STOCKTON DELTA WATER SUPPLY PROJECT

Final Program Environmental Impact Report
State Clearinghouse No. 2003112060

Prepared for:
City of Stockton

CITY OF STOCKTON

October 2005

In association with

MWH

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Chapter 1
Introduction

CHAPTER 1
INTRODUCTION

1.1 PURPOSE OF THE FINAL ENVIRONMENTAL IMPACT REPORT

This report has been prepared to accompany the Draft Program Environmental Impact Report (DPEIR) for the City of Stockton's (City) Delta Water Supply Project (DWSP). The DPEIR identified the environmental impacts associated with the construction and operation of the DWSP and recommended mitigation measures to reduce significant impacts. The statutes and Guidelines of the California Environmental Quality Act (CEQA) require the Lead Agency to consult with public agencies having jurisdiction over a proposed project and to provide the public and other interested parties with an opportunity to comment on a draft of the environmental impact report. This "Responses to Comments" document responds to significant environmental issues raised in the comments on the DPEIR and makes revisions to it as necessary in response to these comments.

1.2 ENVIRONMENTAL REVIEW PROCESS

The DPEIR for the DWSP was submitted to the State Clearinghouse (SCH # 2003112060) and released on April 29, 2005, for a 45-day public and agency review and comment period, which ended on June 13, 2005. Concurrent with the release of the DPEIR, a Notice of Availability was mailed to interested parties. The DPEIR was distributed to responsible and trustee agencies. The City filed a Notice of Completion with the Governor's Office of Planning and Research, State Clearinghouse, indicating that the DPEIR had been completed and was available for review. The City held a public meeting on June 1, 2005, in Stockton to receive oral comments on the DPEIR and accepted written comments at its offices through the close of the review period. In addition, late comments from the San Joaquin County Department of Public Works were accepted on June 24, 2005, and from the California Department of Transportation on June 28, 2005.

This document, together with the DPEIR, constitutes the Final Program Environmental Impact Report (FPEIR).

The CEQA Guidelines (Section 15132) specify that a final environmental impact report shall consist of:

(a) The draft of the environmental impact report or a revision of the draft.

(b) Comments and recommendations received on the draft of the environmental impact report, either verbatim or in summary.

(c) A list of persons, organizations, and public agencies submitting comments.

(d) The responses of the Lead Agency to significant environmental points raised in the review and consultation process.

(e) Any other information added by the Lead Agency.

The City Council will review this FPEIR for adequacy and consider it for certification pursuant to the requirements of Section 15090 of the CEQA Guidelines. If the City Council certifies the FPEIR and chooses to approve the DWSP, the Council will then be required to adopt findings on the feasibility of reducing or avoiding significant environmental effects (CEQA Guidelines, Section 15091, subd. (a)) and to adopt a statement of overriding considerations identifying the project benefits that outweigh the project's significant unavoidable effects (*id.*, Section 15093).

Public Resources Code Section 21081.6, subdivision (a)(1) requires lead agencies to "adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment." Throughout the DPEIR, mitigation measures have been clearly identified and presented in language that will facilitate the establishment of a monitoring and reporting program. Any mitigation measures adopted by the City as conditions for the approval of the project will be included in a monitoring and reporting program to verify compliance. The Mitigation Monitoring and Reporting Program for the DWSP is included in Chapter 5 of this FPEIR.

When the City Council certifies the adequacy of the FPEIR and approves the project (with the accompanying findings, statement of overriding considerations, and Mitigation Monitoring and Reporting Program), the City will file a Notice of Determination with both the County Clerk of the County of San Joaquin and the State Clearinghouse.

1.3 PROJECT SUMMARY

The City proposes to develop the DWSP as a new supplemental water supply for the City of Stockton Metropolitan Area (COSMA). The City has applied to the State Water Resources Control Board for a water rights permit to divert water from the Sacramento-San Joaquin Delta (Delta). The City's water rights application addresses a long-term planning horizon through the year 2050 and requests an ultimate diversion of 125,900 acre-feet per year.

The DWSP would be incrementally expanded as the need for additional treated water supply develops. The initial phase of the DWSP is needed immediately and is proposed for implementation in 2009. It is designed to meet the treated water supply needs of full development (build-out) under the City's current 1990 General Plan, anticipated by about the year 2015. Initially, the DWSP would be sized with a water treatment plant (WTP) capacity to treat and deliver up to 30 million gallons per day (mgd) (33,600 acre-feet per year) of water. Ultimately by about 2050, the WTP would be expanded to treat 160 mgd (125,900 acre-feet per year) of water.

The DWSP is proposed as a conjunctive use program that would integrate surface water and groundwater supplies. The surface water component of the DWSP would include an intake facility with fish screens on the San Joaquin River, new pipelines to convey Delta water to a new water treatment facility located just north of the COSMA, and treated water pipelines to deliver

water to the City's water distribution system. The groundwater component would include coordinated groundwater and surface water management. Initially, groundwater levels would be allowed to recover by in-lieu (natural) recharge. Ultimately, treated Delta surface water may be injected into the groundwater basin underlying the COSMA and extracted during subsequent periods of limited surface water supply (this process is referred to as an aquifer storage and recovery program).

PROJECT OBJECTIVES

The DWSP was developed to meet the following objectives:

- To replace declining and unreliable surface water supplies
- To protect and restore groundwater resources
- To provide adequate water supply to accommodate planned growth

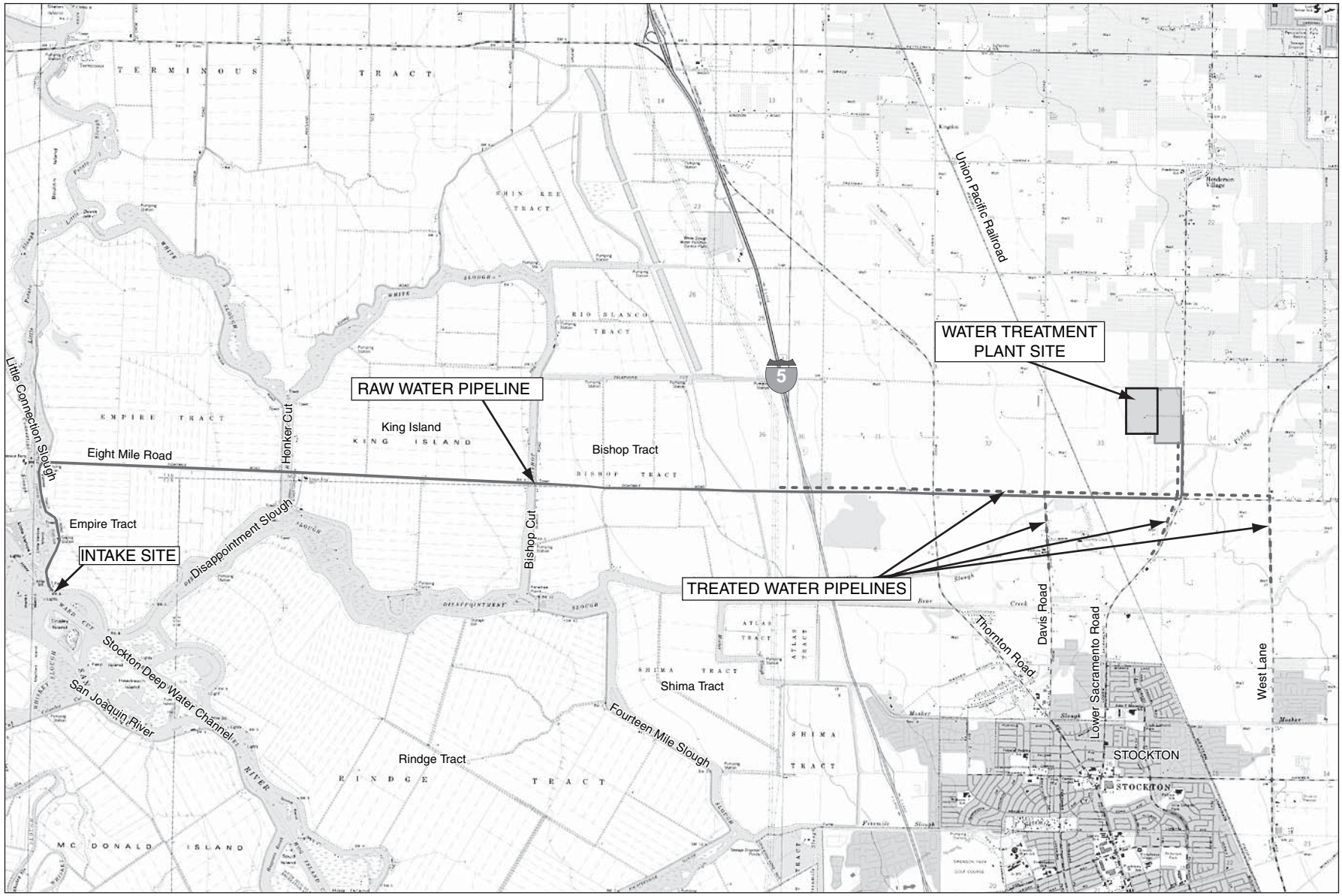
The primary purpose of the DWSP is to provide a secure, reliable supplemental supply of water for the COSMA that will meet current and future water needs, while protecting groundwater and reducing dependence on groundwater.

PROJECT LOCATION

The DWSP intake facility would be constructed on the San Joaquin River, with the raw water pipelines connecting to the new WTP just north of Stockton, California (Figure 1-1). The proposed location for the intake is on the southwest tip of Empire Tract adjacent to the Stockton Deep Water Ship Channel (Figure 1-2). The raw water pipelines would extend from the intake and parallel the Empire Tract levee to Eight Mile Road, where the pipelines would turn east and parallel the north side of Eight Mile Road to Pixley Slough. The alignment then would turn north, parallel Pixley Slough to the west side of Lower Sacramento Road, and finally turn north to the WTP site. This site is located on the west side of Lower Sacramento Road, just north of the City and approximately three miles east of Interstate 5 on a 126-acre parcel. The WTP would occupy approximately 56 acres along the western side of the parcel. The treated water pipeline would parallel the east side of Lower Sacramento Road south to the south side of Eight Mile Road. From the intersection of Lower Sacramento and Eight Mile Roads, the pipeline would go south along Lower Sacramento Road, and east and west along Eight Mile Road to connect with the City's and California Water Service Company's distribution systems.

PROPOSED FACILITIES

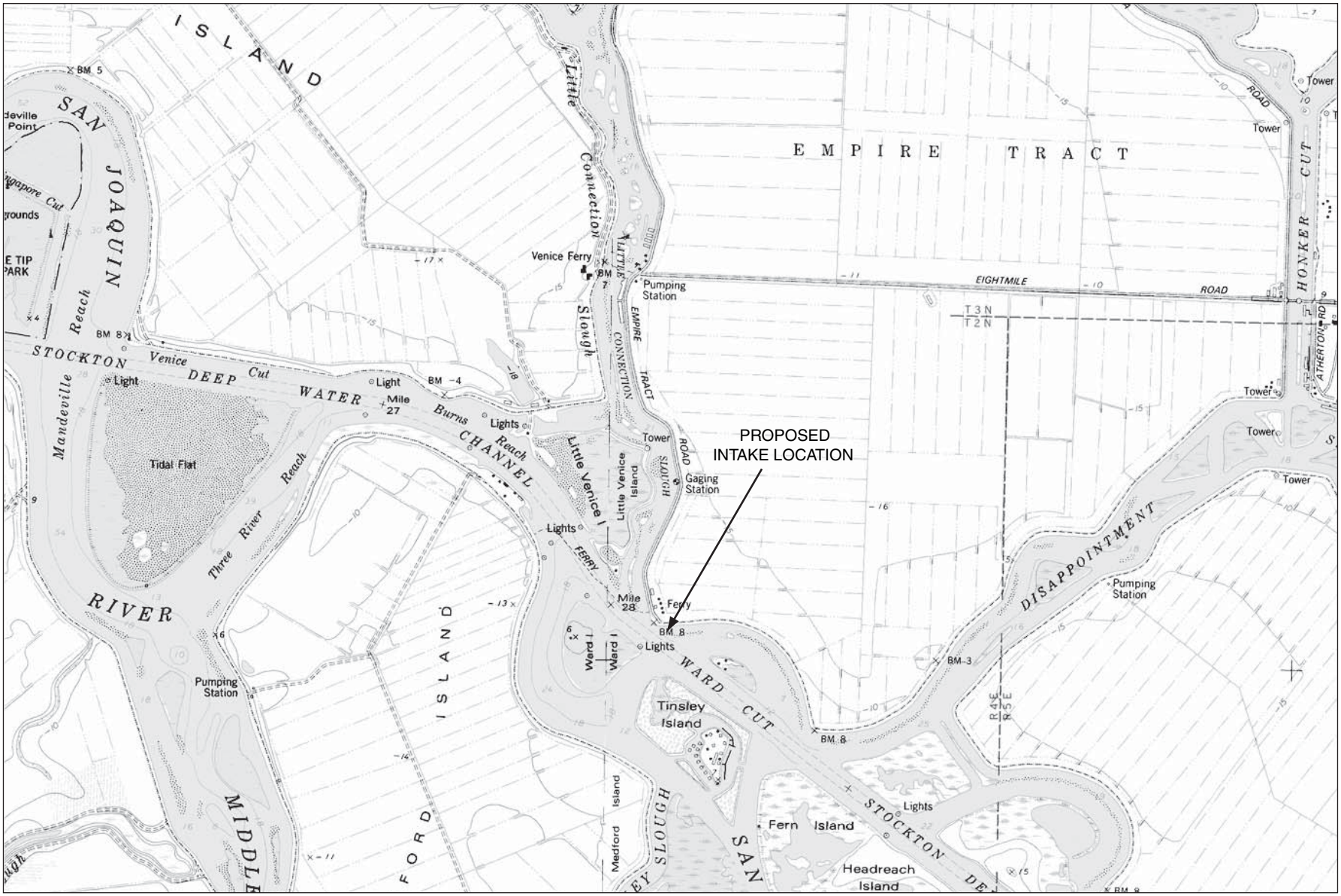
The DWSP would consist of installing a water intake facility on the San Joaquin River, pipelines to convey the raw water to a WTP north of the COSMA, and treated water pipelines to deliver water to the City's current water distribution system (Figure 1-1). The initial capacity of the DWSP would be 30 mgd, with staged incremental expansions to an ultimate capacity of 160 mgd. The intake facility and pump station would be designed to facilitate these expansions and to avoid extensive future construction in the river and sloughs.



SOURCE: USGS 7.5' Quadrangles (Bouldin Island, Terminous, and Lodi South); and ESA, 2004

Delta Water Supply Project . 200090

Figure 1-1
Project Location



SOURCE: USGS 7.5' Quadrangles (Bouldin Island, Terminous, and Lodi South); and ESA, 2004

Delta Water Supply Project . 200090

Figure 1-2
Intake Site Location

Intake Structure and Pump Station Facilities

The proposed intake site would be located on the southwest tip of Empire Tract adjacent to the San Joaquin River. As discussed in the DPEIR (pages 2-22 through 2-24), the general area designated for the intake is on a bend of the river, which creates two shorelines (south and west banks of Empire Tract). The DPEIR proposed both banks as potential locations for the intake and pump station facility (Figure 1-2). As stated in the DPEIR (page 2-22), San Joaquin River flows in the area tend to be sluggish because of the tidal effects on the river. On average, the south bank location has a higher sweeping velocity than the west bank location. Since the publication of the DPEIR, the U.S. Coast Guard, California Department of Boating and Waterways, Port of Stockton, and San Francisco Bar Pilots have indicated that because of navigational concerns, the south bank is the preferred location. The south bank is farther from the Stockton Deep Water Ship Channel than the west bank and affords better protection for both passing vessels and the intake facility. For these reasons, the City's staff and consultants are recommending that the City Council eliminate the west bank as a possible location for the intake facility.

Two intake configurations are currently being considered: (1) an In-River Intake and Pump Station (Figure 1-3); and (2) an In-Bank Intake with Pump Station Facility (Figure 1-4), both using flat plate fish screens. These figures depict the ultimate 160-mgd capacity of the intake structure.

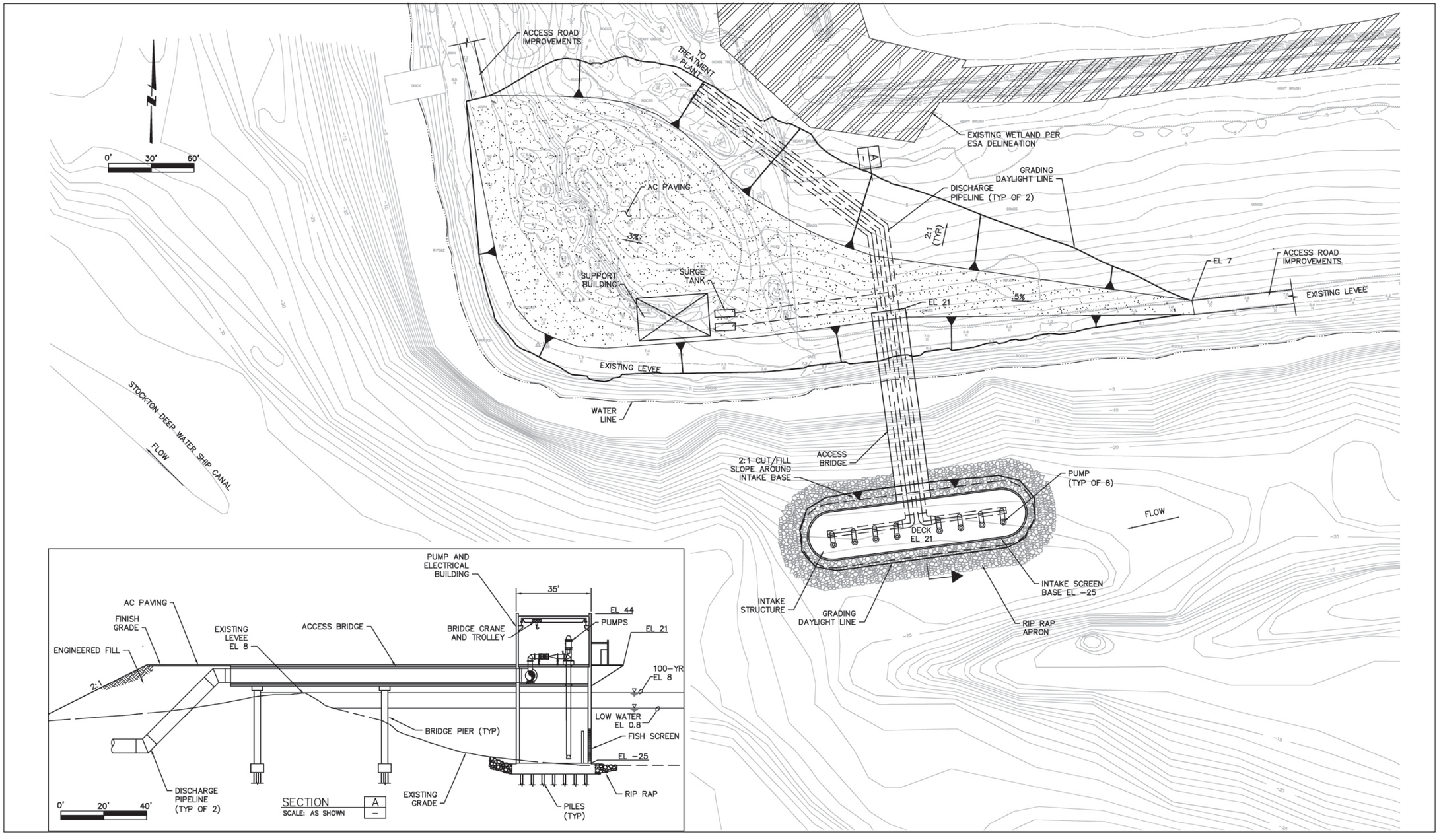
Water Pipelines

Raw Water Pipelines

The approximately 67,000-foot (12.7-mile) raw water pipelines connecting the intake facility and WTP would be installed beneath or north of Eight Mile Road with a short south segment paralleling Empire Tract levee along Little Connection Slough (Figure 1-1). The pipeline alignment would use public rights-of-way where available. Because the project would be constructed in stages, two parallel pipelines would be built along the selected alignment. A 54-inch-diameter pipeline would be installed initially and would provide for the initial 30 mgd WTP and its future expansion up to 60 mgd. A parallel 72-inch-diameter pipeline would be added when additional capacities up to 160 mgd are needed. Staggered construction of two pipelines would reduce the initial cost of the conveyance facilities, maintain sufficient velocity in the piping to avoid deposition/resuspension impacts on the WTP, and ultimately provide redundancy for maintenance and emergency services.

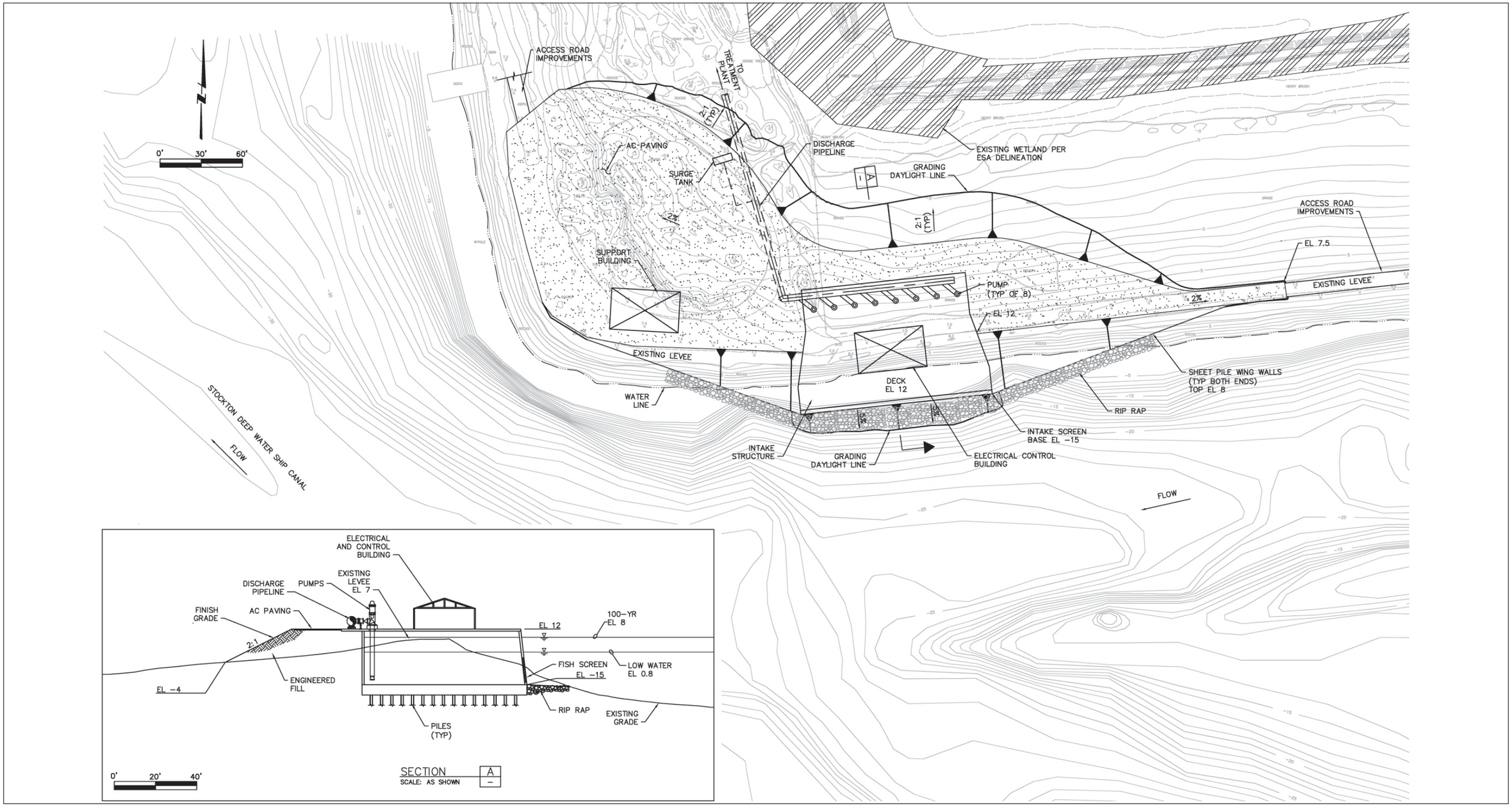
Treated Water Pipelines

At the initial WTP capacity of 30 mgd, a 54-inch-diameter pipeline would connect the process area of the WTP to the current distribution system (Figure 1-1). Approximately 38,730 feet (7.3 miles) of piping would be required. The treated water pipeline would parallel the east side of Lower Sacramento Road south to the south side of Eight Mile Road.



SOURCE: Montgomery Watson Harza and Environmental Science Associates, 2005

Figure 1-3
In-River Intake



SOURCE: Montgomery Watson Harza; and ESA, 2005

Delta Water Supply Project . 200090

Figure 1-4

In-Bank Intake

Water Treatment Plant

The WTP would be located approximately three miles east of Interstate 5 and one-half mile north of Eight Mile Road along Lower Sacramento Road (Figure 1-1). The facility would occupy about 56 acres along the western side of a 126-acre parcel. Raw water would enter the plant via a 54-inch-diameter pipeline. A second parallel 72-inch-diameter pipeline would be constructed when the plant capacity is expanded beyond 60 mgd to its ultimate capacity of 160 mgd. The WTP would likely be either (1) a conventional treatment plant using ozone, deep bed granular activated carbon or (2) a membrane treatment plant with conventional pre-treatment using powdered activated carbon.

1.4 REPORT ORGANIZATION

The remaining chapters of this document contain the following information:

Chapter 2, Master Responses. This chapter contains "Master Responses" to multiple comments that addressed the same or similar issues. Master responses are typically used to thoroughly and consistently address all aspects of these common issues. This chapter includes Master Responses for the following topics: Water Supply and Land Use Planning (Section 2.1), Relationship Between DWSP and Stockton General Plan Update (Section 2.2), Local Hydraulic Effects (Section 2.3), Fisheries (Section 2.4), and DPEIR Recirculation (Section 2.5)

Chapter 3, Written and Oral Comments and Responses. This chapter contains copies of all letters and oral and written comments received on the DPEIR. Oral comments made at the public meeting on the DPEIR were recorded; the transcript of those comments as well as written comments from the meeting is presented in this chapter. Responses follow each letter and oral or written comment. Each letter or comment is coded (i.e., 1, 2, 3 . . .) and each comment is numbered. For example, the first comment in the letter from the California Department of Conservation is **1-1**; the response is assigned the same code. All comments on the content and adequacy of the DPEIR are responded to in full. Oral and written comments made at the public meeting and the responses to those comments follow the written comments. The City received 22 comment letters, two written comments, and six oral comments. The following is a list of commenters:

Comment Letters

1 California Department of Conservation
2 California Urban Water Agencies
3 Central Valley Regional Water Quality Control Board
4 Contra Costa Water District
5 Delta Protection Commission
6 East Bay Municipal Utility District
7 Reclamation Districts Nos. 2029 and 2044
8 Resource Conservation Services
9 San Joaquin Council of Governments, Inc.
10 San Joaquin County Community Development Department

11 San Joaquin County Public Works
12 San Joaquin River Group Authority
13 San Luis & Delta-Mendota Water Authority
14 Sierra Club
15 South Delta Water Agency
16 State Water Contractors
17 State Water Resources Control Board
18 Stockton East Water District
19 U.S. Bureau of Reclamation
20 William Van Amber Fields
21 San Joaquin County Public Works (late comment)
22 California Department of Conservation (late comment)

Written Comments from Public Meeting

23 Sharon Stewart
24 Dale Stocking

Oral Comments from Public Meeting

25 Bill Loyko
26 William Van Fields
27 Sharon Stewart
28 Dale Stocking
29 Alan Coon
30 G. Dhatt

Chapter 4, EIR Text Revisions and Staff-Initiated Text Changes. This chapter includes corrections, revisions, and changes to the DPEIR as a result of comments or based on corrections initiated by City staff and the consultation team.

Chapter 5, Mitigation Monitoring and Reporting Program. This chapter presents the Mitigation Monitoring and Reporting Program for the DWSP.

Chapter 6, List of Preparers. This chapter provides a list of the FPEIR preparers and their responsibilities.

Chapter 2
Master Responses

CHAPTER 2
MASTER RESPONSES

This chapter includes Master Responses for the following topics: water supply and land use planning (Section 2.1), relationship between the Delta Water Supply Project (DWSP) and Stockton General Plan Update (Section 2.2), local hydraulic effects (Section 2.3), fisheries (Section 2.4), and recirculation of the Draft Program Environmental Impact Report (DPEIR) (Section 2.5).

2.1 MASTER RESPONSE–WATER SUPPLY AND LAND USE PLANNING

Several commenters mentioned the case of *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931 (*County of Amador*), and suggested that the DWSP, as proposed by the City, runs afoul of the holding of that case. To the contrary, the City considered that case when formulating the project and preparing the DPEIR and consequently followed an approach consistent with the holding and reasoning of that case.

In *County of Amador*, El Dorado County Water Agency prepared an environmental impact report (EIR) for a water program that included, among other things, a water rights application seeking to divert water from the American River watershed. (76 Cal.App.4th at p. 940.) The court summarized the problem with the water agency's analysis as follows:

> [T]*he primary purpose of the water program* [was] *to provide water supplies to meet projected increased populations. These projections were contained in a draft general plan. In other words, water policy was predicated on the population forecasts of an unadopted general plan, and water projects were tailored to the needs outlined in that still-to-be finalized document.* **In this case,** *approving a water program before enacting a general plan places the proverbial cart before the horse.* (*Id*. at p. 949, emphasis added.)

The court hastened to add that "[h]ad a general plan reflecting population and development policies been adopted, a water project to meet those needs would certainly have been appropriate." (*Id*. at p. 950.) Because the General Plan was only in its draft stages, the court said, the availability of additional water "removes a major barrier to growth and can virtually ensure development." (*Id*. at p. 951.) Thus, the court was concerned that the availability of an additional water supply would induce growth and eliminate any incentive for the local planning agency to evaluate the "interrelationship of growth and water sources" through its general plan process. (*Ibid*.)

With the pitfalls identified by the court in mind, the City's DWSP takes a two-pronged approach to seeking an additional water supply to meet the City's growing needs (DPEIR, pages 1-3 and 6-6).

> *The City has prepared this Program EIR for the DWSP that provides project-level impact and mitigation analysis for the initial 30-mgd phase of the project and program-level analysis for future expansion phases of the project up to 160 mgd and of the overall supplemental water supply program.* (DPEIR, page 1-3).[1]

Thus, the DWSP DPEIR serves as a *project-level* environmental impact report for the 30 million gallons per day (mgd) of water to be diverted from the San Joaquin River to meet demands associated with buildout as described in the current 1990 General Plan (2015). (DPEIR, pages 2-9 to 2-11 and 6-6 to 6-7 ["[t]he City has specifically designed the initial phase of the DWSP (30-mgd) to correspond to the demand associated with the buildout of urban land uses planned under its current adopted 1990 General Plan"].) This project-level analysis, then, does *not* assume that the City Council will approve an updated General Plan that would allow greater levels of population growth than those found in the current General Plan. Rather, the initial phase of the DWSP—the subject of this project-level analysis—is intended to serve population levels already anticipated by the existing, approved General Plan.

