca, Lathrop, and Raymus Village; City of Tracy; City of Stockton and Stockton East Water District.

The location, timing of construction, details of operation, and source of low-salinity water are all unknown. However, it is expected that obtaining an alternative source of low-salinity water would require the construction and operation of underground pipes and/or above-ground canals and pump stations to distribute water from one unknown location to another. Underground pipes would be typically located within existing rights-of-way of roads, adjacent to existing utility lines approximately 3–8 feet below ground surface. If canals were to be used, the location and volume of

canals are unknown. If pump stations are used, they would likely be located adjacent to the canals or the pipelines, but the location is unknown.

Potential Environmental Effects

Construction of new source water supply facilities would likely result in temporary, and highly localized, effects typically associated with similar activities, such as air quality effects and ground disturbance. As noted above, it is likely that such facilities would be constructed in areas that are already disturbed by urban development, and most facilities would be located within existing facility footprints and rights-of-way of existing roads. Depending on the precise location, new diversion facilities could have the potential for aquatic resources effects during construction and operation, which would need to be evaluated and mitigated as part of the project level analysis. The construction and operation of such facilities are highly regulated, and any such project would be required to comply with these regulations. In addition, because such facilities would be publicly-owned by either water supply purveyors and service districts or WWTP service districts and subject to CEQA, any new projects would undergo the appropriate level of CEQA and other required regulatory compliance at the time they are proposed. Implementation of these potential methods of compliance would improve salinity conditions in the southern Delta, thereby slightly improving conditions for agricultural uses and aquatic resources.

Table H-12, *Potential Environmental Effects of New Source Water Supply Facilities*, summarizes the potential environmental effects associated with new source water supply facilities. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance,* at the end of this appendix, lists potential mitigation measures associated with the construction or operation of the methods of compliance and is referenced in Table H-12 where appropriate.

Table H-12. Potential Environmental Effects of New Source Water Supply Facilities

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
Aesthetics	• Construction and operation of new source water supply facilities could include the addition of pipelines, canals, small lift or pump stations, and tie-in stations to existing intakes of existing water treatment plants. These types of facilities would not be expected to significantly affect the visual character or quality of an area. Generally, these would unobtrusive structures, with low profiles and a very low potential to affect existing sensitive receptors (e.g., residents or recreationists). Construction may involve lighting for safety. Impacts would depend on the location of sensitive receptors to potential construction lighting; however, lighting would be temporary and limited in scope, scale, and duration. Furthermore, many of the facilities (such as pipelines) would likely be located below ground surface and, once operational, would not have the ability to affect the visual quality or character of an area. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance,* identifies potential mitigation measures lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant environmental effects associated with light and glare.
Agriculture and Forestry Resources	• Construction and operation of new source water supply facilities such as pipelines, small lift or pump stations, and tie in stations, would not be expected to be located on agricultural lands because they are expected to be located along the rights of way of existing roads or close to existing water supply infrastructure. If canals are constructed and operated, there is the potential for canals to remove some amount of agricultural lands; however, the amount cannot be quantified because the location of the canals is unknown. But it is expected that agricultural uses in the southern Delta would benefit from the reduction in salinity discharges provided by the new source water supplies and thus potentially offset any agricultural land that might be indirectly affected by the new source water supplies. Table H-24 identifies potential mitigation measures lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant environmental effects associated with removal of agricultural resources.
Air Quality	• Construction and operation of new source water supply facilities would likely be located in the San Joaquin Valley Air Basin (SJVAB), which generally covers San Joaquin, Stanislaus, Merced, and Madera Counties. Particulate matter (PM10 and PM2.5) and ozone are of particular concern in the basin. The State of California has classified the SJVAB as being a severe nonattainment area for ozone and a nonattainment area for PM10 and PM2.5. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted an air quality improvement plan that addresses nitrous oxide (NO_X) and reactive organic gases (ROG), both of which are ozone precursors and contribute to the secondary formation of PM10 and PM2.5. • SJVAPCD's published guidelines, *Guide for Assessing Air Quality Impacts* (SJVAPCD 2002) do not require the quantification of construction emissions. Rather, the guidelines require implementation of effective and comprehensive feasible control measures to reduce PM10 emissions (SJVAPCD 2002). SJVAPCD considers PM10 emissions to be the greatest pollutant of concern when assessing construction-related air quality impacts and has determined that compliance with its Regulation VIII, including implementation of all feasible control measures specified in its *Guide for Assessing Air Quality Impacts* (SJVAPCD 2002), constitutes sufficient mitigation to reduce construction-related PM10 emissions to less-than-significant levels and minimize adverse air quality effects. All construction projects must abide by Regulation VIII. Since the publication of the district's guidance manual, the district has revised some of the rules comprising Regulation VIII. Guidance from district

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
	staff indicates that implementation of a Dust Control Plan would satisfy all of the requirements of SJVAPCD Regulation VIII (Siong pers. comm.). Further consultation with SJVAPCD staff indicates that, though explicit thresholds for construction-related emissions of ozone precursors are not enumerated in the *Guide for Assessing and Mitigating Air Quality Impacts*, SJVAPCD considers it to be a significant impact when construction or operational emissions of ROG or NO_X exceed 10 tons per year or if PM10 or PM2.5 emissions exceed 15 tons per year (Siong pers. comm.). • Construction of new source water supply facilities would likely result in emissions associated with construction equipment and construction worker truck trips, as well as fugitive dust emissions from ground disturbance. The quantity, duration, and intensity of construction activity have an effect on the amount of construction emissions and related pollutant concentrations occur at any one time. More emissions are typically generated by relatively large amounts of relatively intense construction. However, if construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix, and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). Depending on the level of activities and amount of infrastructure built, construction of source water supply facilities could exceed thresholds established by SJVAPCD and would require implementation of measures to help reduce or minimize construction-related emissions. Furthermore, generated construction emissions would need to comply with the SJVAPCD regulations described above. Lead agencies (e.g., municipalities or municipal water purveyors) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with construction emissions and air quality. • Operation of new source water supply facilities could include facility inspection and maintenance activities but are expected to be similar to or less than inspection and maintenance of existing water supply facilities. The need for additional energy to distribute the new water supply could result in increased criteria pollutant emissions at other power facilities. However, the power facilities that would compensate for the additional power are already built and permitted to emit a maximum amount of criteria pollutants. These facilities are required to offset additional power generation by the use of pollution credit. Therefore, if additional emissions are generated, they would be generated by facilities that are permitted to do so. Lead agencies (e.g., municipalities or municipal water purveyors) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with operational emissions and air quality. • SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJVAB. Some of these facilities are wastewater treatment facilities, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, painting/coating operations, food processing facilities, feed lots/dairies, and rendering plants. Construction and operation of new water supply facilities would not involve the type of facility identified by SJVAPCD as a known odor source (SJVAPCD 2002). Consequently, it is expected new water supply facilities would not create objectionable odors affecting a substantial number of people.

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
Biological Resources	• Construction and operation of new source water supply facilities, such as pipelines, lift pumps, and tie-ins, would primarily be underground, in the public rights-of-way in existing streets, or adjacent to existing water supply facilities, and are expected to have a low potential to disturb only a very limited habitat or few special-status biological species above ground. If canals are constructed and operated, there is the potential for canals to disturb some amount of habitat or some special-status biological species depending on the location of the canals; however, the potential disturbance cannot be quantified because the location of the canals are unknown. Construction and operation could result in disturbing riparian habitat, jurisdictional aquatic features, and/or special-status plant or animal species. As specific source water supply facilities are designed, lead agencies (e.g., municipalities or municipal water purveyors) would be required to evaluate construction effects of new source water supply facilities such as the potential for direct impacts on jurisdictional waters, habitat, and special-status biological species on a case-by-case basis in subsequent CEQA documents. Table H-24 lists potential mitigation measures lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant environmental effects of construction on special-status biological resources. • Under operation, the new source water supply facilities would primarily be underground and would convey water supplies from a currently unknown source throughout the water district or municipality service area. Therefore, direct and indirect impacts on special-status biological resources or habitat are very unlikely to occur during operation. Furthermore, since the water would likely come from an existing senior water right holder, it is assumed the senior water right holder is using the water for another purpose and, therefore, a change in use of the water for municipal purposes would not result in direct or indirect impacts on special-status biological resources and habitat. Finally, lead agencies (e.g., municipalities or municipal water purveyors) will evaluate the operation of the new source water supply facilities and the potential for direct impacts on jurisdictional waters, habitat, and special-status biological species on a case-by-case basis in subsequent CEQA documents. Table H-24 lists potential mitigation measures lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant environmental effects of operations on special-status biological resources.
Cultural Resources	• Construction of the new water supply facilities would include laying pipeline generally along the rights-of-way of existing roads or installing lift stations or tie-ins in close proximity to existing water supply facilities. There is the potential to encounter significant unknown buried cultural resources during construction because whether significant unknown buried cultural deposits are currently present or absent within these sediments cannot be predicted with certainty. At this time, however, no specific projects have been proposed, and the actual future new source water supply facilities are unknown. Even so, given that most of the construction would occur within highly developed public rights-of-way or where much of the sediments have been previously disturbed, the potential to encounter significant buried cultural resources is greatly reduced. Construction of new water supply facilities such as canals may involve the disturbance of ground not within the rights-of-way of existing roads; however, the location is unknown at this time and, therefore, it the potential to uncover unknown significant cultural resources cannot be determined. However, lead agencies (e.g., municipalities or municipal water purveyors) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects on cultural resources associated with construction.

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
	• As described above, new water supply facilities would primarily be located within the rights-of-way of roads. Therefore, it is highly unlikely human remains, would be disturbed during construction, because these areas have already been highly disturbed. However, canals may be located outside the rights-of-way of public roads; therefore, in the event human remains are uncovered during construction, compliance with the State Health and Safety Code would be required. As specified by Section 7050.5, no further disturbance would occur until the county coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code 5097.98. If such a discovery occurs, excavation or construction would halt in the area of the discovery, the area would be protected, and consultation and treatment would occur as prescribed by law. If the coroner recognizes the remains to be Native American, he or she would contact the Native American Heritage Commission, who would appoint the Most Likely Descendent. Additionally, if the bones are determined to be Native American, a plan would be developed regarding the treatment of human remains and associated burial objects, and the plan shall be implemented under the direction of the Most Likely Descendent.
Geology and Soils	• The locations of the new source water supply facilities could occur in areas known to have an earthquake fault, experience strong seismic ground shaking, experience seismic related ground failure, experience landslides, or be located on a geologic unit or soil that is unstable or be located on expansive soil. However, these facilities would not bring people to the risk of earthquakes or geologic hazards, meaning the construction and operation new water supply facilities would not substantially increase the number of people exposed to the risk of earthquakes or geologic hazards because it would not draw people to earthquake areas or hazard locations not already frequented.
	• Furthermore, all facilities would be required to follow all appropriate building codes and would be designed to withstand seismic-related activities as identified by the building codes. Geologic studies would also be required, and design guidelines would be incorporated into the design and build that would reduce the geologic risk to the structures. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts related to geology and soils associated with construction.
	• Construction of the new source water supply facilities would result in limited ground-disturbing activities, which could cause soil erosion or loss of topsoil; however, ground-disturbing activities would be limited in duration and geography. Furthermore, ground-disturbing activities of an 1 acre or greater would require the water district or municipality to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), as required by the Central Valley Water Board. The SWPPP would require soil and erosion control mechanisms to reduce the effects of soil, erosion, and runoff that may be generated during construction. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts related to soil erosion and stormwater runoff and erosion associated with construction.
	• The construction and operation of new source water supply facilities would not involve constructing or operating septic tanks and, therefore, septic tanks would not be affected by soils incapable of supporting the use of them or other alternative wastewater disposal systems.

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
Greenhouse Gas Emissions	• Construction and operation of new source water supply facilities would likely result in increased use of electricity and fuels. However, the overall increased electrical load would be extremely small compared to the existing electrical load. Therefore it is unlikely to require the construction of major new power generation or transmission facilities and, therefore, any potential air quality and greenhouse gas emissions would be minor. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts on greenhouse gas emissions associated with construction.
Hazards and Hazardous Materials	• Construction of new water supply facilities would be short term and may involve the limited transport, storage, use, and disposal of hazardous materials such as fuel and lubricating grease for motorized heavy equipment. Some examples of typical hazardous materials handling are fueling and servicing construction equipment on the site and transporting fuels, lubricating fluids, solvents, and bonding adhesives. These types of materials are not acutely hazardous, and storage, handling, and disposal of these materials is regulated by local, county, and state laws. Furthermore, the quantities of these materials used during construction would be small (e.g., less than 100 gallons) because construction would be limited in duration. Therefore, if a spill occurred, it could be readily and easily contained. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts associated with hazardous materials during construction. • Construction and operation new source water supply facilities would not be a hazard or provide safety concerns to airports since the facilities would be relatively low profile and/or underground. • Construction of new source water supply facilities, such as pipelines, lift stations, or tie-ins, would not physically interfere with an adopted emergency response plan since they would be located in the existing rights-of-way of public roads. During construction, road shoulders or lanes may be closed, but traffic construction workers would be employed to direct and control traffic as is typical during construction work that occurs in the rights-of-way of public roads. Road shoulders or lanes may be closed as a result of construction of canals if the canals are adjacent to roads or cross roads. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts associated with traffic and potential conflicts with emergency response. Once new source water supply facilities are operational, they would either be underground, adjacent to existing water supply infrastructure, or contained in a linear canal and would not physically interfere with an emergency response plan because they would not interrupt the ability of people to use roads and escape potential emergencies. • Construction and operation of new source water supply facilities would not involve the construction of housing or an increase in population and thus would not expose people or structures to wildland fires.
Hydrology and Water Quality	• Construction of new source water supply facilities could result in temporary changes to drainages, erosion, or runoff associated with typical construction activities such as grading or preparation of land. As discussed earlier in this table (Geology and Soils), soil disturbance of over 1 acre would require water districts or municipalities to prepare and implement a SWPPP. Table H-24 also lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts on hydrology and water quality.

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
	• Under operating conditions of a new source water supply facility, a water district or municipality would need to purchase water from a source such as an irrigation district. The source would have a water right to obtain water from various locations and allocate the amount of water as it sees fit. The source has to comply with its water right, and the water right is designed to comply with all applicable objectives. Therefore, impacts on hydrology and water quality would not occur under operating conditions of new source water supplies because the water district or municipality could not obtain water from a source that was out of compliance with its water right. • It is unknown if new source water supply facilities would be located in a flood hazard area. However, the new source water supply facilities would not substantially increase the number of people exposed to the risk of flooding because they would not draw people to flood hazard locations. Construction of new source water supply facilities would not result in flooding or otherwise cause flooding. The new source water supply facilities are expected to be low in profile and/or underground and would, therefore, not impede or redirect flood flows. • Construction and operation of new source water supply facilities would not result in depletion of groundwater or interfere with groundwater recharge. Furthermore, new source water supplies could actually reduce the amount of groundwater pumped because typically groundwater is saline, and the use of it increases the salinity concentration in the treated effluent discharged into the southern Delta. • Construction and operation of new source water supply facilities would primarily be located in areas of relatively flat relief because pipelines and canals are typically not located on the side of steep slopes. Therefore, these locations would not support mudflows, which typically need very steep slopes and large amounts of precipitation to occur. Furthermore, these areas would not be adjacent to the ocean and, therefore, they would not be affected by tsunamis.
Land Use and Planning	• Construction and operation of new source water supply facilities would not physically divide an established community because the facilities would be located either underground or on land likely designated for infrastructure. • Typically, general land use designations and zoning designations allow for the development of infrastructure, such as pipelines or pumping stations. Thus, it is not anticipated the construction or operation of the new source water supply facilities would result in a conflict with land use designations or zoning. If the new source water supply facilities were inconsistent with applicable land use plans, policies, or regulations, an amendment or variant from the local jurisdiction approving the discretionary action associated with the facilities would be required by the project proponent (e.g., water district or municipality) prior to project approval and construction. If no discretionary action were to occur as a result of the construction or operation of the facilities, it is assumed it would not result in a conflict with local land use plans, policies or regulations. • Potential conflictss with habitat conservation plans, natural community conservation plans, or other plans, policies and regulations protecting biological species and resources are evaluated in Biological Resources.

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
Mineral Resources	• Construction and operation of new source water supply facilities would have a very low potential to result in the removal or inability to access state or locally designated mineral resource areas. This is because the new source water supply facilities would likely be located within the rights-of-way of existing public roads or adjacent to water supply facilities. Additionally, if the new source water supply facilities are located within a state or locally designated mineral resource area, construction and operation of the facilities would not permanently remove access to a mineral resource as there would be other locations around the facilities that could provide access to the mineral resource.
Noise	• Construction of the new source water supply facilities would likely exceed noise standards established in local general plans or noise ordinances. This construction would generally occur within rights-of-way along public roads; however, it is unknown where the new source water supply facilities (e.g., canals) would be located. They could be located in residential neighborhoods or within immediate proximity to other sensitive receptors (e.g., schools, hospitals, parks). If sensitive receptors were adjacent to construction activities and experienced construction noise, construction would likely be temporary and it would be required to follow existing local noise ordinances limiting the timing of construction (e.g., generally Mondays–Fridays, sometimes Saturdays, 7am–6pm, excluding federal holidays and Sundays). Table H-24 lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts related to noise. • Once operational, the new source water supply facilities would be located underground and may include some lift stations. Although the location of the lift pump stations is unknown, it is unlikely they would generate sufficient noise to exceed noise standards established by a local general plan or noise ordinance as they would likely be enclosed for security purposes by some type of enclosed structure or fencing that would serve to mute and reduce noise generated. • The construction and operation of new source water supply facilities would not bring people within close proximity to an airport or expose people to airport noise.
Population and Housing	• The construction and operation of new source water supply facilities would not involve the construction of new homes or businesses, the extension of roads, or other actions that may induce substantial property or population growth in an area. Furthermore, it would not develop any amenities (e.g., malls, amusement parks, hotels, recreation areas) that would attract people to the southern Delta. Finally, they would not be constructed and operated to increase capacity to serve new users. • The construction and operation of new source water supply facilities would not displace substantial numbers of people and necessitate the construction of replacement housing elsewhere because the pipeline facilities and lift pump stations are expected to be located in the rights-of-way of existing roads and adjacent to existing water supply infrastructure. While it is unknown where a canal might be located, it is likely the canal would avoid established homes and neighborhoods.

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
Public Services	• The need for additional public services (e.g., fire protection, police protection, libraries, schools) or the deterioration of existing public services typically results from an increase in population. As a location's population increases, the need for additional or new public services and public service facilities generally increases. As discussed above, construction and operation of new source water supply facilities would not involve an increase in population or housing. In addition, these actions would not include proposals for new housing and thus would not generate students or increased demands for school services or facilities. As discussed above in Hazards and hazardous materials, table H-24 lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts related to emergency vehicles and access.
Recreation	• Construction of new source water supply facilities would likely occur in the rights-of-way of public roads or adjacent to waters supply infrastructure. If recreational facilities were located within very close proximity to construction, the new source water supply facilities may affect recreation; however, construction would be unlikely to result in significant effects on recreational facilities because construction would be temporary and contained to the footprint of the construction area (e.g., rights-of-way of public roads). Construction and operation of new source water supply facilities would not increase the use of existing parks or recreational facilities and would not result in the construction of actual recreational facilities. Table H-24 lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts on recreation related to construction.
Transportation and Traffic	• Construction of new source water supply facilities could result in some additional trips associated with construction workers. These facilities may be located in urban and suburban areas that could already experience some congestion. The temporary increased traffic during construction could exceed local or regional road trip thresholds; however, it is unknown the number of construction trips that might be needed for these facilities. But it is expected construction would be relatively limited in duration. Table H-24 lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts of transportation and traffic related to construction. • Operation of new source water supply facilities would not generate additional trips beyond those required to maintain the existing facilities as operation of the facilities would unlikely result in a substantial increase in the number of employees employed by the water district or municipality, thus the amount of traffic generated on a daily basis would not increase.
Utilities and Service Systems	• Construction and operation of new source water supply facilities would not be expected to exceed wastewater treatment requirements of the Central Valley Water Board because it would not involve the discharge of treated effluent from a wastewater treatment plant (WWTP). Furthermore, it would actually help achieve wastewater treatment requirements because it is expected the lower-salinity source water would result in lower-salinity treated effluent discharged into the southern Delta. Additionally, it would not result in a determination by the wastewater treatment provider that it has inadequate capacity to meet the service area's demand because the wastewater facility would continue to treat the same volume of wastewater as it currently does. • Construction and operation of new source water supply facilities does not involve the construction of wastewater treatment facilities.

Potential Environmental Effects of New Source Water Supply Facilities	
Resource	Discussion
	• Construction and operation of new source water supply facilities does not involve the construction of water supply infrastructure. Environmental effects associated with water supply infrastructure are discussed earlier in this table (Aesthetics through Transportation and Traffic). Table H-24 lists potential mitigation measures that lead agencies (e.g., municipalities or municipal water purveyors) can and should implement to reduce potentially significant impacts related to all environmental resources. • The construction and operation of new source water supply facilities are not expected to need the construction of additional stormwater drains because the facilities would either be underground (e.g., pipelines) or be conveyance canals that would not generate substantial volumes of runoff. Thus, it is expected that existing stormwater infrastructure would be used. • Construction and operation of new source water supply facilities would be unlikely to generate substantial amounts or an increase in solid waste. The new source water supply facilities would move water from one location to another and would not generate solid waste. Solid waste generated during construction would be disposed of at landfills as it would not be considered hazardous and would comply with all applicable laws related to construction debris recycling and solid waste disposal in California.

H.3.2 Salinity Pretreatment Programs

A salinity pretreatment program would target salinity loading in a wastewater service provider's wastewater collection system from domestic (residential) and industrial and commercial sources. It would provide salinity source controls at different locations within a service district to reduce the overall salt loading into the sewer system.

Domestic water similar to that found in the southern Delta may have a high concentration of minerals (typically magnesium and calcium). Water softeners are frequently used in residences to remove these minerals. During a water softener's recharge cycle, brine is used to clean the system and remove magnesium and calcium that accumulate in the mineral exchange tank. The recharge water, with suspended minerals, is then discharged to the wastewater collection system. This brine[2] and mineral solution is rarely treated at a wastewater treatment facility. By removing self-regenerating (or "automatic") water softeners and reducing salinity discharged to the wastewater collection system, salinity in the southern Delta would be expected to be reduced. Many wastewater treatment agencies operate a water softener buy-back program to remove water softeners from domestic use.

Salts also can enter the wastewater collection system as a byproduct of CII activities. Commercial activities, industrial processes, and food preparation activities can contribute to elevated salt loads entering the wastewater collection system and discharging into the southern Delta. Some CII sources of salinity are commercial laundry facilities, food processing operations, and industrial fabrication shops. To address salinity loading by CII dischargers, many wastewater treatment agencies prohibit CII users from discharging to the wastewater collection system or strictly regulate the quality of wastewater entering the wastewater collection system. To improve the water quality of CII dischargers, a variety of pollution-control methods can be used, such as BMPs and desalination devices, depending on the activities conducted by the CII discharger. These methods are typically applied at the industrial or commercial business generating the wastewater.

Cost Evaluation

Many wastewater treatment agencies offer rebate programs for removal of water softeners. Currently, the Inland Empire Utilities Agency (IEUA) and the Los Angeles County Sanitation Districts (LACSD) offer $206–$2,000 to homeowners to remove water softeners (Proctor pers. comm. and Ghuman pers. comm.). Rules for each agency's programs differ, but in general, once a homeowner certifies that the water softener is removed (and it is later verified by the wastewater treatment agency), the wastewater treatment agency will reimburse the homeowner for the cost of removal.

To operate a water softener buyback program, a wastewater treatment agency must: advertise the program, coordinate inspections, process rebate claims, and conduct verification inspections. In some cases, the wastewater treatment agency will hire a plumber to remove water softeners. The administrative support for an in-home water softener rebate program varies. Table H-13, *Inland Empire Utilities Agency Water Softener Buy-Back Program Costs* and Table H-14, *Los Angeles County Sanitation Districts Water Softener Buy-Back Program Costs,* offer general program costs for IEUA and LACSD.

[2] Brine is the saline solution prevented from traveling through an RO filter.

High and low estimates for project cost were obtained by dividing the amount each entity spent on rebates by the upper and lower bounds of the eligible rebate amount, which provided a high and low estimate of the number of rebates issued. The total program cost was divided by the estimated number of rebates issued to obtain a per rebate cost.

Table H-13. Inland Empire Utilities Agency Water Softener Buy-Back Program Costs

	Cost
Program Duration	4 years
Total Program Cost	$ 639,541
Total Amount Spent on Rebates	$ 307,453
Eligible Range of Rebate	$300 - $2,000
Number of Rebates Actually Issued	463
Low Estimate – Program Cost Per $300 Rebate Issued	$620
High Estimate – Program Cost Per $2,000 Rebate Issued	$4,160
Actual Cost – Program Cost Per Rebate Issued	$1,380
Source: Proctor pers. comm.	

Table H-14. Los Angeles County Sanitation Districts Water Softener Buy-Back Program Costs

	Cost
Program Duration	7 years
Total Program Cost	$ 5,931,388
Total Amount Spent on Rebates	$ 2,631,667
Eligible Range of Rebate	$206 - $2,000
Number of Rebates Actually Issued	N/A
Low Estimate – Program Cost Per $206 Rebate Issued	$460
High Estimate – Program Cost Per $2,000 Rebate Issued	$4,510
Actual Cost – Program Cost Per Rebate Issued	N/A
Source: Ghuman pers. comm.	

Based on the information presented in Tables H-13 and H-14, if a wastewater treatment agency anticipates replacing 2,000 water softeners over 5 years, the agency can reasonably expect to pay $928,590–$9,015,410 over a period of 5 years ($185,720–$1,803,080 per year).

Processes to pretreat CII wastewater vary due to discharger type and sources of elevated saline discharge. In some cases, an activity can be modified to reduce the amount of salts discharged to the wastewater collection system. Some general examples of BMPs that a wastewater treatment agency's pretreatment program could implement to reduce salinity are to conserve water, pretreat water, install a desalination device, reduce water runoff, use process water for landscape irrigation, or dispose of solids in landfills instead of in the wastewater collection system.

The costs of some BMPs (e.g., disposing of solids in landfills) have nominal costs (e.g., a slightly higher garbage removal bill). Other BMPs may save the CII money (e.g., using process water for landscape irrigation could reduce the user's monthly water bill).

In the case when a CII discharger decides to install a desalination device, costs vary based on what is being discharged, the volume, and the desired water quality entering the wastewater collection system. Some light commercial reverse osmosis (RO) filtration systems cost as little as $1,000 to install and $200 per year to operate. These systems would purify the domestic water supply for the specific discharger, but the brine must be thrown away in a landfill and not discharged back to the wastewater collection system. Other systems cost millions to install and tens of thousands to operate per year, per user. In some areas, the wastewater treatment agency will bear the cost of procuring and installing a CII pretreatment device; in other areas, the costs will be split between the CII discharger and the wastewater treatment agency.

Environmental Evaluation

Summary of Potential Action

Salinity pretreatment programs would provide salinity source controls at residential homes or existing industrial or commercial facilities within a wastewater treatment service provider's service area. It is anticipated that the following municipalities and/or wastewater treatment service providers that discharge into the southern Delta could implement such programs: City of Tracy, City of Manteca, City of Stockton, Town of Discovery Bay Community Services District, and Mountain House Community Services District. The decision to implement pretreatment programs would include many variables, such as the type and number of industrial or commercial wastewater dischargers in the service area of each service provider and the availability of funding to implement a residential home program.

For residential homes, the program would request or compensate residential users to modify their activities. For industrial or commercial users, a salinity pretreatment program would be expected to modify existing industrial processes and/or require the construction and operation of salinity source controls, such as RO. These salinity source controls would be located at existing industrial or commercial facilities. The location, timing of construction, and details of operation of industrial salinity source controls is unknown. However, any new salinity source controls at an existing industrial facility would likely be constructed and operated within an existing industrial facility footprint or within relative close proximity. This is because salinity source controls would have to be integrated with the industrial waste stream process to capture and treat the water either prior to the industrial process or capture and treat it prior to discharge into the sewer system. Furthermore, it is expected that the industrial facility would be located in urban areas with other industrial uses because generally land uses such as these are located in appropriately designated and zoned areas of municipalities. There may be some highly concentrated salt waste as a result of the operation of the industrial salinity source controls. This concentrated waste could not be disposed of in the sewer and would likely need to be trucked offsite and disposed of in a nonhazardous landfill because the salt waste would not be considered hazardous material. It is anticipated these salinity source controls at industrial facilities would not require additional employees and would not modify or change the volume of industrial or commercial wastewater discharged into the sewer system. However, it is anticipated the quality of the wastewater would be better as the salinity source controls would reduce the salinity of the wastewater.

Potential Environmental Effects

Any environmental effects associated with salinity source control activities at industrial or commercial facilities would be expected to be very minor. Installation of salinity control equipment at existing industrial facilities would involve short-term construction-related effects, such as air quality and ground-disturbing effects. Any construction of new facilities at industrial locations would not be likely to affect natural or cultural resources as those locations because these areas are likely already highly disturbed. Programs involving residential users would not be expected to produce measurable environmental effects. Both residential and industrial programs may result in the production of minor amounts of solid waste, which would be disposed of in accordance with applicable laws and regulations. To the extent such programs were successful in reducing salinity in the southern Delta, agricultural uses and aquatic resources would benefit.

Table H-15 summarizes the potential environmental effects associated with salinity source controls at industrial or commercial facilities. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, at the end of this appendix, lists potential mitigation measures associated with the construction or operation of the methods of compliance and is referenced in Table H-15 where appropriate.

Table H-15. Potential Environmental Effects of Salinity Source Controls

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion
Aesthetics	• Construction and operation of salinity source controls at existing industrial or commercial facilities would not be expected to significantly affect the visual character or quality of areas because the facilities would be located within the existing footprint of other industrial facilities so as to appropriately treat the wastewater prior to discharge into the sewer system. The salinity source controls would be either much smaller than the existing industrial facilities or similar in size and scale as the existing facilities so the wastewater generated by the industrial process can be targeted and treated. Construction and operation of salinity source controls may involve operational and safety lights. Impacts associated with lighting would depend on the location of sensitive receptors to potential lighting; however, lights would be expected to follow lighting guidelines and lighting plans of local jurisdictions approving the construction and operation of the salinity source controls. In addition, as stated above, the salinity source controls would likely be within existing industrial facilities and infrastructure, which may already have operational and safety lighting. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, identifies potential mitigation measures lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant environmental effects associated with lighting.
Agriculture and Forestry Resources	• Construction and operation of salinity source controls would not be expected to be located on lands used for agriculture or convert agricultural lands to nonagricultural uses because the salinity source controls are expected to be located within the footprint of existing industrial or commercial facilities. Additionally, it is expected that agricultural uses in the southern Delta would benefit from the reduction in salinity and thus potentially offset any agricultural land that might be indirectly affected by the salinity source controls.
Air Quality	• Industrial or commercial facilities that would implement salinity source controls would likely be located in the San Joaquin Valley Air Basin (SJVAB), which generally covers San Joaquin, Stanislaus, Merced, and Madera Counties. Particulate matter (PM10 and PM2.5) and ozone are of particular concern in the basin. The State of California has classified the SJVAB as being a severe nonattainment area for ozone and a nonattainment area for PM10 and PM2.5. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted an air quality improvement plan that addresses nitrous oxide (NO_X) and reactive organic gases (ROG), both of which are ozone precursors and contribute to the secondary formation of PM10 and PM2.5. • SJVAPCD's published guidelines, *Guide for Assessing Air Quality Impacts* (SJVAPCD 2002) do not require the quantification of construction emissions. Rather, the guidelines require implementation of effective and comprehensive feasible control measures to reduce PM10 emissions (SJVAPCD 2002). SJVAPCD considers PM10 emissions to be the greatest pollutant of concern when assessing construction-related air quality impacts and has determined that compliance with its Regulation VIII, including implementation of all feasible control measures specified in its *Guide for Assessing Air Quality Impacts* (SJVAPCD 2002), constitutes sufficient mitigation to reduce construction-related PM10 emissions to less-than-significant levels and minimize adverse air quality effects. All construction projects must abide by Regulation VIII. Since the publication of the district's guidance manual, the district has revised some of the rules comprising Regulation VIII. Guidance from district staff indicates that implementation of a Dust Control Plan would satisfy all of the requirements of SJVAPCD Regulation VIII (Siong pers. comm.). Further consultation with SJVAPCD staff indicates that, though explicit thresholds for construction-related

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion

emissions of ozone precursors are not enumerated in the *Guide for Assessing and Mitigating Air Quality Impacts*, SJVAPCD considers it a significant impact when construction or operational emissions of ROG or NO_X exceed 10 tons per year or if PM10 or PM2.5 emissions exceed 15 tons per year (Siong pers. comm.).

- Prior to a project dealing with a stationary source of emissions (such as an industrial or commercial facility), it is required to receive an Authority to Construct (ATC) from SJVAPCD. The project is subject to the requirements of SJVAPD Rule 2201. As stated under Section 1.0 and 1.2 of Rule 2201[3]:

  > *The purpose of this rule is to provide for the following: 1.1 The review of new and modified Stationary Sources of air pollution and to provide mechanisms including emission trade-offs by which Authorities to Construct such sources may be granted, without interfering with the attainment or maintenance of Ambient Air Quality Standards; No net increase in emissions above specified thresholds from new and modified Stationary Sources of all nonattainment pollutants and their precursors.*

- This rule applies to new stationary sources and all modifications to existing stationary sources that are subject to permit requirements and after construction may emit one or more affected pollutant.
- Construction of salinity source controls would likely result in emissions associated with construction equipment and construction worker truck trips, as well as fugitive dust emissions from ground disturbance. The quantity, duration, and intensity of construction activity have an effect on the amount of construction emissions and related pollutant concentrations occur at any one time. More emissions are typically generated by relatively large amounts of relatively intense construction. However, if construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix, and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). Depending on the level of activities and amount of infrastructure built, construction of salinity source controls could exceed thresholds established by SJVAPCD and would be required to implement measures to help reduce or minimize construction-related emissions. Furthermore, construction emissions generated would need to comply with the SJVAPCD regulations described above. Lead agencies (e.g., industrial facilities or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with construction emissions and air quality.

[3] Sources whose primary function is permitted by SJVAPCD through Rules 2010 and 2201 are not subject to SJVAPCD Rule 9510 (Indirect Source Review). Projects subject to Rule 9510 are required to quantify and reduce indirect (mobile source emissions), area-source (space heating, landscaping, and maintenance), and construction exhaust emissions.

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion
	• Operation of salinity source controls would likely be electric because of their expected locations in urban and suburban areas and the expected location within the footprint of an industrial or commercial facility. Salinity source controls may use nonelectric backup intermittently for emergency circumstances. Operations could include facility inspection and maintenance activities and are expected to be similar to or fewer activities than inspection and maintenance of existing wastewater treatment facilities. The need for additional energy could result in increased criteria pollutant emissions at other power facilities. However, the power facilities that would compensate for the additional power are already built and permitted to emit a maximum amount of criteria pollutants. These facilities are required to offset additional power generation by the use of pollution credit. Therefore, if additional emissions are generated, they would be generated by facilities that are permitted to do so. There would be an increased number of truck trips associated with the disposal of salt concentrate at landfills, and these trips would produce emissions (e.g., diesel). The number of truck trips would depend on the salinity of the wastewater, which is a function of the quality and volume of the influent and the industrial or commercial process and therefore cannot be fully quantified. Lead agencies (e.g., industrial facilities or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with operational emissions and air quality. • SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJVAB. Some of these facilities are wastewater treatment facilities, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, painting/coating operations, food processing facilities, feed lots/dairies, and rendering plants (SJVAPCD 2002). While salinity source controls may be applied at one or more of these types of facilities, the salinity source controls would not contribute to any odors that would already be produced by the facilities. This is because the salinity source controls take the facility wastewater that is already produced on site and remove salt. Therefore, construction and operation of salinity source controls would not create objectionable odors affecting a substantial number of people.
Biological Resources	• It is expected that construction and operation of salinity source controls would be in urban and suburban areas within the footprint of existing industrial or commercial facilities. These areas are expected to have a low potential for special-status plant species, animal species, and habitat because the footprint of the industrial or commercial facilities are expected to have a very low potential for special-status plant species, animal species, and habitat because they typically have buildings and impervious surfaces and would be very unlikely to support special-status biological resources. Because of their location, construction and operation of such facilities are unlikely to interfere with the migration of biological resources. Because of this, it is highly unlikely construction and operation of salinity source controls would conflict with local policies protecting biological resources or conflict with an adopted natural community conservation plan or habitat conservation plan. Furthermore, it is expected that the treated effluent discharged from the wastewater treatment plant (WWTP) would actually be improved from baseline conditions because the salinity source controls would remove salinity, and this would be considered beneficial to aquatic and other biological resources. Table H-24 lists potential mitigation measures lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant environmental impact of construction and operations on special-status biological resources.

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion
	• The brine generated by salinity source controls would be disposed of at landfills, and would have a very low potential to affect special-status biological resources because the brine would be within the landfill's boundaries.
Cultural Resources	• Construction and operation of salinity source controls would likely exist in urban and suburban areas within industrial or commercial facilities. Construction may result in some ground-disturbing activities, which has the potential to disturb or destroy buried, unknown significant cultural resources. While it is unknown if cultural resources exist in these locations, these areas would have likely been previously disturbed during the construction of the existing industrial or commercial facilities, thus reducing the potential for significant unknown cultural resources to exist. Operation of salinity source controls has no potential to affect cultural resources because the facilities would simply remove salt and discharge a higher quality wastewater into the sewer system. Lead agencies (e.g., industrial facilities or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects on cultural resources associated with construction.
	• As described above, it is expected the industrial or commercial facility locations would be previously disturbed. If, in the highly unlikely event human remains are uncovered during construction, compliance with the State Health and Safety Code would be required. As specified by Section 7050.5, no further disturbance shall occur until the county coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code 5097.98. If such a discovery occurs, excavation or construction shall halt in the area of the discovery, the area shall be protected, and consultation and treatment shall occur as prescribed by law. If the coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission, who shall appoint the Most Likely Descendent. Additionally, if the bones are determined to be Native American, a plan shall be developed regarding the treatment of human remains and associated burial objects, and the plan shall be implemented under the direction of the Most Likely Descendent.
Geology and Soils	• There are no impact mechanisms associated with salinity source controls that could result in an impact on, or be affected by: Alquist-Priolo faults, strong seismic shaking, seismic-related ground failure, expansive soils, or landslides. Since the facilities would be located within existing industrial or commercial facilities, the addition of the salinity source controls would not substantially add to the structure such that it would increase the exposure of the structure to potential substantial adverse effects, such as risk of loss to rupture of known earthquake fault, seismic ground shaking, or seismic ground-related failure. Furthermore, all new structures related to salinity source controls would be required to follow all appropriate building codes and be designed to withstand seismic-related activities as identified by the building codes. Finally, salinity source controls would not substantially increase the number of people exposed to the risk of earthquakes or geologic hazards because it would not draw people to earthquake areas or hazard locations not already frequented.
	• The construction and operation of salinity source controls would not involve constructing or operating septic tanks and, therefore, septic tanks would not be affected by soils incapable of supporting the use of them or other alternative wastewater disposal systems.
	• Construction of salinity source controls could result in limited ground-disturbing activities, which could cause soil erosion or loss of topsoil; however, ground-disturbing activities would be limited in duration and geography and would be contained within the site of the industrial or commercial facility. Furthermore, ground-disturbing activities of 1 acre or greater would

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion
	require the need for preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) as required by the Central Valley Water Board. The SWPPP would require soil and erosion control mechanisms. Table H-24 also lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant impacts related to soil erosion and stormwater runoff and erosion associated with construction.
Greenhouse Gas Emissions	• Construction and operation of salinity source controls would likely result in increased use of electricity and fuels. Furthermore, depending on the process used (e.g., reverse osmosis) salinity source controls is known to be an energy-intensive process. However, the overall increased electrical load would be extremely small compared to the existing electrical load of the service area. Therefore it is unlikely to require the construction of major new power generation or transmission facilities and, therefore, any potential air quality and greenhouse gas emissions would be minor. Table H-24 also lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant impacts on greenhouse gas emissions.
Hazards and Hazardous Materials	• Construction of salinity source controls would be short term in nature and may involve the limited transport, storage, use, and disposal of hazardous materials such as fuel and lubricating grease for motorized heavy equipment. Some examples of typical hazardous materials handling are fueling and servicing construction equipment on the site and transporting fuels, lubricating fluids, solvents, and bonding adhesives. These types of materials are not acutely hazardous, and all storage, handling, and disposal of these materials are regulated by local, county, and state laws. Furthermore, the quantities of these materials used during construction would be small (e.g., less than 100 gallons) because construction would be limited in duration. Therefore, if a spill occurred, it could be readily and easily contained. Table H-24 also lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant impacts associated with hazardous materials during construction. • Operation of salinity source controls would not produce any new wastewater that would not already be produced and discharged to the sewer system and ultimately treated at the WWTP. If municipal wastewater already contains constituents, they should not be hazardous due to pretreatment requirements with which industrial and commercial facilities must comply. Therefore, when compared to baseline, no new quantities of hazardous materials would be used, transported, or disposed of. There could be a new waste stream (e.g., salt concentrated waste) generated from the industrial or commercial facility that would need to be removed; however, it is unlikely this would be deemed hazardous because of the pretreatment program and because it would be primarily comprised of salt. Table H-24 also lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant impacts associated with hazardous materials during operation.