As noted above, the DPEIR also serves as a *program-level* EIR for potential additional water to be diverted if needed to meet additional needs dictated by growth that will be allowed during future General Plan cycles, including the proposed General Plan that is currently being updated. (DPEIR, pp. 2-9 to 2-10; 6-7 to 6-8 ("[t]he City will consider expansion of the DWSP beyond the initial 30-mgd as needed to meet the needs of additional planned growth tied to an updated and approved General Plan").) Because additional (project-level) environmental review will be necessary before these later phases of the DWSP can be implemented, the City will not be in a position, in certifying the DPEIR, to obtain water supplies beyond those required for currently anticipated levels of population growth, as found in the current General Plan.

The water rights application, now pending before the State Water Resources Control Board (SWRCB), reflects this multiphase approach. The application has been bifurcated into two separate applications, Applications 30531A and 30531B. Application 30531A covers only the initial phase of the DWSP up to 30 mgd and the place of use is confined to the current 1990 General Plan boundary. When later phases of the DWSP are needed, the City will be required to return to the SWRCB to request that the permit amounts be increased. According to SWRCB staff, a project-level CEQA review will be required before a water right can be issued for the full amount requested in the application. Consequently, the SWRCB can only use this DPEIR to

[1] "The primary advantage of preparing a Program EIR for the DWSP is that it allows the City to evaluate the plan as a whole and provides a comprehensive planning document that addresses the broad and regional effects" (DPEIR, page 1-3). In the future, "[a]s appropriate, when the City proposes to expand the DWSP, it will process additional CEQA documentation that builds on the analysis presented in this Program EIR" (DPEIR, page 1-4).

analyze the environmental effects of issuing a water right permit for the initial 30 mgd. The City will be required to prepare additional project-level CEQA documentation before a water right permit can be issued on the balance of the 92,300 acre-feet applied for in the application or to expand the place of use beyond the current 1990 General Plan boundary.

It is true that "[e]xpansion of the DWSP beyond the 30-mgd initial project would be able to accommodate urban growth beyond that planned for in the current 1990 Stockton General Plan" (DPEIR, p. 6-8). Unlike the situation in *County of Amador*, however, where the court was concerned that the availability of additional water would facilitate growth ahead of proper land use planning, here, "the City intends to expand the DWSP incrementally, and only as appropriate, to continue to match the needs of planned growth as the City's General Plan is updated and approved" (DPEIR, p. 6-8). Also in stark contrast to the situation in *County of Amador*, here, "[w]hen the City proposes expansion of the DWSP WTP and operations, the City will conduct subsequent CEQA review as appropriate and review the consistency of the expansion with current approved land use plans and adopted growth policies" (DPEIR, p. 6-8).

The environmental effects, associated with the growth allowed in the 1990 General Plan, were evaluated in the General Plan EIR. The initial 30 mgd component of the DWSP would accommodate growth consistent with that General Plan. Thus, the potentially growth-inducing effects of the initial phase have already been analyzed in that document (DPEIR, page 6-9; refer also to pages. 6-9 through 6-14 [summary of General Plan EIR]). For any additional capacity, the DWSP DPEIR anticipates that the EIR for the General Plan update "would provide a basis for future infrastructure planning, including the analysis of future DWSP expansion" (DPEIR, page 6-9). The DWSP DPEIR acknowledges that the analysis in the General Plan update EIR is not yet available, but includes a summary of potential impacts from further growth in keeping with those contained in the 1990 General Plan EIR and current trends (DPEIR, pages 6-9, 6-14 to 6-16).

In light of cases such as *Stanislaus Natural Heritage Project v. County of Stanislaus* (1996) 48 Cal.App.4th 182, 200 ("to defer any analysis whatsoever of the impacts of supplying water to this project until after the adoption of the specific plan calling for the project to be built would appear to be putting the cart before the horse[]") and *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001) 91 Cal.App.4th 342, 372-374 (EIR for Specific Plan deemed inadequate for failing to identify additional possible water sources where certainty of primary source was questionable), the City feels it is prudent to begin the process of securing water to meet the City's needs into and beyond the next General Plan cycle. Being mindful of *County of Amador*, *supra*, however, the City has tried to find a balance between securing water supplies to support future land uses and allowing water planning to run roughshod over the General Plan process. The City feels that the two-pronged approach taken by the DWSP DPEIR is a balanced approach.

In light of this approach, any claim that the City is "violating" the *County of Amador* decision would boil down to an assertion that, by prudently looking beyond the near term by conducting a *program-level* analysis of possible future phases of the DWSP, the City has somehow violated CEQA. The City would react to any such argument by noting that it does not read CEQA to

penalize agencies for looking beyond the immediate future. Rather, more information is generally better than less, and more-informed decisions are generally better than less-informed decisions. The key point is that, if and when the City Council certifies this EIR, it will not yet be in a position to obtain water supplies beyond those needed in the current General Plan. It may be a step closer to obtaining such future supplies, but the mere fact that program-level analysis has been prepared is not, by itself, "growth-inducing."

2.2 MASTER RESPONSE—RELATIONSHIP BETWEEN DWSP AND STOCKTON GENERAL PLAN UPDATE

Several comments reference the City's General Plan Update process now under way and raise questions about the relationship between that land use planning process and the DWSP. Readers are also referred to the Master Response on Water Supply and Land Use Planning in Section 2.1.

Acting on DWSP Before General Plan Update

The City initiated detailed development of the DWSP in 2000, with the CEQA environmental review process initiated in November 2003. The City began its General Plan Update process in 2002 and initiated the CEQA environmental review process in late 2004. A draft General Plan Update and Draft EIR are targeted for release in late 2005.

The initial phase of the DWSP (30 mgd) is designed to meet immediate and near-term water supply needs for the City associated with the needs of both existing customers and the near-term development that the City can consider based on its currently adopted 1990 General Plan. As described in the DPEIR (pages 2-3 and 2-4), the DWSP project objectives are to protect and restore the groundwater basin, replace declining and unreliable surface water supplies, and provide adequate water supply to accommodate planned growth. The first two objectives are related to issues that need to be addressed under the current adopted General Plan. To address the third objective, the City prudently designed the DWSP for possible expansion beyond the initial phase to address the City's potential long-term future water needs. DWSP expansion will only be pursued if it is necessary to serve growth contemplated by the new, updated General Plan, once it is adopted. The initial phase of the DWSP does not presuppose adoption of a new General Plan and would be necessary even if the new General Plan is no different, in terms of population at buildout, from the current General Plan.

As discussed in Master Response on Water Supply and Land Use Planning in Section 2.1, the DWSP EIR serves as a *project-level EIR* for the initial phase (30 mgd) of the DWSP. This project-level analysis does not assume that the City Council will approve an updated General Plan and allow greater levels of population growth than those found in the current General Plan. It is appropriate and necessary that the City Council move forward with consideration of the DWSP Final Program EIR for certification and of the approval of the DWSP's initial phase in advance of considering the adoption of a General Plan update. This initial phase of the project is needed to serve the community under the existing, approved General Plan and would be needed even if the current General Plan remained in place and unchanged indefinitely.

With an eye towards *possible* long-term needs, the DWSP was designed for possible expansion beyond the initial phase (30 mgd). The DPEIR thus also serves as a program-level EIR for the potential expansion of the DWSP to meet additional needs dictated by growth that will be allowed during future General Plan Update cycles, including the proposed General Plan Update process currently under way. As described in the DPEIR (pages 2-9 to 2-10 and 6-7 to 6-8), "the City will consider expansion of the DWSP beyond the initial 30-mgd as needed to meet the needs of additional planned growth tied to an updated and approved General Plan." Because additional project-level CEQA environmental review will be necessary before these later expansion phases of the DWSP can be implemented, the City, by certifying this EIR, will not be in a position to obtain water supplies or construct facilities to serve growth beyond the anticipated levels associated with the current General Plan. The mere program-level analysis of possible later phases is not growth-inducing because it is merely the first—purely analytical—step toward ultimately completing the more detailed CEQA analysis needed for the approval of any later phases.

Analysis of Growth Effects Under the General Plan Update

The Draft EIR on the City's proposed General Plan Update, which is now being developed, will specifically address the potential secondary environmental effects of the planned land use and growth. If and when the City pursues expansion of the DWSP, it will use the General Plan EIR impact analysis as a foundation for evaluating the secondary effects of growth associated with water supply system expansion. The DWSP DPEIR acknowledges that the General Plan Update EIR is not yet available but it will include a summary of the potential impacts of future growth in keeping with those contained in the 1990 General Plan EIR and current trends (DPEIR, pages 6-9, and 6-14 through 6-16).

Some comments include recommendations for policies and/or mitigation measures to be incorporated into the General Plan Update. These comments need to be directed to the General Plan process; the Draft EIR for the General Plan Update is expected to be available for review in early 2006. The DWSP DPEIR is not intended to be a vehicle for formulating mitigation measures to deal with terrestrial impacts associated with growth under an updated General Plan.

Conceptual Water Infrastructure Plan

As part of the General Plan Update process, the City has also prepared a conceptual water infrastructure plan to describe the extension of the treated water delivery system that would be required to serve the area depicted in the updated General Plan land use map. This conceptual infrastructure plan has been referred to as a Water Master Plan, but it is really a public utilities service plan rather than a water supply plan. The DWSP represents the centerpiece of the City's water supply plan. The City is also preparing similar draft conceptual infrastructure plans for its wastewater and stormwater management systems in conjunction with the General Plan Update process.

2.3 MASTER RESPONSE—LOCAL HYDRAULIC EFFECTS

Several comments addressed the DPEIR's analysis of hydrodynamic effects in the vicinity of the proposed DWSP intake.

The proposed location for the DWSP intake is the southwest tip of Empire Tract adjacent to the Stockton Deep Water Ship Channel. This site is sufficiently north that the DWSP would benefit from the higher quality Sacramento River water that flows south through the Delta Cross Channel and Georgianna Slough. The maximum diversion rate under the initial phase (30 mgd) of the DWSP would be 46 cubic feet per second (cfs), increasing to 248 cfs under the ultimate phase (160 mgd) of the DWSP at a 2050 level of development.

Flow in the San Joaquin River at and downstream of the intake location is dominated by tidal effects. Over the tidal cycle, flows in the river typically vary from approximately 10,000 cfs downstream to a reverse flow of approximately the same magnitude. Stage varies from -2 to +5 feet. Superimposed on the tidal cycle are freshwater inflows from the San Joaquin River.

Historically, 60 percent of the San Joaquin River flow at Vernalis is derived from the Merced, Tuolumne, and Stanislaus Rivers (Vernalis lies just inside the boundary of the Delta and is used as a monitoring point for Delta inflows and standards). An average of 3 million acre-feet per year flows past Vernalis, contributing to Delta inflow. Flow at Vernalis is typically below 5,000 cfs for 80 percent of the time. The flow typically peaks in February and March and drops to a minimum in August. During the Vernalis Adaptive Management Plan (VAMP) period (April 15 through May 15), flows are managed to be at or above the flow standards specified in Water Right Decision 1641. During the summer, flow is primarily derived from upstream reservoir releases and agricultural return flows.

Simulated (CALSIM II) average month flows at Vernalis typically range from a high of approximately 5,900 cfs during the spring to a low of approximately 1,600 cfs during the summer (Modeling Technical Appendix to the DPEIR, Tables 4-8, 4-16, and 4-23). The average annual simulated flow at Vernalis for the period 1922 to 1994 is approximately 3,700 cfs.

The Delta Simulation Model (DSM2) was used to analyze the hydrodynamic impacts of the proposed DWSP diversion on flow conditions in the San Joaquin River. In the Modeling Technical Appendix to the DPEIR, Figures 5-6, 5-14, and 5-22 show simulated average annual flow in the Delta for 1976 to 1991 using 2003, 2015, and 2050 levels of development. Flow under No Project conditions was compared to With Project conditions. The DWSP has negligible impact on flows in the San Joaquin River upstream of the proposed intake location. Depending on barrier operations, approximately 40 to 50 percent of the inflow at Vernalis subsequently flows into the Old River. Further downstream, San Joaquin River water flows west into the Central Delta through Turner Cut and Columbia Cut. The average net flow in the San Joaquin River at the DWSP intake is approximately 2,000 cfs. Downstream of the DWSP intake, San Joaquin River water flows south to the export pumps (reverse flow) through the Middle River and Old River. Sacramento River water mingles with the San Joaquin River at its confluence with the Mokelumne River, downstream of the Middle River. Figure 2-1 below shows an exceedence plot

of simulated hourly flows at the DWSP intake location. For a 248 cfs diversion, the channel stage in the San Joaquin River would be reduced by approximately 0.01 feet or less and channel velocities would be reduced by approximately 0.01 feet per second. These effects are not considered significant, particularly in the context of the tidal variation.

In the Modeling Technical Appendix to the DPEIR, Figures 5-6, 5-14, and 5-22 show that Delta diversions under the DWSP have a negligible effect on flows at the Head of the Old River. Similarly, the DWSP would have no significant impact on flows west through Turner Cut and Columbia Cut. For the initial phase (30 mgd) of the DWSP, changes in flow through Turner Cut would be about 0.1 percent and through Columbia Cut would be about 0.5 percent. Changes in flow for the ultimate phase (160 mgd) of the DWSP at a 2050 level of development would decrease flows in Turner Cut and Columbia Cut by approximately 0.6 percent and 2 percent, respectively. These changes may be induced partially by changes in simulated Central Valley Project (CVP) and State Water Project (SWP) exports in the south Delta. Table 2-1 presents the average monthly change in flow in the San Joaquin River at the DWSP intake and through Turner and Columbia Cuts for the February to May period under future (2050) cumulative conditions. The February to May period is critical for fish migration.

Table 2-1. Comparison of No Project and With Project Simulated Flows in the Delta, October 1976 to September 1991

		Average Monthly Flow (cfs)			
		Feb	**Mar**	**Apr**	**May**
DWSP Initial Phase, 2015 Level of Development					
San Joaquin River at DWSP Intake	No Project	3,121	3,245	2,990	2,625
	With Project	3,102	3,229	2,967	2,592
	Change	-19	-16	-22	-34
Turner Cut	No Project	620	575	461	567
	With Project	623	575	460	567
	Change	2	1	-1	0
Columbia Cut	No Project	1,081	973	674	897
	With Project	1,085	972	670	893
	Change	4	0	-4	-4
DWSP Ultimate Phase, 2050 Level of Development					
San Joaquin River at DWSP Intake	No Project	3,158	3,310	3,030	2,648
	With Project	3,049	3,190	2,908	2,524
	Change	-109	-120	-122	-124
Turner Cut	No Project	615	564	465	583
	With Project	618	564	461	574
	Change	3	0	-4	-8
Columbia Cut	No Project	1,072	950	686	936
	With Project	1,066	937	663	903
	Change	-5	-12	-23	-33

Figures 2-2, 2-4, and Figure 2-6 are a series of stage, velocity, and flow longitudinal profiles for the San Joaquin River for a 40-mile reach centered on the DWSP intake location. The profiles show flow conditions in the San Joaquin River over a 12-hour cycle at two-hour intervals. Flow under the future (2050) cumulative No Project conditions is compared to the future cumulative

With Project conditions. The simulated DWSP diversion under the With Project is 248 cfs (the maximum possible diversion rate for the ultimate phase of the DWSP).

Figures 2-3, 2-5, and 2-7 show the variation of stage, velocity, and flow at the DWSP intake over a 24-hour cycle. The first 12 hours of the cycle corresponds to the stage, velocity, and longitudinal profiles described above. The figures show that hydrodynamic effects of the DWSP diversion are negligible.

Figure 2-1. Exceedence Plot of Simulated Channel Velocities in the San Joaquin River Adjacent to the Proposed DWSP Intake Location, October 1976 – September 1991

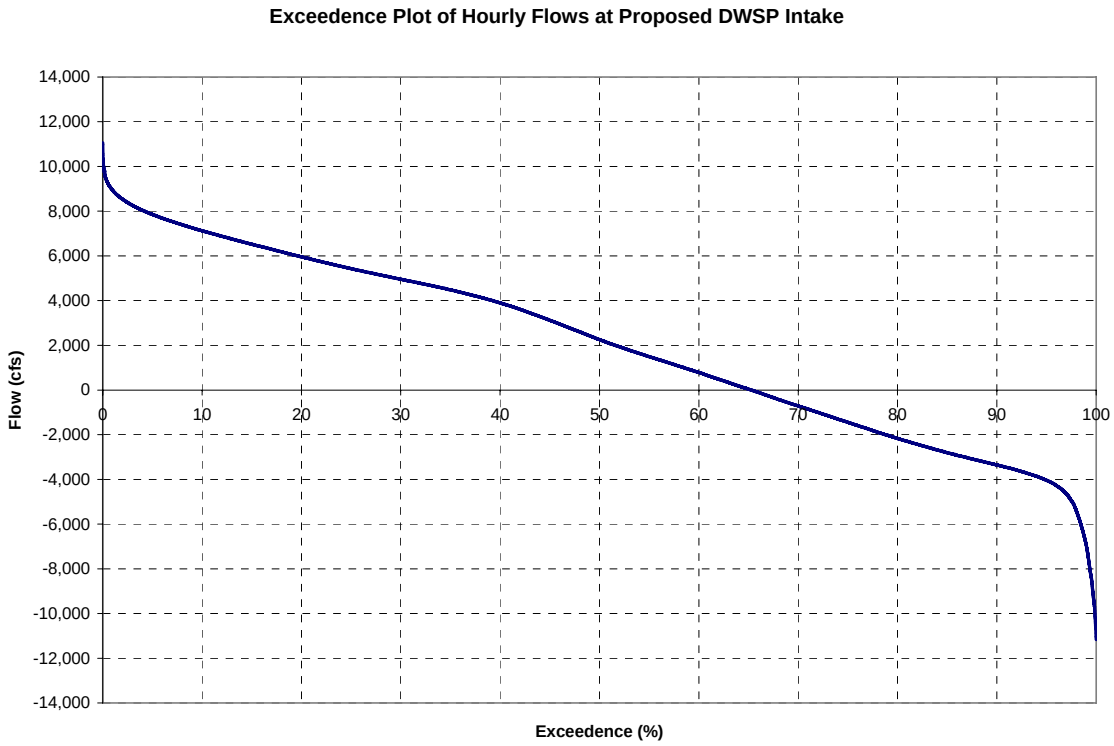
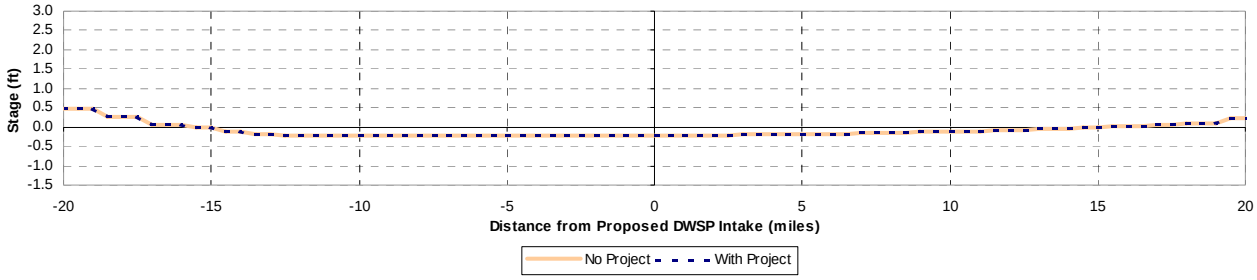


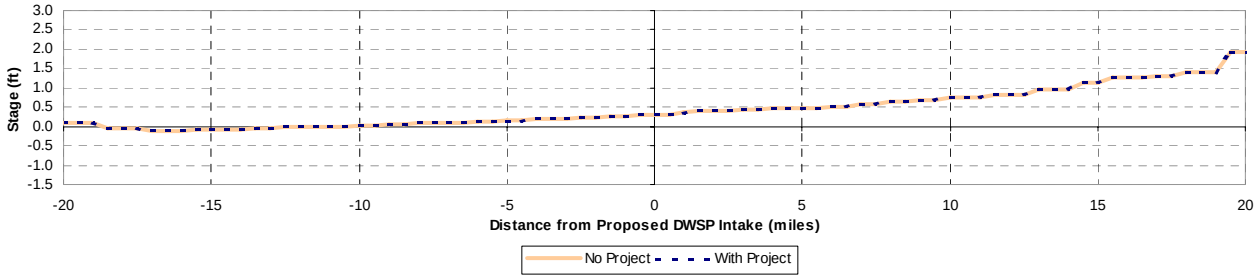
Figure 2-2. Variation of Simulated Stage Along the San Joaquin River over a 12-hour Tidal Cycle, April 2, 1976.

(DWSP diversion rate = 248 cfs, 2050 level of development, two-hour time interval)

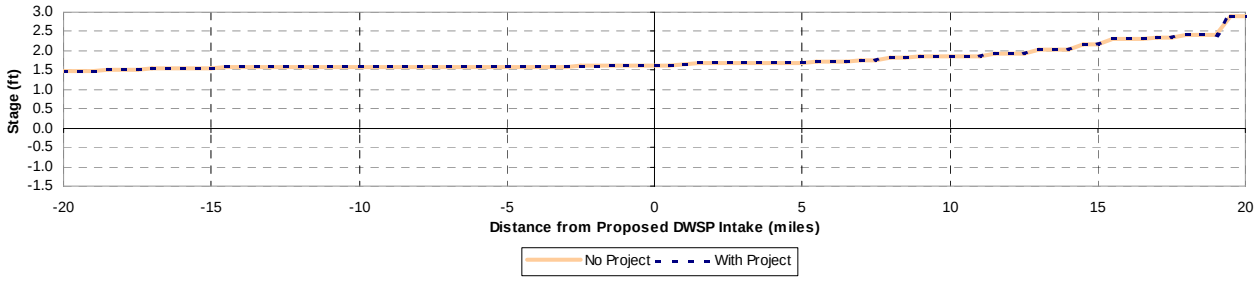
(a) 0000 hrs



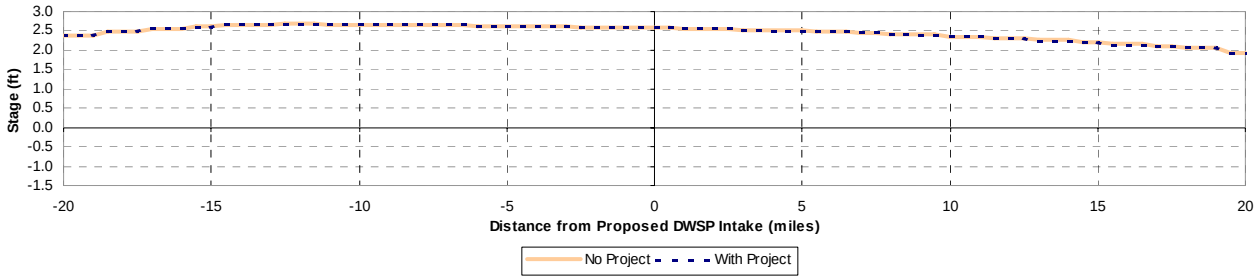
(b) 0200 hrs



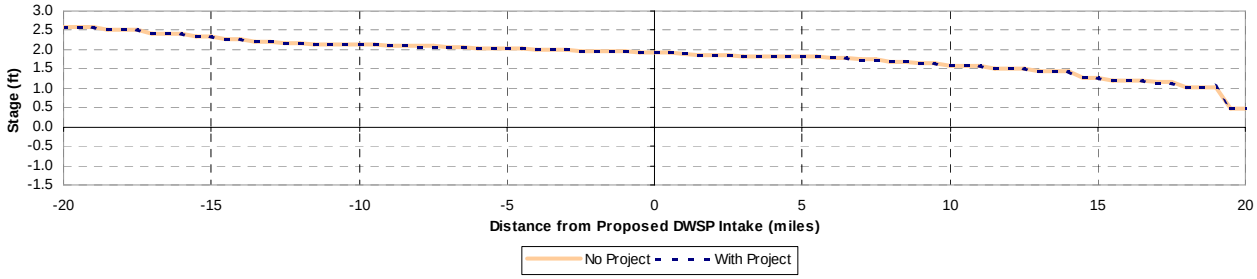
(c) 0400 hrs



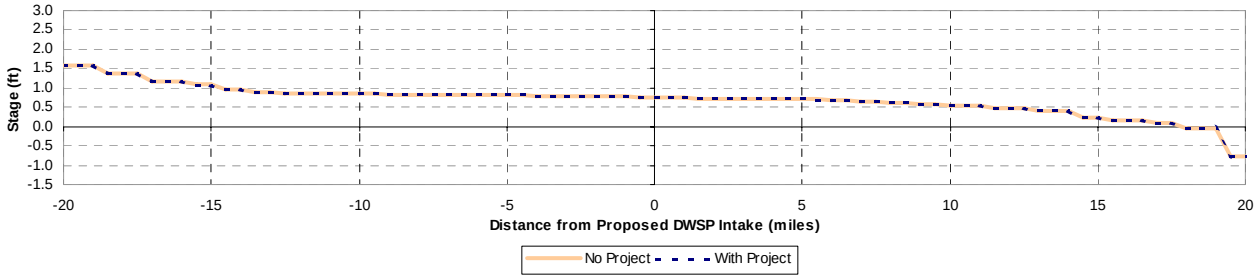
(d) 0600 hrs



(e) 0800 hrs



(f) 1000 hrs



(g) 1200 hrs

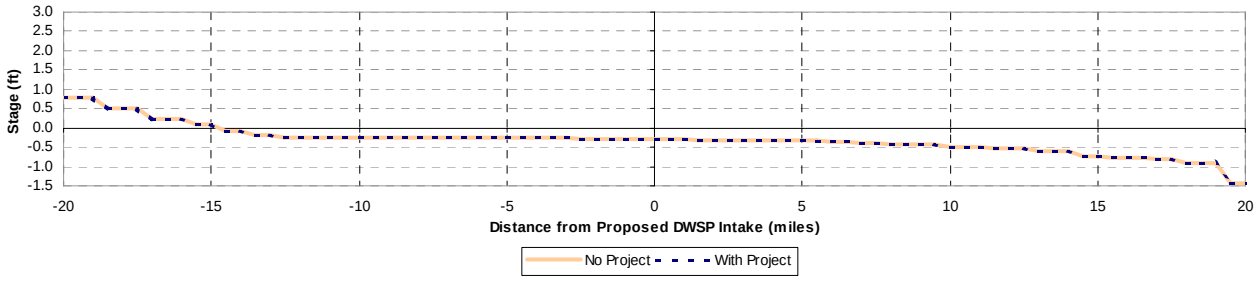
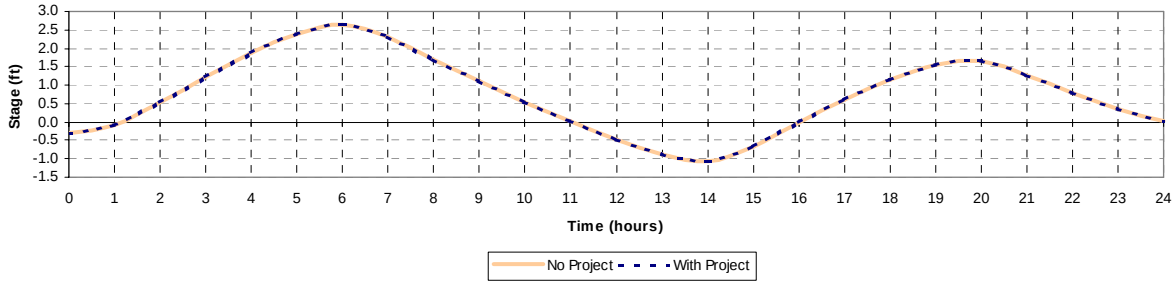


Figure 2-3. Variation of Simulated Stage in the San Joaquin River at the DWSP Intake over a 24-Hour Tidal Cycle, April 2, 1976.
(DWSP diversion rate = 248 cfs, 2050 level of development)

(a) Stage as a Function of Time



(b) Difference in Stage as a Function of Time

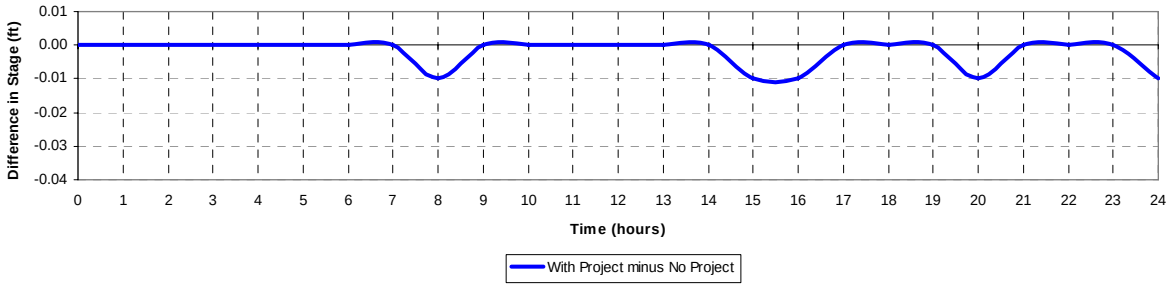
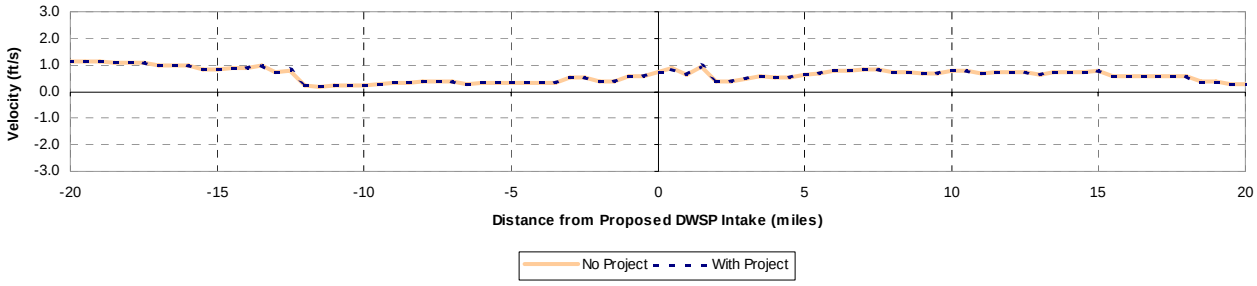
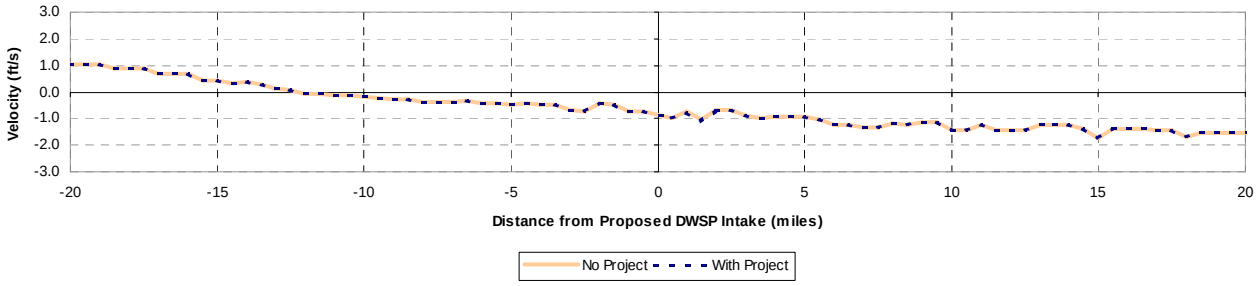


Figure 2-4. Variation of Simulated Velocity Along the San Joaquin River over a 12-Hour Tidal Cycle, April 2, 1976.
(DWSP diversion rate = 248 cfs, 2050 level of development, two-hour time interval)

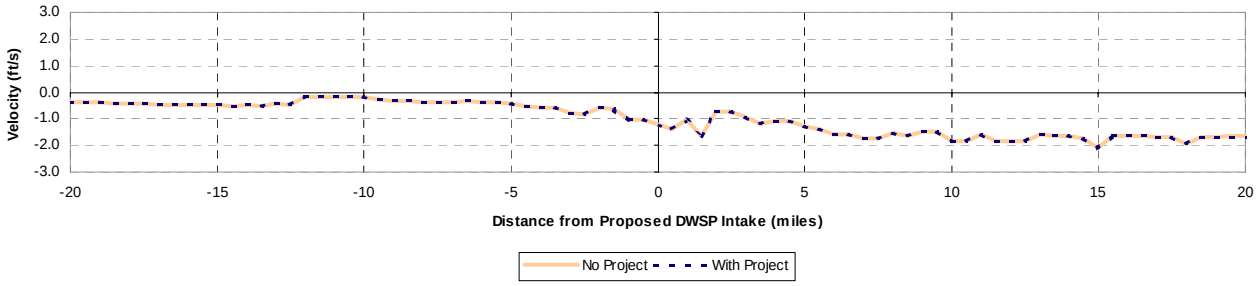
(a) 0000 hrs



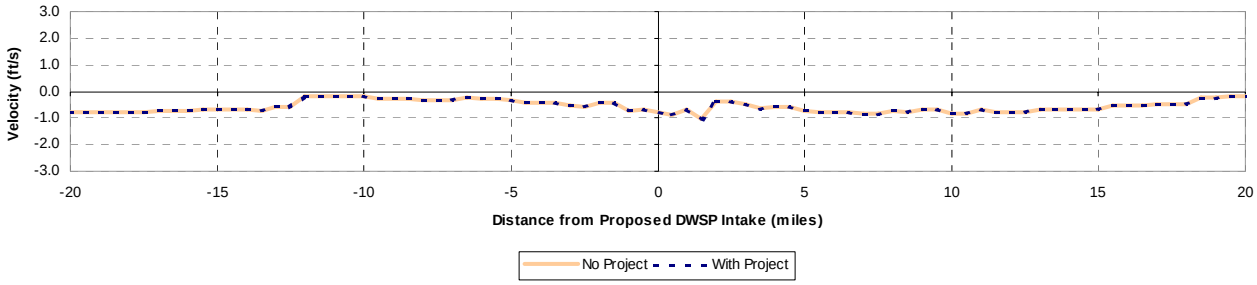
(b) 0200 hrs



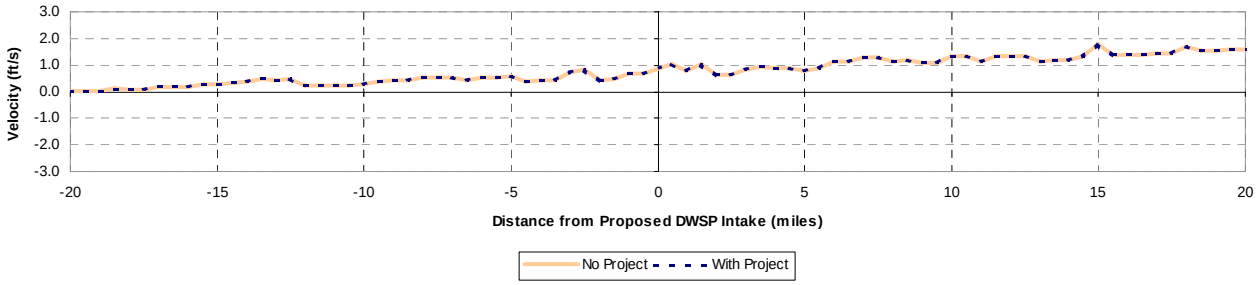
(c) 0400 hrs



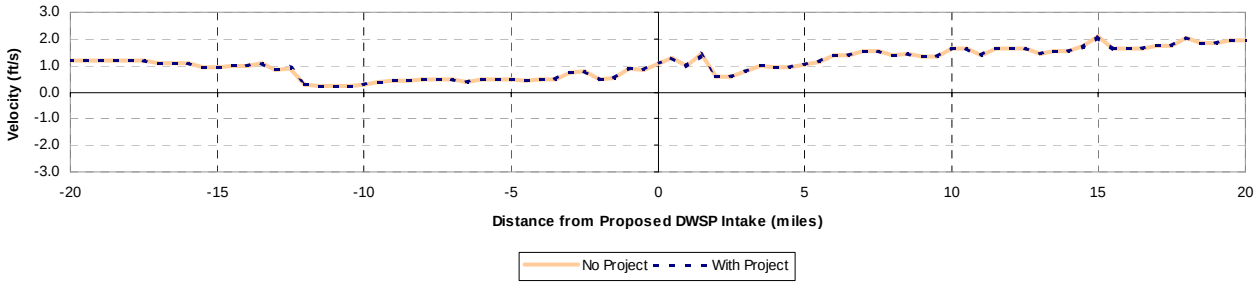
(d) 0600 hrs



(e) 0800 hrs



(f) 1000 hrs



(g) 1200 hrs

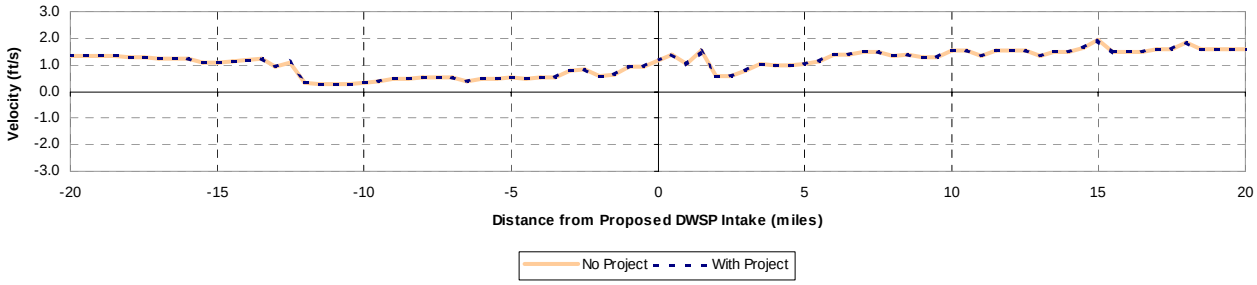
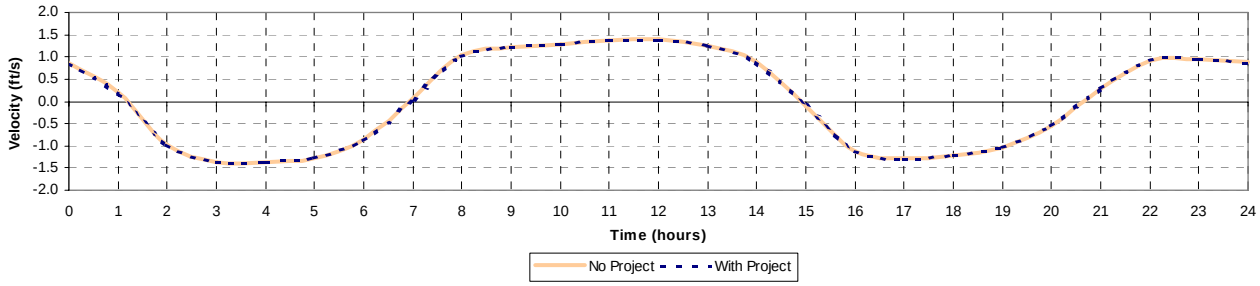


Figure 2-5. Variation of Simulated Velocity in the San Joaquin River at the DWSP Intake over a 24-Hour Tidal Cycle, April 2, 1976.
(DWSP diversion rate = 248 cfs, 2050 level of development)

(a) Velocity as a Function of Time



(b) Difference in Velocity as a Function of Time

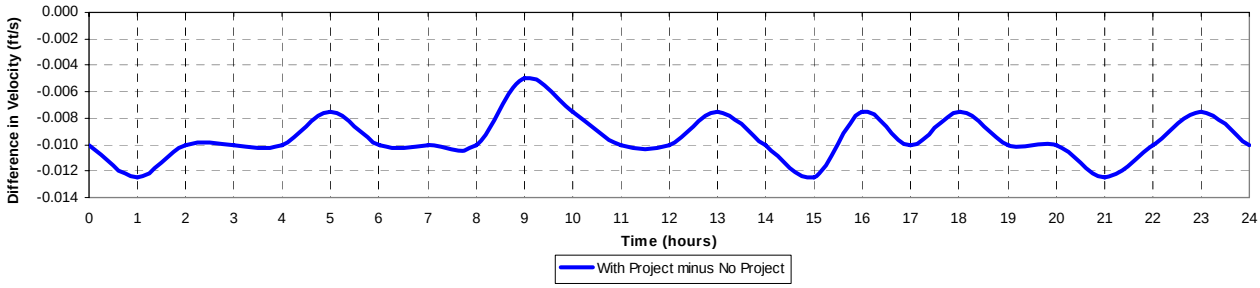
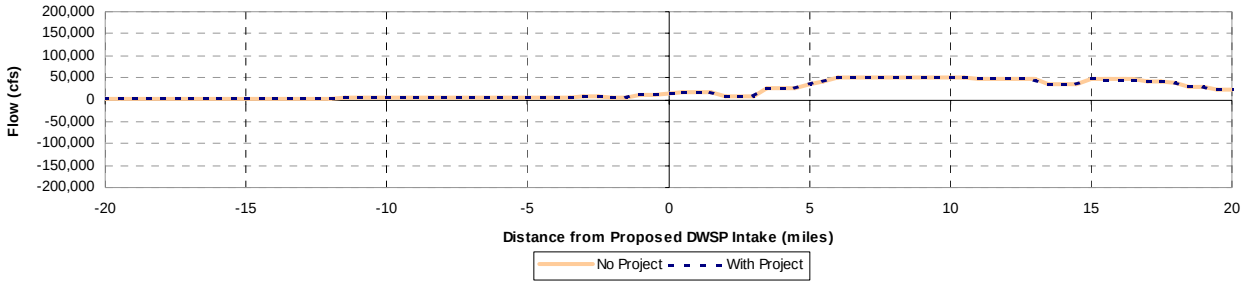
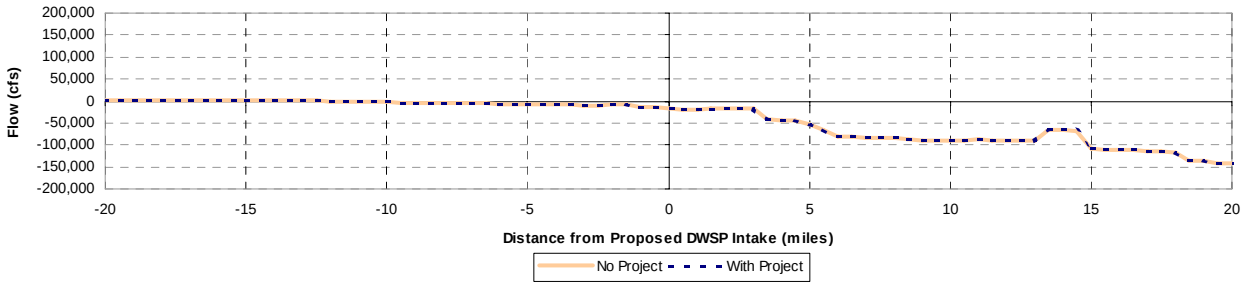


Figure 2-6. Variation of Simulated Flow Along the San Joaquin River over a 12-Hour Tidal Cycle, April 2, 1976.
(DWSP diversion rate = 248 cfs, 2050 level of development, two-hour time interval)

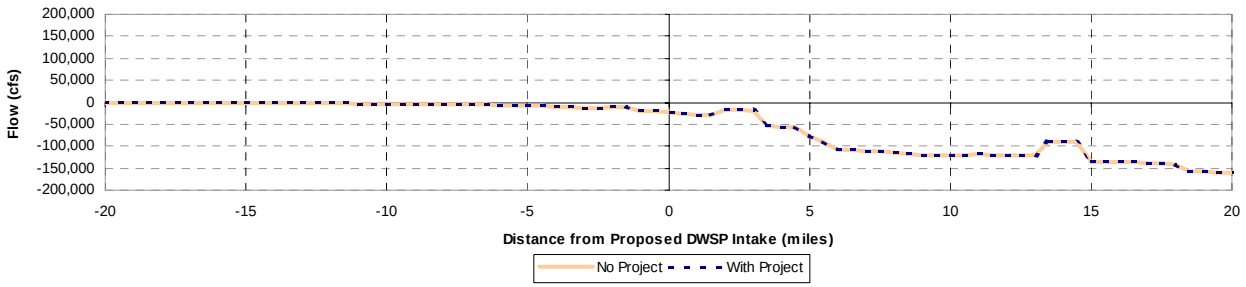
(a) 0000 hrs



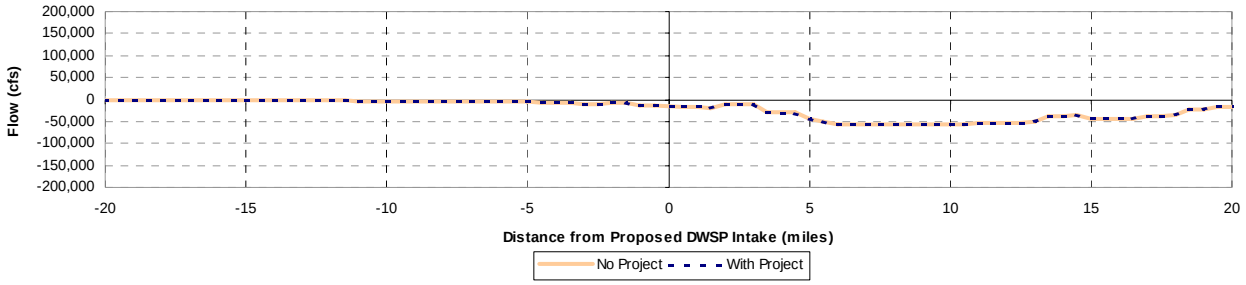
(b) 0200 hrs



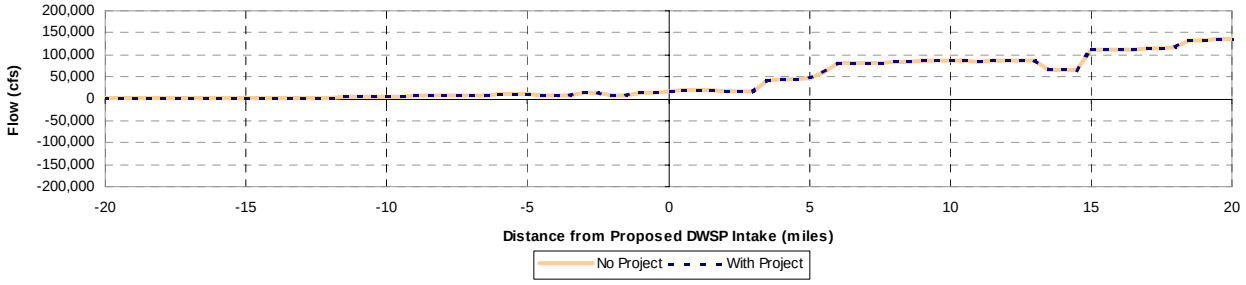
(c) 0400 hrs



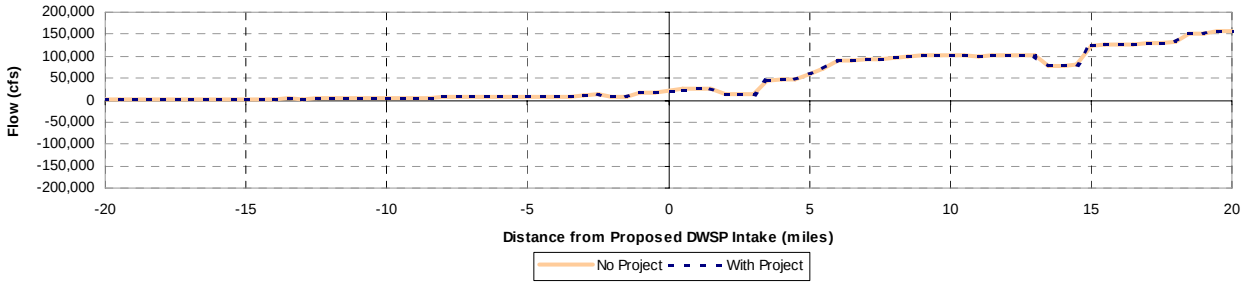
(d) 0600 hrs



(e) 0800 hrs



(f) 1000 hrs



(g) 1200 hrs

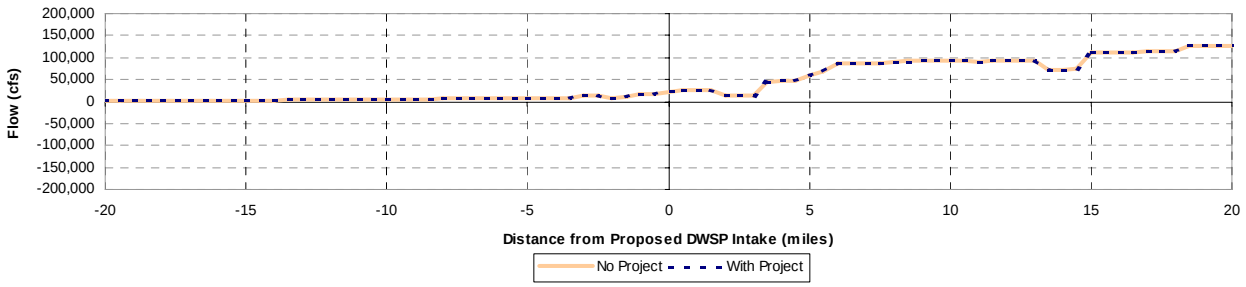
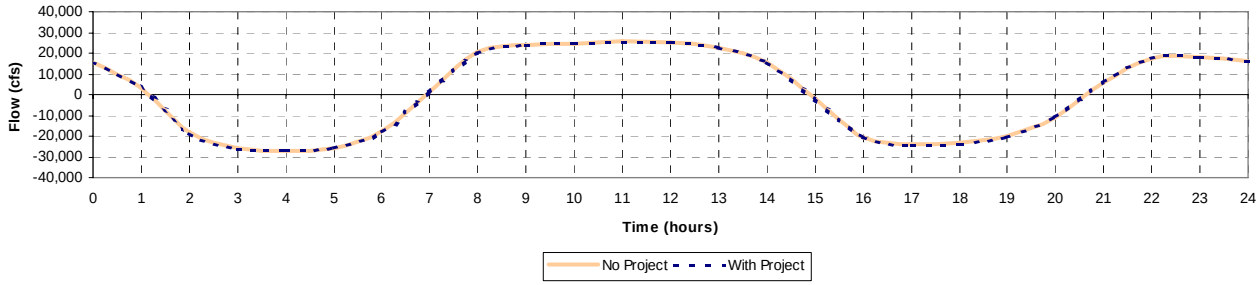
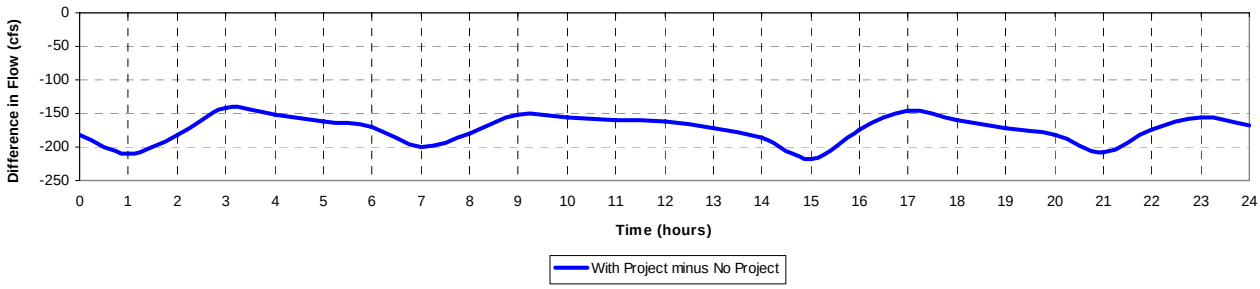


Figure 2-7. Variation of Simulated Flow in the San Joaquin River at the DWSP Intake over a 24-Hour Tidal Cycle, April 2, 1976.
(DWSP diversion rate = 248 cfs, 2050 level of development)

(a) Flow as a Function of Time



(b) Difference in Flow as a Function of Time



2.4 MASTER RESPONSE—FISHERIES

A number of DPEIR reviewers requested clarification of issues related to various aspects of the fish screen design, effectiveness of the fish screen for different species and life history stages, and the effects of proposed diversions on local and regional hydrology and fish. The DPEIR analysis of these issues is best clarified in a comprehensive response. The following is a general clarification of the DPEIR's discussion of fish screen effectiveness and impacts.

Fish Affected by the DWSP

Section 4.2 of the DPEIR addresses Chinook salmon and steelhead in general, rather than focusing exclusively on San Joaquin River Chinook salmon, because the proposed DWSP may affect fish entering the Delta from a variety of sources (Delta Cross-Channel, Georgiana and Three-Mile Sloughs, and the Mokelumne, Calaveras, and San Joaquin Rivers). In addition, the mechanism by which the DWSP may affect salmonids while they are within the project area is the same. Regardless of origin, these fish would be influenced by the back-and-forth tidal flow and the fish screen, if the tidal circulation brings them into its zone of influence. There are no data to indicate that juvenile salmon of various origins would behave differently in the project area; their general behavior would be to seek aquatic cover and rearing habitat and/or move downstream to the ocean (Wang, 1986). The fish screen proposed for the DWSP has been

designed to protect all Chinook salmon fry and smolts as well as steelhead; therefore, there is no need to address direct effects of the screen on a stock-by-stock basis.

Peak seasonal migration timing of adult Chinook salmon varies by tributary and adults may be in the project river reach from July and August (early Mokelumne River runs) through early January (Tuolumne River). Migration timing may be affected by flow, water temperature, dissolved oxygen levels, and other factors (Snider and Titus, 2000; Moyle, 2002). DWSP effects on adult salmon and steelhead would not be influenced by these factors; healthy adult Chinook salmon and steelhead are not known to be affected by fish screens. Their high swimming speed and size allow them to pass fish screens without contact. If contact is made, its effects are negligible.

The Modeling Technical Appendix to the DPEIR addresses the indirect effects of diversion operations on river and Delta hydrology and hydraulics and, therefore, on the migration of San Joaquin River Chinook salmon and steelhead. In the discussion below, the City has clarified these indirect effects with specific reference to the modeling results and to recent radio-telemetry studies of San Joaquin River Chinook salmon smolts (Vogel 2004, 2005). Information on the seasonal occurrence of fall-run Chinook salmon fry within the Delta is available from an analysis of the size frequency by season for juvenile salmon collected in SWP and CVP fish salvage operations (CDFG, DWR, and Reclamation, unpublished data) and from the U.S. Fish and Wildlife Service (USFWS) beach seining surveys conducted within the Delta (USFWS, unpublished data). Information on the seasonal migration of fall-run Chinook salmon from the Stanislaus River is available from monitoring conducted by Demko, et al. (1998). East Bay Municipal Utility District monitors juvenile fall-run and steelhead migration from the Mokelumne River (unpublished data). CDFG (unpublished data) monitors juvenile fall-run Chinook salmon migration from the San Joaquin River tributaries at Mossdale during the late winter and spring migration period of salmon fry and smolts. Results of these and other Delta monitoring programs (e.g., Interagency Ecological Program monitoring, CDFG 20-millimeter larval delta smelt monitoring, real-time monitoring, summer tow-net surveys, fall mid-water trawl surveys, and VAMP monitoring at both Antioch and Chipps Island have been used in developing the fishery impact analysis for the DWSP. Additional information on the hydraulic performance of positive barrier fish screens and the effectiveness of similar fish screens located in the central Delta affected by tidal conditions (e.g., Contra Costa Water District's [CCWD] Old River intake) (Morinaka, 2000) have also been used to assess potential impacts of diversion operations on various species and life stages of resident and migratory fish inhabiting the lower San Joaquin River and Delta.

Site Conditions and Fish Use of the Channel

The potential for the DWSP diversion to affect fish is influenced by site conditions. As discussed in the DPEIR (pages 2-22 through 2-24), the general area designated for the intake is on a bend of the San Joaquin River, which creates two shorelines, the south and west banks of Empire Tract. The west bank faces Little Connection Slough and the south bank faces the mainstem San Joaquin River. The DPEIR proposed both banks as potential locations for the intake and pump station facility. As stated in the DPEIR (page 2-22), San Joaquin River flows in the area tend to be sluggish because of the tidal effects on the river. On average, the south bank location has a

higher sweeping velocity that the west bank location. Since the publication of the DPEIR, the U.S. Coast Guard, California Department of Boating and Waterways, Port of Stockton, and San Francisco Bar Pilots have indicated that because of navigational concerns, the south bank is the preferred location. The south bank is located farther from the Stockton Deep Water Ship Channel than the west bank, and affords better protection for both passing vessels and the intake facility. For these reasons, the City's staff and consultants are recommending that the City Council eliminate the west bank as a possible location for the intake facility.

The mainstem San Joaquin River channel at the intake location is about 600 feet wide at its narrowest point. The screen will be about five miles downstream from Turner Cut and a mile from Columbia Cut. The Stockton Deep Water Ship Channel is located about 200 to 220 feet from the shoreline in this reach of the river. Two alternative intake facilities have been proposed: (1) an in-bank intake built into the levee face and (2) a "free standing" in-river intake located about 90 feet south of the levee. Both of these intakes would be 120 feet from the northern edge of the ship channel.

The south bank site is a riprapped levee on the outside curve of the San Joaquin River at the southwest tip of Empire Tract, an area subject to relatively high scour during high flows and to sediment resuspension and high turbidity associated with commercial and recreational ship traffic. The levee is virtually barren and there is only scattered emergent vegetation. The channel bottom is sand and silt, with little submerged aquatic vegetation. With limited cover and limited potential food resources, the channel itself would not generally be considered good rearing habitat for emigrating smolts, although on the south margin of the channel, there is rearing habitat associated with a series of small islands.

The DWSP intake site is in an area dominated by tidal influences rather than flow from the upstream San Joaquin River (Vogel, 2005). Tidal flow results in daily flow reversals in the project area, and net downstream flow during periods of low to moderate river flow may be in the range of 0.5 mile per day (Vogel, 2005). Any fish entering this part of the Central Delta would, therefore, be affected by tidal conditions. Radio-telemetry studies from 1996 through 2004 involving over 800 radio-tagged juvenile Chinook salmon have shown that fish movement corresponds to magnitude, duration, and direction of water velocity vectors in Delta channels (Vogel, 2004). In 2002–2003, radio-telemetry studies coordinated with VAMP study periods were conducted to determine San Joaquin River Chinook salmon migratory pathways in the east and south Delta. Two findings of these studies were:

- A high proportion (more than one-half) of radio-tagged emigrating juvenile salmon (smolt and yearling-sized salmon are typically used in these radio-tag investigations and may or may not be representative of movement and behavior of salmon fry in the area) moved off the San Joaquin River and into south Delta channels, primarily via Turner Cut.

- Fish moving off the mainstem channel remained in channels south of the San Joaquin River.

Vogel (2005) notes that net southward flow in Turner Cut and other south Delta channels may explain some of this behavior. Regardless of the reason, it is clear that under low to moderate flow conditions, a substantial percentage of juvenile salmonids migrating down the San Joaquin River would not pass the project area.

Data from the VAMP studies indicate that a portion of the fall-run Chinook salmon smolts migrating downstream do, in fact, reach Antioch and Chipps Island (SJRGA 2001, 2002, 2003, 2004, 2005) and that their migration is relatively rapid (Table 2-1). Given that diversion into the South Delta results in delayed migration, many of the tagged fall-run Chinook salmon smolts recaptured during VAMP sampling probably used the mainstem channel or the channel to the south of Medford Island. In the 2000 and 2001 VAMP studies, for example, coded-wire tagged fish released at Durham's Ferry (River Mile 70) and Mossdale (River Mile 56) were recaptured in 5 to 26 days, with peak captures occurring about 7 to 10 days following release (Table 2-1). This suggests a migration rate of up to eight to 10 miles per day. Given Vogel's analysis suggesting net downstream flow of only about 0.5 mile per day, this suggests that juvenile salmon in the mainstem river may (a) be actively swimming downstream or (b) modifying their position in the channel to take advantage of high downstream flow rates on the ebb tide. In either case, emigrating fish could rapidly pass through the project area. Vogel (2005) also found that many juvenile Chinook salmon entering the south Delta at Turner Cut and Columbia Cut did not return to the mainstem and were found along Empire Cut and Middle River.

Table 2-1
Release Site and Date and Recapture Dates for Coded-Wire Tagged Salmon, 2000 and 2001 VAMP Study

Release Site and Date			Recapture Dates (days from release to recapture)		
Release Site	**Release Date**	**Distance to Recapture (miles)**	**First**	**Peak**	**Last**
Durham Ferry	April 17, 2000	58	April 22 (6)	April 26 (10)	May 6 (20)
Mossdale	April 18, 2000	44	April 23 (6)	April 27 (10)	May 5 (18)
Durham Ferry	April 28,2000	58	May 3(6)	May 7 (10)	May 23 (26)
Durham Ferry	April 30, 2001	58	May 5 (6)	May 8 (9)	May 11 (12)
Durham Ferry	May 7, 2001	58	May 12 (6)	May 14 (8)	May 20 (14)
Mossdale	May 1, 2001	44	May 5 (5)	May 8 (8)	May 12 (12)
Mossdale	May 8, 2001	44	May 13 (6)	May 14 (7)	May 18 (11)
Source: Vogel, 2005					

Results of the radio-tagging conducted by Vogel (2005) during the spring VAMP test period reflect hydraulic conditions within the Central Delta when the Head of Old River temporary barrier was installed. During the spring, other temporary barriers are also installed at various locations in the Delta to provide improved water elevations and water quality. Radio-tagging results when these temporary barriers are installed are expected to be similar to results in the future with operation of South Delta permanent barriers.