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion
	• Construction and operation of salinity source controls would not be a hazard or provide a safety concern to airports since salinity source controls would be constructed and operated within the footprint of existing industrial or commercial facilities. • Construction and operation of salinity source controls would not physically interfere with an adopted emergency response plan since they would be located within exiting industrial or commercial facilities and therefore would not prohibit the mobility of people to escape potential emergencies. • Construction and operation of salinity source controls would not involve the construction of housing or an increase in population and thus would not expose people or structures to wildland fires.
Hydrology and Water Quality	• Construction of salinity source controls could result in temporary changes to drainages, erosion, or runoff associated with typical construction activities, such as grading or preparation of land. As discussed earlier in this table (Geology and Soils), for soil disturbance of over 1 acre, wastewater treatment special districts or municipalities would be required to prepare and implement a SWPPP. Table H-24 also lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant impacts on hydrology and water quality. • It is unknown if industrial or commercial facilities implementing salinity source controls would be located in a flood hazard area. However, since salinity source controls would be located within an existing industrial or commercial facility footprint, the addition of salinity source controls would not substantially add to the existing structures such that flood flows would be impeded or redirected. Furthermore, salinity source controls would not substantially increase the number of people exposed to the risk of flooding because they would not draw people to flood hazard locations. Construction of salinity source controls would not result in flooding or otherwise cause flooding. • Under operating conditions, industrial or commercial facilities would continue to discharge pretreated wastewater into the sewer and would have to comply with the pretreatment requirements of the receiving WWTP. The pretreatment requirements are in place such that they meet waste discharge requirements of the WWTP. While there could be an exceedance in wastewater treatment effluent due to an unforeseen circumstance, it would not be expected under normal operating procedures of the industrial or commercial facility. Salinity source controls would not increase the volume of wastewater discharged from the industrial facility but rather would reduce the salinity of the wastewater discharged into the sewer system. Therefore, it is expected that hydrology or water quality would not be affected as the pretreated wastewater would be the same volume the facility currently discharges and would be of better water quality (i.e., less salinity). • The salinity source controls would likely not result in the need for new stormwater facilities because there is a low likelihood of new impervious surfaces being created as salinity source controls would likely be located in existing industrial or commercial facility footprints. • Increases in groundwater pumping are not expected under the construction and operation of salinity source controls because these types of control measures would not need to pump groundwater. Furthermore, industrial or commercial uses do not typically pump groundwater and receive their source water from municipal sources. • Construction and operation of salinity source controls would primarily be located in areas of relatively flat relief because they would be within the footprint of existing industrial or commercial facilities, and these facilities typically are not located on the side of steep slopes. Therefore, these locations would not support mudflows, which typically need very steep slopes and large

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion
	amounts of precipitation to occur. Furthermore, these areas would not be adjacent to the ocean and, therefore, would not be affected by tsunamis.
Land Use and Planning	• Construction and operation of salinity source controls would not physically divide an established community because they would likely be located in the existing footprint of industrial or commercial facilities. • Construction and operation of salinity source controls would take place on the footprint of existing industrial or commercial facilities and thus would not conflict with land use designations or zoning because the industrial or commercial facilities are allowed generally to update or modify their facilities and processes within their appropriate land use and zoning designations. • If the salinity source controls were inconsistent with applicable land use plans, policies, or regulations, an amendment or variant from the local jurisdiction approving the discretionary action associated with the salinity source controls would be required by the project proponent prior to project approval and construction. If no discretionary action occurred as a result of the construction or operation of the salinity source controls, it is assumed it would not result in a conflict with local land use plans, policies, or regulations. • Potential conflictss with habitat conservation plans, natural community conservation plans, or other plans, policies and regulations protecting biological species and resources are evaluated in Biological Resources.
Mineral Resources	• Construction and operation of salinity source controls would have a very low potential to result in the removal or inability to access state or locally designated mineral resource areas. This is because salinity source controls would be within existing industrial and commercial facilities, which are typically not located in the middle of mineral resource extraction areas. Furthermore, if the industrial or commercial facilities are located within a state or locally designated mineral resource area, construction and operation of salinity source controls would not permanently remove access to a mineral resource as there would be other locations around the facilities that could provide access to the mineral resource.
Noise	• Construction of salinity source controls could generate temporary noise. It is likely salinity source controls would be constructed in areas with suitable land use designations and zoning for industrial or commercial uses because they would be within the footprint of existing industrial and commercial facilities; therefore, it would be unlikely that sensitive receptors (e.g., homes, hospitals, schools) would be within close proximity. If sensitive receptors were adjacent to construction activities and experienced construction noise, construction would likely be temporary and would be required to follow existing local noise ordinances limiting the timing of construction (e.g., generally Mondays –Fridays, sometimes Saturdays, 7am–6pm, excluding federal holidays and Sundays). Table H-24 lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant impacts related to noise.

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion
	• The operation of salinity source controls may generate temporary noise when the industrial or commercial facility is running. However, the existing facilities may already generate intermittent process noise (e.g., from alarm bells, pumps, and generators). Furthermore, it is anticipated there would be a very low probability that sensitive receptors (e.g., homes, hospitals, schools) would be located within close proximity to experience the operating noise generated because it is anticipated that the industrial or commercial facilities would be located in areas with similar land uses (e.g., other industrial facilities). Finally, it is expected that the salinity source controls would be enclosed within the industrial or commercial buildings, which can act to mute the operating noise. • The construction and operation of salinity source controls would not bring people within close proximity to an airport or expose people to airport noise.
Population and Housing	• The construction and operation of salinity source controls would not involve the construction of new homes or businesses, the extension of roads, or other actions that may induce substantial property or population growth in an area. Furthermore, it would not develop any amenities (e.g., malls, amusement parks, hotels, recreation areas) that would attract people to the southern Delta. • The construction and operation of salinity source controls would not displace substantial numbers of people and necessitate the construction of replacement housing elsewhere because the facilities would be located in the existing footprint of industrial or commercial buildings and not where people currently reside.
Public Services	• The need for additional public services (e.g., fire protection, police protection, libraries, schools) or the deterioration of existing public services typically results from an increase in population. As a location's population increases, the need for additional or new public services and public service facilities generally increases. As discussed above, the construction and operation of salinity source controls would not involve an increase in population or housing. In addition, these actions do not include proposals for new housing and thus would not generate students or increased demands for school services or facilities.
Recreation	• Construction of salinity source controls would likely occur within the footprint of industrial or commercial facilities. These facilities are typically located adjacent to other commercial or industrial land uses, so it is unlikely recreational facilities would be located in areas where they currently exist. However, if recreational facilities were located within very close proximity to the salinity source controls, their construction may affect the recreational facilities. However, it is unlikely that salinity source control construction would result in significant effects on recreational facilities because construction would be temporary and limited. Construction and operation of salinity source controls would not increase the use of existing parks or recreational facilities and would not result in the construction of actual recreational facilities. Table H-24 lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant impacts on recreation related to construction.
Transportation and Traffic	• Construction of salinity source controls could result in some additional trips associated with construction workers. Industrial or commercial facilities may be located in urban and suburban areas that could already experience some congestion. The temporary increased traffic during construction could exceed local or regional road trip thresholds as it is unknown the number of construction trips that might be needed. Table H-24 lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant transportation and traffic

Potential Environmental Effects of Salinity Source Controls	
Resource	Discussion
	impacts related to construction. • Operation of salinity source controls would generate additional truck trips to dispose of the salt concentration generated by the salinity source control process. The number of truck trips depends on the volume of wastewater treated per day and the quality of water; therefore, the number of trucks that would be required is unknown. Table H-24 lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant transportation and traffic impacts related to operations.
Utilities and Service Systems	• Construction and operation of salinity source controls would not be expected to exceed wastewater treatment requirements of the Central Valley Water Board because it would actually improve the water quality of wastewater entering a WWTP and therefore would overall reduce the salinity in the treated effluent that is discharged into receiving waters. Additionally, construction and operation of salinity source controls would not result in a determination by a wastewater treatment provider that it has inadequate capacity to meet the service area's demand because industrial or commercial facilities would discharge the same volume of wastewater into the sewer system; therefore, the wastewater treatment facility would treat the same volume of wastewater. • Construction and operation of salinity source controls would not involve the construction of wastewater treatment facilities or water supply treatment facilities or infrastructure. • The construction and operation of salinity source controls would not need the construction of additional stormwater drains because they would likely be built within the footprint of the existing industrial or commercial facilities, which currently have impervious surfaces that generate runoff; therefore, it is expected that existing stormwater infrastructure would be used. • Construction and operation of salinity source controls could generate solid waste in the form of salt concentrate. This type of solid waste is not considered hazardous, and the disposal of brine would follow all regulations and guidelines of solid waste in Class I/II landfills (non-hazardous waste landfills). Table H-24 lists potential mitigation measures that lead agencies (e.g., industrial facilities or municipalities) can and should implement to reduce potentially significant impacts.

H.3.3 Desalination

Some wastewater treatment agencies may opt to remove salts at the WWTP before treated effluent is discharged to the southern Delta. Conventional wastewater treatment processes do not significantly remove salts from the wastewater treatment stream. To remove salts, a discharger must desalinate treated wastewater effluent. Methods to desalinate water at WWTPs include thermal separation, electro-dialysis, and reverse osmosis (RO). RO is analyzed herein because it is the most common desalination technology in California and is comparable or less expensive than other desalination methods (e.g., ion exchange, distillation, etc.) (DWR 2009).

Cost Evaluation

The costs of RO include the costs associated with the construction of the RO facilities and operation and maintenance costs associated with energy and brine disposal. Brine's salinity is a function of the quality and volume of the influent into the RO filter and the efficiency of the RO filter. For example, if the influent water had 75,000 pounds of salt per 10 million gallons per day, and the RO filter was 85 percent efficient, the brine would contain 75,000 pounds of salt per 1.5 million gallons of RO filter reject water (or a 5 percent saline brine solution).

Brine disposal is an important consideration when evaluating wastewater treatment technologies used to reduce salinity. This is because of the associated costs potential environmental effects of brine disposal. There are five major methods of brine disposal: (1) disposal to WWTPs, (2) disposal to surface waters, (3) deep-well injection, (4) evaporation ponds, and (5) evaporation to dryness (crystallization). Approximately 40 percent of all desalination facilities in the country discharge brine to an existing wastewater collection system (Sethi, et al. 2006; USBR 2006b). Approximately 48 percent of all desalination facilities in the country discharge brine directly to surface water (Sethi, et al. 2006; USBR 2006b). In some areas, brine may be discharged to a deep well, below potable water aquifers (TWDB 2009). Regulatory concerns associated with this method of brine disposal include the receiving water's transmissivity, the salinity of the receiving water, and the presence of a structurally isolating and confining layer between the receiving aquifer and any overlying source of drinking water (Sethi, et al. 2006; USBR 2006b). Evaporation ponds can be used in relatively warm, dry climates with high evaporation rates, level terrain, and low land costs (Sethi, et al. 2006a). Evaporation ponds allow the brine to dewater, and then be hauled to a landfill for ultimate disposal. Thermal separators and vapor compression systems can completely remove water from brine, leaving a crystallized solid for disposal. These systems are very energy intensive. The capital, operations, and maintenance costs can exceed the cost of the desalination facility. This potential brine disposal method is used for very small flows where other discharge methods are not feasible (Sethi, et al. 2006). Other methods that have been utilized are treatment wetlands and other developing technologies (TWDB 2009).

Evaporation ponds were selected for this cost evaluation because of their associated cost and regulatory constraints. The assumptions included in the cost evaluation are: a portion or all of the wastewater would be treated with RO at the wastewater facility; the brine would be dewatered in evaporation ponds located at the wastewater facility or adjacent to the wastewater facility; and solids remaining after evaporation would be transported and disposed of at a Class I/II landfill (non-hazardous waste landfill).

The cost to install a desalination system at a WWTP is highly variable. Important factors to consider are: the quality and quantity of water entering the desalination system, the desired water quality leaving the desalination system, energy costs, the chosen method of desalination, and the brine disposal method. Some WWTPs will only need to treat a portion of the influent wastewater to achieve effluent limitations for salinity, which would reduce costs.

The California Water Plan Update 2009 discusses the cost of desalination, with the following summary of costs (Table H-16, DWR 2009).

Table H-16. California Water Plan Update 2009 Unit Cost of Desalination

	Total Water Cost ($/AF)	
Type of Desalting	Low	High
Groundwater	$500	$900
Wastewater	$500	$2,000
Seawater	$1,000	$2,500

Source: DWR 2009
AF = acre-feet

Using this approximation, a 10 million gallon per day discharger can expect to pay $5–$22 million to construct an RO system at the WWTP. Extrapolating this trend is nonlinear. The associated administrative, engineering, and legal costs do not generally decrease for smaller projects. Larger RO facilities cost more, but the typical unit price of water produced decreases due to the scale of construction costs compared to administrative, engineering, and legal costs.

Environmental Evaluation

Summary of Potential Action

The location, timing of construction, and details of operation of desalination facilities is unknown. However, any modified or new desalination facilities would likely be constructed and operated in the existing footprint of, or within very close proximity to, a WWTP that discharges treated effluent into the southern Delta waterways or is physically located within the southern Delta. This is because the desalination process would have to be integrated with the wastewater treatment stream to capture the wastewater, remove the salt, and release the treated effluent into existing receiving water. Additionally, it is assumed WWTPs are located within close proximity to creeks or rivers because they must discharge treated effluent into receiving waters. It is also assumed WWTPs are located in more urbanized areas and adjacent to industrial and urban uses because they must be located in an area to serve their existing municipal customers. Treatment plants are generally located on lands designated and zoned for public facilities and industrial uses. Desalination would likely require the disposal of highly concentrated salt waste streams (e.g., brine). These waste streams are assumed to be trucked offsite and disposed of in a landfill for nonhazardous materials. Since the operation of the desalination facilities would be located within existing WWTPs or within close proximity, and the process is highly automated, it is anticipated that the current employees of the existing WWTP would maintain and operate the facility and that substantial additional employees would not be needed.

Potential Environmental Effects

Construction of wastewater desalination facilities would likely result in minor, temporary, and highly localized effects typically associated with similar activities including air quality effects and ground disturbance. As noted above, it is likely that such facilities would be constructed in areas that are already disturbed by urban development, and most facilities would be located within existing facility footprints and rights-of-way. In addition, because such facilities are publicly-owned in the plan area and subject to CEQA, any new projects would undergo the appropriate level of CEQA compliance at the time they were proposed.

Desalination facilities are typically relatively energy intensive. However, the overall increased electrical load for new treatment facilities would be very small compared to the existing electrical grid capacity and is unlikely to require the construction of major new power generation or transmission facilities. Any potential air quality and GHG emissions due to increased power generation would be minor. The operation of new treatment facilities may require a slight increase in chemical transport and storage, but this potential increase would likely be minimal because new facilities would likely be constructed within or adjacent to existing wastewater treatment facilities. Therefore, the increase would be negligible compared to existing chemical use and transport. New desalination facilities may result in the production of solid waste, which would be disposed of in accordance with applicable laws and regulations in landfills. To the extent such programs were successful in reducing salinity in the southern Delta, agricultural uses and aquatic resources would benefit.

Table H-17 summarizes the potential environmental effects associated with desalination. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, at the end of this appendix lists potential mitigation measures associated with the construction or operation of the methods of compliance and is referenced in Table H-17 where appropriate.

Table H-17. Potential Environmental Effects of Wastewater Treatment Plant Desalination

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
Aesthetics	• Construction and operation of wastewater treatment plant (WWTP) desalination would not be expected to significantly affect the visual character or quality of areas because desalination facilities would be located within the existing footprint of WWTPs or within close proximity. These facilities would be similar in size and scale as the existing facilities of the WWTP. Construction and operation of desalination facilities may have operational and safety lights. Impacts would depend on the location of sensitive receptors to potential lighting; however, lights would be expected to follow lighting guidelines and lighting plans of local jurisdictions approving the construction and operation of the desalination facilities. In addition, the desalination facilities would likely be located adjacent to wastewater facilities and infrastructure, which may already have operational and safety lighting. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, identifies potential mitigation measures lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant environmental effects associated with lighting.
Agriculture and Forestry Resources	• Construction and operation of desalination facilities would not be expected to take place on lands used for agriculture because they would be located within the footprint of existing WWTPs or within very close proximity such that the desalination facilities can use the existing wastewater treatment stream. Additionally, it is expected that agricultural uses in the southern Delta would benefit from the reduction in salinity and thus potentially offset any losses of agricultural land that might be indirectly affected by the desalination facilities. Furthermore, if agricultural lands were removed, the local jurisdiction would implement applicable policies to compensate for the loss of the land. Table H-24 identifies potential mitigation measures lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant environmental effects on agricultural resources.
Air Quality	• Desalination facilities would likely be located in the San Joaquin Valley Air Basin (SJVAB), which generally covers San Joaquin, Stanislaus, Merced, and Madera Counties. Particulate matter (PM10 and PM2.5) and ozone are of particular concern in the basin. The State of California has classified the SJVAB as being a severe nonattainment area for ozone and a nonattainment area for PM10 and PM2.5. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted an air quality improvement plan that addresses nitrous oxide (NO_X) and reactive organic gases (ROG), both of which are ozone precursors and contribute to the secondary formation of PM10 and PM2.5. • SJVAPCD's published guidelines, *Guide for Assessing Air Quality Impacts* (SJVAPCD 2002) do not require the quantification of construction emissions. Rather, the guidelines require implementation of effective and comprehensive feasible control measures to reduce PM10 emissions (SJVAPCD 2002). SJVAPCD considers PM10 emissions to be the greatest pollutant of concern when assessing construction-related air quality impacts and has determined that compliance with its Regulation VIII, including implementation of all feasible control measures specified in its *Guide for Assessing Air Quality Impacts* (SJVAPCD 2002), constitutes sufficient mitigation to reduce construction-related PM10 emissions to less-than-significant levels and minimize adverse air quality effects. All construction projects must abide by Regulation VIII. Since the publication of the district's guidance manual, the district has revised some of the rules comprising Regulation VIII.

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion

Guidance from district staff indicates that implementation of a Dust Control Plan would satisfy some requirements of SJVAPCD Regulation VIII (Siong pers. comm.). Further consultation with SJVAPCD staff indicates that, though explicit thresholds for construction-related emissions of ozone precursors are not enumerated in the *Guide for Assessing and Mitigating Air Quality Impacts*, SJVAPCD considers it a significant impact when construction or operational emissions of ROG or NO_X exceed 10 tons per year or if PM10 or PM2.5 emissions exceed 15 tons per year (Siong pers. comm.).