Vogel (2004, 2005) has also found that the position of the fish in the channel and localized flow conditions at channel flow splits were primary factors affecting fish migration routes. Radio-tagged juvenile Chinook salmon smolts were found to preferentially use the Stockton Deep Water Ship Channel as opposed to the edge of the river. Results of beach seining in the Central Delta by the USFWS (unpublished data) show that fall-run Chinook salmon fry are collected in shallow water habitats along the channel margins, frequently in areas where water velocities are reduced. Studies conducted by Knudsen and Dilley (1987) and others have shown that riprap channel margins are not a preferred rearing habitat for juvenile salmon.

Based on habitat conditions at the DWSP intake site, it would be expected that there may be some fall-run salmon fry along the south bank of Empire Tract during the late winter (i.e., February through March). However, the majority of salmon fry in the area would be expected to inhabit the higher quality shallow water areas on the tule-lined, low-velocity areas adjacent to the islands on the south side of the river channel away from the intake location. As the salmon fry grow and develop, it appears that they move into higher velocity water and the main channels, presumably for foraging and in preparation for downstream migration to coastal waters.

From these and other data cited in Section 4.2 of the DPEIR, it would appear that a substantial percentage of emigrating salmon moving downstream in the San Joaquin River are initially diverted away from the project area into the south Delta via Turner Cut and Columbia Cut. Fish remaining in the mainstem San Joaquin River appear to concentrate in the deeper water of the Stockton Deep Water Ship Channel or pass south of Medford Island and move relatively rapidly downstream, although the mechanism for this is unknown. Vogel (2005) notes that fish released seven to 10 days apart under similar flow and export conditions showed a twofold difference in survival (although his data show no clear trend in travel time for those surviving).

Fish Screen Design

The fish screen will be designed to meet California Department of Fish and Game (CDFG) and National Marine Fisheries Service (NMFS) screening criteria for all life history stages of emigrating juvenile Chinook salmon and steelhead:

- **Screen Orientation**. The screen will be oriented such that flow past the screen will be parallel to river flow.
- **Approach Velocity**.[1] The screen will be designed so that a maximum uniform approach velocity of 0.2 feet per second (ft/sec) as well as an adjustment for flow patterns will be provided across the face of the screen.
- **Screen Cleaning**. The screen will be fitted with an automatic rotating brush or hydraulic screen cleaner that cleans the entire fish screen once every five minutes.

[1] Approach velocity is the velocity of water passing perpendicular to a screen surface into the diversion representing the hydraulic force that would potentially entrain or impinge fish and debris on a screen.

- **Sweeping Velocity**.[2] Except during periods of tidal flow reversal, sweeping flow velocity will be at least twice the approach velocity.

- **Screen Openings**. Screen openings will not exceed 1.75 millimeters with a minimum open area of 27 percent based on the salmonid fry criterion.

- **Screen Materials**. The screen will be of rigid, corrosion-resistant material with no sharp edges or projections (stainless-steel or copper-nickel alloy using wedge wire).

Screens of this design will (a) meet the USFWS approach velocity criterion for delta smelt (0.2 ft/sec), (b) provide for approach velocities 40 percent lower than the recommended approach velocity for Chinook salmon fry and be well below the approach velocities for larger salmon smolts and steelhead parr, and (c) virtually eliminate the potential for salmon entrainment. Delta smelt are weak swimmers, and the adoption of the delta smelt criterion, therefore, ensures high levels of protection for other fish. In addition, under the NMFS criterion, the approach velocity is measured within three inches of the screen face; velocity of flow toward the screen decreases with distance from the screen. The screen's detectable influence on flow is thus limited to the first few feet around the screen, and in this area, approach velocities are substantially below the screen design approach velocity. Given that the diversion/screen would have a detectable influence on flow extending only a few feet off the screen face and that the channel is over 200 yards wide at the screen, a vast majority of fish in the vicinity of the diversion/screen would not be affected by DWSP operation. For salmon smolts, which preferentially use the main ship channel, it is likely that not more than 1 percent would be found within the zone of influence for the screen.

Except for periods of slack flows as the tide reverses, river and tidal flow will provide sweeping velocities across the fish screen surface. Debris will also be removed from the screen surface by an automatic, continuously operating mechanical brush or hydraulic screen cleaning system that will cover the entire screen surface at approximately five-minute intervals. The 1.75-millimeter mesh size, intended to protect all fish larger than 25 millimeters (one inch), will protect Chinook salmon fry and steelhead parr, which are approximately 35 millimeters in length or longer when they reach the Delta (DWR, unpublished data). This has been confirmed by extensive CDFG, NMFS, and independent monitoring studies that show that Chinook salmon fry and smolts and steelhead parr are not entrained by diversions screened with mesh of this size (Morinaka 2000; Dan Odenweller, CDFG, personal communication to C. Hanson).

Sweeping velocities in the project river reach are generally a function of tidal influences, not river flow (Vogel, 2005; DPEIR Modeling Technical Appendix). Except during the twice-daily slack periods when the tide is turning, sweeping velocities will meet the screen criterion at all times and will protect all life history stages of Chinook salmon and steelhead. During the brief daily periods of slack tide conditions (estimated to be about 1.5 hours during each slack tidal period), the screen will not meet sweeping flow requirements. A juvenile fish bypass is not feasible because sweeping flows occur in two directions. Even so, fish mortality is not expected. This situation also occurs at CCWD's Old River diversion and fish screen that serves Los Vaqueros Reservoir

[2] Flow moving parallel past the screen surface that serves to remove debris from the screen.

without noticeable adverse consequences. The CCWD screen has an almost identical design as the DWSP screen and has been monitored since it began operating. Morinaka (2000) described the results of two years of fish monitoring conducted by the CDFG behind CCWD's newly installed positive barrier screen on Old River. The CDFG used a large sieve net to determine if Chinook salmon, steelhead, and delta smelt were being entrained (taken) at the diversion. Morinaka reported that the net captured 19 species (three native and 16 non-native) with only one delta smelt and no salmon found in the samples. He concluded that "the results demonstrate that a properly designed and operated screen can reduce entrainment losses." The low approach velocity of screens designed to these criteria almost eliminates entrainment and allows juvenile fish to swim away from the screen face.

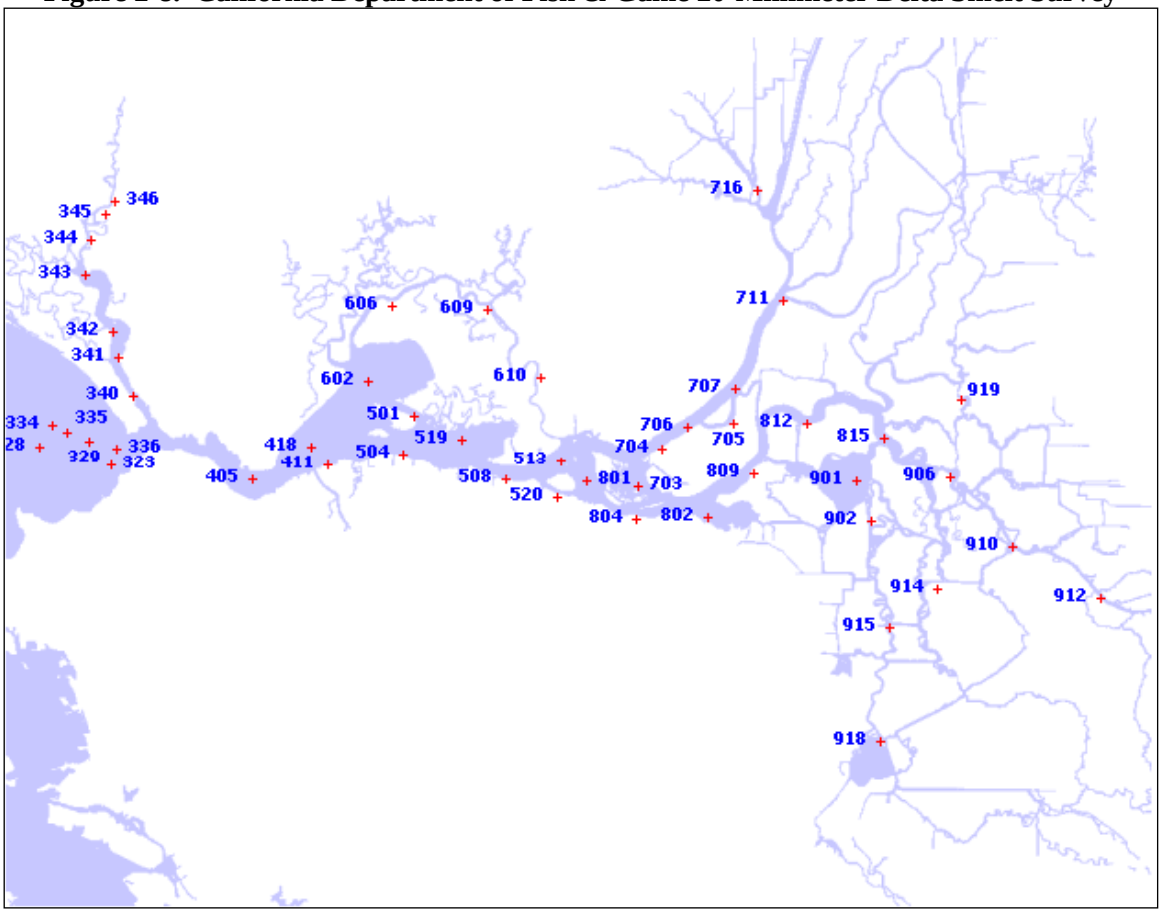
The screen's effects on fish that come within a few feet of its face are almost entirely related to screen contact, and therefore, these screens are designed to have smooth, slightly rounded surfaces. Automatic cleaning devices, monitored daily and well-maintained as they have been in other new screen installations, provide for optimal operating conditions—consistent and consistently-low approach velocities and uniform flow across the face. Removal of debris reduces potential for eddy effects and for debris to clog portions of the screen and create areas of high approach velocities.

Although the positive barrier fish screen is effective in excluding juvenile and adult fish larger than one inch in length, planktonic fish eggs and larvae less than one inch in length, including larval delta smelt, would be vulnerable to entrainment into the diversion. As noted on pages 4-86 through 4-90 of the DPEIR, to protect larval delta smelt during April through June ,when early life history stages of delta smelt and the eggs and larvae of other fish are likely to be in the project area, the potential of the fish screen and diversions to impact these life stages of fish would be reduced operationally (by reducing diversions and thus reducing approach velocities and diversion volume) or physically (by installing an aquatic filter barrier). Either of these options would also reduce the potential for juvenile fish of all sizes to be affected by the diversion and fish screen during the spring (April through June).

Monitoring will be required from April through June to detect the presence of larval delta smelt in the vicinity of the project area and trigger the implementation of impact avoidance and minimization measures. CDFG conducts a 20-millimeter larval delta smelt survey at approximately two-week intervals at survey sites throughout the Delta (Figure 2-8). The results of these surveys have been reviewed and used as a basis for developing a preliminary monitoring and response plan for springtime diversion operations. The monitoring for larval delta smelt in the vicinity of the intake would primarily rely on results of CDFG surveys at sampling station 906 (Figure 2-8). The densities and geographic distribution of larval delta smelt there would be used to trigger operational changes (reduced diversion rates or installation of the fine-mesh screen material) at the intake if larval smelt in the area would be vulnerable to entrainment. The CDFG monitoring results would also be used to identify those periods when larval delta smelt are not in the area and no operational changes would be made. If CDFG does not conduct its survey or the City desires more frequent delta smelt monitoring to refine diversion operations, the City would perform larval monitoring at the intake site in accordance with a standard sampling protocol. A

copy of the proposed larval delta smelt monitoring and response plan will be provided to the USFWS and CDFG for review prior to initiating operation of the DWSP intake and fish screen.

Figure 2-8. California Department of Fish & Game 20-Millimeter Delta Smelt Survey



Sampling Sites in the Sacramento San Joaquin Delta.

Screen Effectiveness

Several reviewers commented on the overall level of protection provided by the proposed fish screens, expressing concern related to the "95 percent effectiveness" noted in the DPEIR (page 4-87). No mechanical device operates perfectly at all times, and the NMFS fish screen criteria are intended to avoid impacts to at least 95 percent of fish **encountering** the screen. This suggests that 5 percent of fish within the screen zone of influence may be affected. Given the small mesh size, a very small number of small fish may actually be entrained (Morinaka, 2000). A majority of the effects of screening are thus associated with brief contact with the screen's smooth surface and with stress associated with contact and/or swimming to escape the screen. The effects of screen exposure are generally not associated with mortality. For example, Danley et al. (2002) found no elevated indicators of physiological stress associated with screen exposure for Sacramento splittail, even at 10 times the approach velocity for the project screens.

In a population-level context, the potential for 5 percent of fish within the DWSP fish screen zone of influence to be affected would be minimal, because the number of Chinook salmon and

steelhead actually in the screen's zone of influence would be a small fraction of the total population:

- First, it is expected that fewer than 50 percent of San Joaquin River salmonids migrating downstream will pass through the mainstem San Joaquin River at Empire Tract (many will divert to the south Delta or follow the mainstem flow split south of Medford Island based on flow splits and results of the radio-tagging conducted by Vogel [2004, 2005]);

- Of the salmonids that do pass the fish screen, a majority of salmon smolts are expected to use the Stockton Deep Water Ship Channel (Vogel 2004, 2005). Fall-run salmon fry are expected to inhabit the shallow-water, low-velocity channel margins during rearing and movement through the Delta; however, the riprap banks near the intake site are not preferred habitat for salmon fry (Knudsen, 1987) and a greater percentage of the fry would be expected to inhabit the shallow tule-lined islands that provide better cover habitat associated with the small unriprapped islands and better foraging conditions on the south side of the river channel away from the intake site;

- Only a fraction of the fish using the 100- to 200-foot-wide area between the ship channel and the fish screen will come within the screen's zone of influence (the hydraulic zone of influence is expected to be undetectable or measurable one to two feet from the screen surface; the 0.2 ft/sec maximum approach velocity for the screen is measured within three inches of the screen surface, and velocity decreases with distance away from the screen);

- Only 5 percent of those within the zone of influence are anticipated to potentially be directly affected by the fish screen;

- A vast majority of the juvenile fish, including fall-run Chinook salmon fry and smolts, affected by the fish screen will contact the screen and then swim away.

The potential for a properly designed and maintained fish screen to have direct population-level effects is therefore miniscule. These effects will be further reduced by either (a) reduction in diversion rate and approach velocity during periods when planktonic delta smelt larvae are in the project reach of the river or (b) use of a aquatic filter barrier to exclude planktonic delta smelt larvae from the zone of influence.

Screen Monitoring and Maintenance

Prior to operation, the fish screen will be tested to ensure that equipment is working as designed (i.e., approach velocities measured at three inches from the screen face are 0.2 ft/sec across the screen face and the automatic brush cleaner is operational and effective). Clogging of the screen will be monitored indirectly, based on water flow and pressure, which will provide ongoing information about the flow of water through the screen. Thus, changes in flow through the screen will be detected rapidly and the screen will be inspected to determine the cause of any change. The screen will be protected from floating debris by a floating boom, but in the event that debris damages the screen, a replacement screen panel will be kept onsite to ensure rapid repair and restoration of screen function.

CEQA requires that a cumulative analysis include future actions and projects that can be reasonably predicted to occur within the terms of the proposed project. The cumulative analysis evaluates the effects of the proposed project when combined with those of other water supply programs or actions. A cumulative analysis was undertaken for the initial phase (30 mgd) of the DWSP for a 2015 level of development and for the ultimate phase (60 mgd) of the DWSP at a 2050 level of development. Future actions and projects included under the cumulative conditions were the Freeport Regional Water Project (FRWP), the South Delta Improvement Program (SDIP), the Delta-Mendota Canal-California Aqueduct Intertie (DMC-CA Intertie), and integrated CVP-SWP operations. The SDIP and CVP-SWP integration were included in Reclamation's Operations Criteria and Plan Biological Assessment (OCAP BA) as part of the early consultation process. The FRWP and DMC-CA Intertie were included as part of the OCAP BA formal consultation. For the cumulative analysis, the proposed upgrade of the Stockton East Water District's water treatment plant was included as a future action.

A number of reviewers requested clarification of the DWSP's indirect effects related to changes in hydrology and hydraulics, noting that the DWSP might affect exports at other diversions or hydrologic variables such as flow, salinity, and other conditions that might affect fish behavior.

The Modeling Technical Appendix to the DPEIR describes projected hydrologic and hydraulic variables that could affect conditions for fish by comparing the DWSP and the No Project Alternative, based on CALSIM II modeling. For clarification, results for the ultimate phase of the project at a 2050 level of development are summarized below.

River Flow: The CALSIM II modeling predicted that the DWSP's operation could impact flow in the Sacramento and Feather Rivers due to changes in CVP-SWP reservoir operations. However, differences in average monthly flow are small, less than 1 percent. Flows are lower in January to March and higher in April to December. Negligible impacts to flow in the San Joaquin River or the Stanislaus River were predicted.

Delta Flow: DWSP effects on monthly average in-Delta flow at various points were estimated at:

Variable	Average Monthly Change	Average Annual Change
Georgianna Slough	-0.3 to 0.6 percent	0.1 percent
Delta Cross Channel	-0.3 to 2.7 percent	0.6 percent
Total Delta Inflow	-1.2 to 0.0 percent	0.5 percent
Net Delta Outflow	-1.8 to 0.2 percent	0.6 percent
QWEST	-7.1 to -1.7 percent	4.1 percent

SWP and CVP Exports: Total exports at the Banks and Tracy Pumping Plants were predicted to decrease by about 0.5 percent.

Position of X2: The position of X2 (the calculated location of the 2 parts per thousand salinity levels within the Delta) during February to June was estimated to be unchanged or to move westward in 47 percent of the months. Changes of greater than 0.5 kilometer were estimated to occur less than 1 percent of the time.

Water Levels in the South Delta: Monthly mean water levels in the south Delta were estimated to be changed by the DWSP by about 0.01 feet (one-eighth of an inch).

River Temperatures: River temperatures were estimated by the model to change by about 0.1°C.

On average, the CALSIM II modeling suggests that hydrologic and hydraulic variables would not be significantly affected by the operation of the diversion and fish screen. Estimated impacts are generally measured in fractions of a percentage. For biologically sensitive variables like net Delta outflow, it is probable that the maximum projected effect, an average annual change of 186 cfs from a baseline flow of 22,461 cfs during above-normal years would probably not be detectable by fish and other aquatic wildlife. Similarly, a projected decrease in total annual Delta inflow of 198 cfs from a baseline of 33,176 cfs would not be detectable.

In addition, virtually all of the estimates fall well within the potential modeling error and are thus not statistically significant. The model does predict an up to 7 percent reduction in QWEST (a calculated estimate of reverse flow in the lower San Joaquin River), although the average impact on QWEST is 4 percent. The average QWEST change associated with the DWSP is equivalent to a reduction in Delta flow of about 100 cfs. Note also that, as Vogel (2005) indicates, net Delta flow west is not strongly reflected in conditions experienced by fish in the project reach because river flow is dwarfed by tidal flow. The reduction in QWEST would thus not be detectable by fish in the project reach.

The potential project effects on the VAMP program were specifically evaluated in the Modeling Technical Appendix to the DPEIR. The CALSIM II analysis showed no effect on flows at Vernalis, except for a 1 cfs reduction in flow during above-normal water years, which have an average flow rate of 3,972 cfs. Therefore, the proposed DWSP would have no effect on the "baseflows" used to establish VAMP target flows at Vernalis each year and, therefore, would not affect reservoir releases required for VAMP. Pulse flows from the VAMP reservoirs would not be modified by the proposed DWSP and the effects of these releases would not be altered when those releases reach the project area. The river system is under the influence of tidal flow, and flow in the San Joaquin River is a minor component of the conditions experienced by fish. To the extent that flow is reduced at the project site and water levels decline (albeit by only one-eighth of an inch on average), the DWSP's effects would be to lower water levels slightly, increasing the stream gradient and thus reducing the relative flow cue to Turner Cut and Columbia Cut. These effects would be positive, but again would not likely be detectable by fish.

Conclusions

Based on a review of the life history, habitat requirements, and seasonal periods of spawning and juvenile migration for fall-run Chinook salmon, other races of salmon, steelhead, delta smelt, and other resident and migratory fish species, in combination with information on the design, operations, and expected performance of a state-of-the-art positive barrier fish screen in reducing and avoiding entrainment and impingement of fish, the City has concluded:

- The proposed positive barrier fish screen, designed to meet the UFWS delta smelt maximum approach velocity of 0.2 ft/sec having 1.75-mm screen mesh in

compliance with screening criteria for salmonid fry and equipped with an automatic continuously operating mechanical brush or hydraulic screen cleaner, will be effective in avoiding entrainment of fish greater than one inch in length (including fall-run salmon fry) and reducing the risk of impingement of juvenile and adult fish, and therefore, no additional mitigation or protection for juvenile and adult fish is required;

- Testing will be performed during the initial phase of intake operations to verify that the screen meets the maximum approach velocity criterion and provides uniform flow into the intake. Adjustable louver baffles will be used in combination with velocity test results to fine-tune screen performance. The protocol and results of intake velocity testing will be provided to CDFG, NMFS, and USFWS for review;

- Although two alternative intake sites (south and west banks of Empire Tract) were proposed in the DPEIR results to date indicate that the south bank site has preferable site characteristics (proximity to the deep channel, sweeping velocities, reduced interference with recreational boaters, wider channel cross-sectional area, etc.);

- Although the proposed fish screen would be effective in excluding juvenile and larger fish from the intake, the screen is not expected to be completely effective in avoiding entrainment of planktonic larval delta smelt. A mitigation plan has been developed, using results of fishery monitoring to assess the density and geographic distribution or vulnerability of larval smelt to entrainment at the intake in combination with an operational response plan that would either provide short-term reductions in diversions or use an aquatic filter barrier to exclude larval delta smelt (and incidentally other fish eggs and larvae) from the intake during the spring. The monitoring and response plan will be provided to CDFG, NMFS, and USFWS for review prior to initiating diversion operations;

- Results of CALSIM II modeling under 2015 and 2050 assumed conditions did not detect biologically significant changes in hydrologic indicators of habitat conditions for fish within the Delta (e.g., changes in SWP/CVP export operations, X2 location, Delta inflow and outflow, etc.). The proposed DWSP would have no effect on the "baseflow" used to calculate the VAMP Vernalis pulse flow, and therefore, would not affect reservoir releases required for VAMP;

- No additional impacts to fishery resources have been identified. The state-of-the-art positive barrier fish screen designed and operated to meet delta smelt approach velocities and salmonid fry screening is considered to provide adequate protection to San Joaquin River fall-run Chinook salmon fry and smolts and juvenile lifestages of other fish species, and no additional mitigation is required;

- Design, construction, and operations of the proposed DWSP intake structure and positive barrier fish screen, and the anticipated effectiveness of these actions in reducing and avoiding losses of protected fish species as a result of direct and indirect effects on aquatic habitat, and entrainment and impingement mortality, will be the subject of Endangered Species Act Section 7 consultation and biological opinions prepared by NMFS, USFWS, and CDFG for the protection of protected fish, and other fish species, inhabiting the Delta.

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2.5 MASTER RESPONSE—DPEIR RECIRCULATION

A number of commenters suggested that, in light of either their comments or the proposed changes or additions to the DPEIR they advocated in their comments, the City would be required to recirculate a new DPEIR for a second round of formal public review. The City respectfully disagrees with those comments because there are no legal grounds for recirculation despite the inclusion of new information in this FPEIR.

The statute governing a Lead Agency's duty in this context is Public Resources Code section 21092.1, which provides that recirculation is necessary when, after the release of a Draft EIR but prior to certification of a Final EIR, a lead agency receives "significant new information."

This vague statutory command was interpreted by the California Supreme Court in *Laurel Heights Improvement Association of San Francisco, Inc. v. Regents of the University of California* (1993) 6 Cal.4th 1112 (*Laurel Heights II*). In that seminal decision, the court reasoned as follows:

> [W]*e conclude that the addition of new information to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a* ***substantial*** *adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement ….* [R]*ecirculation is not required where the new information added to the EIR "merely clarifies or amplifies … or makes insignificant modifications in … an adequate EIR. (Id. at pp. 1129-1130 (emphasis in original).)*

The court then provided four examples of how the above-stated general principles should be applied in practice:

> *[R]ecirculation is required, for example, when the new information added to an EIR discloses:*

> *(1) a new substantial environmental impact resulting from the project or from a new mitigation measure proposed to be implemented;*
>
> *(2) a substantial increase in the severity of an environmental impact unless mitigation measures are adopted that reduce the impact to a level of insignificance;*
>
> *(3) a feasible project alternative or mitigation measure that clearly would lessen the environmental impacts of the project, but which the project's proponents decline to adopt; or*
>
> *(4) that the draft EIR was so fundamentally and basically inadequate and conclusory in nature that public comment on the draft was in effect meaningless.* (*Mountain Lion Coalition v. Fish & Game Com.* (1989) 214 Cal.App.3d 1043). (*Id.* at p. 1130 (citations omitted); CEQA Guidelines, section 15088.5, subd. (a).)

These general principles and examples are now found, with slight embellishments, in CEQA Guidelines section 15088.5, which was enacted in 1994 and then amended in 1998. One embellishment relates to the Supreme Court's third example of a circumstance requiring recirculation. This circumstance is described as follows in section 15088.5, subdivision (a)(3):

> *(3) A feasible project alternative or mitigation measure* ***considerably different from others previously analyzed*** *would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it.* (CEQA Guidelines, § 15088.5, subd. (a)(3) (emphasis added).)

The bolded language, which is not found in *Laurel Heights II*, represents the Resources Agency's own interpretation of Public Resources Code section 21092.1. The agency was apparently concerned that recirculation should not be triggered simply because a "new" mitigation measure or alternative might lessen the significant environmental effects of a proposed project. The agency apparently believes that, where a new measure or alternative is similar to one already outlined in an EIR, the time and expense associated with recirculation would not be justified.

The Resources Agency also expressed the fourth example of a circumstance triggering recirculation in wording slightly different than that used by the Supreme Court. Section 15088.5, subdivision (a)(4), requires recirculation when

> *(4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.* (*Mountain Lion Coalition v. Fish & Game Com.* (1989) 214 Cal.App.3d 1043 [263 Cal.Rptr. 104].)

Notably, in formulating the principles and examples set forth above, the Supreme Court in *Laurel Heights II* explained that recirculation of Draft EIRs was the exception, not the rule:

> [b]*y codifying the 'significant new information' language* [in section 21092.1], *the Legislature apparently intended to reaffirm the goal of meaningful public*

> *participation in the CEQA review process. It is also clear, however, that by doing so the Legislature did not intend to promote endless rounds of revision and recirculation of EIR's. Recirculation was intended to be an exception, rather than the general rule.* (*Laurel Heights II, supra,* 6 Cal.4th at p. 1132 (citations omitted).)

The court stated its agreement with an earlier appellate decision that had explicitly rejected the proposition that:

> … **[A]*ny*** *new information triggers recirculation. A contrary conclusion indeed would have been at odds with the statutory scheme, which did not (and does not) generally require that a FEIR be recirculated even though that document by definition contains information not found in the draft EIR in the form of public comments and responses thereto.* (6 Cal.4th at p. 1128 (emphasis in original).)

As should be evident to a reader who reviews all of the responses to comments in this FPEIR, as well as DPEIR text amended to reflect information that became available since the issuance of the DPEIR, the City has not added any "significant new information" to the original document and, thus, is not required to recirculate even a portion of the original DPEIR. Rather, the new information found herein "merely clarifies or amplifies … or makes insignificant modifications in … an adequate EIR." Additional information has been added to the DPEIR in several areas, with two areas in particular being updated: Delta hydrodynamics and water quality and fisheries. The discussion of fisheries has been augmented in response to comments to provide additional information on the San Joaquin River fall-run Chinook salmon and to amplify the impact analysis in the DPEIR. This additional information is discussed above in Section 2.4, Master Response on Fisheries, and presented in Chapter 4, DPEIR Text Revisions and Staff-Initiated Text Changes. With respect to the Delta hydrodynamic and water quality analysis, revised model output has been prepared and presented in this document to correct a data input error discovered in the DSM2 model analysis prepared for the DPEIR. (Refer to Chapter 4 of this document where text edits are presented). The revised modeling results do not change the DPEIR impact analysis regarding potential project effects on Delta hydrodynamics or water quality or any of the other impact conclusions. This correction of modeling data represents a minor modification to the DPEIR and, in accordance with the CEQA statute and case law interpretation described here, does not prompt recirculation of the DPEIR.

As is evident from the preceding discussion, in no instance has the City revealed new significant environmental effects not fully disclosed in the DPEIR, concluded that a previously disclosed effect will be "substantially more severe" than previously disclosed, or added new mitigation measures that are "considerably different" from those in the DPEIR *and* that the City declines to adopt. Rather, the lengthy responses to comments in this document, as well as the text modifications, explain the City's conclusions in greater detail and offer detailed factual information in response to specific queries and assertions made by various commenters. The new mitigation language devised through the process of preparing the FPEIR does not involve mitigation measures that are "considerably different from others previously analyzed," nor does the City "decline to adopt" such new language. Such new information and new language is the normal fare for Final EIRs, which by definition include information not found in Draft EIRs.

Large numbers of comments elicit large numbers of sometimes lengthy responses. The sheer length of a Final EIR, however, does not by itself trigger any obligation to recirculate.

Chapter 3
Written and Oral Comments and Responses

CHAPTER 3
WRITTEN AND ORAL COMMENTS AND RESPONSES

The agencies, organizations, and individuals listed below provided written and oral comments on the Stockton Delta Water Supply Project DPEIR. Oral comments made at the public meeting on the DPEIR were recorded; the transcript of those comments as well as written comments from the meeting is presented in this chapter. Each letter or testimony is coded (i.e., 1, 2, 3 . . .) and each comment is numbered. For example the first comment in the letter from the California Department of Conservation is 1-1. Responses follow each letter, written comment, or individual's testimony. All comments on the content and adequacy of the DPEIR have been responded to in full. The City received 22 comment letters, two written comments, and six oral comments. The following is a list of commenters:

Written Comment Letters

1 California Department of Conservation
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Chapter 4
DPEIR Test Revisions and Staff-Initiated Text Changes

CHAPTER 4

DPEIR TEXT REVISIONS AND
STAFF-INITIATED TEXT CHANGES

4.1 INTRODUCTION

The following corrections and/or clarifications have been made to the DPEIR text. These corrections include: minor corrections made by the DPEIR authors to improve writing clarity, grammar, and consistency; corrections or clarification requested by a specific response to comments; or staff-initiated text changes to update information presented in the DPEIR. The text revisions are organized by the chapter and page number that appear in the DPEIR. ~~Deleted text~~ presented in this section indicates text that has been deleted from the DPEIR. Text that has been added to this DPEIR is presented as double-underlined.

4.2 TEXT REVISIONS

CHAPTER 2 PROJECT DESCRIPTION

In response to Comment 18-5, page 2-1, paragraph 1 has been revised.