- Prior to a project dealing with a stationary source of emissions (such as a WWTP) it is required to receive an Authority to Construct (ATC) from SJVAPCD. The project is subject to the requirements of SJVAPD Rule 2201. As stated under Section 1.0 and 1.2 of Rule 2201[4]:

  > *The purpose of this rule is to provide for the following: 1.1 The review of new and modified Stationary Sources of air pollution and to provide mechanisms including emission trade-offs by which Authorities to Construct such sources may be granted, without interfering with the attainment or maintenance of Ambient Air Quality Standards; No net increase in emissions above specified thresholds from new and modified Stationary Sources of all nonattainment pollutants and their precursors.*

- This rule applies to new stationary sources and all modifications to existing stationary sources that are subject to permit requirements and after construction may emit one or more affected pollutant. The requirements of this rule in effect on the date the application is determined to be complete by the Air Pollution Control Officer shall apply to such application.
- Construction of desalination facilities would likely result in emissions associated with construction equipment and construction worker truck trips as well as fugitive dust emissions from ground disturbance. The quantity, duration, and intensity of construction activity have an effect on the amount of construction emissions and related pollutant concentrations occurring at any one time. As such, more emissions are typically generated by relatively large amounts of relatively intense construction. However, if construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix, and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). Depending on the level of activities and amount of infrastructure built, construction of desalination facilities could exceed thresholds established by SJVAPCD and would be required to implement measures to help reduce or minimize construction-related emissions. Furthermore, construction emissions generated would need to comply with the SJVAPCD regulations described above. Lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects of construction emissions and air quality.

[4] Sources whose primary function is permitted by SJVAPCD through Rules 2010 and 2201 are not subject to SJVAPCD Rule 9510 (Indirect Source Review). Projects subject to Rule 9510 are required to quantify and reduce indirect (mobile source emissions), area-source (space heating, landscaping, and maintenance), and construction exhaust emissions.

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
	• Operation of desalination facilities would likely be electric because of their expected locations in urban and suburban areas and the expected location in close proximity to existing wastewater treatment infrastructure. They may use nonelectric backup for intermittent emergency circumstances. Operations could include facility inspection and maintenance activities and are expected to be similar to or fewer maintenance activities than inspection and maintenance of existing wastewater treatment facilities. The need for additional energy could result in increased criteria pollutant emissions at other power facilities. However, the power facilities that would compensate for the additional power are already built and permitted to emit a maximum amount of criteria pollutants. These facilities are required to offset additional power generation by the use of pollution credits. Therefore, if additional emissions are generated, they would be generated by facilities that are permitted to do so. The increased number of truck trips that would be associated with the disposal of brine at landfills would produce emissions (e.g., diesel). The brine would be dewatered in evaporation ponds and then transported offsite to landfills. The number of truck trips cannot be fully quantified because it would depend on the salinity of the wastewater, which is a function of the quality and volume of the influent and the time the brine would need to spend in the evaporation ponds. Lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with operational emissions and air quality. • SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJVAB. Some of these facilities are wastewater treatment facilities, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, painting/coating operations, food processing facilities, feed lots/dairies, and rendering plants. Construction and operation of desalination facilities would not involve the type of facility identified by SJVAPCD as a known odor source (SJVAPCD 2002). The desalination facilities would be located at the wastewater treatment facility but would not produce additional odors beyond what currently may be produced at the wastewater treatment facility. This is because the desalination process typically uses the existing volume of wastewater which is already treated to secondary levels (as required by state law). The desalination process further processes the wastewater. Therefore, the additional processing of the wastewater does not produce further odors as the odors are typically generated during primary treatment and biosolids production. Furthermore, many WWTPs contain any odors by enclosing primary treatment and biosolids production and by scrubbing odor-generating emissions. Consequently, it is expected desalination would create objectionable odors affecting a substantial number of people.

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
Biological Resources	• It is expected that construction and operation of desalination facilities would be in urban and suburban areas within the footprint of existing WWTPs. These areas are expected to have a low potential for special-status plant species, animal species, and habitat. Furthermore, the footprints of WWTPs are expected to have a very low potential for special-status biological resources because typically WWTPs are industrial facilities with buildings and impervious surfaces that would be unlikely to support special-status biological resources. Furthermore, it is expected that the treated effluent discharged from the WWTP would actually be improved from baseline conditions because the desalination facilities would remove salinity prior to discharge into the receiving water. This would be considered beneficial to aquatic resources and not interfere with migration or habitat. Therefore, it is expected that construction or operation of desalination facilities would not result in a conflict with an existing local policy or an adopted habitat conservation plan or natural community conservation plan. Table H-24 lists potential mitigation measures lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant environmental effects of construction and operations on special-status biological resources. • Disposal of the brine generated by the desalination facilities would occur at landfills and would have a very low potential to affect sensitive biological resources because the brine would remain within the landfill's boundaries.
Cultural Resources	• Construction and operation of desalination facilities would likely take place in urban and suburban areas adjacent or within close proximity to existing wastewater treatment facilities and infrastructure. Construction may result in some ground-disturbing activities which have the potential to disturb or destroy buried, unknown, significant cultural resources. While it is unknown if cultural resources exist in these locations, these areas would likely have been previously disturbed during the construction of the existing wastewater treatment facilities, thus reducing the potential for significant unknown cultural resources to exist. Operation of desalination facilities have no potential to affect cultural resources because the facilities would simply remove salt and discharge treated effluent into receiving waters as is currently done under baseline conditions. Lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects on cultural resources associated with construction. • As described above, it is expected the wastewater treatment sites would have been previously disturbed. Therefore, it is highly unlikely human remains, typically buried at depths of 6 feet, would be disturbed during construction. If, in the highly unlikely event human remains are uncovered during construction compliance with the State Health and Safety Code would be required. As specified by Section 7050.5, no further disturbance would occur until the county coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code 5097.98. If such a discovery occurs, excavation or construction would halt in the area of the discovery, the area would be protected, and consultation and treatment would occur as prescribed by law. If the coroner recognizes the remains to be Native American, he or she would contact the Native American Heritage Commission, who would appoint the Most Likely Descendent. Additionally, if the bones are determined to be Native American, a plan would be developed regarding the treatment of human remains and associated burial objects, and the plan would be implemented under the direction of the Most Likely Descendent.

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
Geology and Soils	• There are no impact mechanisms associated with desalination facilities that could result in an impact on or be affected by: Alquist-Priolo faults, strong seismic shaking, seismic-related ground failure, expansive soils, or landslides. Since the facilities would be located within or in close proximity to existing WWTPs, the addition of the desalination facilities would not substantially add to the structure such it would increase the exposure of the structure to potential substantial adverse effects, such as the risk of loss to rupture of known earthquake faults, seismic ground shaking, or seismic ground-related failure. Furthermore, all new structures would be required to follow all appropriate building codes and would be designed to withstand seismic-related activities as identified by the building codes. Finally, desalination facilities would not substantially increase the number of people exposed to the risk of earthquakes or geologic hazards because it would not draw people to earthquake areas or hazard locations not already frequented. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts related to geology and soils associated with construction. • The construction and operation of desalination facilities would not involve constructing or operating septic tanks and, therefore, septic tanks would not be affected by soils incapable of supporting the use of them or other alternative wastewater disposal systems. • Construction of desalination facilities and the distribution system would result in limited ground-disturbing activities that could cause soil erosion or loss of topsoil; however, ground-disturbing activities would be limited in duration and geography. Furthermore, ground-disturbing activities of 1 acre or greater would require the need for preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), as required by the Central Valley Water Board. The SWPPP would require soil and erosion control mechanisms. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts on soil erosion and stormwater runoff associated with construction.
Greenhouse Gas Emissions	• Construction and operation of desalination facilities would likely result in increased use of electricity and fuels. Furthermore, the desalination process is an energy-intensive process. However, the overall increased electrical load would be extremely small compared to the existing electrical load. Therefore, it is unlikely to require the construction of major new power generation or transmission facilities, and therefore any potential air quality and greenhouse gas emissions would be minor. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts of construction and operations on greenhouse gas emissions.

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
Hazards and Hazardous Materials	• Construction of desalination facilities would be short term and may involve the limited transport, storage, use, and disposal of hazardous materials such as fuel and lubricating grease for motorized heavy equipment. Some examples of typical hazardous materials handling are fueling and servicing construction equipment on the site and transporting fuels, lubricating fluids, solvents, and bonding adhesives. These types of materials are not acutely hazardous, and all storage, handling, and disposal of these materials are regulated by local, county, and state laws. Furthermore, the quantities of these materials used during construction would be small (e.g., less than 100 gallons) because construction would be limited in duration. Therefore, if a spill occurred, it could be readily and easily contained. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts associated with hazardous materials during construction. • Operation of desalination facilities would not produce any new wastewater that would not already be discharged. If municipal wastewater already contains constituents, they should not be hazardous due to pretreatment requirements with which industrial and commercial facilities must comply. Therefore, when compared to baseline, no new quantities of hazardous materials would be used, transported, or disposed of. However, there would be a new waste stream (e.g., brine) generated from the WWTP that would need to be removed. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts associated with hazardous materials during operations. • Construction and operation of desalination facilities would not be a hazard or provide safety concerns to airports since the facilities would be constructed and operated within the footprint of existing wastewater treatment facilities or within close proximity. • Construction and operation of desalination facilities would not physically interfere with an adopted emergency response plan since they would be located within existing facilities and therefore would not prohibit the mobility of people to escape potential emergencies. • Construction and operation of desalination facilities would not involve the construction of housing or an increase in population and thus would not expose people or structures to wildland fires.
Hydrology and Water Quality	• Construction of desalination facilities could result in temporary changes to drainages, erosion, or runoff associated with typical construction activities, such as grading or preparation of land. As discussed earlier in this table (Geology and Soils), for soil disturbance of over 1 acre, wastewater treatment special districts or municipalities would be required to prepare and implement a SWPPP. Table H-24 also lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts of construction on hydrology and water quality. • It is likely that the desalination facilities would be located in a flood hazard area because wastewater treatment facilities are typically located adjacent to rivers and streams so they can discharge treated effluent into receiving waters. However, since the desalination facilities would be located within the existing wastewater treatment footprint (or in close proximity), the addition of the desalination facilities would not substantially add to the existing structures such that flood flows would be impeded or redirected. Furthermore, the desalination facilities would not substantially increase the

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
	number of people exposed to the risk of flooding because they would not draw people to flood hazard locations. Construction of desalination facilities would not result in flooding or otherwise cause flooding. • Desalination in conjunction with the wastewater treatment process would not be expected to increase the volume of treated effluent discharged into receiving waters. This is because the amount of wastewater entering the facilities and leaving the facilities would be the same, and only salts would be removed. Therefore, it is expected that hydrology would not be affected. The treated effluent released would have less salinity and therefore not degrade water quality and comply with beneficial use standards, objectives, and National Pollution Discharge Elimination System permits. • Increases in groundwater pumping are not expected to occur under the construction and operation of desalination facilities because wastewater treatment facilities do not pump groundwater. Furthermore it is anticipated that evaporation ponds would be lined such that salts could not enter the groundwater system. • Construction and operation of desalination facilities would primarily be located in areas of relatively flat relief because they would be within the footprint of existing WWTPs or within relatively close proximity, and WWTPs typically are not located on the side of steep slopes. Therefore, these locations would not support mudflows, which typically need very steep slopes and large amounts of precipitation to occur. Furthermore, these areas would not be adjacent to the ocean and, therefore, they would not be affected by tsunamis.
Land Use and Planning	• Construction and operation of desalination facilities would not physically divide an established community because they would likely be located in the footprint of the existing wastewater facility. • Construction and operation of desalination facilities would take place on the footprint of an existing WWTP or within close proximity and thus would not conflict with land use designations or zoning because WWTPs are typically located in areas that are for public facilities or industrial uses. • If the desalination facilities were inconsistent with applicable land use plans, policies, or regulations, an amendment or variant from the local jurisdiction approving the discretionary action associated with the desalination facilities would be required by the project proponent prior to project approval and construction. If no discretionary action occurred as a result of the construction or operation of the desalination facilities, it is assumed it would not result in a conflict with local land use plans, policies, or regulations. • Potential conflictss with habitat conservation plans, natural community conservation plans, or other plans, policies and regulations protecting biological species and resources are evaluated in Biological Resources.
Mineral Resources	• Construction and operation of desalination facilities would have a very low potential to result in the removal or inability to access state or locally designated mineral resource areas. This is because the recycled water facility site(s) would be within existing WWTPs. Furthermore, if the desalination facilities are located within a state or locally designated mineral resource area, construction and operation of the desalination facilities would not permanently remove access to a mineral resource as there would be other locations around the facilities that could provide access to the mineral resource.

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
Noise	• Construction of desalination facilities could generate temporary noise or groundborne vibrations if pile driving is used. It is likely desalination facilities would be constructed in areas with suitable land use designations and zoning for infrastructure (e.g., public facilities or industrial) and thus would be unlikely to have sensitive receptors (e.g., homes, hospitals, schools) within close proximity. If sensitive receptors were adjacent to construction activities and experienced construction noise, construction would likely be temporary and would be required to follow existing local noise ordinances limiting the timing of construction (e.g., generally Mondays–Fridays, sometimes Saturdays, 7am– 6pm, excluding federal holidays and Sundays). Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant noise impacts related to construction. • Desalination facilities may generate temporary noise when the facilities are in operation. However, the facilities would likely not run continuously as there are peak hours during the day (e.g., early in the morning and the evening) when wastewater is primarily generated. Additionally, the existing WWTPs already generate intermittent noise (e.g., from alarm bells, pumps, and generators). Furthermore, it is anticipated there would be a very low probability that sensitive receptors (e.g., homes, hospitals, schools) would be located within close proximity to experience the operating noise generated because it is anticipated that the WWTPs would be located in areas with similar land uses (e.g., other public facilities or industrial facilities). Finally, most of the wastewater treatment facilities are enclosed within buildings that can act to mute the operating noise. • The construction and operation of desalination facilities would not bring people within close proximity to an airport or expose people to airport noise.
Population and Housing	• The construction and operation of desalination facilities would not involve the construction of new homes or businesses, the extension of roads, or other actions that may induce substantial property or population growth in an area. Furthermore, it would not develop any amenities (e.g., malls, amusement parks, hotels, recreation areas) that would attract people to the southern Delta. Finally, they would not be constructed and operated increase capacity to serve new users. • The construction and operation of desalination facilities would not displace substantial numbers of people and necessitate the construction of replacement housing elsewhere because the facilities would be located in the existing footprint of WWTPs and not where people currently reside.
Public Services	• The need for additional public services (e.g., fire protection, police protection, libraries, schools) or the deterioration of existing public services typically results from an increase in population. As a location's population increases, the need for additional or new public services and public service facilities generally increases. As discussed above, the construction and operation of desalination facilities would not involve an increase in population or housing. In addition, these actions do not include proposals for new housing, and thus would not generate students or increase demands for school services or facilities.

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
Recreation	• Construction of desalination facilities would likely occur within the footprint or immediately adjacent to existing wastewater facilities. These facilities are typically located adjacent to receiving waters and in industrial or urban areas to provide wastewater service to the urban, suburban, industrial users of the wastewater system. So it is unlikely recreational facilities would be located in areas where wastewater facilities currently exist. However, if recreational facilities were located within very close proximity, construction of desalination facilities may affect them; however, construction of desalination facilities is unlikely to result in significant effects on recreational facilities because construction would be temporary and limited. Construction and operation of desalination facilities would not increase the use of existing parks or recreational facilities and does not result in the construction of actual recreational facilities. Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts on recreation related to construction.
Transportation and Traffic	• Construction of desalination facilities could result in some additional trips associated with construction workers. Wastewater treatment facilities may be located in urban and suburban areas that could already experience some congestion. The temporary increased traffic during construction could exceed local or regional road trip thresholds as it is unknown the number of construction trips that might be needed. Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts on transportation and traffic related to the construction. • Operation of desalination facilities would generate additional truck trips to dispose of the brine generated by the desalination process. The number of truck trips depends on the volume of wastewater treated per day and the quality of water; therefore, the number of trucks that would be required is unknown. Trucks would likely not be required every day because the evaporation ponds would first dewater the brine solution. Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts on transportation and traffic associated with operations.

Potential Environmental Effects of Wastewater Treatment Plant Desalination	
Resource	Discussion
Utilities and Service Systems	• Construction and operation of desalination facilities would not be expected to exceed wastewater treatment requirements of the Central Valley Water Board because, by removing salts, it would actually improve the water quality of the treated effluent that is discharged into receiving waters. Additionally, it would not result in a determination by the wastewater treatment provider that it has inadequate capacity to meet the service area's demand because the desalination facilities would not increase the actual volume of wastewater generated in the service area. • Construction and operation of desalination facilities involve construction at wastewater treatment facilities; environmental effects associated with this are discussed earlier in this table (Aesthetics through Transportation and Traffic). Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts related to all environmental resources. • The construction and operation of desalination facilities would not need the construction of additional stormwater drains because desalination facilities would likely be built within the footprints of existing wastewater treatment facilities, which currently have impervious surfaces that generate runoff; therefore, it is expected that existing stormwater infrastructure would be used. • Construction and operation of desalination facilities could generate solid waste in the form of brine. This type of solid waste is not considered hazardous, and the disposal of brine would follow all regulations and guidelines of solid waste in Class I/II landfills (non-hazardous waste landfills) . Furthermore, Table H-24 lists potential mitigation measures that lead agencies (e.g., wastewater treatment special districts or municipalities) can and should implement to reduce potentially significant impacts on utilities and service systems associated with construction and operations.

H.3.4 Agricultural Return Flow Salinity Control

Agricultural return flow salinity controls, such as real-time management (e.g., changing the timing of the release of agricultural discharge to receiving waters) or containing agricultural discharge in evaporation ponds, are potential methods of compliance for agricultural water users that must comply with numeric salinity objectives. These methods, either as stand-alone actions or implemented comprehensively, may reduce salinity entering the southern Delta.

Cost Evaluation

Real-Time Management

Agricultural dischargers could monitor receiving water's assimilative capacity on a real-time basis, and time discharges to coincide with periods of high flow (i.e., more assimilative capacity). This potential method of compliance with proposed salinity standards would require dischargers to establish a network of monitoring stations and a discharge schedule. When there is no assimilative capacity, irrigators would either recycle water that would otherwise be discharged or would discharge to a detention pond until discharges to the receiving waters are permitted. This method of compliance could be integrated with other BMPs (such as water recycling or use of evaporation ponds) to reduce salinity entering the plan area.

Temporary discharge basin sizing was estimated in the Central Valley Water Board's *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Salt and Boron Discharges into the Lower San Joaquin River, July 2004* (Basin Plan Amendments 2004). The Basin Plan Amendments analyzed a project area that included 1.4 million acres of irrigated agricultural land. The Central Valley Water Board estimated that for this irrigated area, 50,000 AF of water may need to be stored annually for when there is no assimilative capacity in the river (Central Valley Water Board 2004). For this plan area, it is assumed that there are roughly 137,000 acres of irrigated agricultural land (roughly the size of the South Delta Water Agency [SDWA]). Using the relationship of detention volume to agricultural land developed in the Basin Plan Amendments 2004 and this plan area's assumed irrigated land acreage, it is estimated that this method of compliance would need 4.9 thousand acre-feet (TAF) of detention basin storage. If each detention basin is 10 feet deep, approximately 490 acres would be used for this potential method of compliance.

Enhanced monitoring equipment, modeling, and forecasting capability would be needed to forecast assimilative capacity in the LSJR. Control gates and conveyance systems would also be needed to divert drainage from river discharge to permanent treatment structures when assimilative capacity is not available. Personnel would be needed to manage real-time systems and coordinate discharges from multiple subareas in the LSJR watershed. (Central Valley Water Board 2004). It is assumed that there would be multiple subareas within the project area that would manage discharges in real time, creating a real-time monitoring system. Table H-18, *Costs and Components of a Real-Time Management System*, estimates the components needed and costs associated with constructing a real-time management system.

Table H-18. Costs and Components of a Real-Time Management System

Construction	
Computer and Software	$5,000
Control Gates (10)	$100,000
Floats, Weirs, and EC Monitoring Equipment	$50,000
Installation of Monitoring Components	$75,000
Conveyance to River	$100,000
Subtotal	$330,000
Contingency (30%)	$99,000
Total Construction Cost	$429,000

Operations and Maintenance	
Operations and Maintenance (Including Coordinating Discharges)	$100,000 per year

Source: Central Valley Water Board 2004
EC = salinity

The costs in Table H-18 were adapted from the Central Valley Regional Water Board's Basin Plan Amendments 2004. Costs for a real-time management system in the plan area were assumed to be the same as those in Table H-18 , but the contingency was increased to 30 percent of construction costs based on best professional judgment. It is assumed that 11 systems would need to be constructed to effectively cover the major water users in the plan area (Central Valley Water Board 2004). The total estimated construction cost for 11 systems is $4,719,000, with an operations and maintenance budget of $1,100,000 per year. This cost is in addition to the costs to construct and operate temporary detention ponds, which are the same as the costs to construct and operate evaporation ponds, discussed below.

Evaporation Ponds

Water treatment actions, such as implementation of evaporation ponds, may reduce salt loading in the plan area. Before water is discharged to receiving waters, evaporation ponds may be installed to allow a portion of the discharged water to evaporate and leave behind suspended and dissolved solids. These solid salts are then collected and hauled to landfills for disposal instead of being discharged to receiving waters.

Based on estimations in the Central Valley Water Board's Basin Plan Amendments 2004, sizing of evaporation ponds for the plan area was estimated. The Basin Plan Amendments 2004 estimated that 514–494 TAF of mean annual volume of agricultural drainage needing treatment is produced each year. The range is due to water year types, with more drainage needing treatment occurring in wetter water years. The Basin Plan Amendments 2004 analyzed a project area that included 1.4 million acres of irrigated agricultural land. Assuming 137,000 acres of irrigated agricultural land for the plan area (roughly the size of SDWA), then 48–50 TAF storage is needed assuming zero discharge to the river.

The Central Valley Water Board analyzed evaporation ponds as a potential method of compliance with the proposed TMDL for salt and boron in 2004. Generally, to construct an evaporation pond, it would cost $340 per AF. These costs include construction, land acquisition, purchase of compensatory land (if needed on a 1:1 basis), and a 30 percent contingency (Central Valley Water Board 2004). To operate an evaporation pond system, it would generally cost $50 per AF, including maintenance, pumping power, and monitoring (Central Valley Water Board 2004). Assuming a maximum of 50 TAF of storage is needed for zero surface water discharge, it is estimated to cost $17 million to construct the evaporation ponds and $2.5 million per year to operate them. Actual costs are assumed to be less because there is no proposal to eliminate surface water discharges.

It is estimated that concentrated salts could be stored in an evaporation pond for up to 50 years before salt would have to be hauled to a landfill. To haul salts to a landfill may cost $200 per ton and $25 per ton for operations and maintenance (Central Valley Water Board 2004).

Environmental Evaluation

Summary of Potential Action

The potential establishment of a salinity TMDL in the southern Delta by the Central Valley Water Board would trigger possible actions by the agricultural dischargers in the southern Delta. The Central Valley Water Board may need to undertake additional evaluation of the reasonably foreseeable methods of compliance that the regulated community (i.e., agricultural dischargers) would take with a TMDL in an environmental document (i.e., CEQA document). As part of this evaluation, the Central Valley Water Board may identify particular actions they would take based on the particular requirements and salinity loading of the TMDL.

The two potential agricultural return flow salinity control measures that could be implemented, real-time management and evaporating salts using evaporation ponds, are very similar in their activities and effects. Real-time management would include shifting the agricultural discharge timing such that the timing of the agricultural return flow released from agricultural lands would occur during times of high assimilative capacity for the receiving waters. This would require agricultural dischargers to hold or contain their discharge in detention ponds and release it at different times of the year. The agricultural dischargers could hold salt in the soil column for a period of time and then leach it by applying water. The leached water (e.g., agricultural return flow) could be held in a detention pond or released directly into the receiving water, depending on the assimilative capacity of the receiving water at the time of leaching. While assimilative capacity can increase in receiving waters during higher flows, the relationship between assimilative capacity and flow is not always linear. The construction of detention ponds on the agricultural discharger property would likely be contained in close proximity to the discharge point and the generation source (e.g., fields and orchards in the southern Delta). The location, timing of construction, and details of operation for the detention ponds are unknown. However, detention ponds for these types of purposes would likely be less than 0.5 acre and take a few months to construct. The volume of agricultural discharge would essentially remain the same, and discharges would be expected to occur from current outfall locations along the receiving waters.

Evaporating salts from agricultural return flow would use evaporation ponds to contain the agricultural discharge and naturally evaporate the salts from the water. The location, timing of construction, and details of operation of the salt evaporation ponds are unknown. However, it is likely they would be constructed and operated on existing agricultural property in the southern Delta because they would need to be located in close proximity to the discharge generation location (e.g., the fields and orchards in the southern Delta) and the discharge outfall location. The evaporation ponds would likely need to store the entire volume of agricultural return flow for the season and thus would be located on several acres. While the rate of water evaporation would be relatively rapid as the southern Delta is generally a warm location with sunlight to aid the process, the rate of salt accumulation in the evaporation pond would be slow. This is because the agricultural return flow has a relatively low concentration of salt as a result of its freshwater condition when compared to water that has higher concentrations of salt, such as salt water. Operation of the salt evaporation ponds would create a waste stream of salt that would be collected and disposed. It is likely that the salt would be collected by truck and disposed of at a nonhazardous landfill because salt is not considered a hazardous material. However, because of the slow accumulation of salt in the evaporation ponds, it is anticipated that the collection of salt would likely occur once every 50 years (Central Valley Water Board 2004). The volume of agricultural return flow would be reduced overall, but some return flow would continue to be discharged from existing outfall location points into the southern Delta.

Potential Environmental Effects

The most likely potential effect of a change in discharge timing and the use of detention ponds or evaporation ponds would be the repurposing of lands currently used for agriculture. Discharge timing or the use of detention ponds or evaporation ponds would not result in the loss of agricultural land but only a reuse of that land. While there may be economic effects for individuals, the amount of land temporarily taken out of production would be small compared to the amount of agricultural land in the southern Delta (primarily located in San Joaquin County). There is some potential that natural and cultural resources adjacent to existing agricultural lands could be affected. However, detention pond facilities or evaporation ponds would be subject to local land use and sometimes federal regulations (e.g., Clean Water Act) that could minimize such effects. Implementation of these methods of compliance would improve salinity conditions in the South Delta, thereby slightly improving conditions for agricultural uses and aquatic resources. The removal, transport, and disposal of salt collected would result in very minor, unnoticeable environmental effects, given the relatively small change in traffic that would be consistent with the surrounding agricultural area.

Table H-19 summarizes the potential environmental effects associated with agricultural return flow salinity controls. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, at the end of this appendix lists potential mitigation measures associated with the construction or operation of the methods of compliance and is referenced in Table H-19 where appropriate.

Table H-19. Potential Environmental Effects of Agricultural Return Flow Salinity Controls

Potential Environmental Effects of Agricultural Return Flow Salinity Controls	
Resource	Discussion
Aesthetics	• The detention or evaporation ponds that may store agricultural discharges would be on private agricultural property in the southern Delta. There are relatively few sensitive receptors to views in the southern Delta, but receptors may include boaters on southern Delta waterways. The detention or evaporation ponds would have a very low potential to affect any sensitive receptors because the ponds are not expected to involve large buildings or facilities, and they would have a very low profile because they would be below grade. They may be fenced for security purposes, and this fencing would serve as a screen from viewers. These facilities would not substantially detract from the existing agricultural activities and facilities in the southern Delta.
Agriculture and Forestry Resources	• The detention or evaporation ponds would likely be constructed and operated within existing agricultural land. They would be relatively small in size when compared to the overall amount of agricultural land in production in the southern Delta. Therefore, they would have a low potential to convert large amounts of agricultural land. Furthermore, they would be supporting existing agricultural lands by reducing salinity of the discharge used for irrigation and increasing the water quality of the southern Delta. However, Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, identifies potential mitigation measures the Central Valley Water Board can and should implement if there was a net loss of prime or unique farmland prior to the adoption of a total maximum daily load (TMDL).
Air Quality	• Construction of detention or evaporation ponds may require soil disturbance, but it would generally be on less than 2 acres of land, be constructed in several months, and require a limited amount of equipment. Therefore, it is anticipated there would be a very low potential to generate air quality emissions that would exceed local and regional thresholds. Furthermore, all construction projects must abide by San Joaquin Valley Air Pollution Control District (SJVAPCD) Regulation VIII, including the implementation of a Dust Control Plan (Siong pers. comm.). • Operation of detention ponds would not release air quality emissions because changing the timing of the release of discharge into receiving waters does not generate air quality emissions. • Operations of evaporation ponds would likely require some number of truck trips associated with removing the salt left behind in the evaporation process and taking it to landfills. The number of truck trips would depend on the actual size of the evaporation pond, the rate of evaporation, and the accumulation of salt; therefore, the number of trips cannot be quantified. However, because of the freshwater source, it is anticipated that the salt would accumulate at a relatively slow rate, and thus the truck trips needed would take place only during a limited period of time after decades of evaporation. Therefore, it is not anticipated that the number of truck trips needed would be sufficient to exceed local and regional air quality thresholds.

Potential Environmental Effects of Agricultural Return Flow Salinity Controls	
Resource	Discussion
	• The evaporation ponds could result in salt dust; however, the evaporation ponds can be wetted and would be wetted during the evaporation process, thus it is expected salt dust would be minimal and might only occur during removal from ponds by trucks for disposal purposes. Furthermore, in compliance with SJVAPCD Regulation VIII it is anticipated that a Dust Control Plans would have to be prepared. Table H-24 lists potential mitigation measures the Central Valley Water Board can and should implement to reduce potentially significant environmental effects on air quality resources prior to the adoption of a TMDL.
	• SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJVAB. Some of these facilities are wastewater treatment facilities, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, painting/coating operations, food processing facilities, feed lots/dairies, and rendering plants (SJVAPCD 2002). Construction and operation of detention or evaporation ponds would not involve the type of facility identified by SJVAPCD as a known odor source. Consequently, it is expected detention or evaporation ponds would not create objectionable odors affecting a substantial number of people.
Biological Resources	• Construction of detention or evaporation ponds would result in soil disturbance in areas of active agricultural management and land disturbance. There is generally a low potential for special-status plant species, animal species, or habitat in these areas because of the active agriculture and the changing landscape. However, Table H-24 lists potential mitigation measures the Central Valley Water Board can and should implement to reduce potentially significant environmental effects on biological resources prior to the adoption of a TMDL.
	• Operations of the detention ponds would be expected to discharge agricultural flow in receiving waters when salinity levels in the river are less than the designated salinity objective and with high assimilative capacity (i.e. ability for the receiving waters to absorb an increase in salt). Thus, the salinity in the receiving waters would likely have salinity that would not result in effects on fish and wildlife. Furthermore, these fish and wildlife are adapted to exist in tidally influenced environments which exhibit a wide range of salinity levels.
	• Operation of the evaporation ponds would discharge a reduced volume of agricultural return flow into receiving waters with less salt. Thus it is expected water quality would improve providing a benefit to aquatic species.
Cultural Resources	• Construction of detention or evaporation ponds would result in ground disturbance in existing managed and active agricultural lands in the southern Delta. It is likely managed and active agricultural lands have been disturbed before; however, cultural resources could exist depending on the location. The Central Valley Water Board can and should implement potential mitigation measures identified in Table H-24 to reduce potentially significant environmental effects associated with construction of detention or evaporation ponds should unknown significant cultural resources be discovered during construction prior to the adoption of a TMDL.

Potential Environmental Effects of Agricultural Return Flow Salinity Controls	
Resource	Discussion
	• Construction of detention ponds or evaporation ponds would result in ground-disturbing activities at depths greater than 6 feet. While it is considered unlikely human remains, typically buried at depths of 6 feet, would be disturbed during construction, in the event human remains are uncovered during construction, compliance with the State Health and Safety Code would be required. As specified by Section 7050.5, no further disturbance shall occur until the county coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code 5097.98. If such a discovery occurs, excavation or construction shall halt in the area of the discovery, the area shall be protected, and consultation and treatment shall occur as prescribed by law. If the coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission, who shall appoint the Most Likely Descendent. Additionally, if the bones are determined to be Native American, a plan shall be developed regarding the treatment of human remains and associated burial objects, and the plan shall be implemented under the direction of the Most Likely Descendent • Operation of detention ponds or evaporation ponds would result in a change in timing of release of water or a change in the volume of agricultural return flow released and would not involve ground-disturbing activities. Therefore, it is highly unlikely any known or unknown cultural resources would be affected because of the lack of ground-disturbing activities during operation.
Geology and Soils	• There are no impact mechanisms associated with construction or operation of a detention or evaporation pond that could result in an impact on, or be affected by: Alquist-Priolo faults, strong seismic shaking, seismic-related ground failure, unstable geologic units, expansive soils or landslides. Furthermore, storing agricultural return flow in a detention pond or evaporation pond land would not bring people to the risk of earthquakes or geologic hazards, meaning construction or operation of detention ponds or evaporation ponds use would not substantially increase the number of people exposed to the risk of earthquakes or geologic hazards because it would not draw people to earthquake areas or hazard locations not already frequented. • Construction of the detention or evaporation ponds would result in ground-disturbing activities that could result in soil erosion or loss of topsoil; however, ground-disturbing activities would be limited in duration and geography. Furthermore, ground-disturbing activities of an 1 acre or greater would require the need for preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) as required by the Central Valley Water Board. The SWPPP would require soil and erosion control mechanisms. Table H-24 also lists potential mitigation measures the Central Valley Water Board can and should implement to reduce potentially significant impacts related to soil erosion and stormwater runoff prior to the adoption of a TMDL. • Operation of detention or evaporation ponds would involve the release of agricultural return flow into receiving waters. It is expected the releases would occur at existing discharge points and thus the releases would not result in erosion or topsoil loss. • Construction and operation of detention or evaporation ponds would not involve constructing or operating septic tanks and, therefore, they would not be affected.

Potential Environmental Effects of Agricultural Return Flow Salinity Controls	
Resource	Discussion
Greenhouse Gas Emissions	• Construction of detention or evaporation ponds would likely result in increased use of electricity and fuels and emission of greenhouse gases. However, the overall increase in greenhouse gases would be extremely small when compared to the overall emission of the gases within the plan area because of the limited duration of construction. Therefore it is unlikely potential greenhouse gas emissions would exceed local or regional thresholds. Table H-24 also lists potential mitigation measures that the Central Valley Water Board can and should implement to reduce potentially significant impacts on greenhouse gas emissions prior to the adoption of a TMDL. • Operation of the evaporation ponds would result in truck trips associated with the removal of salt. However, because of the freshwater source, it is anticipated that the salt would accumulate at a relatively slow rate, and thus the number of truck trips needed would take place only during a limited period of time after decades of evaporation. Therefore, it is not anticipated that the number of truck trips needed would be sufficient to exceed greenhouse gas thresholds. The release of agricultural return flow into receiving waters from detention or evaporation ponds does not have the potential to emit greenhouse gases.
Hazards and Hazardous Materials	• Construction of detention or evaporation ponds would be short term and may involve the limited transport, storage, use, and disposal of hazardous materials such as fuel and lubricating grease for motorized heavy equipment. Some examples of typical hazardous materials handling are fueling and servicing construction equipment on the site and transporting fuels, lubricating fluids, solvents, and bonding adhesives. These types of materials are not acutely hazardous, and all storage, handling, and disposal of these materials are regulated by local, county, and state laws. Furthermore, the quantities of these materials used during construction would be small (e.g., less than 100 gallons) because construction would be limited in duration. Therefore, if a spill occurred, it could be readily and easily contained. Table H-24 also lists potential mitigation measures that the Central Valley Water Board can and should implement to reduce potentially significant impacts associated with hazardous materials during construction of detention or evaporation ponds prior to the adoption of a TMDL. • Operation of detention or evaporation ponds would result in a change in timing or volume of agricultural return flow discharged into receiving waters. The activity of discharging agricultural return flow would not result in the use, transport, or disposal of hazardous materials. Nor would it interfere with an airport or result in an increased risk of wildland fire exposure.

Potential Environmental Effects of Agricultural Return Flow Salinity Controls	
Resource	Discussion
Hydrology and Water Quality	• Construction of detention or evaporation ponds could result in temporary changes to drainages, erosion, or runoff associated with typical construction activities such as grading or preparation of land. As discussed earlier in this table (Geology and Soils), for soil disturbance of over 1 acre, wastewater treatment special districts or municipalities would be required to prepare and implement a SWPPP. Table H-24 also lists potential mitigation measures that the Central Valley Water Board can and should implement to reduce potentially significant impacts on hydrology and water quality prior to the adoption of a TMDL. • Operation of a detention pond is expected to change the seasonal fluctuations of agricultural return flow by changing the timing of the discharge from agricultural lands to receiving waters. Although the discharge could have a different salinity concentration than the discharge previously released, the change in timing of the release would allow the receiving water to have the ability to assimilate the discharge. Thus the discharge would not be considered polluted runoff. The same volume of discharge would be released under baseline conditions when compared to the method of compliance conditions. Since assimilative capacity does not necessarily correspond with higher flow, it is unknown if discharges would occur during higher flows or normal flows. Water quality standards would be maintained because the method of compliance would comply with the TMDL. • The evaporation ponds would likely be lined with clay to reduce the potential for percolation. There would be an overall reduction in discharge to surface water because the discharge would be contained within evaporation ponds, and the water would be allowed to evaporate rather than being released continuously. The volume of discharge normally released under baseline conditions is expected to be reduced (although the magnitude or timing of the reduction is unknown). This would reduce the volume of the discharge such that runoff, erosion, or the possibility of flooding would also be reduced when compared to baseline. Salinity in the receiving waters is expected to be reduced, thus complying with water quality objectives and standards and not representing a substantial degradation of water quality. • Detention or evaporation ponds could be located within a 100-year flood hazard area; however these structures are of low relief, and/or below ground surface, and would not impede or redirect flood flows. Additionally, they would not bring people to a location which could result in flooding or increase the risk of flooding. • Detention or evaporation ponds would be constructed in areas of low land relief. Therefore, these locations would not support mudflows, which typically need very steep slopes and large amounts of precipitation to occur. Furthermore, these areas would not be adjacent to the ocean and, therefore, they would likely not be affected by tsunamis. • Construction and operation of the detention or evaporation ponds would not substantially deplete groundwater supplies because they would not pump groundwater.

Potential Environmental Effects of Agricultural Return Flow Salinity Controls	
Resource	Discussion
Land Use and Planning	• Construction and operation of detention or evaporation ponds is not expected to physically divide established community because the ponds would be developed on existing agricultural land and support existing agricultural practices and because the discharge locations already exist on the agricultural lands. Detention or evaporation ponds would support agricultural land use and zoning designations as these two types of activities are considered agricultural infrastructure and agricultural infrastructure is typically included within agricultural land use designations and zoning. Furthermore, the amount of agricultural land that might be removed as a result of the detention or evaporation ponds would be minimal when compared to all the agricultural lands in the southern Delta. If the construction and operation of detention or evaporation ponds were inconsistent with local land use plans, policies and regulations, and required a discretionary action by a local government agency, the project would obtain an amendment or variant from the local jurisdiction prior to operation. • Potential conflictss with habitat conservation plans, natural community conservation plans, or other plans, policies and regulations protecting biological species and resources are evaluated in Biological Resources.
Mineral Resources	• Construction and operation of the detention ponds or evaporation ponds would not result in the removal or inability to access state or locally designated mineral resource areas. This is because these uses would be located within existing agricultural lands that are not used for mineral extraction.
Noise	• Construction and operation of the detention ponds or evaporation ponds would occur in agricultural areas where there are limited sensitive receptors. Additionally, loud agricultural activities are part of the existing noise conditions in active agricultural lands. Furthermore, construction would be temporary and limited to ground-disturbing activities and would be required to follow existing local noise ordinances limiting the timing of construction (e.g., generally Mondays–Fridays, sometimes Saturdays, 7am–6pm, excluding federal holidays and Sundays). Table H-24 also lists potential mitigation measures that the Central Valley Water Board can and should implement to reduce potentially significant impacts associated with noise during construction of detention or evaporation ponds prior to the adoption of a TMDL. • Once operational, detention or evaporation ponds would not produce noise as they would either discharge agricultural return flows into receiving waters or evaporate water, neither of which is a noise-producing activity. • Construction and operation of the detention ponds or evaporation ponds would not bring more people within close proximity to an airport or expose people to airport noise than may already occur (depending on the location of the detention ponds or evaporation ponds).
Population and Housing	• Construction and operation of detention or evaporation ponds would not involve the construction of new homes or businesses, the extension of roads, or other actions that may induce substantial property growth in an area. Furthermore, it would not develop any amenities (e.g., malls, amusement parks, hotels, recreation areas) that would attract people to the southern Delta. • Construction and operation of detention or evaporation ponds would not displace substantial numbers of people and necessitate the construction of replacement housing elsewhere because the change in volume of water (and timing of release of water) would take place at existing discharge points and agricultural lands, and not where people currently reside.