> The City of Stockton Metropolitan Area (COSMA) (Figure 2-1) is currently experiencing substantial population growth and increasing water demands. Existing contracted surface water supplies to the COSMA are limited and interim in duration and insufficient to provide for future growth. In addition, groundwater conditions in the Eastern San Joaquin Groundwater Basin are threatened primarily by groundwater withdrawals to the east of the COSMA, which has resulted in saline water intrusion under the western portions of the COSMA.

In response to Comment 18-9, page 2-5, bullet 1 has been revised.

- Calaveras River via New Hogan Reservoir pursuant to a contract between the U.S. Bureau of Reclamation (Reclamation), Calaveras County Water District (CACWD), and SEWD: contract "safe" yield ~~40,171~~ 84,100 AF/year, of which SEWD is entitled to 40, 171.

In response to Comment 18-10, page 2-5, paragraph 3 has been revised.

> On average, SEWD receives approximately ~~10,000~~ 24,000 AF/year for M&I use from the Calaveras River, including water not currently being used upstream by CACWD. This source of surface water may not be a reliable long-term supply for SEWD as Calaveras

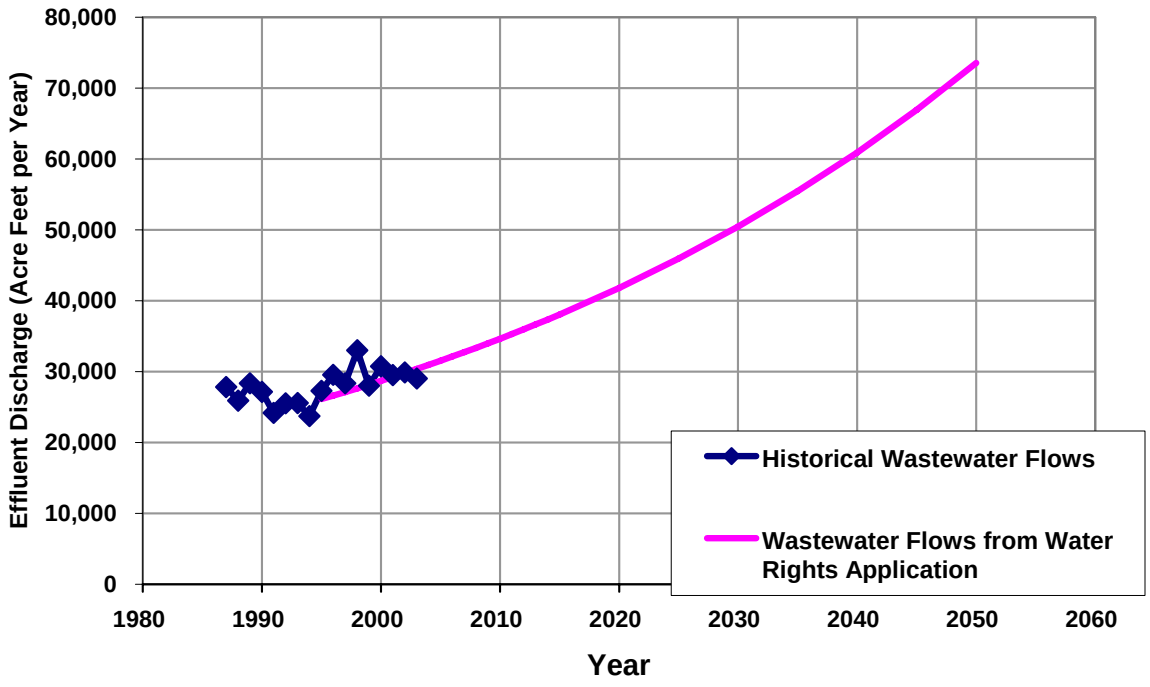
County continues to develop and require additional water supplies, and due to possible dedication of instream flows to fishery restoration in the lower Calaveras River.

In response to Comment 18-16, page 2-6, line 9 has been revised.

Even though the ~~City plans~~ parties plan to negotiate for the renewal of the contract, for planning purposes the City has assumed that only one contract would be renewed in 2009, with a maximum transfer amount of 15,000 AF/year.

In response to Comment 16-6, Figure 2-6 (page 2-18) has been revised to show smooth growth in effluent discharge in response to the assumed growth in population.

FIGURE 2-6 (Revised)
HISTORICAL AND PROJECTED TREATED EFFLUENT DISCHARGE FROM STOCKTON REGIONAL WASTEWATER CONTROL FACILITY



In response to Comment 3-7, Table 2-10 (page 2-61) has been revised to show additional CVRWQCB's requirements and permits required for the DWSP.

TABLE 2-10
REGULATORY REQUIREMENTS AND PERMITS FOR DWSP FACILITIES

Agency	Type of Approval	Project Component
Federal Agencies		
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit	Intake facility, raw water pipelines
	River & Harbor Act Section 10 Permit	Intake facility
U.S. Fish and Wildlife Service	Federal Endangered Species Act compliance (Section 7)	Intake facility, raw and treated water pipelines, WTP
National Marine Fisheries Service	Federal Endangered Species Act compliance (Section 7)	Intake facility
U.S. Coast Guard	Private Aids to Navigation Permit	Intake facility
State Agencies		
State Water Resources Control Board	Water Rights for Diversion from San Joaquin River	Intake facility
	~~Clean Water Act Section 401 Water Quality Certification~~	~~Intake facility, raw water pipelines~~
California Department of Fish & Game	State Endangered Species Act compliance	Intake facility, raw and treated water pipelines, WTP
	Section 1601 Streambed Alteration Agreement	Intake facility, raw and treated water pipelines
State Reclamation Board	Encroachment Permit	Intake facility, raw water pipelines
California Department of Transportation	Encroachment Permit	Raw and treated water pipelines
Central Valley Regional Water Quality Control Board	National Pollutant Discharge Elimination System Construction Storm Water Permit	Intake facility, raw and treated water pipelines, WTP
	General Order for Dewatering and Other Low Threat Discharge to Surface Waters Permit	Intake, raw and treated water pipelines, WTP
	National Pollutant Discharge Elimination System Industrial Storm Water Permit	WYP
	Clean Water Act Section 401 Water Quality Certification	Intake facility, raw water pipelines
	Waste Discharge Requirements of waiver of WDRs	WTP, ASR
State Historic Preservation Office	National Historic Preservation Act Section 106	Intake facility, raw and treated water pipelines, WTP
California Department of Health Services	Drinking Water Treatment Plant Permit	WTP
Local/Other Agencies		
San Joaquin Valley Air Pollution Control District	Authority to Construct Permit To Operate	Intake facility, WTP Intake facility, WTP
San Joaquin County	Encroachment Permit	Raw and treated water pipelines
Union Pacific Railroad	Crossing Permit	Raw and treated water pipelines
Reclamation District 2029 (Empire Tract)	Endorsement	Intake facility, raw water pipelines
Reclamation District 2044 (King Island)	Endorsement	Intake facility, raw water pipelines
Reclamation District 2042 (Bishop Tract)	Endorsement	Intake facility, raw water pipelines
Port of Stockton	Construction Permit	Intake facility

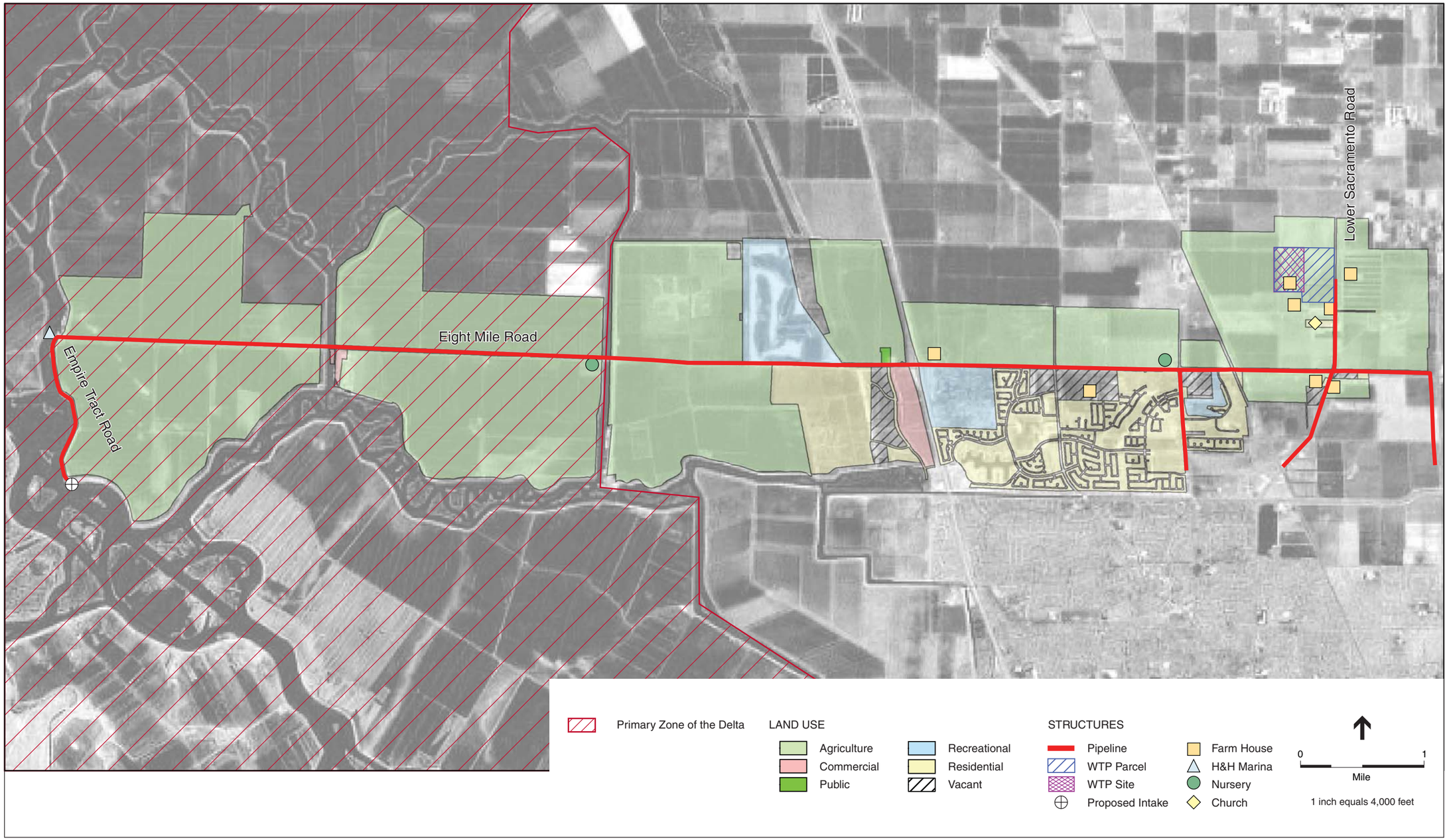
CHAPTER 3 ENVIRONMENTAL ANALYSIS - PROJECT FACILITIES

3.2 LAND USE, RECREATION, AND AESTHETIC RESOURCES

In response to Comment 5-2, Figure 3.2-1 (page 3.2-3) has been revised to show the boundary of the Primary Zone of the Delta.

In response to Comments 5-1 and 5-2, page 3.2-17, has been revised.

> The DPEIR has been amended to read as follows: The Delta Protection Act states that the basic goals of the State for the Delta are the following: (a) protect, maintain, and, where possible, enhance and restore the overall quality of the delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities; (b) ensure orderly, balanced conservation and development of delta land resources; (c) improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety. The Delta Protection Act further states that to protect the regional, state, and national interests for the long-term agricultural productivity, economic vitality, and ecological health of the delta resources, it is necessary to provide and implement Delta land use planning and management by local governments. Furthermore, the Delta Protection Act states that regulation of land use and related activities that threaten the integrity of the Delta's resources can best be advanced through comprehensive regional land use planning implemented through reliance on local government in its local land use planning procedures and enforcement. In order to protect regional, state, and national interests in the long-term agricultural productivity, economic vitality, and ecological health of Delta resources, it is important that there be a coordination and integration of activities by the various agencies whose land use activities and decisions cumulatively impact the Delta. Agricultural, recreational, and other uses of the Delta can best be protected by implementing projects that protect wildlife habitat before conflicts arise.
>
> Local general plans within the Primary Zone must be consistent with the Land Use and Resources Management Plan for the Primary Zone of the Delta (Management Plan), adopted by the Delta Protection Commission in 1995, and subsequent project approvals must be consistent with those general plans. Parties who believe a land use decision within the Primary Zone is inconsistent with the policies of the Management Plan may appeal the decision to the Delta Protection Commission. The following Management Plan policy relates to utilities and infrastructure plans within the Primary Zone:
>
> P-1. Impacts associated with construction of transmission lines and utilities can be mitigated by locating new construction in existing utility or transportation corridors, or along property lines, and by minimizing construction impacts. Before new transmission lines are constructed, the utility should determine if an existing line has available capacity. To minimize impacts on agricultural practices, utility lines shall follow edges of fields. Pipelines in utility corridors or existing rights-of-way shall be buried to avoid adverse impacts to terrestrial wildlife. Pipelines crossing agricultural areas shall be buried deep enough to avoid conflicts with normal agricultural or



SOURCE: San Joaquin County GIS, and Environmental Science Associates, 2005

Delta Water Supply Project / 200090-002 ■

Figure 3.2-1
Land Use

construction activities. Utilities shall be designed and constructed to minimize any detrimental effect on levee integrity or maintenance.

The Delta Protection Act exempts development defined as "planning, approval, construction, operation, maintenance, reconstruction, alteration, or removal by … a local agency of any water supply facilities or mitigation or enhancement activities undertaken in connection therewith." (Public Resources Code § 27723(b)(8).)

In response to Comment 7-3, Table 3.2-1 (page 3.2-22) and pages 3.25 and 3.2-26 have been revised.

Impact LU-3: Construction of DWSP facilities could conflict with existing agricultural uses. Less than significant with mitigation for all DWSP facilities.

Mitigation Measure LU-3: Prior to construction, the City shall consult with farmers potentially affected by construction of the DWSP intake and raw water pipeline to reduce disturbance to farming practices and maintain access to canals for irrigation and drainage purposes.

~~**Mitigation**: No mitigation is required~~. **Significance After Mitigation**: Less than significant.

In response to Comment 1-1, Mitigation Measure LU-5b (page 3.2-29) has been revised.

Mitigation Measure LU-5b: ~~If the City adopts an agricultural land conversion mitigation policy prior to 2010, the City shall pay into a "farmland trust" fund for San Joaquin County that will acquire ACEs to compensate for the conversion of important farmland at the WTP site and along the raw water pipeline alignment. The farmland subject to the easements shall be of the same acreage, and at least the same category of farmland, as identified by the latest FMMP report, as that farmland affected at the WTP and along the raw water pipeline alignment.~~ In order to mitigate for the permanent loss of agricultural land due to construction of water treatment facilities and pipelines for the DWSP, the City shall take steps to obtain conservation easements within San Joaquin County on a one to one basis, meaning that one acre of farmland shall be preserved for each acre permanently lost due to construction of these facilities. Such easements shall be obtained concurrent with the permanent cessation of agricultural activities due to facilities construction, and thus may be obtained in discrete phases as facilities are initially constructed and later expanded. The easements may be created through one of three possible means: direct purchase by the City of easements from willing sellers; through payments into a "farmland trust" of the City's choosing; or through participation in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJCMSCP). Should the City choose to employ the third option, the City may determine that satisfaction of Mitigation Measure BIO-2a constitutes full or partial satisfaction of this Mitigation Measure (LU-5b), provided that any purchase of conservation easements pursuant to the SJCMSCP, in order to achieve habitat

TABLE 3.2-1
SUMMARY OF IMPACTS – LAND USE, RECREATION, AND AESTHETIC RESOURCES

Impact	In-River Intake Facility	In-Bank Intake Facility	Raw Water Pipelines	Water Treatment Plant	Treated Water Pipelines
LU-1: Construction of proposed DWSP could physically divide an established community.	NI	NI	NI	LS	LS
LU-2: Construction of proposed DWSP facilities could reduce access to, or interfere with the use of existing recreational facilities.	LSM	LSM	LSM	NI	LSM
LU-3: Construction of DWSP facilities could conflict with existing agricultural uses.	LSM	LSM	LSM	LSM	LSM
LU-4: The proposed DWSP could conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.	LS	LS	LS	LS	LS
LU-5: Construction of DWSP WTP and raw water pipeline appurtenant facilities would convert economically viable prime farmland and farmland of statewide importance to non-agricultural use.	NI	NI	SU	SU	NI
LU-6: The proposed DWSP could conflict with existing zoning for agricultural use, or a Williamson Act contract.	LS	LS	LS	LS	LS
LU-7: The proposed DWSP could involve other changes in the existing environment that, due to its location or nature, could individually or cumulatively result in loss of economically viable farmland.	LS	LS	LS	LS	LS

preservation, will also simultaneously satisfy the one to one ratio for loss of farmland contemplated by this measure. The City may also elect to achieve more habitat preservation than would be required under BIO-2a in order to simultaneously achieve the one to one ratio with respect to agricultural land preservation.

In response to Comment 5-3, Impact and Mitigation Measure LU-9 (pages 3.2-31 and 3.2-32) have been revised.

Impact LU-9: Operation of the DWSP intake could reduce access to, or interfere with the use of existing recreational facilities. Less than significant with mitigation for the intake facility. No impact for raw and treated water pipelines and WTP.

The proposed intake facility would extend across the existing levee road. Currently, public access for vehicles is blocked at the end of Empire Tract Road where the intake facility would be located. However, fishermen and hikers can continue walking east on the levee road to Disappointment Slough. Construction and operation of the intake facility would potentially block this access, resulting in a significant recreational impact. With mitigation, the impact would be less than significant.

Permanent impacts to boating associated with the intake facility could be potentially significant due to construction and operation of the proposed DWSP. However, with use of the waterway marking system prescribed by the Department of Boating and Waterways, any impacts would be reduced to less than significant.

Mitigation Measure LU-9a: The design of the intake facility shall provide for continued public access to the San Joaquin River and Disappointment Slough. Pedestrian access shall be designed to discourage trespassing on adjacent properties.

Mitigation Measure LU-9b: Waterway markers (buoys and/or signs) will be placed in, on, or near the water to protect the safety of boat operators as specified in Title 14 Department of Boating and Waterways Section 7000 et seq. The shapes of aids to navigation shall be compatible with the shapes established by Coast Guard regulations for the equivalent Coast guard aids to navigation. When lights are placed on buoys as an aid to navigation, their characteristics shall be compatible with those designated by federal regulations for federal aids to navigation.

Significance After Mitigation: Less than significant.

3.3 GEOLOGY , SOILS, AND SEISMICITY

In response to Comment 7-1, Mitigation Measure GEO-3 (pages 3.3-19 and 3.3-21) has been revised.

Mitigation Measure GEO-3c: During final design of the DWSP facilities. a licensed geotechnical or civil engineer shall prescribe, and the City shall implement a preconstruction survey and monitoring program of affected levees and roadways

susceptible to settlement. The survey shall establish monitoring points and measure preconstruction elevations along the levees and roadways to establish a baseline for measuring potential settlement. Periodic monitoring, not less than weekly, shall be performed throughout construction and at least two months after completion of construction. The settlement monitoring plan shall include action limits, which if exceeded will require immediate corrective action.

In response to Comment 11-1, Mitigation Measure GEO-4 (pages 3.3-21 and 3.3-22) has been revised.

Mitigation Measure GEO-4a: Final design of the intake facility will take into account projected subsidence rates within the eastern Delta to ensure that the finished floor elevation remains above the 100-year flood elevation and includes three feet of freeboard during the operational life expectancy of the intake facility. This will be accomplished by determining the projected rate of subsidence for Empire Tract over the next 100 years and adding that projected change in elevation onto the current design finished floor elevation for the intake facility. This design feature will ensure sufficient height above the 100-year flood elevation during the operational life of the DWSP.

Mitigation Measure GEO-4b: The project design shall evaluate and where appropriate implement the use of light weight fill to reduce settlement at the intake location.

Mitigation Measure GEO-4c: The site settlements shall be monitored on a weekly basis for two months after completion of grading operations. The settlement monitoring results will be a basis for further evaluation and verification of the future settlement estimates.

3.4 DRAINAGE AND FLOODPLAIN MANAGEMENT

In response to Comment 11-2, Mitigation Measure DFM-3 (page 3.4-13) has been revised.

Mitigation Measure DFM-3: The City shall comply with all measures of the City's Stormwater Quality Control Criteria Plan to effectively manage and minimize increases in storm water runoff resulting from the operation of the DWSP facilities. Measures to be implemented may include detention basins, vegetated swales, buffer strips, and/or infiltration basins. Detention basins or other storm water detention facilities shall be designed to retain the 100-year flood event in accordance with the San Joaquin County Improvement Standards.

3.5 BIOLOGICAL RESOURCES

As a staff initiated text change, page 3.5-23, paragraph 1 has been revised.

Restoration of temporary disturbance to these wetland ditches would be performed after work completion. Therefore, this would be a less than significant impact with implementation of Mitigation Measure BIO-1~~b~~.

In response to Comment 14-17, Mitigation Measure BIO-2a (page 3.5-25) has been revised.

> **Mitigation Measure BIO-2a:** The City anticipates that the DWSP would be approved for participation in the SJMSCP for land-based facilities (pipelines and WTP). Compliance with the SJMSCP would provide for impact avoidance measures (e.g., pre-construction surveys during appropriate seasons for identification, construction set-backs, restriction on construction timing) and mitigation for loss of habitat for all species that may be affected by this impact, with the exception of eel-grass pondweed and marsh skullcap. Impact avoidance measures would include, but are not limited to, the species-specific measures presented below, which are summarized from the SJMSCP. Complete impact avoidance and habitat compensation measures from the SJMSCP are presented in detail in Appendix D.
>
> If construction of DWSP land-based facilities are not approved for participation in the SJMSCP, then the City shall obtain the necessary individual permits and shall conduct the pre-construction surveys and avoidance and minimization measure required in those permits, which are expected to be consistent with the SJMSCP. Should pre-construction surveys find that habitat is occupied for any of the covered species, the City shall implement avoidance and minimization measures using performance criteria consistent with those found in the SJMSCP, prepare reports documenting the surveys and avoidance and minimization measures shall be submitted for review to the appropriate regulatory agency (CDFG or USFWS).
>
> Because the WTP is located more than one mile, but less than five miles, from a Swainson's hawk nest active within the last five years, mitigation for loss of farmland habitat shall include the transfer of Habitat Management lands to CDFG on a minimum 0.75:1 basis (per CDFG's 1994 Staff Report on Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California). Habitat Management land shall include provisions to ensure that only crops compatible with Swainson's hawk foraging are allowed, and that the land is located in San Joaquin County and within two miles of a Swainson's hawk nest that has been active within the previous five years. Examples of suitable crops include alfalfa, low-growing row or field crops, dry-land and irrigated pasture, rice, and cereal grain crops. The City shall also provide a management endowment of $400 per acre (as adjusted for inflation) to ensure the long-term management of the land. Preservation of these Habitat Management lands will mitigate the loss of agricultural foraging habitat for Swainson's hawk and other wildlife species to a less than significant level.

CHAPTER 4 DELTA WATER AND FISHERIES RESOURCES

In response to Comment 19-4, page 4-11, paragraph 4 has been revised.

> Bromide is important from a drinking water perspective because during chlorination for disinfection of drinking water, bromide reacts with natural organic compounds in the water to form disinfectant byproducts (DBPs) such as trihalomethanes (THMs) and bromates. Four species of THMs are regulated in drinking water including chloroform,

bromodichloromethane, dibromochloromethane, and bromoform. Plants that use ozone can form bromate as a disinfection by-product. However, bromate is mainly a by-product of ozonation of high bromide waters.

In response to Comment 3-4, page 4-12 of the DPEIR has been modified to reflect the addition of Tables 4-2 and 4-3, Figure 4-2, and associated text. The addition of the tables and the figure necessitates revisions to the table and figure numbering in Chapter 4.

Water Quality at Intake Site

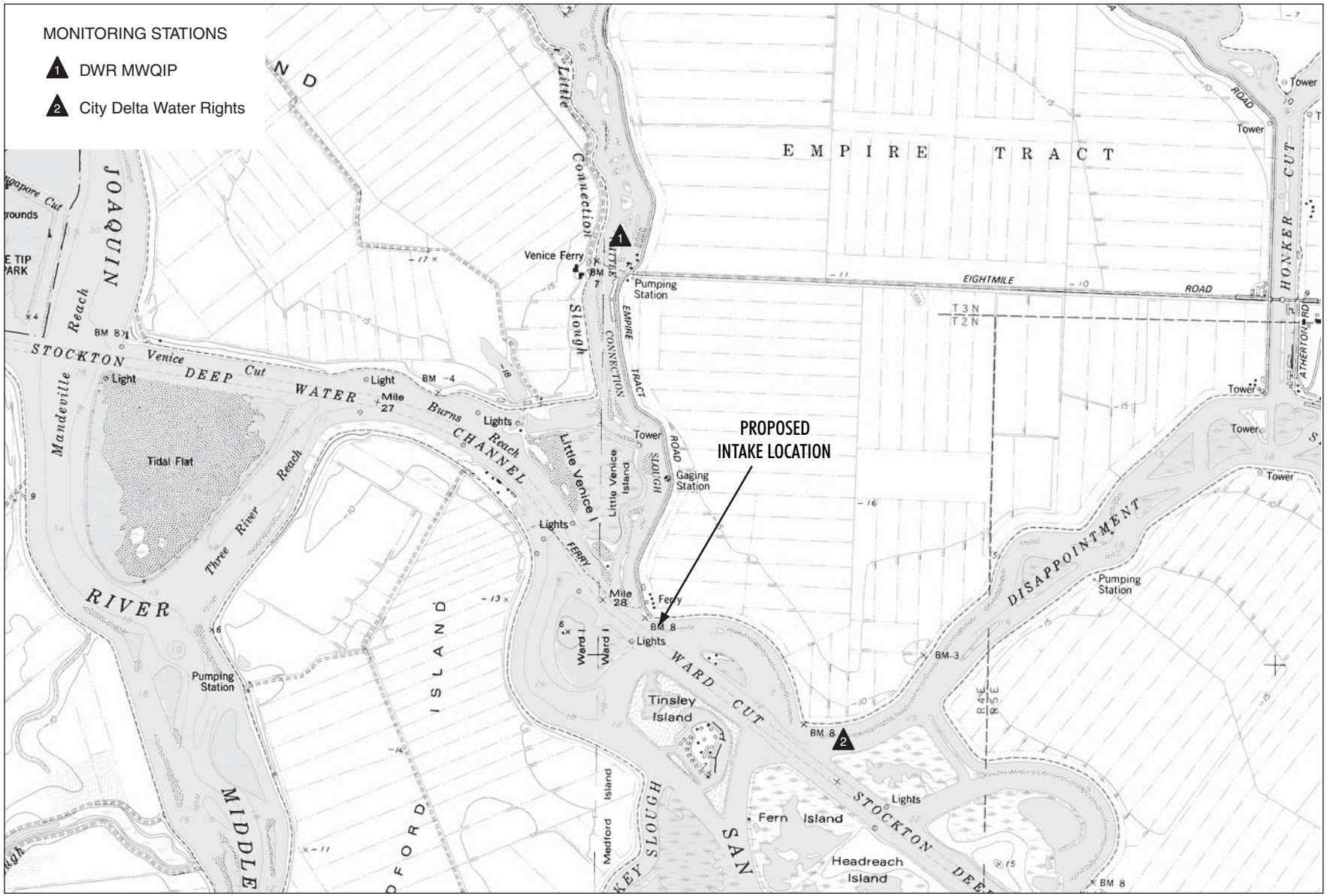
The Bay-Delta estuary's primary source of fresh water comes from the Sacramento and San Joaquin rivers. Seawater enters the Bay-Delta from the Pacific Ocean via tides. Because the Delta is at sea level, water levels vary greatly during each tidal cycle. During the tidal cycle, flows can also vary in direction and amount. Because of tidal fluctuation, the seasonal flow and quality variations of contributing rivers, and the impacts of return flows (agricultural drains, wastewater treatment plants, etc.) and export pumping at Clifton Court, water quality varies widely throughout the Delta. Therefore, in order to conduct a comparable analysis from which to draw relevant conclusions, existing water quality data should be used from sites as close in proximity to the proposed intake site as possible.

The California Department of Water Resources (DWR), U.S. Bureau of Reclamation (Reclamation), U.S. Geological Survey (USGS), the California Data Exchange Center (CDEC), various water and reclamation districts, and various cities monitor water quality in the Delta. However, research conducted on available water quality data near the intake site found that the most suitable information was available from the City (Delta Water Rights Program) and DWR (Municipal Water Quality Investigations Program [MWQIP]). To reflect water quality during wet and dry year conditions, water quality data, if available, was collected for the years 1990 to 1992 (representing dry year conditions) and for the years 1997 to 2000 (wet year conditions) (MW, 2001)[1].

Figure 4-2 shows the location of both City and DWR water quality monitoring stations that are nearest to the proposed intake site. Table 3-1 shows the dry and wet year maximum, minimum, and average values at the two monitoring stations near the site. The City's data represents years 1990-1992 and 1997-2000. DWR's data represents years October 1990 through October 1992.

Variations in the hydrologic cycle affect Delta water quality. Table 4-2 shows significant differences in water quality between wet and dry years for a number of parameters, including total dissolved solids, total organic carbon, chloride, total and fecal coliform bacteria, and chlorophyll a, an indicator of algae concentration. Water quality generally improves in wet years, although there are exceptions, such as turbidity, where wet year values are higher than dry year.

[1] Montgomery Watson. 2001. City of Stockton Water Project. Water Quality Monitoring Plan. Technical Memorandum 3: Prepared for the City of Stockton. February 2001.



SOURCE: USGS 7.5 Minute Quadrangles (Bouldin Island and Terminous); and Environmental Science Associates, 2003

Figure 4-2
Water Quality Monitoring Stations Near the Site

Table 4-2 (New)
Summary of Water Quality Data

Constituent	Unit	Water Year Type		City of Stockton 1990-1992, 1997-2000	DWR MWQIP 10/1990 – 10/1992
Water Temperature	^{o} C	Dry	maximum	24.0	
		Dry	average	7.7	
		Dry	minimum	15.9	
		Wet	maximum	23.0	
		Wet	average	10.2	
		Wet	minimum	16.1	
Turbidity	NTU	Dry	maximum	15.0	7.0
		Dry	average	4.2	3.0
		Dry	minimum	10.4	4.9
		Wet	maximum	17.0	
		Wet	average	4.2	
		Wet	minimum	12.5	
Total dissolved solids	mg/L	Dry	maximum	310.0	207.0
		Dry	average	130.0	90.0
		Dry	minimum	210.0	133.8
		Wet	maximum	199.0	
		Wet	average	91.0	
		Wet	minimum	146.7	
pH, field		Dry	maximum	7.9	
		Dry	average	6.3	
		Dry	minimum	7.5	
		Wet	maximum	7.6	
		Wet	average	7.2	
		Wet	minimum	7.4	
Alkalinity as $CaCO_3$	mg/L	Dry	maximum	100.0	83
		Dry	average	56.0	51
		Dry	minimum	72.3	65
		Wet	maximum	98.0	
		Wet	average	40.0	
		Wet	minimum	57.9	
Total organic carbon	mg/L	Dry	maximum	9.0	
		Dry	average	3.0	
		Dry	minimum	5.1	
		Wet	maximum	6.6	
		Wet	average	1.7	
		Wet	minimum	3.5	
Dissolved organic carbon	mg/L	Dry	maximum		8.0
		Dry	average		2.1
		Dry	minimum		3.3
		Wet	maximum		
		Wet	average		
		Wet	minimum		
Chloride	mg/L	Dry	maximum	69.3	40.0
		Dry	average	22.0	11.0
		Dry	minimum	45.3	21.5
		Wet	maximum	39.0	
		Wet	average	15.0	
		Wet	minimum	25.7	
Chlorophyll a	µg/L	Dry	maximum	18.0	
		Dry	average	1.7	
		Dry	minimum	5.5	
		Wet	maximum	6.2	
		Wet	average	1.7	
		Wet	minimum	3.9	

Constituent	Unit	Water Year Type		City of Stockton 1990-1992, 1997-2000	DWR MWQIP 10/1990 – 10/1992
Total coliform bacteria	MPN/100 ml	Dry	maximum	2,400	
		Dry	average	5	
		Dry	minimum	354	
		Wet	maximum	300	
		Wet	average	20	
		Wet	minimum	126	
Fecal coliform bacteria	MPN/100 ml	Dry	maximum	800	
		Dry	average	20	
		Dry	minimum	238	
		Wet	maximum	110	
		Wet	average	7	
		Wet	minimum	34	

Notes:
mg/L = milligrams per liter
µg/L = micrograms per liter
MPN/100 ml = most probable number per 100 milliliters of sample
NTU = nephelometeric turbidity units

Source: Montgomery Watson, 2001

In general, water quality improves traveling downstream on the San Joaquin River, (northwesterly direction) downstream of the City. This is due primarily to dilution from the higher flows and quality of the Sacramento River, which is pulled south to the Clifton Court pumping plants. Higher total dissolved solids (TDS) tend to occur in dry rather than wet years. In dry years, there is less flow into the Delta from the Sacramento and San Joaquin Rivers.

This results in more saltwater intrusion into the Delta and less dilution of agricultural return flows, resulting in higher TDS. Thus, higher chloride concentrations are seen in dry rather than wet years.

To gain a more reliable and current characterization of water quality at the intake site, a Water Quality Monitoring Plan was developed. Its purpose to supplement existing data and support engineering and permitting of the DWSP (Stockton MUD et al., 2003)[2]. Monitoring began in June 2002 and ended in July 2003. Table 4-3 presents a summary of the data collected for the 14-month sampling period. The majority of maximum concentrations occurred during December through April during the wet periods of the year. As the data show, the various parameters fluctuate with the time of year and the hydrology. Therefore, the DWSP will be designed to accommodate these fluctuations. Additional data will be collected after the DWSP is certified and has received necessary permits.

[2] City of Stockton Municipal Utilities Department (Stockton MUD), Environmental Science Associates, MWH Americas, and West Yost & Associates. 2003. Delta Water Supply Project Engineering Feasibility Study. January 2003. Available at www.stockton.gov/MUD/.

Table 4-3 (New)
Water Quality Data at the DWSP Intake Site, June 2002 through July 2003
(Positive Results Only)

Constituent	Unit	6/27/02	7/30/02	8/27/02	10/9/02	11/19/02	12/12/02	1/16/03	3/18/03	4/22/03	5/29/03	7/10/03	Avg.	Min.	Max
Apparent color	ACU	15	15	15	15	20	25	30	20	25	20	15	19	15	30
Odor	TON	8	8	8	8	17	4	4	3	8	2	17	7	2	17
Specific conductance	µmhos/cm	190	206	244	310	266	363	242	225	385	261	134	256	134	385
Turbidity	NTU	12.0	8.2	7.5	6.1	4.3	4.0	16.0	7.8	8.7	8.8	6.6	8.2	4.0	16.0
Total dissolved solids	mg/L	130	140	160	180	170	230	170	135	220	150	83	161	83	230
Langelier index	none	-0.70	-0.59	-0.20	-0.60	-0.59	-0.69	-0.49	-0.40	-0.10	-0.69	-0.90	-0.54	-0.90	-0.10
pH of $CaCO_3$ saturation (25^oC)	Unit	8.4	8.4	8.3	8.3	8.3	8.3	8.3	8.3	8.2	8.5	8.7	8.4	8.2	8.7
pH of $CaCO_3$ saturation (60^oC)	Unit		8.0	7.9	7.9	7.9	7.8	7.9	7.9	7.8	8.0	8.3	7.9	7.8	8.3
Lab pH	Unit	7.7	7.8	8.1	7.7	7.6	7.5	7.7	7.9	8.1	7.7	7.8	7.8	7.5	8.1
Alkalinity	mg/L as Ca CO_3	59	58	71	71	72	78	68	70	71	57	47	66	47	78
Bicarbonate alkalinity	mg/L as Ca CO_3	71.9	70.6	86.3	86.5	87.7	95.1	82.8	85.2	86.3	69.4	57.2	79.9	57.2	95.1
Total Hardness as $CaCO_3$	mg/L	65.0	62.9	74.9	80.6	78.6	82.7	79.8	71.2	92.7	61.2	42.2	72.0	42.2	92.7
Hydroxide	mg/L as Ca CO_3		0.010	0.020	0.009	0.007	0.005	0.009	0.010	0.020	0.009	0.010	0.010	0.010	0.020
Carbon dioxide, free (25^0C)	mg/L	2.87	2.24	1.37	3.45	4.41	6.01	3.3	2.15	1.37	2.77	1.81	2.89	1.37	6.01
Carbonate, calculated	mg/L as Ca CO_3	0.234	0.289	0.706	0.282	0.227	0.195	0.270	0.440	0.706	0.226	0.235	0.346	0.195	0.706

Constituent	Unit	6/27/02	7/30/02	8/27/02	10/9/02	11/19/02	12/12/02	1/16/03	3/18/03	4/22/03	5/29/03	7/10/03	Avg.	Min.	Max
Anion sum, calculated	meq/L	1.91	1.98	2.66	2.97	2.68	3.83	2.34	2.28	3.58	2.34	1.30	2.53	1.30	3.83
Bromide	mg/L	0.058	0.087	0.120	0.130	0.098	0.200	0.062	0.063	0.120	0.079	0.027	0.095	0.027	0.200
Chloride	mg/L	15.0	22.0	35.0	42.0	30.0	65.0	23.0	20.0	45.0	25.0	7.5	30.0	7.5	65.0
Fluoride	mg/L	0.07	0.06	0.07	0.07	0.06	0.08	0.05	0.06	0.07	0.05		0.06	0.05	0.08
Nitrate, total	mg/L Nitrite-N	0.41	0.20	0.22	0.46	0.55	0.57	0.85	0.35	0.89	0.47	0.17	0.47	0.17	0.89
Nitrate, as nitrogen	mg/L	0.41	0.20	0.22	0.46	0.55	0.57	0.85	0.35	0.78	0.47	0.17	0.46	0.17	0.85
Ammonia nitrogen	mg/L			0.063		0.129	0.103	0.108	0.076	0.066	0.055		0.086	0.055	0.129
Sulfate	mg/L	13.0	8.5	11.0	16.0	17.0	19.0	13.0	14.0	40.0	22.0	6.4	16.4	6.4	40.0
Cations sum, calculated	meq/L	1.99	2.08	2.63	3.02	2.73	3.43	2.26	2.16	3.38	2.13	1.18	2.5	1.2	3.4
Aluminum	µg/L	620	290	290	200	220	180	660	210	230	340	250	317	180	660
Arsenic	µg/L	2.8	3.4	2.4	2.9	2.2	2.2	2.1	2.2	2.7	2.9	1.4	2.5	1.4	3.4
Barium	µg/L	31	28	32	30	33	32	41	31	36	30	24	32	24	41
Calcium	mg/L	14	13	15	16	16	15	17	15	19	13	9	15	9	19
Chromium	µg/L	2.4	3.0	1.4	2.9	3.5	3.6	3.4	3.7	2.1	2.7	1.1	2.7	1.1	3.7
Copper	µg/L	3.6	3.7	5.9	3.0	5.0	3.0	11.0		4.1	3.4	3.1	4.6	3.0	11.0
Iron	µg/L	0.82	0.41	0.40	0.35	0.30	0.30	0.52	0.39	0.50	0.52	0.38	0.44	0.30	0.82
Lead	µg/L	0.51				0.68		0.66	1.20		0.65		0.74	0.51	1.20
Magnesium	mg/L	7.3	7.4	9.1	9.9	9.4	11.0	9.1	8.2	11.0	7.0	4.8	8.6	4.8	11.0
Manganese	µg/L	26	19	20	19	18	20	55	27	26	26	19	25	18	55

Constituent	Unit	6/27/02	7/30/02	8/27/02	10/9/02	11/19/02	12/12/02	1/16/03	3/18/03	4/22/03	5/29/03	7/10/03	Avg.	Min.	Max
Nickel	µg/L							5.4							
Potassium	mg/L	1.6	1.5	1.9	2.2	2.7	2.9	2.0	1.6	1.9	1.4		2.0	1.4	2.9
Sodium	mg/L	15.0	18.0	25.0	31.0	25.0	39.0	14.0	16.0	34.0	20.0	7.8	22.3	7.8	39.0
Zinc	µg/L	5.9	5.0	5.5		66.0		7.3	7.0		18.0		16.4	5.0	66.0
Dissolved organic carbon	mg/L	2.2	1.6	2.4	2.1	3.5	3.8	5.3	3.0	3.3	2.4	2.2	2.9	1.6	5.3
Total organic carbon	mg/L	2.3	1.8	2.6	2.4	3.5	4.0	5.8	3.3	3.5	2.6	2.3	3.1	1.8	5.8
Disinfection By-Products															
Chlorine dose	mg/L	5													
Chlorine residual	mg/L	0.36													
Total trihalomethanes	µg/L	140													
Chloroform	µg/L	108													
Bromodichloro methane	µg/L	30													
Dibromochloro methane	mg/L	6													
UV_{254}	cm^{-1}	0.072	0.062	0.055	0.054	0.095	0.068	0.175	0.090	0.101	0.076	0.058	0.082	0.054	0.175
Algae	#/ml	78	127	141	93	86	190		232	1,130	157	74	246	74	1,130
Stephanodiscus	%	24	15	10			11		21	33					
Unidentified flagellates	%	20		30			61		33	10	47	39			
Navicula	%	9		9			8				7	9			
Cocconeis	%	12	10	9			8		10		10	24			

Constituent	Unit	6/27/02	7/30/02	8/27/02	10/9/02	11/19/02	12/12/02	1/16/03	3/18/03	4/22/03	5/29/03	7/10/03	Avg.	Min.	Max
Melosira	%								14	46					
Nitzschia	%		17	11											
Crytopmonas	%		9												
Achnanthes	%										4	7			
Bacteria															
Fecal coliforms	MPN/ 10 ml	9.2	9.2			9.2	3.6		12.0	3.6	5.1	3.6	6.9	3.6	12.0
Total coliforms	MPN/ 10 ml	23	23			>23	>23		23	>23	>23	>23	23	23	>23
24 hr fecal confirmed									7						
24 hr presumptive									10						
24 hr total confirmed									8						
48 hr presumptive									10						
48 hr total confirmed									10						

Notes:
#/ml = number per milliliter
ACU = Apparent Color Unit
cm = centimeter
meq/L = milliequivalents per liter
mg/L = milligrams per liter
µg/L = micrograms per liter
MPN/10 ml = Most Probable Number per 10 milliliters of sample
ml = milliliter
µmhos/cm = micromhos per centimeter
NTU = nephelometeric turbidity unit
TON = threshold odor number

Source: Montgomery Watson Harza, unpublished data

In response to Comment 16-8, Table 4-4 (page 4-28) has been revised.

TABLE 4-4
MODELING SCENARIOS

Analysis	Existing Conditions Analysis		Project-Level Cumulative Analysis		Program-Level Cumulative Analysis	
	Existing Conditions – No Project	30-mgd DWSP	2015 Conditions – No Project	2015 Conditions – 30-mgd DWSP	2050 Conditions – No Project	2050 Conditions – 160-mgd DWSP
CALSIM II Study Area Level of Development [1]	2001	2001	2020	2020	2020	2020
COSMA						
Level of Development [2]	2003	2015	2015	2015	2050	2050
Demand (TAF/year) [3]	71.40	85.33	85.33	85.33	177.90	177.90
DWSP Surface Water Supply						
DWSP – Section 1485 [4]	No	Yes	No	Yes	No	Yes
DWSP – Section 11460 et seq. [5]	No	No	No	No	No	Yes
Calaveras River (via SEWD)						
Reclamation Contract (TAF/year) [6]	40.17	40.17	40.17	40.17	40.17	40.17
CACWD Transfer (TAF/year) [7]	2.4	2.4	2.4	2.4	0	0
Stanislaus River (via SEWD)						
CVP Contract (TAF/year) [8]	10	10	10	10	0	0
SSJID/OID Transfer (TAF/year) [9]	30	15	15	15	0	0
CSJWCD Transfer (TAF/year) [10]	0	0	0	0	0	0
Infrastructure						
DWSP WTP (mgd)[11]	0	30	0	~~0~~ 30	0	160
DWSP ASR[12]	No	No	No	No	No	Yes
SEWD WTP (mgd)[13]	45	45	50	50	50	50
Other Projects/Actions – Cumulative Conditions						
MWD Demands (TAF/year)[14]	Variable	Variable	2,011	2,011	2,011	2,011
Freeport Regional Water Project[15]	No	No	Yes	Yes	Yes	Yes
DMC-CA Intertie[16]	No	No	Yes	Yes	Yes	Yes
Trinity River min. flow (TAF/year)[17]	369 - 815	369 - 815	369 - 815	369 - 815	369 - 815	369 - 815
SDIP (8,500 cfs Banks Pumping Plant) [18]	No	No	Yes	Yes	Yes	Yes
CVP-SWP Integration [19]	No	No	Yes	Yes	Yes	Yes
CALFED Storage Projects [20]	No	No	No	No	No	No

Chapter 4 of the DPEIR presents an analysis of Delta hydrodynamic and water quality impacts of the proposed DWSP based on DSM2 model results. A data input error was discovered in the DSM2 model analysis prepared for the DPEIR. The error was corrected and the analysis amended accordingly. The revised modeling results do not change the DPEIR impact analysis regarding potential project effects on Delta water quality or any of the impact conclusions. This correction of modeling data represents a minor modification to Tables 4-12 through 4-14 in Chapter 4 of the DPEIR. Therefore, as a staff initiated text change, pages 4-51 through 4-54 have been revised.

TABLE 4-12 (Revised)
BOUNDARY FLOW CONDITIONS
(a) DWSP Compared to Existing Conditions

Location	Average Monthly Flow (cfs)												Total (1,000
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	AF/year)
Sacramento River inflow													
Existing Conditions	12,184	18,499	25,106	32,164	34,807	36,180	21,985	16,068	16,635	16,782	13,598	12,790	15,461
Changes with proposed DWSP	6	-7	-6	-17	2	0	-3	7	17	28	24	-5	3
San Joaquin River inflow													
Existing Conditions	3,846	2,840	4,248	5,365	8,169	8,594	7,131	5,604	5,432	2,790	1,425	2,032	3,455
Changes with proposed DWSP	-33	-42	-100	-26	-39	-22	-17	-19	-15	-12	-23	-31	-23
CVP-SWP Exports (Tracy PP and Banks PP)													
Existing Conditions	8,207	7,831	8,185	9,782	7,674	7,016	4,554	4,403	5,313	7,414	7,961	8,520	5,247
Changes with proposed DWSP	-30	-19	-21	-5	-30	-15	-9	-1	4	15	5	-27	-8
Net Delta Outflow													
Existing Conditions	6,790	13,755	26,309	32,321	52,472	51,628	27,669	15,957	12,907	7,851	4,448	5,034	15,404
Changes with proposed DWSP	4	-27	-84	-37	-4	-7	-11	-11	-2	1	-5	-13	-12
DWSP													
Existing Conditions	0	0	0	0	0	0	0	0	0	0	0	0	0
Changes with proposed DWSP	41	29	43	21	22	25	35	46	46	44	45	45	27

(b) DWSP Compared to 2015 No Project Cumulative Conditions

Location	Average Monthly Flow (cfs)												Total (1,000
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	AF/year)
Sacramento River inflow													
No Project cumulative conditions	12,367	18,391	25,537	32,126	34,870	36,985	22,107	15,992	16,603	16,734	12,511	12,283	15,444
Changes with proposed DWSP	44	-21	-4	-24	-11	-61	19	23	47	55	38	24	8
San Joaquin River inflow													
No Project cumulative conditions	3,640	2,822	4,166	5,328	8,212	8,611	6,997	5,915	5,369	2,858	1,494	1,991	3,451
Changes with proposed DWSP	-38	-26	-19	-18	-19	-19	-33	-46	-46	-44	-45	-45	-24
CVP-SWP Exports (Tracy PP and Banks PP)													
No Project cumulative conditions	8,570	7,869	9,863	10,117	8,132	7,950	4,717	4,526	5,351	7,491	6,947	8,393	5,433
Changes with proposed DWSP	-20	-9	-14	-36	34	11	-3	8	-4	10	13	-17	-2
Net Delta Outflow													
No Project cumulative conditions	6,374	13,594	24,896	31,963	51,902	51,786	27,142	16,083	12,807	7,782	4,401	4,641	15,178
Changes with proposed DWSP	26	-38	-38	-25	-77	-99	-11	-31	4	1	-20	-16	-19
DWSP													
No Project cumulative conditions	0	0	0	0	0	0	0	0	0	0	0	0	0
Changes with proposed DWSP	39	26	19	18	18	19	33	46	46	44	45	45	24

(c) DWSP Compared to 2050 No Project Cumulative Conditions

Location	Average Monthly Flow (cfs)												Total (1,000 AF/year)
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Sacramento River inflow													
No Project cumulative conditions	12,382	18,462	25,606	32,211	34,834	36,873	22,127	16,141	16,387	16,586	12,408	12,329	15,434
Changes with proposed DWSP	52	-47	34	-116	-67	-169	44	18	160	162	167	135	23
San Joaquin River inflow													
No Project cumulative conditions	3,695	2,840	4,198	5,356	8,270	8,674	7,066	5,993	5,450	2,929	1,562	2,051	3,492
Changes with proposed DWSP	-176	-167	-156	-143	-142	-161	-181	-195	-148	-102	-123	-226	-116
CVP-SWP Exports (Tracy PP and Banks PP)													
No Project cumulative conditions	8,627	7,942	9,901	10,197	8,067	7,783	4,725	4,675	5,212	7,450	6,898	8,451	5,433
Changes with proposed DWSP	-162	-34	-125	-68	54	34	-22	-70	13	51	96	-55	-18
Net Delta Outflow													
No Project cumulative conditions	6,387	13,610	25,022	31,999	52,092	51,890	27,221	16,160	12,811	7,745	4,414	4,666	15,217
Changes with proposed DWSP	38	-181	-78	-255	-300	-419	-115	-107	0	9	-52	-42	-90
DWSP													
No Project cumulative conditions	0	0	0	0	0	0	0	0	0	0	0	0	0
Changes with proposed DWSP	183	167	156	143	142	161	181	195	148	102	123	227	116

TABLE 4-13 (Revised)
AVERAGE MONTHLY ELECTRICAL CONDUCTIVITY AT SELECTED DELTA LOCATIONS

(a) DWSP Compared to Existing Conditions

Location	Average Monthly EC (µS/cm)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton													
Existing Conditions	2,188	1,659	1,170	795	571	308	344	530	945	1,025	1,570	2,251	1,113
Changes with proposed DWSP	-2	-3	4	-2	-2	0	0	1	0	-3	-1	7	0
Old River at CCWD's Los Vaqueros intake													
Existing Conditions	648	556	542	493	480	369	316	350	339	361	425	604	457
Changes with proposed DWSP	2	0	3	3	1	0	1	1	1	1	1	2	2
Old River at Rock Slough													
Existing Conditions	714	601	591	520	472	326	273	295	323	370	473	700	471
Changes with proposed DWSP	2	0	3	3	1	1	1	1	1	0	1	2	1
West Canal at mouth of Clifton Court Forebay intake													
Existing Conditions	587	515	506	463	464	433	354	377	353	358	398	539	446
Changes with proposed DWSP	3	1	2	3	0	0	1	1	2	2	2	3	2
Delta Mendota Canal at Tracy Pumping Plant													
Existing Conditions	594	534	526	478	481	470	374	392	374	392	440	593	471
Changes with proposed DWSP	2	1	2	2	0	0	1	1	2	2	2	3	1
Rock Slough at Contra Costa Canal at Pumping Plant No. 1													
Existing Conditions	746	675	657	735	782	682	484	417	363	415	486	654	591
Changes with proposed DWSP	2	0	1	5	1	3	2	1	1	0	0	1	1
San Joaquin River at Jersey Point													
Existing Conditions	1,856	1,573	1,358	995	675	363	301	402	688	918	1,423	2,143	1,058
Changes with proposed DWSP	0	-3	10	1	-3	0	1	1	2	1	3	6	2
Martinez/Benicia boundary condition													
Existing Conditions	20,223	18,106	16,156	12,882	10,328	8,150	9,588	12,507	15,335	17,715	20,030	21,020	15,170
Changes with proposed DWSP	6	2	25	17	1	3	4	6	3	0	1	7	6

(b) DWSP Compared to 2015 No Project Cumulative Conditions

Location	Average Monthly EC (µS/cm)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton													
No Project cumulative conditions	2,199	1,633	1,244	827	543	302	323	563	876	985	1,608	2,339	1,120
Changes with proposed DWSP	-11	-2	2	2	0	0	0	0	0	-5	1	11	0
Old River at CCWD's Los Vaqueros intake													
No Project cumulative conditions	662	565	579	589	490	368	328	332	333	351	420	605	468
Changes with proposed DWSP	1	-1	2	1	-1	0	0	-1	0	0	1	4	1
Old River at Rock Slough													
No Project cumulative conditions	723	599	642	619	474	321	266	277	303	356	458	702	478
Changes with proposed DWSP	1	-1	2	1	-1	0	0	-1	0	0	1	5	1
West Canal at mouth of Clifton Court Forebay intake													
No Project cumulative conditions	603	530	520	532	475	421	381	357	361	353	398	545	456
Changes with proposed DWSP	1	0	1	1	0	0	0	-1	0	0	1	3	0
Delta Mendota Canal at Tracy Pumping Plant													
No Project cumulative conditions	606	533	535	535	498	463	392	361	392	408	453	618	483
Changes with proposed DWSP	1	0	1	1	0	0	0	-1	0	-1	0	2	0
Rock Slough at Contra Costa Canal at Pumping Plant No. 1													
No Project cumulative conditions	764	694	650	822	853	721	504	403	347	398	472	644	606
Changes with proposed DWSP	3	-2	0	1	-2	-3	0	-1	0	0	0	4	0
San Joaquin River at Jersey Point													
No Project cumulative conditions	1,925	1,544	1,638	1,153	681	372	279	401	610	883	1,345	2,181	1,084
Changes with proposed DWSP	-3	-1	5	2	1	1	1	3	2	1	8	15	3
Martinez/Benicia boundary condition													
No Project cumulative conditions	20,615	18,339	16,697	13,538	10,458	8,166	9,590	12,545	15,325	17,715	20,027	21,162	15,348
Changes with proposed DWSP	0	3	11	11	9	15	11	15	6	-2	6	15	8

(c) DWSP Compared to 2050 No Project Cumulative Conditions

Location	Average Monthly EC (µS/cm) and Change in Monthly EC (µS/cm)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton													
No Project cumulative conditions	2,195	1,631	1,225	807	544	309	327	555	882	1,005	1,625	2,334	1,120
Changes with proposed DWSP	-28	2	1	5	2	1	3	6	-1	-20	-7	11	-2
Old River at CCWD's Los Vaqueros intake													
No Project cumulative conditions	662	566	579	585	492	370	333	337	341	355	423	606	471
Changes with proposed DWSP	7	2	8	4	2	1	0	-1	-1	0	1	14	3
Old River at Rock Slough													
No Project cumulative conditions	721	598	640	611	475	321	269	281	305	354	457	698	477
Changes with proposed DWSP	7	2	9	4	2	1	0	-1	1	0	3	19	4
West Canal at mouth of Clifton Court Forebay intake													
No Project cumulative conditions	604	532	521	530	476	428	387	364	369	359	403	549	460
Changes with proposed DWSP	7	2	7	4	5	2	0	-1	0	-2	0	11	3
Delta Mendota Canal at Tracy Pumping Plant													
No Project cumulative conditions	608	535	536	533	498	468	397	367	399	413	458	621	486
Changes with proposed DWSP	7	2	5	3	3	2	0	-1	1	-3	0	8	2
Old River at Contra Costa Canal at Pumping Plant No. 1													
No Project cumulative conditions	762	693	650	818	847	722	504	407	349	396	472	642	605
Changes with proposed DWSP	12	-2	5	4	1	1	1	-1	0	1	0	13	3
San Joaquin River at Jersey Point													
No Project cumulative conditions	1,922	1,547	1,629	1,141	675	373	282	405	602	879	1,341	2,171	1,081
Changes with proposed DWSP	-10	14	9	10	9	8	5	7	6	-1	23	54	11
Martinez/Benicia boundary condition													
No Project cumulative conditions	20,599	18,319	16,666	13,488	10,439	8,218	9,605	12,504	15,306	17,728	20,040	21,154	15,339
Changes under proposed DWSP	11	42	30	67	59	76	72	65	23	-8	8	33	40

For existing conditions, changes in average monthly EC would be about ~~one~~ two percent or less for the entire year. For 2015 cumulative conditions, changes in average monthly EC would be less than 0.5 percent for the entire year.

For 2050 cumulative conditions, maximum increases in average monthly EC would be less than ~~three~~ two percent. The largest impacts would occur in December/January and September. There is no accepted standard for a significance threshold with regard to model determinations of project impacts. CALFED estimates modeling uncertainty at 10 percent and identifies all impacts below 10 percent as less than significant (CALFED, 2000).

Prior to expansion of the DWSP beyond the 30-mgd capacity, additional CEQA environmental review will be required to re-evaluate the impacts of expanded DWSP operation. At that time, additional Delta water resources modeling will be conducted using the latest models and information about current and future Delta conditions. Several potential actions could influence and alter Delta conditions in the future. For example, it is possible that in the future operation of Friant Dam may have changed so that more water is being released into the San Joaquin River than is presently. Other developments in the Delta may also affect the impacts of the DWSP. If at that time, modeling shows that the DWSP would significantly affect salinity concentrations at other intakes, then DWSP operations would be modified to keep impacts to less than significant. This would involve altering water diversion patterns for the DWSP – modifying the quantity and timing of diversions to maintain Delta water quality at acceptable levels.

TABLE 4-14 (Revised)
PERCENT CHANGE IN AVERAGE MONTHLY ELECTRICAL CONDUCTIVITY AT SELECTED DELTA LOCATIONS

(a) DWSP Compared to Existing Conditions

Location	Change in Average Monthly EC (%)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton	-0.1	-0.2	0.3	-0.3	-0.4	0.0	0.1	0.2	0.0	-0.3	-0.1	0.3	0.0
Old River at CCWD's Los Vaqueros intake	0.4	0.1	0.5	0.7	0.2	0.0	0.3	0.4	0.4	0.4	0.3	0.4	0.3
Old River at Rock Slough	0.3	-0.1	0.5	0.5	0.2	0.3	0.2	0.3	0.2	0.1	0.1	0.3	0.2
Rock Slough at Contra Costa Canal	0.3	0.1	0.1	0.7	0.1	0.4	0.3	0.2	0.2	0.1	0.0	0.2	0.2
West Canal at mouth of Clifton Court Forebay	0.4	0.2	0.4	0.6	-0.1	0.1	0.3	0.3	0.5	0.5	0.4	0.6	0.4
Delta Mendota Canal at Tracy Pumping Plant	0.4	0.2	0.3	0.4	0.1	0.1	0.3	0.3	0.4	0.4	0.4	0.4	0.3
San Joaquin River at Jersey Point	0.0	-0.2	0.8	0.1	-0.4	0.1	0.2	0.3	0.2	0.1	0.2	0.3	0.2
Martinez/Benicia boundary condition	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(b) DWSP Compared to 2015 No Project Cumulative Conditions

Location	Change in Average Monthly EC (%)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton	-0.5	-0.1	0.2	0.2	0.1	0.1	0.1	0.0	-0.1	-0.5	0.1	0.5	0.0
Old River at CCWD's Los Vaqueros intake	0.2	-0.1	0.3	0.2	-0.2	0.0	0.0	-0.2	-0.1	0.0	0.2	0.6	0.1
Old River at Rock Slough	0.1	-0.1	0.4	0.2	-0.2	0.0	0.0	-0.2	0.1	0.1	0.3	0.7	0.2
Rock Slough at Contra Costa Canal	0.4	-0.2	0.0	0.1	-0.3	-0.4	-0.1	-0.1	0.0	0.1	0.1	0.6	0.0
West Canal at mouth of Clifton Court Forebay	0.2	-0.1	0.3	0.2	0.1	0.0	0.0	-0.2	-0.1	-0.1	0.1	0.5	0.1
Delta Mendota Canal at Tracy Pumping Plant	0.2	-0.1	0.2	0.2	0.0	0.0	0.0	-0.2	-0.1	-0.1	0.1	0.4	0.1
San Joaquin River at Jersey Point	-0.1	-0.1	0.3	0.1	0.2	0.3	0.4	0.7	0.3	0.1	0.6	0.7	0.3
Martinez/Benicia boundary condition	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.1

(c) DWSP Compared to 2050 No Project Cumulative Conditions

Location	Change in Average Monthly EC (%)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton	-1.3	0.1	0.1	0.6	0.4	0.5	0.9	1.0	-0.1	-2.0	-0.4	0.5	-0.2
Old River at CCWD's Los Vaqueros intake	1.1	0.3	1.4	0.8	0.4	0.4	0.0	-0.4	-0.2	-0.1	0.4	2.2	0.7
Old River at Rock Slough	0.9	0.3	1.4	0.7	0.4	0.3	0.1	-0.5	0.2	-0.1	0.7	2.7	0.8
Rock Slough at Contra Costa Canal	1.6	-0.3	0.8	0.5	0.1	0.2	0.2	-0.3	0.1	0.2	0.0	2.0	0.5
West Canal at mouth of Clifton Court Forebay	1.2	0.3	1.3	0.7	0.9	0.5	0.0	-0.4	0.0	-0.5	0.1	1.9	0.6
Delta Mendota Canal at Tracy Pumping Plant	1.2	0.3	1.0	0.5	0.6	0.3	0.0	-0.4	0.1	-0.6	-0.1	1.3	0.4
San Joaquin River at Jersey Point	-0.5	0.9	0.6	0.9	1.4	2.0	1.9	1.6	0.9	-0.2	1.7	2.5	1.0
Martinez/Benicia boundary condition	0.1	0.2	0.2	0.5	0.6	0.9	0.7	0.5	0.1	0.0	0.0	0.2	0.3

In response to Comment 6-1, page 4-64, paragraph 1 has been revised.