Potential Environmental Effects of Agricultural Return Flow Salinity Controls	
Resource	Discussion
Public Services	• The need for additional public services (e.g., fire protection, police protection, libraries, schools) or the deterioration of existing public services typically results from an increase in population. As a location's population increases, the need for additional or new public services and public service facilities generally increases. As discussed above, construction and operation of the detention or evaporation ponds would not involve an increase in population or housing. In addition, construction and operation of the ponds would not include proposals for new housing, and thus would not generate students or increase demands for school services or facilities.
Recreation	• Recreational facilities are not typically located in agricultural fields, and thus the construction and operation of detention or evaporation ponds in agricultural lands would not result in impacts on recreational facilities or lead to the construction of recreational facilities.
Transportation and Traffic	• Construction of detention or evaporation ponds may involve truck or worker trips. But due to the limited geographic scale and limited duration of construction, it is not expected truck or worker trips would exceed local or regional road trip thresholds. • Operation of the detention ponds would not require trips. • Operation of the evaporation ponds would require a limited number of truck trips to collect and dispose of the salt accumulated from the evaporation process. However, because of the freshwater source, it is anticipated that the salt would accumulate at a relatively slow rate, and thus the truck trips needed would take place only during a limited period of time after decades of evaporation. Therefore, it is not anticipated that the number of truck trips needed would be sufficient to exceed local or regional traffic thresholds.
Utilities and Service Systems	• Construction and operation of detention or evaporation ponds would not involve the need for utilities or service system because it would not require the construction or operation of wastewater facilities or water supply facilities. It would not result in the generation of solid waste.

H.3.5 Low Lift Pumping Stations

The program of implementation for the SDWQ alternatives requires additional studies and monitoring of the southern Delta circulation and water levels. It is possible that additional study and monitoring would determine the need for modifications of the existing South Delta Temporary Barriers Project. If this determination is made by the State Water Board, DWR may be required to install low lift pumping stations at the temporary barriers as a method of compliance.

Modifications could include providing additional lift stations at the barriers. DWR prepared the Low-Head Pumping Conceptual Plan (2011) describing potential modifications to the operations of these barriers. Below is the cost evaluation and environmental evaluation performed by the Low Head Pumping Conceptual plan for the installation of either permanent or temporary pumps at the southern Delta temporary barriers.

Cost Evaluation

Cost evaluations were based on a number of layouts and scenarios. Costs were evaluated for stand-alone pumping sites or "single pumping sites" on each of the agricultural barriers in the southern Delta (Old River, Middle River, and Grant Line Canal). Costs were also evaluated for two-pumping sites, or pumping sites on two of the three agricultural barriers (Middle and Old Rivers or Middle River and Grant Line Canal). Three intake structure types were analyzed: temporary cylindrical, permanent cylindrical, and permanent flat intake screens. Lastly, pumping capacities were also analyzed with the above variables. The three analyzed pumping capacities were 250, 1,000, and 1,500 cubic feet per second (cfs). Tables H-20 through H-23 show the costs of these potential methods of compliance.

Table H-20. Single Pumping Sites Estimated Initial Capital Costs

	Pump Capacity [cfs]		
Pump Facility Intake Screen Design	250	500	1,000
Temporary Cylindrical	$5.5–$20.7	$9.8–$40.9	$19.6–$80.9
Permanent Cylindrical	$20.2–$60.8	$40.9–$112.9	$81.7–$234.3
Permanent Flat	$120– $161.4	$214.5–$286.6	$391.7–$551

Source: DWR 2011

Note: All values in millions of dollars

cfs = cubic feet per second

Table H-21. Two Pumping Sites Estimated Initial Capital Costs

	Pump Capacity [cfs]		
Pump Facility Intake Screen Design	250	500	1,000
Temporary Cylindrical	$14.9	$28.4	$55.5
Permanent Cylindrical	$49.5	$87.6	$168.1
Permanent Flat	$186.9	$301.0	$540.7

Source: DWR 2011
Note: All values in millions of dollars
cfs = cubic feet per second

Table H-22. Single Pumping Sites Estimated Annual Costs

	Pump Capacity [cfs]		
Pump Facility Intake Screen Design	250	500	1,000
Temporary Cylindrical	$10 – $22.6	$15.6 – $45.1	$32.4 – $89.9
Permanent Cylindrical	$0.7 – $1.4	$1.4 – $2.6	$2.7 – $5.3
Permanent Flat	$3.4 – $4.5	$6.1 – $8.5	$11.8 – $16.3

Source: DWR 2011
Note: All values in millions of dollars
cfs = cubic feet per second

Table H-23. Two Pumping Sites Estimated Annual Costs

	Pump Capacity [cfs]		
Pump Facility Intake Screen Design	250	500	1,000
Temporary Cylindrical	$17.8	$33.5	$62.7
Permanent Cylindrical	$1.3	$2.3	$4.5
Permanent Flat	$4.7	$8.0	$14.7

Source: DWR 2011
Note: All values in millions of dollars
cfs = cubic feet per second

The cost ranges are based on different site layout configurations analyzed in DWRs Low-Head Pumping Conceptual Plan. The site layout that would provide the greatest reduction in water quality violations is a two-pumping site alternative with 1,000 cfs pumping capacity combined pumping at Middle and Old River barriers (DWR 2011). The estimated cost of this layout is $55.5–$540.7 million; the estimated annual costs are $4.5–$62.7 million.

Environmental Evaluation

As part of the conceptual plan (2011), DWR prepared an environmental checklist and analysis documenting potential impacts on environmental resources should the conceptual plan be implemented. The environmental checklist and analysis identified environmental commitments and/or potential mitigation measures to be implemented by DWR, should the project move forward, to reduce potentially significant impacts for the following resources: aesthetics, agriculture, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, transportation and traffic, and utilities and service systems. The environmental checklist and analysis identified less-than-significant impacts for the following resources: mineral resources, population and housing, public services, and recreation. Attachment 1 of this appendix contains the analysis of the conceptual plan and is incorporated into this evaluation as a method of compliance. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, lists potential mitigation measures that DWR can and should implement to reduce potentially significant environmental effects on the environmental resources identified in Attachment 1 of this appendix.

H.4 Sources of Funding

There are many financial assistance programs designed to assist agencies implement water supply and water quality projects. The federal and state governments manage these programs. Often, these funding programs can leverage each other to make a project more feasible. Below is a brief description of some pertinent funding programs.

H.4.1 Federal Sources

United States Department of Agriculture (USDA)

Water and wastewater loans and grants are offered through USDA Rural Development. Eligible applicants are public entities, nonprofit organizations, federally recognized tribes, and mutual water companies located outside cities, with a population under 10,000 people. Financial assistance recipients may receive a grant and loan component. The grant component cannot exceed 75 percent of the total financial assistance requested. Loans are offered up to a 40-year term at an interest rate updated quarterly, based on nonmetropolitan median household income (CFCC 2012).

United States Department of the Interior, Bureau of Reclamation (USBR)

The Water Sustain and Manage America's Resources for Tomorrow (Water SMART) Program is an umbrella program that manages many grant programs for water supply research and implementation projects. The core focus of Water SMART is sustainable management and water

efficiency. Typical projects include projects to reduce water losses in distribution systems, water recycling projects, and the creation of new water sources for agricultural irrigation purposes. Water SMART has multiple funding opportunities for municipal and agricultural water users. Typical grant awards range from $200,000 to $1,500,000 (CFCC 2012).

USBR also offers grant programs targeted at improving the Bay-Delta's water resources and water quality through the Bay-Delta Restoration Water Use Efficiency Grants Program. Funds are available for improving water supply reliability and for increasing water use efficiency. Eligible applicants are public entities with authority over water delivery located within the CALFED solution area as identified in the 1999 *CALFED Programmatic Environmental Impact Statement/ Environmental Impact Report* (CFCC 2012).

H.4.2 State Sources

California Infrastructure and Economic Development Bank

The Infrastructure State Revolving Fund finances water supply and water quality projects. Financial assistance is available in the form of lower-than-market interest rate loans. Based on a project description and applicant's credit score, an interest rate is computed. The term of the loan can be up to 30 years. Eligible applicants include public entities, such as cities, counties, and special districts (CFCC 2012).

Department of Water Resources (DWR)

The Agricultural Water Use Efficiency Grant Program provides funds for projects that improve agricultural water use efficiency. Projects must result in water savings, increased in-stream flow, increased water quality, or increased energy efficiency in water systems. Sample projects include: feasibility studies, research, development, training, education, public outreach, and pilot projects (CFCC 2012).

Integrated Regional Water Management (IRWM) provides funds for many types of water quality activities. Current IRWM grant programs include: planning, implementation, and stormwater flood management. IRWM grants focus on holistic watershed management activities and regional coordination of water supplies. Eligible applicants include cities, counties, districts, and nonprofit organizations (CFCC 2012).

DWR manages the Delta and San Joaquin and Sacramento Rivers Water Quality Grant Program to assist agencies with projects that protect drinking water supplies. Eligible projects include (a) projects that reduce or eliminate discharges of salt, dissolved organic carbon, pesticides, pathogens, and other pollutants to the SJR; (b) projects that reduce or eliminate discharges of bromide, dissolved organic carbon, salt, pesticides, and pathogens from discharges to the Sacramento River; (c) projects at Franks Tract and other locations in the Delta that will reduce salinity or other pollutants at agricultural and drinking water intakes; and (d) projects identified in the June 2005 Delta Region Drinking Water Quality Management Plan, prioritizing design and construction of the relocation of drinking water intake facilities for in-Delta water users (CFCC 2012).

State Water Resources Control Board

The Clean Water State Revolving Fund provides low-interest loans for water quality improvement projects, including water recycling and desalination. The loan term is up to 30 years, and the interest rate is between 0 percent and half the general obligation bond rate (2.4 percent–3 percent) depending on the applicant's population and median household income. Principal forgiveness is available for small disadvantaged communities. Typical loans are for 20 years at half the State's general obligation bond rate. Eligible applicants are cities, counties, special districts, and joint powers authorities (CFCC 2012).

Water recycling projects that offset potable water supplies are eligible to apply for financial assistance from the Water Recycling Funding Program (WRFP). WRFP has funds available to assist with planning and implementation of water recycling projects. Only public entities (e.g., cities, counties, special districts) are eligible to apply for these funds. The WRFP offers both grants and loans (CFCC 2012).

The Agricultural Drainage Loan and Agricultural Drainage Management Loan Programs provide funding for projects that address treatment, storage, conveyance, or disposal of agricultural drainage that threatens waters of the State. An example project is the installation of tailwater recirculation systems and drip irrigation systems to reduce the volume of tailwater and contaminants discharged to a receiving water body. Eligible applicants include public entities (e.g., cities, counties), districts, joint powers authority, or other political subdivisions of the State involved with water management (CFCC 2012).

Department of Public Health

The Safe Drinking Water State Revolving Fund provides low-interest loans for projects that correct and upgrade drinking water infrastructure. The loan term is up to 30 years, and the interest rate is between 0 percent and half the general obligation bond rate (2.4 percent–3 percent) depending on the applicant's population and median household income. Principal forgiveness is available for small disadvantaged communities. Typical loans are for 20 years at half the State's general obligation bond rate. Eligible applicants are cities, counties, special districts, and joint powers authorities (CFCC 2012).

H.5 Potential Mitigation Measures

The regulated public agencies would likely be required to comply with CEQA and perform a project-specific analysis, and engineering design should they determine the need, to approve a discretionary action associated with a method of compliance. The project-specific analysis would be required to identify potentially significant environmental impacts. The lead agency would be required to require the implementation of all feasible mitigation measures to reduce impacts to less than significant or be responsible for providing a statement of overriding considerations for significant impacts that cannot be mitigated to a level of less than significant. Table H-24, *Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance*, identifies the potential mitigation measures that the regulated community could implement should they determine a discretionary action they approve has significant impacts. These mitigation measures are based, in part, on mitigation measures presented in the following documents.

- North Coast Regional Water Quality Control Board *Proposed Amendment to the Water Quality Control Plan for the North Coast Region to Establish Exception Criteria to Point Source Waste Discharge Prohibition by Raising the Action Plan for Storm Water Discharges and Adding a New Action Plan for Low Threat Discharges.*
- Central Valley Regional Water Quality Control Board *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Methylmercury and Total Mercury in the Sacramento and San Joaquin Delta Estuary*.
- California Regional Water Quality Control Board, Los Angeles Region Substitute Environmental Document for *Toxic Pollutants in the Dominguez Chanel and Greater Los Angeles and Long Beach Waters Total Maximum Daily Load*.
- City of Tracy *Initial Study and Mitigated Negative Declaration for the Tracy Desalination and Green Energy Project*.
- Central Valley Regional Water Quality Control Board *Irrigated Lands Regulatory Program Program Environmental Impacts Report*.
- California Department of Water Resources *Low Head Pump Salinity Control Study Prepared to Meet requirements of the State of California State Water Resources Control Board Water Rights Order WR 2010-0002, Condition A.7. Appendix C: Environmental Considerations for South Delta Low Head Pump Station*.

The State Water Board may not have the authority to implement the mitigation measures presented in Table H-24.

Table H-24. Potential Mitigation Measures for Construction and Operation Activities Related to Methods of Compliance

Resource	Potential Mitigation Measure	Alternative Surface Water Supplies	Substituting surface water with groundwater	Aquifer Storage and Recovery	Recycled Water Source	New Source Water Supply	Salinity Source Control	Wastewater Treatment Plant Desalinization	Agricultural Return Flow Salinity Controls	Low Lift Pump Station(s)
Construction										
Aesthetics	• Direct construction lighting away from residential and roadway areas if sensitive receptors are present. [2]		X		X	X	X	X		
Agriculture and Forestry Resources	• If forest or vegetation is removed by a qualified forester or restoration ecologist and reviewed by the appropriate agencies, develop and implement a reforestation and/or revegetation plan. [2]							X		
	• Restrict ground-disturbing mechanical operations around sensitive forested or agricultural areas. [2]							X		
	• Preserve or replace onsite trees as a means of maintaining forest resource(s) and providing carbon storage (afforestation/reforestation). [2]							X		
	• Require payment of the appropriate Agricultural Mitigation Fee, as required by local agencies, to offset the loss of Prime and Unique Farmland if construction activities disturb or destroy Prime Farmland or Unique Farmland, as defined by the California Department of Conservation.[4]					X		X	X	
	• Avoid agricultural lands to the greatest extent possible. [6]									X
Air Quality	• Apply appropriate construction mitigation measures from the applicable air district (e.g., San Joaquin Valley Air Pollution Control District) to reduce construction emissions. These measures will be applied on a project-level basis and may be tailored in consultation with the appropriate air district, depending on the severity of anticipated construction emissions. Although not specifically cited in this document, references to individual air district documents that contain recommended mitigation measures are included in the references section of this appendix.[5]		X		X	X	X	X	X	
	• Apply appropriate Toxic Air Contaminants (TAC) and Hazardous Air Pollutants (HAP) mitigation measures from the applicable air district to reduce public exposure to Diesel Particulate Matter (DPM), pesticides, and asbestos. These measures are documented in official rules and guidance reports; however, not all districts make recommendations for mitigation measures for TAC/HAP emissions. These measures will be applied on a project-level basis and may be tailored in consultation with the appropriate air district, depending on the severity of anticipated TAC/HAP emissions. [5]	X		X		X	X	X	X	
	• Use vehicles with zero-emission or lower-emission engines.[2]	X		X		X	X	X	X	
	• Limit the unnecessary idling of vehicles and equipment. [2]	X		X		X	X	X	X	
	• Use soot-reduction traps or diesel particulate filters. [2]	X		X		X	X	X	X	
	• Use low/zero carbon/alternative fuels, such as B20 biodiesel or renewable diesel. [2]	X		X		X	X	X	X	
	• Control visible emissions from off-road diesel powered equipment. [2]	X		X		X	X	X	X	
	• Design structural devices to minimize the frequency of maintenance trips. [2]	X		X		X	X	X	X	
	• Perform necessary equipment maintenance, such as inspections and corrections, to detect failures early keep equipment operating cleanly and efficiently. [2]	X		X		X	X	X	X	
	• Use the proper sized equipment for the job during construction and operation. [2]	X		X		X	X	X	X	
	• Train equipment operators in proper use of equipment during construction and operation. [2]	X		X		X	X	X	X	

Resource	Potential Mitigation Measure	Alternative Surface Water Supplies	Substituting surface water with groundwater	Aquifer Storage and Recovery	Recycled Water Source	New Source Water Supply	Salinity Source Control	Wastewater Treatment Plant Desalinization	Agricultural Return Flow Salinity Controls	Low Lift Pump Station(s)
	• Produce concrete onsite if determined to be less emissive than transporting ready mix. [2]		X		X	X	X	X	X	
	• Minimize the amount of concrete for paved surfaces or utilize a low-carbon concrete option. [2]		X		X	X	X	X	X	
	• Use locally sourced or recycled materials for construction materials. [2]		X		X	X	X	X	X	
	• Control fugitive dust emissions during land clearing, grubbing, scraping, excavation, leveling, grading, or cut and fill operations with application of water (at least twice daily) or by presoaking. [2,4]		X		X	X	X	X	X	
	• Cover stockpiles of soil, sand, and other materials, and stabilize all disturbed areas and storage piles that are not being actively utilized for construction purposes using water, chemical stabilizers, or by covering with tarps, other suitable cover, or vegetative ground cover. [2,4]		X		X	X	X	X	X	
	• Pave, apply water, or apply soil stabilizers to unpaved areas, including all access roads and parking areas [2,4]		X		X	X	X	X	X	
	• Sweep surrounding streets and paved areas (e.g., once per day). [2]		X		X	X	X	X	X	
	• Suspend excavation and grading activity when winds (instantaneous gusts) exceed		X		X	X	X	X	X	
	• 25 miles per hour and/or greater than 20 mph over a 1-hour period. [2,4]									
	• Initiate landscaping and revegetation as soon as construction tasks allow in order to minimize wind erosion. [2]		X		X	X	X	X	X	
	• Encourage ride sharing and of use transit transportation for construction employees commuting to the project site.[4]		X		X	X	X	X	X	
	• Use electric equipment for construction whenever possible in lieu of fossil fuel-powered equipment. [4]		X		X	X	X	X	X	
	• Do not operate construction equipment longer than 8 cumulative hours per day. [4]		X		X	X	X	X	X	
	• Use cooled exhaust gas recirculation (EGR) if permitted under manufacturer's guidelines for on-road and off-road diesel equipment. [4]		X		X	X	X	X	X	
	• Use Caterpillar prechamber diesel engines or equivalent if economical and available to reduce NO_x emissions. [4]		X		X	X	X	X	X	
	• Discontinue all construction activities during first stage smog alerts, first stage ozone alerts, and/or curtail construction during periods of high ambient pollutant concentrations [4]		X		X	X	X	X	X	
	• Water previously disturbed exposed surfaces (soil) a minimum of 3 times per day or whenever visible dust is capable of drifting from the site or approaches 20 percent opacity.[4]		X		X	X	X	X	X	
	• Water all haul roads (unpaved) a minimum of 3 times per day or whenever visible dust is capable of drifting from the site or approaches 20 percent opacity. [4]		X		X	X	X	X	X	
	• Reduce speed on unpaved roads to less than 15 miles per hour. [4]		X		X	X	X	X	X	
	• Install and maintain a trackout control device that meets the specifications of regional air board requirements if needed (e.g., SJVAPCD Rule 8041 if the site exceeds 150 vehicle trips per day or more than 20 vehicle trips per day by vehicles with three or more axles. [4]		X		X	X	X	X	X	
	• Cover trucks hauling debris, soil, sand, or other material to reduce dust and suspended air particles, and when transporting materials offsite, maintain a freeboard limit of at least 6 inches or effectively wet to limit visible dust emissions. [4,2]		X		X	X	X	X	X	