> The majority of juvenile Chinook salmon migrating past the proposed water intake and fish screen is expected to be fall-run salmon. The occurrence of juvenile Chinook salmon within the central Delta would be expected to occur during the late fall through ~~early spring~~ summer with the largest numbers occurring between February and May (CDFG, unpublished data), when water temperatures within the central Delta would be suitable for juvenile Chinook salmon migration.

In response to Comment 6-3, page 4-66, paragraph 1 has been revised.

> Although the majority of adult steelhead migrate upstream within the Sacramento River mainstem, there is a probability, although low, that adults may migrate into the central Delta. The diversion of water from the Sacramento River through the central Delta via the Delta Cross Channel, Georgiana Slough, and Threemile Slough may contribute to olfactory cues and an increased probability that adult steelhead would migrate into the central Delta. Adult steelhead are also known to migrate into the Mokelumne River and the Calaveras River, and hence would potentially occur in the DWSP area. The occurrence of adult steelhead within the central Delta and the DWSP area would be limited to the winter and early spring period of adult upstream migration.

In response to Comment 6-5, page 4-87, paragraph 3 has been revised.

> Installation and long-term operation of the positive barrier fish screens would avoid entrainment and impingement of juvenile, sub-adult, and adult fish at the DWSP intake. Because Chinook salmon and steelhead do not spawn in the project area, the small emergent life stages (e.g., ~~swim-up fry~~ alevins and yolk sac stages) of these fish would not be vulnerable to diversion operations. The proposed fish screens would substantially reduce or eliminate entrainment of juvenile and older life stages of Chinook salmon, steelhead, other resident and migratory fish species including fry, and macroinvertebrates. Typically, positive barrier fish screens are expected to be about 95 percent (or greater) effective in avoiding fish losses (Hanson Environmental, 2004).

In response to Comment 12-9, Section 4.2, pages 4-58 through 4-66 and pages 4-99 through 4-103 have been revised.

4.2 FISHERIES

4.2.1 SETTING

STATUS AND OCCURRENCE OF FISH SPECIES

The Sacramento-San Joaquin Delta, the most upstream portion of the Bay-Delta estuary, is a triangle-shaped area composed of islands, river channels, and sloughs at the confluence of the Sacramento and San Joaquin rivers. The Delta's tidally influenced channels and sloughs, covering a surface area of approximately 75 square miles, support a number of

resident freshwater fish and invertebrate species (Moyle et al., 1995, Baxter et al., 1999; Moyle, 2002). The waters are also used as migration corridors and rearing areas for anadromous fish species and as spawning and rearing grounds for many estuarine species (Baxter et al., 1999). Shallow-water habitats (i.e., less than three meters in depth [mean low water] are considered particularly important forage, reproduction, rearing, and refuge areas for numerous fish and invertebrate species (Reclamation and DWR, 2003).

The geographic distribution of species within the Delta is determined in part by salinity gradients (Baxter et al., 1999). Results of a number of investigations have shown changes in species composition and abundance within the Delta over the past several decades. Many of the fish and macroinvertebrate species have experienced a generally declining trend in abundance (Moyle et al., 1995). Several factors have contributed to the decline of fish species within the Delta, including changes in hydrologic patterns resulting from water project operations, loss of habitat, contaminant input, entrainment in diversions, and introduction of non-native species (Moyle et al., 1995; Reclamation and DWR 2003).

Seasonal and yearly variability in hydrologic conditions, including the magnitude of flows into the Bay-Delta estuary from the Sacramento and San Joaquin rivers and the outflow from the Delta into San Francisco Bay, have been identified as important factors affecting habitat quality and availability, and abundance of fish and invertebrate species within the Bay-Delta estuary (Kimmerer 2002 a, b). Flows within the Bay-Delta system may affect larval and juvenile transport and dispersal, water temperatures (primarily within the upstream tributaries), dissolved oxygen concentrations (e.g., during the fall within the lower San Joaquin River), and salinity gradients within the estuary (Kimmerer 2002a). The seasonal timing and geographic location of salinity gradients are thought to be important factors affecting habitat quality and availability for a number of species (Baxter et al., 1999). Operation of upstream storage impoundments, in combination with natural hydrologic conditions, affects seasonal patterns in the distribution of salinity within the system. Water project operations, for example, may result in a reduction in Delta inflows during the late winter and spring with an increase in Delta inflows, when compared to historical conditions, during the summer months (Reclamation and DWR, 2003). Objectives have been established for the location of salinity gradients during the late winter and spring to support estuarine habitat for a number of species (X2 location), in addition to other salinity criteria for municipal, agricultural, and wetland benefits (Reclamation and DWR, 2003).

Despite the high degree of habitat modification that has occurred in the Delta, Delta habitats are of key importance to fisheries, as illustrated by the more than ~~120~~ 55 fish species (Baxter et al., 1999) that rely on its unique habitat characteristics for one or more of their lifestages (USEPA, 1993). Fish species found in the Delta include anadromous species, as well as freshwater, brackish water, and saltwater species (Baxter et al., 1999; Moyle, 2002). The Delta provides spawning and nursery habitat for more than 40 resident and anadromous fish species, including delta smelt, Sacramento splittail, American shad, and striped bass (Moyle et al., 1995). The Delta also is a migration corridor and seasonal rearing habitat for Chinook salmon and steelhead (Reclamation and DWR, 2003).

Table 4-15 gives the common and scientific names for fish species found in the Delta that could be potentially affected by the DWSP.

ESSENTIAL FISH HABITAT

The Pacific Fisheries Management Council (PFMC) has designated the Central San Francisco Bay, Suisun Bay, and the Delta as Essential Fish Habitat (EFH) to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297), requires all federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH of commercially managed marine and anadromous fish species. The EFH provisions of the Sustainable Fisheries Act are designed to protect fishery habitat from being lost due to disturbance and degradation.

Under the Pacific Coast Salmon Fishery Management Plan, the entire San Francisco Bay-Delta estuary has been designated as EFH for spring-, fall-, late fall- and winter-run Central Valley Chinook salmon (Pacific salmon). These areas serve as a migratory corridor, holding area and rearing habitat for both adult and juvenile salmon. The Delta, including the proposed water intake structure location, has been designated as EFH for Pacific salmon. ~~In addition, operation of the DWSP intake facility would have the potential to directly and indirectly affect Delta outflow, seasonal salinity, and hydrodynamics within the estuary that serves as EFH for other managed species. These potential project effects on EFH are assessed as part of the DWSP impact analyses.~~

CRITICAL HABITAT

On December 19, 1994, USFWS designated critical habitat for delta smelt within the Sacramento-San Joaquin system. Specific areas identified as critical habitat for delta smelt spawning include Barker, Lindsay, Cash, Prospect, Georgiana, Beaver, Hog, Sycamore Sloughs and the Sacramento River in the Delta, and the tributaries of northern Suisun Bay. Areas identified as critical habitat for delta smelt rearing extend eastward from the Carquinez Straits, including Suisun Bay (including the contiguous Grizzly, and Honker Bays), Montezuma Slough and its tributary sloughs, up the Sacramento River to its confluence with Three-Mile Slough, and south along the San Joaquin River including Big Break. The DWSP intake would be located within the critical habitat of Delta smelt.

NOAA Fisheries has designated the Sacramento River, Delta, and the San Francisco Bay as critical habitat for winter-run Chinook salmon. The DWSP intake would not be located within the region of the estuary designated as critical habitat for winter-run Chinook salmon. In December 2004, NOAA Fisheries proposed to designate critical habitat within the Delta and its tributaries for spring-run Chinook salmon and Central Valley steelhead. A final rule designating critical habitat for the species is expected in the summer of 2005.

TABLE 4-15
FISHES SPECIES POTENTIALLY AFFECTED BY THE DWSP

Common Name	*Scientific Name*
Pacific lamprey *	*Lampetra tridentate*
River lamprey *	*Lampetra ayersi*
White sturgeon *	*Acipenser transmontanus*
Green sturgeon *	*Acipenser medirostris*
American shad	*Alosa sapidissima*
Threadfin shad	*Dorosoma petenense*
Central Valley steelhead *	*Oncorhynchus mykiss*
Chum salmon	*Oncorhynchus keta*
Chinook salmon (winter, spring, fall, and late-fall runs) *	*Oncorhynchus tshawytscha*
Longfin smelt *	*Spirinchus thaleichthys*
Delta smelt *	*Hypomesus transpacificus*
Wakasagi	*Hypomesus nipponensis*
Hitch *	*Lavinia exilicauda*
Sacramento blackfish *	*Orthodon microlepidotus*
Sacramento splittail *	*Pogonichthys macrolepidotus*
Hardhead *	*Mylopharodon conocephalus*
Sacramento pikeminnow *	*Ptychocheilus grandis*
Fathead minnow	*Pimephales promelas*
Golden shiner	*Notemigonus chrysoleucas*
Common carp	*Cyprinus carpio*
Goldfish	*Carassius auratus*
Sacramento sucker *	*Catostomus occidentalis*
Black bullhead	*Ameiurus melas*
Brown bullhead	*Ameiurus nebulosus*
Yellow bullhead	*Ameiurus natalis*
White catfish	*Ameiurus catus*
Channel catfish	*Ictalurus punctatus*
Western mosquitofish	*Gambusia affinis*
Rainwater killfish	*Lucania parva*
Striped bass	*Morone saxatilis*
Inland silverside	*Menidia beryllina*
Bigscale logperch	*Percina macrolepida*
Bluegill	*Lepomis macrochirus*
Redear sunfish	*Lepomis microlophus*
Green sunfish	*Lepomis cyanellus*
Warmouth	*Lepomis gluosus*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Largemouth bass	*Micorpterus salmoides*
Smallmouth bass	*Micropterus dolomieui*
Bigscale logperch	*Percina macrolepida*
Tule perch *	*Hysterocarpus traski*
Threespine stickleback *	*Gasterosteus aculeatus*
Yellowfin goby	*Acanthogobius flavimanus*
Chameleon goby	*Tridentiger trigonocephalus*
Prickly sculpin *	*Cottus asper*

* indicates a native species.

~~The DWSP intake would not be located within the region of the estuary proposed as critical habitat for spring-run Chinook salmon, but would be located within the proposed critical habitat for Central Valley steelhead.~~ The DWSP is located within the region of the Bay-Delta estuary identified as critical habitat for Central Valley steelhead.

~~The potential impacts of DWSP intake construction and operation on critical habitat for both Delta smelt and Central Valley steelhead are included below in the analysis of both direct and indirect DWSP effects.~~

SPECIAL-STATUS SPECIES

A species has special status when it is listed as threatened or endangered; is proposed as or is a candidate for listing as threatened or endangered; is a species of special concern (state); is fully protected (state), according to applicable federal or state law, such as the federal Endangered Species Act of 1973 and the California Endangered Species Act of 1972; or is subject to specific management programs designed to protect or enhance the species status.

The construction and operation of the DWSP may affect special-status fish species that inhabit the Delta. Table 4-16 lists the special-status species, as designated by federal or state agencies, found in the Delta near the intake site.

TABLE 4-16
SPECIAL-STATUS FISH SPECIES FOUND
IN THE SACRAMENTO/SAN JOAQUIN DELTA

		Listing Status	
Common Name	**Scientific Name**	**Federal[1]**	**State[2]**
Delta smelt	*Hypomesus transpacificus*	FT	ST
Central Valley steelhead	*Oncorhynchus mykiss*	FT	--
Central Valley spring-run Chinook salmon	*Oncorhynchus tshawytscha*	FT	ST
Winter-run Chinook salmon	*Oncorhynchus tshawytscha*	FE	SE
Central Valley fall/late fall-run Chinook salmon	*Oncorhynchus tshawytscha*	FP	CSC
Green sturgeon	*Acipenser medirostris*	FP	CSC
River lamprey	*Lampetra tridentate*	FSC	CSC
Sacramento splittail	*Pogonichthys macrolepidotus*	FSC	CSC
Longfin smelt	*Spirinchus thaleichthys*	FSC	CSC

Sources: CNDDB, 2004; NOAA Fisheries, 2004; USFWS, 2004.

[1] FE = Federal endangered, FT = Federal threatened; FP = Federal proposed; FSC = Federal species of concern

[2] SE = State endangered; ST = state threatened; CSC = California species of special concern.

The following descriptions summarize the life history, distribution, and current status of the special-status fish species that inhabit the delta near the intake site.

Chinook Salmon

Chinook salmon are an anadromous species, which spawn in freshwater rivers but migrate to the ocean to rear (Moyle, 2002). Chinook salmon typically return to their natal stream to spawn. Within the Central Valley there are four races (species) of Chinook salmon; fall-run, late fall-run, winter-run and spring-run Chinook salmon inhabit the Sacramento River system while only fall-run Chinook salmon currently inhabit the San Joaquin River system. The timing of spawning of the four races of Chinook salmon in Central Valley rivers follows (SWRCB, 1999).

- Adult fall-run Chinook salmon migrate through the Sacramento/San Joaquin Delta and into Central Valley rivers from July through December, and spawn from October through December. Within the San Joaquin River the peak adult migration period extends from September to November (Moyle, 2002). Depressed dissolved oxygen concentrations and seasonally elevated water temperatures within the lower San Joaquin River in the general vicinity of the Stockton Deep Water Ship Channel have been identified as factors that impede the seasonal timing of adult upstream migration into the San Joaquin River (Hallock et al.,. 1970; Lee and Jones-Lee, 2000, 2003). A temporary barrier has been installed at the Head of Old River during the fall to improve flows and increase dissolved oxygen concentrations within the lower San Joaquin River to improve fall conditions for adult migration. An investigation is currently underway to identify alternative methods for improving water quality conditions in the lower river to improve migration conditions for fall-run Chinook salmon (Lee and Jones-Lee, 2000, 2003). Peak spawning activity usually occurs in October and November.

- Adult late-fall-run Chinook salmon migrate through the Delta and into the Sacramento River from October through March, or possibly April, and spawn from January through April. Peak spawning activity occurs in February and March.

- Adult winter-run Chinook salmon migrate through the Delta from late November through June and into the Sacramento River from December through July. Winter-run Chinook salmon remain in the river up to several months before spawning. Spawning occurs from mid-April through August (Moyle, 2002), with peak spawning activity in May and June.

- Adult spring-run Chinook salmon migrate through the Delta from January through June, enter the Sacramento River and its tributaries from March through September, and remain in the rivers up to several months before spawning. Spawning occurs from late August through October, with peak spawning activity in September. Table 4-17 summarizes the timing of Chinook salmon occurrence in the Delta by race and lifestage.

TABLE 4-17
TIMING OF CHINOOK SALMON IN THE SACRAMENTO-SAN JOAQUIN DELTA

	Sacramento River				San Joaquin River
Life Stage	**Fall-run**	**Late fall-run**	**Winter-run**	**Spring-run**	**Fall-run**
Adult upstream migration	July - December[1]	October-April[1]	Late November – June[2]	January - June[2]	July - December[1]
Juvenile Rearing and Emigration	January - June[1] (fry/smolts) October – December[1] (yearlings)	April - December[1]	September - May[2]	October - June[2] (young-of-the-year) mid-October March (yearlings)	January - June[1]

Sources: Reclamation, 1997; CDFG, 1998 SWRCB, 1999.

Within the San Joaquin River system, Chinook salmon spawn and rear in the Stanislaus, Tuolumne, Merced, Calaveras, and Mokelumne Rivers. No successful spawning occurs currently in the mainstem San Joaquin River, although the mainstem supported populations of spring-run and fall-run Chinook salmon prior to construction of Friant Dam (Yoshiyama et al. 1998, McBain and Trush 2002). Chinook salmon lay their eggs in the gravel of the stream bottom where they incubate for six to nine weeks, depending on water temperature (Moyle, 2002). The newly emerged fry remain in the gravel for another two to four weeks. The timing of rearing and outmigration is different for the various runs of Chinook salmon. Within the San Joaquin River tributaries, juvenile rearing and outmigration of fall-run Chinook typically occurs from January through June, with the peaks of juvenile migration occurring in February for fry and April through May for smolts (Demko et al. 1999; Ford and Brown 2001; Workman, personal communication to C. Hanson). Rearing salmonids feed on a variety of aquatic and terrestrial insects and other small invertebrates. Newly emerged fry are sometimes prey to older steelhead. Juveniles begin the smolting process as they migrate seaward. Smolting consists of physiological, morphological, and behavioral changes that stimulate emigration and prepare the salmonids for ocean life. Chinook salmon generally outmigrate in the first year and spend two to four years in the ocean before returning to spawn (SWRCB, 1999; Moyle, 2002).

A variety of environmental factors affect the abundance, mortality, and population dynamics of San Joaquin River Chinook salmon (McBain and Trush, 2002; Moyle, 2002). One of the primary factors affecting population abundance has been the loss of access to historic spawning and juvenile rearing habitat as a result of the migration barrier caused by construction of major dams and reservoirs (Yoshiyama et al., 1998). Water temperatures within the rivers and creeks have also been identified as a factor affecting incubating eggs, holding adults, and growth and survival of juvenile Chinook salmon (Baker and Morhardt, 2001; McBain and Trush, 2002). Juvenile Chinook salmon are also vulnerable to entrainment at a large number of unscreened water diversions located along the Sacramento

River and within the Delta in addition to entrainment and salvage mortality at the SWP and CVP export facilities (CDFG, unpublished data; Dan Odenweller, personal communication fo C. Hanson). Changes in habitat quality and availability for spawning and juvenile rearing, exposure to contaminants and acid mine drainage, predation mortality by Sacramento pikeminnow, striped bass, and other predators, and competition and interactions with hatchery-produced Chinook salmon have all been identified as factors affecting Chinook salmon abundance (Yoshiyama et al., 1998; McBain and Trush 2002; Moyle, 2002). In addition, subadult and adult Chinook salmon are vulnerable to recreational and commercial fishing, ocean survival is affected by climatic and oceanographic conditions, and adults are vulnerable to predation mortality by marine mammals (Yoshiyama et al., 1998; Moyle 2002).

A number of investigations have been conducted in recent years to evaluate the significance of various environmental factors affecting the distribution, migration, and survival of fall-run Chinook salmon within the tributaries, mainstem river, and within the Delta. One of the largest investigations is the Vernalis Adaptive Management Plan (VAMP) which has been designed as a large-scale long-term experimental investigation to assess the potential relationship between San Joaquin River flows at Vernalis during the spring smolt outmigration period (mid-April to mid-May), installation of the Head of Old River temporary rock barrier, and SWP and CVP export rates. As part of the VAMP experimental program, specific river flows and export rates are selected each year based on water storage and hydrologic conditions within the Tuolumne, Stanislaus, and Merced Rivers. Coded wire tagged Chinook salmon smolts from the Merced River Fish Hatchery are then released into the river at Durham Ferry, Mossdale, and Jersey Point and recaptured in SWP and CVP salvage and through fishery sampling at Antioch and Chipps Island. Using the mark-recapture information survival rates are calculated for each group of fish and related to the flow and export conditions occurring within the test period. Results of the testing program have been reported each year by SJRGA (2000, 2001, 2002, 2003, 2004, 2005). Preliminary test results indicate that juvenile Chinook salmon survival within the lower San Joaquin River and Delta is low. Additional survival tests as part of VAMP are expected to occur over the next six years. As a complimentary study, CDFG has been releasing marked juvenile Chinook salmon into the San Joaquin River tributaries to assess their survival. Results to date indicate that mortality rates during downstream migration are high (SJRGA, 2004). Vogel (2005) conducted another complimentary study during the VAMP test period to evaluate the effects of Delta hydrodynamic conditions on migration of juvenile Chinook salmon migrating downstream within the San Joaquin River and Delta. Vogel (2005) used radio tagged Chinook salmon to track the movement of juvenile salmon in response to tidal currents and flow splits at various Delta channels. Vogel (2005) found that juvenile salmon migrate from the mainstem river at flow splits such as Turner and Columbia Cuts. Baker and Morhardt (2001), Lando et al. (2005), and CDFG (2005) have analyzed information on the relationship between San Joaquin River flows and juvenile Chinook salmon survival and adult escapement based on the VAMP experimental design and preliminary test results. Mesick (2001) provided a further analysis of the relationship between San Joaquin River flows and SWP/CVP exports during October and the number of adult Chinook salmon that

stray to other watersheds. Hydrodynamic modeling of flows further complements these biological results as they move downstream from the San Joaquin River into the Delta (Flow Science, 2005). Insight into factors affecting movement patterns and migration routes for San Joaquin River Chinook salmon will help in the interpretation of VAMP study results and identify factors contributing to the mortality of juvenile salmon during downstream migration from the river and Delta.

In recent years a number of changes have been made to improve the survival and habitat conditions for Chinook salmon (USFWS, 1995). Modifications have been made to reservoir operations for instream flow and temperature management, modifications been made to operation of the Red Bluff diversion gate operations, and several large previously unscreened water diversions have been equipped with positive barrier fish screens. Changes to ocean salmon fishing regulations, and modifications to SWP and CVP export operations have also been made to improve the survival of both adult and juvenile Chinook salmon. These changes in management actions, in combination with favorable hydrologic and oceanographic conditions in recent years, are thought to have contributed to the trend of increasing abundance of adult Chinook salmon returning to the San Joaquin River and Sacramento River to spawn (CDFG, 2004a, b).

Adult and juvenile Chinook salmon primarily migrate upstream and downstream within the mainstem Sacramento River. Fall-run Chinook salmon also migrate through the lower San Joaquin River to spawning and juvenile rearing areas within the tributaries. Juvenile Chinook salmon migrate from the Sacramento and San Joaquin Rivers into the interior Delta during their downstream migration, and may occur within the central Delta, including the lower San Joaquin River, during the winter and early ~~spring~~ summer migration period (January through June). Because winter-run and spring-run Chinook salmon do not occur in the San Joaquin River, their potential occurrence within the DWSP area is expected to be extremely low. Although the probability of juvenile winter-run and spring-run Chinook salmon occurring within the DWSP area is low, the occurrence of juvenile salmon in the SWP and CVP salvage operations suggests that some juvenile salmon do migrate into the Delta (DWR and Reclamation, 2000) and, therefore, may occur within the DWSP area. The majority of juvenile Chinook salmon migrating past the proposed water intake and fish screen is expected to be fall-run salmon, primarily migrating downstream from San Joaquin River tributaries. The occurrence of juvenile Chinook salmon within the central Delta would be expected to occur during the late fall through early ~~spring~~ summer with the largest numbers occurring between February and May (CDFG, unpublished data), when water temperatures within the central Delta would be suitable for juvenile Chinook salmon migration.

Although the majority of adult winter-run and spring-run Chinook salmon migrate upstream within the mainstem Sacramento River, there is a probability, although low, that adults may migrate into the central Delta. The diversion of water from the Sacramento River through the central Delta via the Delta Cross Channel, Georgiana Slough, and Threemile Slough may contribute to olfactory cues and an increased probability that adult Chinook salmon would migrate into the Delta. Adult salmon migrating upstream into the

San Joaquin River are fall-run Chinook salmon. The occurrence of adult fall-run Chinook salmon within the Delta, and potentially the DWSP area, would be limited to the fall period of adult upstream migration (primarily September through November). Because Chinook salmon do not spawn within the Delta, there is low probability that the DWSP would adversely affect Chinook salmon spawning or egg incubation.

Steelhead

Steelhead typically return to their natal streams to spawn. Considerable variation occurs in steelhead-run timing. Stocks in the Central Valley are all winter steelhead. Adults migrate upstream through the Delta and into the Sacramento River and tributaries primarily during the late fall, winter, and spring. Steelhead begin moving through the mainstem in July, and continue migrating through February or March. A few adults have also been observed in April, May, and June. Steelhead in the Sacramento River basin spawn primarily from January through March, but spawning can begin as early as late December and can extend through April (SWRCB, 1999; Moyle, 2002). The timing of steelhead runs in the San Joaquin River basin is assumed to be similar to the Sacramento River basin. However, currently there is evidence of only a small anadromous run of steelhead in the basin and the origin of these fish is unknown (SWRCB, 1999).

Similar to Chinook salmon, steelhead lay their eggs in the gravel of the stream bottom where they incubate for approximately six to nine weeks depending on water temperature. The newly emerged fry remain in the gravel for another two to four weeks. The timing of rearing and outmigration is different for the various runs of steelhead. Rearing salmonids feed on a variety of aquatic and terrestrial insects and other small invertebrates, and newly emerged fry are sometimes prey of older steelhead. Juvenile steelhead begin the smolting process as they migrate seaward. Smolting consists of physiological, morphological, and behavioral changes that stimulate emigration and prepare the salmonids for ocean life (SWRCB, 1999, Moyle, 2002).

The life history of steelhead differs from that of Pacific salmon in several ways. Unlike salmon, steelhead do not necessarily die after spawning; a small portion of the steelhead survive to become repeat spawners. Post-spawning survival rates are generally low, and vary considerably between populations. Juvenile steelhead also have a longer freshwater rearing requirement (usually from one to three years) and both adults and juveniles are much more variable in the length of time they spend in fresh and salt water. Some individuals may remain in a stream, mature, and even spawn without ever going to sea, others may migrate to the ocean at less than a year old, and some may return to freshwater after spending less than a year in the ocean (SWRCB, 1999, Moyle, 2002).

As a result of significant declines in steelhead populations in the Central Valley, NOAA Fisheries listed the Central Valley, California, Evolutionarily Significant Unit as threatened under the Endangered Species Act on March 19, 1998. The San Joaquin River, Sacramento River, and Delta have been identified by NOAA Fisheries as critical habitat for steelhead.

Factors affecting steelhead abundance are similar to those described for Chinook salmon. One of the primary factors affecting population abundance of steelhead has been the loss of access to historic spawning and juvenile rearing habitat within the upper reaches of the Sacramento and San Joaquin Rivers and their tributaries as a result of the migration barriers caused by construction of major dams and reservoirs. Water temperatures within the rivers and creeks, particularly during summer and early fall months, have also been identified as a factor affecting growth and survival of juvenile steelhead. Juvenile steelhead are vulnerable to entrainment at a large number of unscreened water diversions located along the Sacramento River and within the Delta in addition to entrainment and salvage mortality at the SWP/CVP export facilities. Changes in habitat quality and availability for spawning and juvenile rearing, exposure to contaminants, predation mortality, passage barriers and impediments to migration, changes in land use practices, and competition and interactions with hatchery-produced steelhead have all been identified as factors affecting steelhead abundance. Unlike Chinook salmon, steelhead are not vulnerable to recreational and commercial fishing within the ocean, although steelhead support a small inland recreational fishery for hatchery produced fish. Ocean survival is affected by climatic and oceanographic conditions, and adults are vulnerable to predation mortality by marine mammals. In recent years a number of changes have been made to improve the survival and habitat conditions for steelhead. Several large previously unscreened water diversions have been equipped with positive barrier fish screens. Improvements to fish passage facilities have also been made to improve migration and access to spawning and juvenile rearing habitat.

Adult and juvenile steelhead primarily migrate upstream and downstream within the Sacramento River mainstem, although steelhead also inhabit the Mokelumne and Calaveras Rivers. Juvenile steelhead may migrate from the Sacramento River into the Delta during their downstream migration and may occur within the Delta, including the lower San Joaquin River, during the winter and early spring migration period. Since steelhead do not occur in the San Joaquin River (observations have been reported for a small number of potential steelhead on San Joaquin River tributaries; however, there is no indication of a significant population), their potential occurrence within the DWSP area is expected to be ~~extremely~~ low. Juvenile steelhead migrating downstream from the Mokelumne and Calaveras rivers would be expected to occur in the DWSP area, primarily during the period from January through April. Although the number ~~probability~~ of juvenile steelhead occurring within the DWSP area is expected to be low, the occurrence of juvenile steelhead in the SWP and CVP salvage operations suggests that some juvenile steelhead do migrate into the Delta, and therefore, may occur within the DWSP area. The occurrence of juvenile steelhead within the Delta would be expected to occur during the winter and early spring migration period when water temperatures within the Delta would be suitable for juvenile steelhead migration.

Although the majority of adult steelhead migrate upstream within the Sacramento River mainstem, there is a probability, although low, that adults may migrate into the central Delta. The diversion of water from the Sacramento River through the central Delta via the

Delta Cross Channel, Georgiana Slough, and Threemile Slough may contribute to olfactory cues and an increased probability that adult steelhead would migrate into the central Delta. Adult steelhead are also known to migrate into the Mokelumne River and Calaveras River and hence would potentially occur in the DWSP area. The occurrence of adult steelhead within the central Delta and the DWSP area would be limited to the winter and early spring period of adult upstream m migration.

Because steelhead do not spawn within the Delta, there is no probability that the proposed DWSP would adversely affect steelhead spawning or egg incubation.

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CHAPTER 9 EIR AUTHORS, CONSULTANTS, AND PERSONS CONSULTED

As a staff initiated text change, page 9-2, has been revised:

ENGINEERING

Montgomery, Watson, Harza

Michael Watson, Project Manager
Jonathan Goetz, Supervising Engineer
Marshall Davert, Vice-President
James Borchardt, Vice-President
Jeff Lodge, Supervising Engineer
William Worrall, Project Engineer
Andrew Draper, Supervising Engineer
Anna ~~Frock~~ Fock, Senior Engineer
Ming-Yen Tu, Senior Engineer
Rebecca Fedak, Engineer

MODELING TECHNICAL APPENDIX

In response to Comment 4-4, page 3-18 under Drinking Water, has been revised:

~~M&I Delta water use is protected by the 1995 Water Quality Control Plan (SWRCB, 1995), which established a maximum salinity standard of 250 mg/L chloride concentration. This standard applies to the Contra Costa Canal, West Canal, DMC, Barker Slough, and Cache Slough. For the Contra Costa Canal, a maximum standard of 150 mg/L applies for between 155 and 240 days depending on the water year type.~~ The 1978 Water Quality Control Plan (SWRCB, 1978) set two objectives to protect M&I beneficial uses of Delta water from the effects of salinity intrusion. The first objective established a maximum mean daily salinity standard of 250 mg/L chloride concentration that applied to four Delta intake facilities (Contra Costa Canal, West Canal, Delta-Mendota Canal, and Cache Slough). The second objective established a maximum mean daily chloride concentration of 150 mg/L for the reasonable protection of industrial beneficial uses. This requirement is in effect for a

minimum of between 155 and 240 days each calendar year, depending on water year type. The compliance locations are Contra Costa Canal at Pumping Plant #1, or the San Joaquin River at the Antioch Water Works intake. These two water quality objectives were carried over in the 1995 Water Quality Control Plan (SWRCB, 1995).), the first objective of 250 mg/L chloride was extended to Barker Slough at the North Bay Aqueduct intake. The SWP has salinity goals of 220 mg/L TDS on a long-term average and 440 mg/L TDS as a maximum monthly average. CCWD has established a delivered water quality goal of 65 mg/L chloride.