Resource	Potential Mitigation Measure	Alternative Surface Water Supplies	Substituting surface water with groundwater	Aquifer Storage and Recovery	Recycled Water Source	New Source Water Supply	Salinity Source Control	Wastewater Treatment Plant Desalinization	Agricultural Return Flow Salinity Controls	Low Lift Pump Station(s)
	• Limit and remove the accumulation of mud and/or dirt from adjacent public roadways at the end of each workday. [4]		X		X	X	X	X	X	
	• Remove visible trackout from the site at the end of each workday. [4]		X		X	X	X	X	X	
	• Comply with applicable regional air board asphalt-concrete paving rules such as SJVAPCD Rule 4641 (e.g., restrict use of cutback, slow-sure, and emulsified asphalt paving materials). [4]		X		X	X	X	X	X	
	• Use emulsified/aqueous diesel fuel. [2,6]		X		X	X	X	X	X	X
	• Install diesel particulate filter and utilize diesel oxidation catalyst. [6]									X
	• Install other after-treatment products. [6]									X
	• Require the pump system be electric or alternatively fueled. [6]									X
	• Locate pump system/emissions generating activity as far from sensitive receptors as possible. [6]		X		X	X	X	X	X	X
Biological Resources[a]	• Prior to land disturbance, contact U.S. Fish and Wildlife Service (USFWS)and Department of Fish and Game (DFG) and conduct all necessary pre-construction surveys for special-status plants, species, and habitat prior to construction activities. This may include the hiring of a qualified biologist to identify riparian and other sensitive vegetation communities and/or habitat for special-status plants and animals.[1,5, 6]		X		X	X	X	X	X	X
	• Comply with local, state, and federal regulations and ordinances such as those listed below.		X		X	X	X	X	X	
	○ USFWS Endangered Species Act (ESA) Section 7 consultation for threatened and endangered species. [2]									
	○ U.S. Army Corps of Engineers (USACE) Section 404 Permit and State Section 401 Water Quality Certification for filling or dredging waters of the United States and other federal permitting actions. [2, 5]									
	○ DFG 1601 Agreement for Streambed Alteration. [2]									
	○ California Water Quality Control Board waste discharge requirements (which are also permits for purposes of the Clean Water Act (CWA), if applicable). [2]									
	○ General plan conservation requirements.[2]									
	○ City and/or county tree ordinances. [2]									
	• Contract with qualified botanists, wildlife biologists, and arborists to develop biological assessments if a project's specific location warrants doing so. At a minimum, assessments should include project area-specific literature searches, reviews of DFG's California Natural Diversity Data Base and the California Native Plant Society's Inventory of Rare and Endangered Plants of California, and field surveys of all potential project sites and their surrounding areas to identify and map existing plant communities, wildlife habitat, and heritage trees, and to identify wildlife species that currently occur, have occurred in the past (e.g., resident and migratory wildlife species that have been documented as foraging or nesting at the site), or have the potential to occur at the site due to the presence of suitable habitat. Field surveys should follow protocols established by DFG and should be conducted during the appropriate time(s) of year (e.g., during the blooming period of potentially occurring plant species).[2,5]	X		X	X	X	X	X	
	• Select a project site that does not contain critical habitat if there are project site alternatives. Or locate project facilities outside the boundaries of critical habitat areas if there is only one project site available. [2, 5]	X		X	X	X	X	X	X	

Resource	Potential Mitigation Measure	Alternative Surface Water Supplies	Substituting surface water with groundwater	Aquifer Storage and Recovery	Recycled Water Source	New Source Water Supply	Salinity Source Control	Wastewater Treatment Plant Desalinization	Agricultural Return Flow Salinity Controls	Low Lift Pump Station(s)
	• Avoid and minimize disturbance of riparian and other sensitive vegetation communities[5]		X		X	X	X	X	X	
	• Avoid and minimize disturbance of areas containing special-status plant or animal species.[5]		X		X	X	X	X	X	
	• Where adverse effects on sensitive biological resources (including fish species) cannot be avoided, undertake additional CEQA review and develop a restoration or compensation plan to mitigate the loss of the resources.[5]		X		X	X	X	X	X	
	• Where construction in areas that may contain special-status fish species cannot be avoided through the use of alternative management practices, conduct an assessment of habitat conditions and the potential for presence of special-status fish species prior to construction; this may include the hiring of a qualified fish biologist to determine the presence of special-status fish species.[5]		X		X	X	X	X	X	
	• Based on the species present in adjacent water bodies and the likely extent of construction work that may affect fish, limit construction to periods that avoid or minimize impacts on special-status fish species.[5]		X		X	X	X	X	X	
	• Develop a mitigation and management plan in coordination with DFG and USFWS to implement all appropriate measures as required by USFWS ESA Section 7 consultation and to satisfy any other local, state, and federal requirements for achieving no net loss of wetlands or other critical habitat, or take of wildlife species of concern. The plan should be submitted to the local city/county environmental planning department, USACE, USFWS, DFG, applicable regional board (e.g., as part of a Section 401 Water Quality Certification application), and/or other oversight agencies as applicable for approval prior to its implementation if an impact on special-status species population(s) is determined to occur based on the biological assessment and evaluation of the final project site and design. [2]		X		X	X	X	X	X	
	• Develop a revegetation plan if vegetation would be disturbed during construction or operation. The re-vegetation plan should be prepared by a qualified restoration ecologist and reviewed by the appropriate agencies. The plan should specify sites where revegetation should take place, the planting stock appropriate for the region, appropriate designs (e.g., plant arrangements that, when mature, replicate the natural structure and species composition of similar habitats in the region), planting techniques, monitoring frequency, and success criteria (e.g., sapling trees no longer require active management). [2]		X		X	X	X	X	X	
	• Establish temporary construction buffers for drainages, wetlands/vernal pools, and other sensitive habitat in the project area that could be affected by construction activities. The outer edges of the buffer zones will be demarcated using flagging or temporary orange mesh construction fencing before initiation of construction activities and based on site-specific conditions, seasonal restrictions for wildlife, local planning department specifications, and resource agency (e.g., USFWS and DFG) requirements. [2,6]		X		X	X	X	X	X	X

Resource	Potential Mitigation Measure	Alternative Surface Water Supplies	Substituting surface water with groundwater	Aquifer Storage and Recovery	Recycled Water Source	New Source Water Supply	Salinity Source Control	Wastewater Treatment Plant Desalinization	Agricultural Return Flow Salinity Controls	Low Lift Pump Station(s)
	• Require a qualified biologist to perform the following construction functions if sensitive habitat or species are present. ○ Perform required preconstruction surveys to determine the current presence of, and demarcate the boundaries of construction buffers around, sensitive habitats, and submit survey reports according to DFG and local agency guidelines for approval prior to construction.[1,2,5, 6] ○ Provide USFWS-approved worker environmental awareness training that informs all construction personnel about sensitive plant and wildlife species and habitats.[2] ○ Oversee major excavation and other construction activities with the authority to stop construction activities until appropriate corrective measures have been completed.[2] ○ Report to USFWS any incidental take.[2] ○ Periodically reinspect the project site (e.g., every week) during construction activities or whenever a there has been a substantial lapse in construction activity (e.g., more than 2 weeks).[2]		X		X	X	X	X	X	X
	• Locate temporary access roads and staging areas outside the boundaries of critical habitat areas, restrict movement of heavy equipment to and from the project site to established roadways and areas designated for construction and staging, and do not allow parking of vehicles or storage of potentially-toxic chemicals near or up-gradient of drainages or sensitive habitats or under heritage trees.[2]		X		X	X	X	X	X	
	• Implement measures to control dust, erosion and noise (see the Air Quality, Geology and Soils, and Noise sections, respectively).[2]		X		X	X	X	X	X	
	• Properly contain or remove all trash that may attract predators to the worksite during construction.[2]		X		X	X	X	X	X	
	• Remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to preproject conditions according to the before-mentioned revegetation plan after completion of construction activities.[2]		X		X	X	X	X	X	
	• Provide compensation for unavoidable degradation or loss of critical habitat due to project construction to ensure no net loss of that habitat as required by local, state, or federal agencies. Compensation could be provided at a minimum ratio (e.g., 3:1, 3 acres of restored wetlands for every 1 acre affected, or three native oak trees planted for every native oak tree eliminated) that ensures long-term replacement of habitat functions and values and complies with local, state, and federal requirements. Examples of compensation are as follows. ○ Construct replacement habitat as close as possible to the previous habitat location at the project site (e.g., locate replacement riparian and wetland habitats along the same drainage affected by the project construction). ○ If site limitations prevent onsite habitat replacement, construct replacement habitat as near the project site as possible. ○ Provide payment on a per-acre basis to an approved restoration or mitigation bank or other trust fund.[2]		X		X	X	X	X	X	

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	• Comply with measures contained within habitat conservation plans or natural community conservation plans, such as the San Joaquin Multiple Habitat Conservation Plan. Consult with appropriate biologists who have training and are knowledgeable about the habitat conservation plan or natural community conservation plan. Monitoring, construction, and relocation surveys by a qualified biologist would be done as appropriate.[4]		X		X	X	X	X	X	
	• Prior to implementing any management practice that would result in the permanent loss of wetlands, conduct a delineation of affected wetland areas to determine the acreage of loss in accordance with current USACE methods. For compliance with the CWA Section 404 permit and Waste Discharge Requirements (WDRs), compensate for the permanent loss (fill) of wetlands and ensure no net loss of habitat functions and values. Compensation ratios will be determined through coordination with the Central Valley Water Board and USACE as part of the permitting process. Compensation may be a combination of mitigation bank credits and restoration/creation of habitat, as described below. ○ Purchase credits for the affected wetland type (e.g., perennial marsh, seasonal wetland) at a locally approved mitigation bank and provide written evidence to the resource agencies that compensation has been established through the purchase of mitigation credits. ○ Develop and ensure implementation of a wetland restoration plan that involves creating or enhancing the affected wetland type.[5]		X		X	X	X	X	X	
	• Install species exclusion fencing for animal species during construction; install a temporary, plastic mesh-type construction fences at least 1.2 meters tall around any established special-status plant species buffer areas to prevent encroachment by construction vehicles and personnel; a qualified biologist will determine the exact location of the fencing.[6]									X
	• Conduct pile driving with vibratory hammer. [6]									X
	• Implement turbidity monitoring during construction/removal. [6]									X
	• Implement environmental awareness program for construction personnel. [6]									X
Cultural Resources	• Where construction within areas that may contain cultural resources cannot be avoided through the use of alternative management practices, conduct an assessment of the potential for damage to cultural resources prior to construction; this may require the hiring of a qualified cultural resources specialist to determine the presence of significant cultural resources.[5]		X		X	X	X	X	X	

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	• Where the assessment indicates that damage may occur, and prior to land disturbance, submit a nonconfidential records search request to the appropriate California Historic Resources Information System (CHRIS) which potentially includes the following in the plan area.[1,5] ○ Calaveras County: Central California CHRIS Information Center[5] ○ Contra Costa County: Central California CHRIS Information Center[5] ○ Madera County: Southern San Joaquin Valley CHRIS Information Center[5] ○ Mariposa County: Central California CHRIS Information Center[5] ○ Merced County: Central California CHRIS Information Center[5] ○ San Joaquin County: Central California CHRIS Information Center[5] ○ Stanislaus County: Central California CHRIS Information Center[5] ○ Tuolumne County: Central California CHRIS Information Center[5]				X	X	X	X	X	
	• Implement the recommendations provided by the CHRIS information center(s) in response to the records search request.[5]									
	• Where adverse effects on cultural resources cannot be avoided, undertake additional CEQA review and develop appropriate mitigation to avoid or minimize the potential impact(s).[5]									
	• Require a professional trained to identify evidence of cultural resources to observe major excavation and earth-moving activities if significant cultural resources are known to exist on the project site or if there is a high probability for significant cultural resources to exist.[2]				X	X	X	X	X	
	• Construction will stop within a 100-foot radius of any archaeological, paleontological, or historical resources discovered during construction activities, and treatment measures will be devised as needed. A qualified archaeologist should be brought on site within 24 hours of the discovery. If the find is determined to be significant, a full archaeological survey will take place. Construction activities in the area resumes once the survey is completed and all cultural resources are recovered.[2, 6]				X	X	X	X	X	X
	• No further excavation or other site disturbance takes place if any human remains are discovered during construction activities. Notify the local coroner so that a determination can be made as to whether the remains are of Native American origin or whether an investigation into the cause of death is required. If the remains are determined to be Native American, the following actions would be taken. ○ The coroner notifies the Native American Heritage Commission (NAHC) within 24 hours ○ The NAHC immediately notifies those persons believed to be the most likely descendant(s) (MLD) of the deceased ○ Once the NAHC identifies the MLD, the MLD, with the permission of the landowner, inspects the site of the discovery and makes recommendations for the treatment or disposition of the remains and any associated grave items within 48 hours (per AB2641) of the MLD being granted access to the site. ○ The landowner is to ensure that the immediate vicinity of the remains, established according to standard professional practices, is not damaged or disturbed by further activity until the landowner has conferred with the MLD.				X	X	X	X	X	

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	○ Discussion and consultation between the landowner and MLD should take into account the possibility of multiple burials and reasonable options regarding the MLD's preferences for treatment. ○ If the NAHC is unable to identify an MLD, if the MLD fails to make a recommendation, or if the NAHC is unable to mediate a dispute concerning the appropriate disposition of the remains, the landowner shall re-inter the human remains and any associated items with appropriate dignity on the property in a location not subject to further subsurface disturbance; and, to protect the remains from disturbance, the landowner must record the site with the NAHC or the appropriate CHRIS, use an open space or conservation zoning designation or easement, and/or record a document with the county in which the property is located. [2, 5]									
	• No further disturbance of an area, if fossils are encountered, will occur until the materials have been evaluated by a qualified paleontologist and appropriate treatment measures have been identified.[4]				X	X	X	X	X	
	• Construction workers should be aware of the following protocols for identifying cultural resources: ○ If built environment resources or archaeological resources, including chipped stone (often obsidian, basalt, or chert), ground stone (often in the form of a bowl mortar or pestle), stone tools (such as projectile points or scrapers), unusual amounts of shell or bone, historic debris (such as concentrations of cans or bottles), building foundations, or structures are inadvertently discovered during ground-disturbing activities, the land owner should stop work in the vicinity of the find and retain a qualified cultural resources specialist to assess the significance of the resources. If necessary, the cultural resource specialist also will develop appropriate treatment measures for the find. ○ If human bone is found as a result of ground disturbance, the land owner should notify the county coroner in accordance with the instructions described above. If Native American remains are identified and descendants are found, the descendants may—with the permission of the owner of the land or his or her authorized representative—inspect the site of the discovery of the Native American remains. The descendants may recommend to the owner or the person responsible for the excavation work means for treating or disposing of the human remains and any associated grave goods, with appropriate dignity. The descendants will make their recommendation within 48 hours of inspection of the remains. If the NAHC is unable to identify a descendant, if the descendants identified fail to make a recommendation, or if the landowner rejects the recommendation of the descendants, the landowner will inter the human remains and associated grave goods with appropriate dignity on the property in a location not subject to further and future subsurface disturbance.[5]				X	X	X	X	X	
Geology and Soils	• Require a licensed geologist to evaluate county general plans and other available geologic literature for additional geological information, and conduct site-specific geologic, geotechnical, and soil investigations to evaluate the potential for the presence of an active fault or other seismic risks (strong ground shaking, liquefaction, landslides, mass wasting, or other ground failure) for site-specific projects. [2]				X	X		X	X	

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	• Comply with existing local, state, and federal geotechnical regulations, building codes, standards specifications, and the recommendations of geotechnical studies prepared for site-specific projects. [2, 4]				X	X		X	X	
	• Evaluate the project site, and up- and down-gradient areas, for erosion potential. Design the project and implement construction and maintenance activities to prevent erosion and sedimentation. [2]				X	X		X	X	
	• Design stormwater runoff control systems to fit the hydrology of the project area once it is fully developed, to have adequate capacity to transport the flow from all upland/upstream areas, to be nonerosive, and to conduct runoff to a stable outlet. Install systems prior to the rainy season.[2]				X	X		X	X	
	• Remove vegetation only when necessary and make every effort to conserve topsoil for reuse in re-vegetation of disturbed areas. [2]				X	X		X	X	
	• Develop land in increments of workable size such that construction can be completed during a single construction season, and coordinate erosion and sediment control measures with the sequence of grading and construction operations. [2]				X	X		X	X	
	• Stabilize and revegetate all disturbed soil surfaces before the rainy season. [2]				X	X		X	X	
	• Restrict stockpiling of construction materials to the designated construction staging areas and exclusive of habitats and their buffer zones. [2]				X	X		X	X	
	• Employ best management practices (BMPs) that prevent soil or sediment from leaving construction sites, monitor them for effectiveness, and maintain them throughout the construction operations and between construction seasons. Standard measures include installation of sediment basins and traps in conjunction with grading operations; development of slope drains; stabilization of stream banks; use of hydraulic mulch, hydroseeding, straw, mulch anchored with a tackifier, polyacrylamide, rolled erosion control products (e.g., blankets and mats), earth dikes, drainage swales, and velocity dissipation devices; and installation of silt fences, fiber rolls, gravel bag berms, sandbag barriers, storm drain inlet protection, and check dams. [2]		X		X	X	X	X	X	
	• Contain runoff from truck and cement equipment washdown. [2]				X	X		X	X	
	• Limit to the dry season any construction activities within an area of the Ordinary High Water (OHW) line of drainages and lakes. Limit any construction activities within a floodplain, but above an OHW line, to those actions that can adequately withstand high river flows without resulting in the inundation of and entrainment of materials in flood flows.[2]				X	X		X	X	
	• Have a professional hydrologist or licensed engineer develop an erosion control and water quality protection plan to avoid habitat degradation and ensure compliance with local and state erosion- and sedimentation-related requirements. The plan should be integrated into the construction schedule and describe how site cleanup and regrading will impact current physical conditions. [2]				X	X		X	X	
	• Locate projects away from areas with unsuitable soils or steep slopes. [2]				X	X		X	X	

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	• Depending on soil and geologic conditions, do the following. ○ Ground improvements, such as soil compaction and excavation and disposal of liquefiable soils. ○ Structural improvements, such as berms or dikes, to prevent large lateral spreading. ○ Buttress landslides. ○ Install special drainage devices and water injection wells. ○ Monitor groundwater level to ensure stable conditions. [2]				X	X		X	X	
Greenhouse Gas Emissions	• Implement all requirements under Air Quality, above.		X		X	X	X	X	X	
	• Implement water recycling practices or policies. [2]				X					
	• Preserve known greenhouse gas (GHG) sinks to the extent feasible and limit GHG sources as a component of project design. [2]								X	
	• Preserve or replace onsite trees or contribute to a mitigation program providing carbon storage. [2]								X	
	• Implement local air district controls to reduce criteria pollutant emissions and help to minimize GHG emissions. Measures to reduce vehicle trips and promote use of alternative fuels, as well as clean diesel technology and construction equipment retrofits, should be considered.[5]		X		X	X	X	X	X	
Hazards and Hazardous Materials	• Provide hazardous materials and worksite safety training for construction workers in accordance with local, state, and federal requirements including, but not limited to the Occupational Safety and Health Act, Title 9 of the Code of Federal Regulations, and Title 8 of the California Code of Regulations. [2]		X		X	X	X	X	X	
	• Provide hazardous materials accidental spill response plans (and/or Hazardous Materials Management Program) and training that would outline methods, materials, and responsibilities for the response to, and clean-up of, an accidental hazardous material spill during construction of the project. At a minimum, the plans should include provisions for immediate response, containment, and cleanup of a spill, including excavation and disposal of contaminated soil and notification responsibilities. Materials needed for potential cleanup activities should be kept onsite. [2]	X		X	X	X	X	X	X	X
	• Provide a health and safety plan for construction workers that is prepared by a certified industrial hygienist; complies with all appropriate local, state, and federal regulations; and identifies specific safety measures to be followed during all phases of construction and long-term operation. [2]	X		X	X	X	X	X	X	
	• Conduct careful surveys of mine sites and prepare written reports and guidance in compliance with applicable state and federal requirements before commencing cleanup actions to identify and characterize safety concerns; potential for erosion during and after cleanup actions; potentially recyclable materials (e.g., sediment/soil for fill, scrap steel, processing equipment, brick, wood, mercury, and gold); and major waste streams for disposal in onsite or offsite landfills. [2]	X		X	X	X	X	X	X	
	• Implement dust-suppression and other measures available to prevent risks associated with inhaling dust and exhaust during construction activities. [2]	X		X	X	X	X	X	X	
	• Label all hazardous materials onsite to inform users of potential risks and train users in appropriate handling, storage, and disposal procedures. [2]	X		X	X	X	X	X	X	

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	• Protect sites from unmonitored access with fencing and signs to prevent accidental health hazards to the nearby residents. [2]		X		X	X	X	X	X	
	• To control vector (e.g., mosquito) production, design projects so they do not increase the area and/or duration of standing water; selectively install systems that are prone to standing water away from high-density areas and away from residential housing; and/or incorporate measures to mitigate vector creation (e.g., install netting over devices and/or employ vector control agencies to mitigate vector production). Design projects to comply with local vector/mosquito control agencies' requirements. [2]								X	
	• Adhere to applicable building and safety codes and permits that would ensure construction activities would result in less-than-significant delays in response times for fire and police vehicles. [2]				X	X				
	• Coordinate with local fire and police providers to establish alternative routes and traffic control during the construction activities that could cause traffic congestion or road closures. [2]				X	X				
	• Review California Department of Fire's Fire Hazard Safety Zone maps, contact local fire protection agencies during early phases of project planning and, if possible, select project sites that are not in a High or Very High fire severity hazard zones. [2]				X					
	• Identify local laws, ordinances, and building codes related to fire prevention, burning, welding and blasting, etc., to obtain any necessary permits and adhere to permit conditions. [2]				X	X				
	• Maintain an adequate number of fire extinguishers and other tools and equipment that can be used for fighting fire onsite, and ensure that personnel are trained in their use. [2]				X	X				
	• Maintain a water tender during extensive welding/cutting operations. [2]				X	X				
	• Maintain a fire watch during hazardous operations and after the work has ceased for the day. [2]				X					
	• Provide funding for an inspector from the local fire agency. [2]				X					
	• Provide equipment that gives construction personnel and fire agencies the ability to communicate with one another. [2]				X					
	• Remove materials that easily ignite or contribute to an increased intensity and spread of fire from high risk areas. [2]				X					
	• Prepare and implement a Risk Management Plan (RMP) for the use and storage of anhydrous ammonia that meets the requirements of California Health and Safety Code, Division 20, Chapter 6.95, Article 2 and the California Code of Regulation Title 19, Division 2, Chapter 4.5, Articles 1–11. Submit the RPM to the appropriate local or regional agency for review and approval (e.g., San Joaquin County Environmental Compliance Division).[4]	X			X	X		X		
	• Identify existing underground utility lines at excavation sites prior to construction, and avoid/relocate underground utility lines in coordination with utility company/service provider; coordinate with natural gas companies and Underground Service Alert before beginning any excavation or other construction activities to ensure that pipelines are not impacted. [2,6]				X	X	X	X	X	X

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Hydrology and Water Quality	• Evaluate site-specific tsunami and seiche risks, comply with local building codes that address tsunami and seiche risk, and consult with an engineer to ensure that critical structures are designed to resist strong ground motion, tsunami, and seiche wave impact if appropriate for the project site. [2]									
	• Elevate and brace any project buildings if buildings are located in areas prone to flooding or tsunamis. [2]				X			X		
	• Position project roads and structures to be perpendicular to potential waves so there is less resistance and erosive force. [2]				X			X		
	• Ensure that project activities do not weaken nearby levees. [2]				X			X	X	
	• Prepare a Storm Water Pollution Prevention Plan (SWPPP) that includes specific types and sources of stormwater pollutants, determines the location and nature of potential impacts, and specifies appropriate control measures to eliminate any potentially significant impacts from stormwater runoff on receiving waters. The SWPPP will require treatment BMPs that incorporate, at a minimum, the required hydraulic sizing design criteria for volume and flow to treat projected stormwater runoff. The SWPPP shall comply with the most current standards established by the regional water quality control board. BMPs shall be selected from the local agency's Stormwater Quality Control Standards.[4., 6]		X		X	X	X	X	X	X
	• Implement turbidity monitoring during construction/removal.[6]									X
Noise	• Limit construction work to the appropriate windows of construction per the local or regional noise ordinances. Typically construction is limited to 7:00 a.m.–6:00 p.m. on weekdays and permit no work on Saturdays, Sundays, or holidays unless appropriate city and county building officials grant prior approval. [2, 3]		X		X	X	X	X	X	
	• Implement noise-reducing construction practices such that noise from construction does not exceed applicable local noise standards or limits specified in the applicable county ordinances and general plan noise elements.[5,6]	X		X	X	X	X	X	X	X
	• Use noise-generating equipment during periods when fewer people are present near the construction area. [2]	X		X	X	X	X	X	X	
	• Muffle or otherwise control all construction equipment with a high noise-generating potential, including all equipment powered by internal combustion engines. [2]	X		X	X	X	X	X	X	
	• Use newer equipment with improved noise muffling, and ensure that all equipment items have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators, intact and operational. Newer equipment will generally be quieter in operation than older equipment. All installation equipment should be inspected at periodic intervals to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding).[3]	X		X	X	X	X	X	X	
	• Shroud or shield all impact tools. [2]	X		X	X	X	X	X	X	
	• Locate all stationary noise-generating equipment, such as compressors, as far as possible from adjacent occupied offices, residents, or sensitive habitats (if they are adjacent to the project site). [2]	X		X	X	X	X	X	X	
	• Turn off mobile equipment and machinery when not in use to reduce noise from idling equipment. [2]	X		X	X	X	X	X	X	
	• Use temporary noise barriers or curtains along installation boundaries or partial enclosures around continuously operating equipment. [2]	X		X	X	X	X	X	X	

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	• Use the shortest possible routes from construction sites to local freeways for truck delivery routes, except when selecting routes to avoid going through residential neighborhoods.[2]		X		X	X	X	X	X	
	• Establish an active community liaison program that notifies landowners within 300 feet of construction areas of the construction schedule, in writing, prior to construction to keep them informed of schedule changes, and designate a "disturbance coordinator" for the construction site. [2]		X		X	X	X	X	X	
	• Develop an operations plan for specific construction activities that documents maximum noise limits and addresses the variety of available measures to limit the impacts from noise on adjacent homes, businesses, or sensitive habitats. [2]		X		X	X	X	X	X	
	• Regularly inspect equipment and monitor noise and vibration to ensure that all equipment on the site is in good condition and effectively muffled and that contractors take all reasonable steps to minimize impacts, particularly when near sensitive areas. [2, 3]		X		X	X	X	X	X	
	• Monitor construction noise and vibrations and modify and/or reschedule construction activities if monitoring determines that maximum limits set by local or regional noise ordinances are exceeded.[2,3]		X		X	X	X	X	X	
Transportation and Traffic	• Use signage, striping, fencing, barricades, and other physical structures to mark the excavated areas, promote safety, and minimize pedestrian/bicyclist accidents. [2]		X		X	X	X	X		
	• Control traffic with signals or traffic control personnel in compliance with authorized local police or California Highway Patrol requirements. [2]		X		X	X	X	X		
	• Develop and implement a project-specific construction traffic management plan to minimize traffic impacts upon the local circulation system and ensure that construction activities adhere to local and state police and transportation requirements. A construction traffic management plan could address traffic control for any street closure, detour, or other disruption to traffic circulation; identify the routes that construction vehicles will use to access the site, hours of construction traffic, and traffic controls and detours; and include strategies for temporary traffic control, temporary signage and tripping, location points for ingestion and egress of construction vehicles, staging areas, and timing of construction activity that appropriately limits hours during which large construction equipment may be brought on or offsite. [2]		X		X	X	X	X		
	• Limit or restrict hours of construction so as to avoid peak traffic times. [2]		X		X	X	X	X		
Public Services	• Notify local emergency and police service providers of construction activities and road closures, if any, and coordinate with the local police protection to establish alternative routes and traffic control during the installation activities.[3]		X		X	X		X		
Utilities and Service Systems	• Coordinate power outages and notify potentially affected utility users of temporary loss of electricity. [6]									X
	• 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. [6]									X

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Operation										
Aesthetics	• Direct operational lighting away from any residential and roadway areas. [2]		X		X	X	X	X		
	• Develop and implement a lighting plan to comply with local jurisdiction lighting requirements that may exist. The lighting plan could include stipulations such as the following.		X		X	X	X	X		
	○ Design site lighting and exterior building light fixtures to reduce the effects of light pollution and glare off of glass and metal surfaces.									
	○ Lighting shall be directed downward and light fixtures shall be shielded to reduce upward and spillover lighting.									
	○ Where it is not feasible to fully shield light fixtures from emitting light pollution, the lighting shall be directed downward and be of the minimum wattage and height suitable for illuminating the areas to be secured and the exterior work areas for worker safety.[4]									
	• Apply minimum lighting standards. [6]									X
	• Use landscape vegetation to buffer views of new facilities if sensitive receptors are present and reduce visibility of new structures. [2,6]		X		X	X	X	X		X
	• Use building materials that do not create a source of glare if sensitive receptors are present. [2,6]		X		X	X	X	X		X
Agriculture and Forestry Resources	• Treat used municipal water and return it to the senior water right holder as recycled water for agricultural uses.				X					
Air Quality	• Apply appropriate mitigation measures from the applicable air district to reduce operational emissions. These measures are suggested by the district or are documented in official rules and guidance reports; however, not all districts make recommendations for operational mitigation measures. Where applicable, measures will be applied on a project-level basis and may be tailored in consultation with the appropriate air district, depending on the severity of anticipated operational emissions. [5]	X		X	X	X	X	X	X	X
	• Apply appropriate TAC and HAP mitigation measures from the applicable air district to reduce public exposure to DPM, pesticides, and asbestos. These measures are suggested by the district or are documented in official rules and guidance reports; however, not all districts make recommendations for mitigation measures for TAC/HAP emissions. These measures will be applied on a project-level basis and may be tailored in consultation with the appropriate air district, depending on the severity of anticipated TAC/HAP emissions. [5]	X		X	X	X	X	X	X	
	• Perform necessary equipment maintenance, such as inspections and corrections, to detect failures early so that the equipment operates cleanly and efficiently. [2]	X		X	X	X	X	X	X	
	• Use maintenance vehicles with zero-emission or lower-emission engines.[2]	X		X	X	X	X	X	X	
	• Limit the unnecessary idling of delivery vehicles and equipment. [2]	X		X	X	X	X	X	X	
	• Use emulsified/aqueous diesel fuel. [2,6]	X		X	X	X	X	X	X	X
	• Use low/zero carbon fuels, such as B20 biodiesel or renewable diesel. [2]	X		X	X	X	X	X	X	
	• Install diesel particulate filter and utilize diesel oxidation catalyst. [6]									X
	• Install other after-treatment products. [6]									X
	• Require the pump system be electric or alternatively fueled. [6]									X

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	• Locate pump system/emissions generating activity as far from sensitive receptors as possible. [6]		X		X	X	X	X	X	X
Biological Resources	• During maintenance activities, properly contain or remove all trash that may attract predators to the worksite. [2]				X	X				X
Greenhouse Gas Emissions	• See measures in Air Quality, above.		X		X	X	X	X	X	
	• Perform necessary equipment maintenance, such as inspections and corrections, to detect failures early so that the equipment operates cleanly and efficiently. [2]		X		X	X	X	X		
	• Implement water recycling practices or policies. [2]				X			X		
	• The California Attorney General's office report entitled, *Addressing Global Warming at the Local Agency Level*, identifies various example measures to reduce GHG emissions at the project level (State of California Department of Justice 2008). The following mitigation measures and project design features were compiled from the California Attorney General's Office report. These measures are not meant to be exhaustive but to provide a sample list of measures that could be incorporated into future project design. The solid waste measures and transportation measures are listed below.				X	X	X	X	X	
	○ Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).									
	○ Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers.									
	○ Recover byproduct methane to generate electricity.									
	○ Limit idling time for commercial vehicles, including delivery and construction vehicles.									
	○ Use low- or zero-emission vehicles, including construction vehicles. [5]									
	• Require pump system to be electric. [6]									X
Hazards and Hazardous Materials	• Provide hazardous materials and worksite safety training for workers who maintain the projects in accordance with local, state, and federal requirements, such as the Occupational Safety and Health Act, Title 9 of the Code of Federal Regulations, and Title 8 of the California Code of Regulations. [2]	X		X			X	X		
	• Provide hazardous materials accidental spill response plans (and/or Hazardous Materials Management Program) and training that would outline methods, materials, and responsibilities for the response to, and clean-up of, an accidental hazardous material spill during long-term maintenance of the project. At a minimum, the plans should include provisions for immediate response, containment, and cleanup of a spill, including excavation and disposal of contaminated soil and notification responsibilities. Materials needed for potential clean-up activities should be kept onsite.[2,6]	X		X			X	X		X
	• Provide a health and safety plan for maintenance workers that is prepared by a certified industrial hygienist; complies with all appropriate local, state and federal regulations; and identifies specific safety measures to be followed during long-term operation. [2]	X		X		X	X	X		
	• Label all hazardous materials onsite to inform users of potential risks, and train users in appropriate handling, storage, and disposal procedures. [2]	X		X			X	X		

Resource	Potential Mitigation Measure	Alternative Surface Water Supplies	Substituting surface water with groundwater	Aquifer Storage and Recovery	Recycled Water Source	New Source Water Supply	Salinity Source Control	Wastewater Treatment Plant Desalinization	Agricultural Return Flow Salinity Controls	Low Lift Pump Station(s)
	• Maintain an adequate number of fire extinguishers and other tools and equipment that can be used for fighting fire onsite, and ensure that personnel are trained in their use. [2]		X		X		X	X		
	• Provide equipment that provides operations personnel and fire agencies the ability to communicate with one another. [2]		X		X			X		
	• Maintain a defensible space around the perimeter of the project area. [2]				X			X		
	• Implement dust-suppression and other measures available to prevent risks associated with inhaling dust and exhaust during maintenance activities. [2]		X		X			X		
	• Dewater and dispose of waste brine at an appropriate landfill. If suitable, and depending on the volumes and characterization of the brine, use the brine byproduct in a solar-thermal electrical generation process to help offset electrical costs to run a desalination device.							X		
Hydrology and Water Quality	• Actively educate project personnel about tsunami and seiche hazards, characteristics, and evacuation routes as part of site safety training. [2]									
	• Develop multiple ways to receive tsunami and seiche warnings and alert site personnel. [2]									
	• Develop a formal tsunami hazard plan as part of the project's site safety plan, and conduct emergency exercises. [2]									
Noise	• Employ noise reduce-reducing operational measures; develop plans for operations and maintenance activities to address the variety of available measures to limit the impacts from noise on adjacent homes, businesses, or sensitive habitats.[2, 6]		X		X	X		X		X
	• Ensure all noise producing equipment under operating conditions (e.g., pumps) are enclosed or located behind barriers such that noise does not exceed applicable local noise standards or limits specified in the applicable county ordinances and general plan noise elements if sensitive receptors are present.[5]		X		X	X		X		

Notes:

[a] Potential mitigation measures for conflictss with habitat conservation plans, natural community conservation plans, or other plans, policies and regulations protecting biological species and resources that maybe attributable to land use and planning are presented in Biological Resources.

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Attachment 1

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	*This potential impact would be less than significant and therefore would not require mitigation.*
Create a New Source of Light or Glare	Create a New Source of Light or Glare	• Construct structures with low-sheen and non-reflective surface materials (PP[1]) Apply minimum lighting standards (PP,TP[2])
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	• Apply minimum lighting standards (PP, TP)
Permanent Changes in Views	Permanent Changes in Views	• 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	• Return disturbed areas to pre-project conditions (PP, TP)
Permanent Conversion of Prime Farmland		*Project is not expected to result in substantial conversion of prime farmland*
AIR QUALITY		
Conflict with Applicable Air Quality Plan or Regulation	Conflict with Applicable Air Quality Plan or Regulation	*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.*
Generation of Criteria Pollutants during Project Construction	Generation of Criteria Pollutants during Project Installation/Removal	*This potential impact would likely be less than significant and therefore would not require mitigation.*

Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
Generation of Criteria Pollutants during Project Operation	Generation of Criteria Pollutants during Project Operation	• 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	• 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	• 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	• 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)

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	• 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	• 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	• 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	• Conduct preconstruction surveys (PP, TP) • Install Exclusion Fencing for Western Pond Turtle (PP, TP)
Loss or Disturbance of Western Pond Turtle Habitat *(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)*	Loss or Disturbance of Western Pond Turtle Habitat *(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)*	• Install Exclusion Fencing for Western Pond Turtle (PP, TP)

Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
Loss or Disturbance of Special-Status Plants		• 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		• Conduct pile driving with a vibratory driver (PP)
Decreased Water Quality and Increased Aquatic Habitat Disturbance During Project Construction *(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)*	Decreased Water Quality and Increased Aquatic Habitat Disturbance During Project Construction/Removal	• 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	• Environmental Awareness Program for Construction Personnel (PP,TP)
Fish Harassment and Displacement During Project Operation	Fish Harassment and Displacement During Project Operation	*This potential impact would likely be less than significant and therefore would not require mitigation.*

Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
CULTURAL RESOURCES		
Damage to or Destruction of As-Yet-Unidentified Cultural Resources, Including Human Remains		• 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	• Prepare and implement a SWPPP (PP, TP)
Potential Structural Damage from Development on Materials Subject to Liquefaction		*This potential impact would be less than significant and therefore would not require mitigation.*
Potential Structural Damage from Development on Expansive Soils		*This potential impact would be less than significant and therefore would not require mitigation.*
GREENHOUSE GAS EMISSIONS		
Generation of GHG Emissions from Project Construction	Generation of GHG Emissions from Project Construction/Removal	*This potential impact would likely be less than significant and therefore would not require mitigation.*
Generation of GHG Emissions from Project Operation	Generation of GHG Emissions from Project Operation	• 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	• 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	• 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	• Prepare and implement SWPPP (PP, TP) • Implement Turbidity Monitoring During Construction (PP) • Implement Turbidity Monitoring During Construction and Removal (TP)

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	• Prepare and implement a Hazardous Materials Management Program (PP, TP)
LAND USE AND PLANNING		
Conflict with Existing Zoning for Agricultural Use *(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)*	Conflict with Existing Zoning for Agricultural Use *(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint of delivery pipeline would increase)*	• Avoid agricultural lands to the greatest extent possible (PP, TP)
Incompatible with Existing Adjacent Land Uses *(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint would increase)*	Incompatible with Existing Adjacent Land Uses *(degree of impact would increase w/increasing flow regime [pumping capacity] because footprint of pipeline would increase*	• 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	• 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	• Employ noise-reducing operational measures (PP, TP)
POPULATION AND HOUSING		
None		
PUBLIC SERVICES		
None		
RECREATION		
None		

Permanent Pump System	Temporary Pump System	Mitigation/Environmental Commitment
TRANSPORTATION/TRAFFIC		
Temporary Increase in Traffic during Construction	Temporary Increase in Traffic during Construction/Removal	*This potential impact would be less than significant and therefore would not require mitigation.*
UTILITIES AND SERVICE SYSTEMS		
Generation of Solid Waste during Project Construction		*This potential impact would be less than significant and therefore would not require mitigation.*
Increase in Power Consumption during Project Operation	Increase in Power Consumption during Project Operation	*This potential impact would be less than significant and therefore would not require mitigation.*
Temporary Disruption of Electricity Service		• Coordinate power outages and notify potentially affected utility users of the temporary loss of electricity.
Disruption to Underground Utility Lines during Excavation Activities		• 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.