Chapter 5 of the Modeling Technical Appendix presents an analysis of Delta hydrodynamic and water quality impacts of the proposed DWSP based on DSM2 model results. A data input error was discovered in the DSM2 model analysis prepared for the EIR. The error was corrected and the analysis amended accordingly. The revised modeling results do not change the DPEIR impact analysis regarding potential project effects on Delta water quality or any of the impact conclusions. This correction of modeling data represents a minor modification to the DPEIR. Figures and tables in Chapter 5 of the Modeling Technical Appendix have been amended and updated. The revised Modeling Technical Appendix is available from the City of Stockton upon request. Please contact: David Stagnaro, City of Stockton, c/o Community Development Department, Planning Division, 425 North El Dorado Street, Stockton, CA 95202-1997.

In response to Comment 19-6, Section 7.3.4, page 7-3 has been revised.

Modeling results show an increase in M&I diversion from the Calaveras River to the SEWD WTP, from 14,000 AF/year under existing conditions to 24,000 AF/year for the DWSP. This ~~reduction~~ increase is not attributable to the DWSP, but results from planned growth within the COSMA between 2003 and 2015. The associated increase in water demand within the COSMA triggers additional withdrawals from New Hogan Reservoir for the SEWD WTP. Except in dry years, diversion from the Calaveras River is demand-driven or limited by the SEWD WTP capacity, rather than supply-limited. The increase in diversion to the SEWD WTP results in an average 11,000 AF reduction of carryover storage in New Hogan Reservoir.

In response to Comment 4-5, Section 7.3.6, pages 7-3 and 7-4 has been revised:

The water right permit for filling Los Vaqueros Reservoir specifies that "no diversion is authorized that would adversely affect the operation of the Central Valley Project or State Water Project." ~~Thus, no diversion to storage is allowed when the Delta is in balanced water conditions.~~ CCWD is not permitted to divert water to storage under its Los Vaqueros water right during balanced water conditions; however, CCWD can still fill Los Vaqueros Reservoir with CVP contract water. Delta conditions were compared between the DWSP and existing conditions. Only once during the 73-year period of simulation, in the month of April, do Delta conditions change under the DWSP from excess to balanced water conditions.

In response to Comment 4-6, Section 7.4.6, page 7-8 has been revised:

> Filling Los Vaqueros also is constrained by the BO based on the location of X2 for the months of December through August. However, filling of the reservoir in December is unrestricted if real-time monitoring indicates delta smelt adults are not present at the intake. The average monthly increase in X2 location under the SEWD WTP expansion alternative varies from 0.00 to 0.04 km. Only once during the 73-year period of simulation, in the month of January, is the shift eastwards of the X2 location sufficient to restrict filling Los Vaqueros Reservoir~~; an impact to Los Vaqueros Reservoir operations would occur in January only if Delta smelt were present at the intake~~.

As a staff initiated text change, Sections 7.3.9, 7.5.9, and 7.6.9 have been revised.

7.3.9 DELTA WATER QUALITY

DSM2 modeling shows relatively small water quality impact under the DWSP throughout the year. Increases in average monthly EC for the Old River at Rock Slough, for the Old River at the Los Vaqueros Reservoir intake, and for Rock Slough at the Contra Costa Canal intake are typically less than one percent. Similarly, increases in average monthly EC at Clifton Court Forebay and Tracy Pumping Plant are typically less than one percent.

The maximum change in average monthly EC on the Old River at Rock Slough is ~~6~~ 3 µS/cm. The corresponding increase in chloride concentration in Rock Slough at the Contra Costa Canal intake is about ~~1.6~~ 0.8 mg/L. The maximum increase in average monthly EC at the Los Vaqueros Reservoir intake on the Old River is ~~5~~ 3 µS/cm, which is equivalent to about ~~1.3~~ 0.8 mg/L chloride. In a few isolated months, there are large water quality impacts resulting from comparative changes in Delta inflow, export, and outflow, which are the boundary conditions for DSM2 taken from CALSIM II. These comparative changes in flow are typically triggered by a CALSIM II 'step function' (an abrupt change in flow when a specified threshold is crossed). Typically an increase in flow in one month is offset by a lower flow in a ~~the~~ following month. ~~Similarly, degradation in water quality in any given month is often offset by water quality improvements in subsequent months. Median water quality impacts are in the order of 2 µs/cm.~~

7.5.9 DELTA WATER QUALITY

DSM2 modeling shows that the largest water quality impacts occur in the late summer, fall, and early winter. The maximum increase in average monthly EC under the DWSP for the Old River at Rock Slough, and the Old River at the Los Vaqueros Reservoir intake is about ~~0.5~~ 0.7 percent or less. Maximum increases in average monthly EC for Clifton Court Forebay and Tracy Pumping Plant are about ~~0.4~~ 0.5 percent or less.

The maximum increase in average monthly EC for the Old River at Rock Slough is ~~3~~ 5 µS/cm. The corresponding increase in chloride concentration at the CCWD Rock Slough pumping plant is ~~less than 1~~ about 1.3 mg/L. The maximum increase in average monthly

EC at the Los Vaqueros Reservoir intake on the Old River is ~~2~~ 4 µS/cm, which is about ~~0.5~~ 1.1 mg/L.

7.6.9 DELTA WATER QUALITY

DSM2 modeling shows that under the ultimate phase of the DWSP (160 mgd intake) the largest water quality impacts occur in the late summer, fall, and early winter. The maximum increase in average monthly EC for the Old River at Rock Slough is ~~2.6~~ 2.7 percent, for the Old River at the Los Vaqueros Reservoir intake the maximum increase is ~~2.4~~ 2.2 percent, and for Rock Slough at CCWD's pumping plant No. 1 the maximum increase is 2.0 percent. The maximum increase in average monthly EC at Clifton Court Forebay and at Tracy Pumping Plant is ~~2.1~~ 1.9 percent, and ~~1.5~~ 1.3 percent respectively.

The maximum increase in average monthly EC for the Old River at Rock Slough is ~~18~~ 19 µS/cm. The corresponding increase in chloride concentration at the CCWD Rock Slough pumping plant is about 5 mg/L. The maximum increase in average monthly EC at the Los Vaqueros Reservoir intake on the Old River is 14 µS/cm, which is approximately equivalent to about 4 mg/L. In a few isolated months, there are large water quality impacts resulting from comparative changes in Delta inflow, export, and outflow, which are the boundary conditions for DSM2 taken from CALSIM II. These comparative changes in flow are triggered by a CALSIM II 'step function' (an abrupt change in flow when a specified threshold is crossed). Typically an increase in flow in one month is offset by a lower flow in the following month. ~~Similarly, degradation in water quality in any given month is often offset by water quality improvements in subsequent months. Median water quality impacts are typically 9 µS/cm or less.~~

Chapter 5
Mitigation Monitoring and Reporting Program

CHAPTER 5
MITIGATION MONITORING AND REPORTING PROGRAM

Section 21081.6(a)(1) of the Public Resources Code requires public agency decision makers, as part of adopting the findings associated with approving a project, to also approve a reporting or monitoring program intended to ensure the implementation of all mitigation measures adopted through such findings. The purpose of this Mitigation Monitoring and Reporting Program (MMRP) is to describe the City of Stockton's (City) roles and responsibilities in the mitigation monitoring process for the proposed Delta Water Supply Project (DWSP). The MMRP is a working guide to facilitate not only the City's implementation of adopted mitigation measures, but also its monitoring, compliance, and reporting activities.

The Draft Program Environmental Impact Report (DPEIR) sets forth several mitigation measures that will be applicable to the DWSP. The MMRP includes a description of the California Environmental Quality Act (CEQA) requirements and a compliance checklist. The intent of the MMRP is to prescribe and enforce a means for properly and successfully implementing the mitigation measures identified in the DPEIR for the DWSP.

5.1 COMPLIANCE CHECKLIST

The MMRP contained herein is intended to satisfy the CEQA requirements as they relate to the DPEIR for the DWSP. This MMRP is intended to be used by City staff, contractors, and mitigation monitoring personnel during all phases of project implementation. The mitigation measures identified in this MMRP were developed in the DPEIR, which presents a detailed set of mitigation measures that will be implemented throughout the lifetime of the project.

The intent of the MMRP is to ensure the effective implementation and enforcement of adopted mitigation measures and permit conditions. The MMRP will provide for monitoring of construction activities, as necessary, and in-the-field identification and resolution of environmental concerns.

The City will coordinate the monitoring and documenting of the implementation of mitigation measures. Table 5-1 summarizes the environmental effects that could result from approval of the proposed project. It identifies (1) each impact, (2) how each significant effect would be mitigated, (3) the monitoring and reporting tasks required to ensure that the mitigation measures are implemented, (4) the responsible party for implementing and monitoring each mitigation measure, and (5) the timing for implementing each measure. The City and its contractors will be responsible for fully understanding and effectively implementing the mitigation measures contained within the MMRP; the City will be further responsible for ensuring compliance with

the MMRP. All the mitigation measures presented in Table 5-1 will be incorporated into the construction and operation activities of the proposed DWSP.

5.2 IMPLEMENTATION AND MONITORING OF MITIGATION MEASURES

Implementation and monitoring of mitigation measures will occur at various stages of DWSP implementation. The inspector assigned by the City will be responsible for field-monitoring mitigation measure compliance and will be thoroughly familiar with permit conditions and this MMRP. In addition, the inspector will be familiar with construction contract requirements, construction schedules, standard construction practices, and mitigation techniques. Aided by Table 5-1, the inspector will be responsible for, but not limited to, the following activities:

- Implementation of development and design standards, guidelines, and programs for the DWSP.
- Onsite, day-to-day monitoring of construction activities.
- Reviewing construction plans and equipment staging/access plans to ensure conformance with adopted mitigation measures.
- Ensuring contractor knowledge of and compliance with all appropriate permit conditions and the MMRP.
- Verifying the accuracy and adequacy of contract wording.
- Having the authority to require corrective actions for activities that violate DWSP permit conditions or mitigation measures. The inspector shall have the ability and authority to secure compliance with the MMRP.
- Acting in the role of contact for property owners or any other affected persons who wish to register observations of violations of project permit conditions or mitigation. Upon receiving any complaints, the inspector shall immediately contact the construction representative. The inspector shall be responsible for verifying any such observations and for developing any necessary corrective actions in consultation with the construction representative and the City.
- Obtaining assistance as necessary from technical experts, such as archaeologists and biologists, in order to develop site-specific procedures for implementing the mitigation measures.
- Maintaining a log of all significant interactions, violations of permit conditions or mitigation measures, and necessary corrective measures.

Responsibility of implementation and monitoring of mitigation measures will typically reside with City staff, as described in Table 5-1.

Table 5-1
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
3.2 Land Use, Recreation, and Aesthetics					
LU-2. Construction of the proposed DWSP facilities could reduce access to, or interfere with the use of existing recreational facilities.	**LU-2.** During intake and pipeline construction, alternative access shall be maintained to all recreational facilities identified in Impact LU-2	• Review design specifications and construction contract to verify inclusion.	City	Throughout construction activities	
LU-5: Construction of the DWSP WTP and the raw water pipeline appurtenant facilities would convert economically viable prime farmland and farmland of statewide importance to non-agricultural use.	**LU-5a:** The 70-acres of farmland at the WTP site, not required for the 30 mgd WTP and future expansions to 160-mgd WTP, shall remain available for farming operations for as long as is economically and environmentally feasible.	• Retain map and documentation of identified areas to remain available for farming operations in the project files.	City	Prior to and throughout project implementation	
	LU-5b: In order to mitigate for the permanent loss of agricultural land due to construction of water treatment facilities and pipelines for the DWSP, the City shall take steps to obtain conservation easements within San Joaquin County on a one to one basis, meaning that one acre of farmland shall be preserved for each acre permanently lost due to construction of these facilities. Such easements shall be obtained concurrent with the permanent cessation of agricultural activities due to facilities construction, and thus may be obtained in discrete phases as facilities are initially constructed and later expanded. The easements may be created through one of three possible means: direct purchase by the City of easements from willing sellers; through payments into a "farmland trust" of the City's choosing; or through participation in the San Joaquin County Multi-Species Habitat Conservation	• Retain record of payments to the "farmland trust" fund in the project files. • Perform inspection of compensation land to verify compliance. Retain inspection record in the project files.	City	Prior to and throughout project implementation	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	and Open Space Plan (SJCMSCP). Should the City choose to employ the third option, the City may determine that satisfaction of Mitigation Measure BIO-2a constitutes full or partial satisfaction of this Mitigation Measure (LU-5b), provided that any purchase of conservation easements pursuant to the SJCMSCP, in order to achieve habitat preservation, will also simultaneously satisfy the one to one ratio for loss of farmland contemplated by this measure. The City may also elect to achieve more habitat preservation than would be required under BIO-2a in order to simultaneously achieve the one to one ratio with respect to agricultural land preservation.				
LU-9: Operation of the DWSP intake could reduce access to, or interfere with the use of existing recreational facilities.	**LU-9a:** The design of the intake facility shall provide for continued public access to the San Joaquin River and Disappointment Slough. Pedestrian access shall be designed to discourage trespassing on adjacent properties.	• Review design specifications and construction contract to verify inclusion.	City	Prior to and throughout construction activities	
	LU-9b: Waterway markers (buoys and/or signs) will be placed in, on, or near the water to protect the safety of boat operators as specified in Title 14 Department of Boating and Waterways Section 7000 et seq. The shapes of aids to navigation shall be compatible with the shapes established by Coast Guard regulations for the equivalent Coast guard aids to navigation. When lights are placed on buoys as an aid to navigation, their characteristics shall be compatible with those designated by federal regulations for federal aids to navigation.	• Review design specifications and construction contract to verify inclusion.	City	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
LU-10: The DWSP intake and WTP would have a substantial adverse effect on scenic vistas, substantially damage scenic resources, or substantially degrade the existing visual character or quality of the site and its surroundings.	**LU-10:** The design of the intake facility and WTP, including the choice of color and materials, shall seek to reduce the visual impact of the facilities. Bright reflective materials and colors shall be avoided.	• Review design specifications and construction contract to verify inclusion.	City	Prior to and throughout construction activities	
LU-11: The DWSP intake and WTP would create a new source of substantial light or glare that would adversely affect nighttime views in the area.	**LU-11:** Outdoor light sources shall be properly shielded and installed to prevent light trespass on adjacent properties. Any flood or spot lamps installed for purposes other than waterway navigation must be aimed no higher than 45 degrees above straight down (half-way between straight down and straight to the side) when the source is visible from any off-site residential property or public roadway.	• Review design specifications and construction contract to verify inclusion.	City	Prior to and throughout construction activities	
3.3 Geology, Soils, and Seismicity					
GEO-1: Construction of the proposed DWSP could lead to accelerated soil erosion and possible sedimentation of local surface waters.	**GEO-1:** The City shall prepare a Storm Water Pollution Prevention Plan (SWPPP) for all construction phases of the proposed project, as required by the Central Valley Regional Water Quality Control Board (CVRWQCB). The objectives of the SWPPP are to identify pollutant sources that may affect the quality of storm water discharge and to implement Best Management Practices (BMPs) to reduce pollutants in storm water discharges.	• Keep the SWPPP in the project files. • Incorporate BMP requirements of the SWPPP into the construction contract.	City in coordination with the CVRWQCB	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	BMPs may include, but would not be limited to, excavation and grading activities in areas with steep slopes or directly adjacent to open water shall be scheduled for the dry season only (April 15 to October 15), to the extent possible. This will reduce the chance of severe erosion from intense rainfall and surface runoff. • If excavation occurs during the rainy season, storm runoff from the construction area shall be regulated through a storm water management/ erosion control plan that shall include temporary onsite silt traps and/or basins with multiple discharge points to natural drainages and energy dissipaters. Stockpiles of loose material shall be covered and runoff diverted away from exposed soil material. If work stops due to rain, a positive grading away from slopes shall be provided to carry the surface runoff to areas where flow would be controlled, such as the temporary silt basins. Sediment basins/traps shall be located and operated to minimize the amount of off-site sediment transport. Any trapped sediment shall be removed from the basin or trap and placed at a suitable location onsite, away from concentrated flows, or removed to an approved disposal site. • Temporary erosion control measures shall be provided until perennial revegetation or landscaping is established and can minimize discharge of sediment into nearby waterways. For construction within 500 feet of a water body, appropriate erosion control measures shall be placed upstream adjacent to the water body.	• Perform inspections to verify compliance. Retain inspection record in the project files.			

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	• Erosion protection shall be provided on all cut-and-fill slopes. Revegetation shall be facilitated by mulching, hydroseeding, or other methods and shall be initiated as soon as possible after completion of grading and prior to the onset of the rainy season (by October 15). • BMPs selected and implemented for the project shall be in place and operational prior to the onset of major earthwork on the site. The construction phase facilities shall be maintained regularly and cleared of accumulated sediment as necessary. Effective mechanical and structural BMPs that would be implemented at the project site include the following: – Mechanical storm water filtration measures, including oil and sediment separators or absorbent filter systems such as the Stormceptor® system, can be installed within the storm drainage system to provide filtration of storm water prior to discharge. – Vegetative strips, high infiltration substrates, and grassy swales can be used where feasible throughout the development to reduce runoff and provide initial storm water treatment. – Roof drains shall discharge to natural surfaces or swales where possible to avoid excessive concentration and channelization of storm water.				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
GEO-2: In the event of seismic activity, strong ground motion, secondary hazards in the form of settlement, and/or associated ground failure (e.g., liquefaction) could possibly impact DWSP facilities.	**GEO-2a:** To reduce potential levee slope instability hazards along the San Joaquin River, the City shall retain a California-registered geotechnical or civil engineer to conduct a slope stability analysis of levees bordering the intake facility. The investigation will include an evaluation of the levee to determine if the soil materials present and the current level of compaction are satisfactory to support the proposed intake facility in the event of an earthquake based on the anticipated peak ground acceleration. If conflicting peak ground acceleration values are obtained, the City will apply the greater of the two values to ensure maximum structural integrity. Recommendations from this analysis shall be incorporated into the final grading and foundation design and submitted to the County and City. Engineering Divisions for review and approval before final grading and construction permits are issued. At a minimum, the intake's design will demonstrate compliance with 1997 UBC and 2001 CBC requirements for structures located in seismic zone 3.	• Conduct a slope stability analysis of levees bordering the intake facility. • Review design specifications and construction contract to verify inclusion. • Perform inspections to verify compliance with requirement. Add inspection records to the project files.	City	Prior to and throughout construction activities	
	GEO-2b: Facility design for all DWSP facilities will comply with the site-specific design recommendations as provided by a licensed geotechnical or civil engineer. These recommendations will be based on the anticipated peak ground acceleration for each project-component within the overall project area. In instances where conflicting peak ground acceleration values are obtained, the City will apply	• Keep record of recommendations in the project files. • Review design specifications and construction contract to verify inclusion.	City and City Engineer	Prior to approval of construction contract	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	the greater of the two values to ensure maximum structural integrity. Design recommendations provided in the geotechnical report will demonstrate compliance with 1997 UBC and 2001 CBC requirements for structures located in seismic zone 3.				
	GEO-2c: To protect on-site personnel, ensure the integrity of the WTP facility and associated infrastructure (e.g., pipelines, intake structures, etc.), and minimize any disruption to water delivery in the event of a major earthquake, the City shall prepare an Earthquake Response Plan. The Earthquake Response Plan shall include an evacuation plan for all personnel-occupied structures and a post-earthquake inspection and repair plan to evaluate any damage that may have occurred and ensure the integrity of the mechanical systems to enable continued operation as soon as possible.	• Prepare an Earthquake Response Plan and maintain Plan in the project files. • Disseminate copies to key personnel.	City	Prior to project operation	
GEO-3: Structural improvements associated with the proposed DWSP could be subject to soil-related hazards including expansive and/or corrosive soil materials or settlement.	**GEO-3a:** The City shall install a cathodic protection system for all underground metallic fittings, appurtenances, and piping to protect these facilities from corrosion. The cathodic protection system shall be designed consistent with City standards.	• Install cathodic protection system. • Review design specifications and construction contract to verify inclusion.	City	Prior to construction activities	
	GEO-3b: Isolation valves will be incorporated into all pipelines to prevent significant losses of surface water in event of pipeline rupture. The specifications of the isolation valves will conform to the UBC, AWWA, and City standards.	• Review design specifications and construction contract to verify inclusion.	City	Prior to construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	GEO-3c: During final design of the DWSP facilities, a licensed geotechnical or civil engineer shall prescribe, and the City shall implement a preconstruction survey and monitoring program of affected levees and roadways susceptible to settlement. The survey shall establish monitoring points and measure preconstruction elevations along the levees and roadways to establish a baseline for measuring potential settlement. Periodic monitoring, not less than weekly, shall be performed throughout construction and at least two months after completion of construction. The settlement monitoring plan shall include action limits, which if exceeded will require immediate corrective action.	• Review design plans and specifications to verify inclusion.	City	Prior to construction activities	
GEO-4: DWSP facilities, including pipelines, intake facilities, sub-surface foundations, and other underground utilities, would be subjected to hazards associated with regional subsidence.	**GEO-4a:** Final design of the intake facility will take into account projected subsidence rates within the eastern Delta to ensure that the finished floor elevation remains above the 100-year flood elevation and includes three feet of freeboard during the operational life expectancy of the intake facility. This will be accomplished by determining the projected rate of subsidence for Empire Tract over the next 100 years and adding that projected change in elevation onto the current design finished floor elevation for the intake facility. This design feature will ensure sufficient height above the 100-year flood elevation during the operational life of the DWSP.	• Review design plans and specifications to verify inclusion.	City	Prior to construction activities	
	GEO-4b: The project design shall evaluate and where appropriate implement the use of lightweight fill to reduce settlement at the intake location.	• Review design plans and specifications to verify inclusion.	City	Prior to construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	GEO-4c: The site settlements shall be monitored on a weekly basis for two months after completion of grading operations. The settlement monitoring results will be a basis for further evaluation and verification of the future settlement estimates.	• Perform inspections to verify compliance. Add inspection records to the project files.	City	Throughout construction activities	
3.4 Drainage and Floodplain Management					
DFM-1: Dewatering of excavated areas during construction in areas of shallow groundwater could affect surface water quality.	**DFM-1:** During construction if groundwater can not be contained on-site, the City shall pump the water into multiple gallon Baker tanks or approved equivalent with either a filter or gel coagulant system or other containment to remove sediment. The remaining water will then be discharged to irrigation ditches. On upland areas sprinkler systems may be used to disperse the water in farmers' fields. BMPs, as described in the SWPPP, will also be implemented, as appropriate, to retain, treat, and dispose of groundwater. Measures shall include but are not be limited to: • Retaining pumped groundwater in surface facilities to reduce turbidity and suspended sediments concentrations. • Treating (i.e. flocculate) pumped groundwater, as appropriate, to reduce turbidity and concentrations of suspended sediments. • Directly conveying pumped groundwater to a suitable land disposal area capable of percolating flows.	• Review construction contract to verify inclusion. • Keep results of tests in project files. If contaminated, revise construction contract to include revised BMPs. Keep revision in project files, if necessary.	City in coordination with the CVRWQCB	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	If contamination is suspected, water collected during dewatering will be tested for contamination prior to disposal. Discharges shall comply with the CVRWQCB's requirements.	• Perform inspections to verify compliance with the collection and disposal method and CVRWQCB requirements. Add inspection records to the project file.			
DFM-2: DWSP construction activities could result in increased erosion and sedimentation, or release fuels or other hazardous materials associated with construction equipment that could impact surface water quality.	Implementation of Mitigation Measure GEO-1 will reduce potential impacts to less than significant. No additional measures will be required.	• See Measure GEO-1.	City	Prior to and throughout construction activities	
DFM-3: DWSP intake and WTP facilities would increase the amount of impervious surfaces, which in turn would increase local storm runoff volumes that could exceed the capacity of on-site drainage systems, and create localized flooding or contribute to a cumulative flooding impact downstream.	**DFM-3:** The City shall comply with all measures of the City's Stormwater Quality Control Criteria Plan to effectively manage and minimize increases in storm water runoff resulting from the operation of DWSP facilities. Measures to be implemented may include detention basins, vegetated swales, buffer strips, and/or infiltration basins. Detention basins or other storm water detention facilities shall be designed to retain the 100-year flood event in accordance with the San Joaquin County Improvement Standards.	• Review design plans and specifications and construction contract to verify inclusion. • Perform inspections to verify compliance. Add inspection records to the project files.	City	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
DFM-4: Removal and stockpiling of trench and tunnel spoils during construction of the raw and treated water pipelines could release chemicals or spoils into the surrounding environment that could affect surface water quality.	**DFM-4:** The City shall limit impacts due to trench and tunnel spoils by hauling contaminated spoils off-site and disposing of them at a permitted waste disposal facility. Spoils containing high volumes of water shall either be transported off-site to a suitable disposal area or retained on-site and treated similar to the pumped groundwater specified in Mitigation Measure DFM-1.	• Review construction contract to verify inclusion. • Perform inspections to verify compliance. Add inspection records to the project files.	City	Prior to and throughout construction activities	
DFM-5: Construction of the intake facility and raw water pipelines could potentially increase the risk of flooding on Empire Tract and King Island.	**DFM-5:** Implementation of Mitigation Measure GEO-1 will reduce potential impacts to less than significant. In addition, the construction contractor will secure a permit from the State Reclamation Board for modifications to the levee in the vicinity of the intake and tunneling for pipeline crossings of jurisdictional waterways. The construction contractor will also develop and implement an Erosion Control and Sedimentation Plan, which will include all the necessary local jurisdiction requirements regarding erosion control as required in the SWPPP.	• See Measure GEO-1. • Keep permit in the project files. • Implement an erosion control plan and keep Plan in the project files. • Review construction contract to verify inclusion. • Perform inspections to verify compliance with mitigation outlined in GEO-1 and Plan. Add inspection records to the project files.	City	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
3.5 Biological Resources					
BIO-1: Construction of DWSP facilities would result in the loss of jurisdictional waters of the U.S., including wetlands.	**BIO-1**: Prior to construction, the City shall obtain and comply with federal and state permit requirements pertaining to impacts on waters of the U.S. and of the State. The City shall coordinate with the Corps to obtain a permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, and with the CVRWQCB to obtain Section 401 water quality certification. The City also shall coordinate with California Department of Fish and Game (CDFG) to obtain a Section 1600 streambed alteration agreement. Terms of these permits and agreements could include additional provisions. For open trench construction crossing minor wetland ditches (less than 15 feet in width), the following measures shall be implemented: • Implement Mitigation Measure GEO-1, to reduce impacts to wetlands during open trench construction. • Conduct all trenching and construction activities across drainages and seasonal wetlands during low-flow or dry periods; • Place sediment curtains upstream and downstream of the construction zone to prevent sediment disturbed during trenching activities from being transported and deposited outside of the construction zone;	• Keep permits in the project files. • Review construction contract to verify inclusion. • Perform inspections to verify compliance with permit requirements. Add inspection records to the project files.	City in coordination with the U.S. Army Corps of Engineers (Corps), the CVRWQCB, and the CDFG	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	• Locate spoil sites such that they do not drain directly into the drainages and/or seasonal wetlands; • Store equipment and materials away from the drainages and wetland areas. No debris will be deposited within 25 feet of the drainages and wetland areas; • Return an impacted wetland to original grade following pipeline installation. Any wetland area left bare following construction will be revegetated using hydroseed and/or plugs of native vegetation matching the species composition of adjacent wetland areas.				
BIO-2: Construction of DWSP facilities could result in impacts to the following special-status species: giant garter snake, Swainson's hawk, western pond turtle, white-tailed kite, other nesting raptors, loggerhead shrike, western burrowing owl, Suisun marsh aster, rose mallow, Delta tule pea, Mason's lilaeopsis, Delta mudwort, eel-grass pondweed, Sanford's arrowhead, marsh skullcap, and blue skullcap.	**BIO-2a:** The City anticipates that the DWSP would be approved for participation in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) for the land-based facilities (pipelines and WTP). Compliance with the SJMSCP would provide for impact avoidance measures (e.g., pre-construction surveys during appropriate seasons for identification, construction set-backs, restriction on construction timing) and mitigation for loss of habitat for all species that may be affected by this impact, with the exception of eel-grass pondweed and marsh skullcap. Impact avoidance measures would include, but are not limited to, the species-specific measures presented below, which are summarized from the SJMSCP. Complete impact avoidance and habitat compensation measures from the SJMSCP are presented in detail in Appendix D.	• Review design specifications and construction contract to verify inclusion of pre-construction surveys. • Perform inspections to verify compliance. Retain inspection record in the project files.	City and a qualified biologist in coordination with the County	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	If construction of DWSP land-based facilities are not approved for participation in the SJMSCP, then the City shall obtain the necessary individual permits and shall conduct the pre-construction surveys and avoidance and minimization measure required in those permits, which are expected to be consistent with the SJMSCP. Should pre-construction surveys find that habitat is occupied for any of the covered species, the City shall implement avoidance and minimization measures using performance criteria consistent with those found in the SJMSCP, prepare reports documenting the surveys and avoidance and minimization measures shall be submitted for review to the appropriate regulatory agency (CDFG or USFWS). Because the WTP is located more than one mile, but less than five miles, from a Swainson's hawk nest active within the last five years, mitigation for loss of farmland habitat shall include the transfer of Habitat Management lands to CDFG on a minimum 0.75:1 basis (per CDFG's 1994 Staff Report on Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California). Habitat Management land shall include provisions to ensure that only crops compatible with Swainson's hawk foraging are allowed, and that the land is located in San Joaquin County and within two miles of a Swainson's hawk nest that has been active within the previous five years. Examples of suitable crops include alfalfa, low-growing row or field crops, dry-land and irrigated pasture, rice, and cereal grain crops. The City shall also provide a management endowment of $400 per acre (as				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	adjusted for inflation) to ensure the long-term management of the land. Preservation of these Habitat Management lands will mitigate the loss of agricultural foraging habitat for Swainson's hawk and other wildlife species to a less than significant level. Giant Garter Snake: Construction shall occur between May 1 and October 1, which is the active period for the snake. Between October 2 and April 30, additional measures may be necessary to minimize and avoid take. Pre-construction surveys for the giant garter snake (conducted after completion of environmental reviews and prior to ground disturbance) shall occur within 24 hours of ground disturbance. Vegetation clearing and disturbance will be limited to the minimal area necessary within 200 feet of the banks of potential giant garter snake aquatic habitat. On-site construction personnel shall be given instruction regarding the presence of SJMSCP Covered Species and the importance of avoiding impacts to these species and their habitats. Swainson's Hawk: In order to encourage the retention of known or potential Swainson's hawk nest trees (i.e., trees that hawks are known to have nested in within the past three years or trees, such as large oaks, which the hawks prefer for nesting), for any nest tree that becomes occupied during construction activities, all construction activities shall remain a distance of two times the dripline of				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	the tree, measured from the nest. Alternatively, nest trees may be removed between September 1 and February 15, when the nests are unoccupied. Western Pond Turtle: When nesting areas for pond turtles are identified on a project site, a buffer area of 300 feet shall be established between the nesting site (which may be immediately adjacent to wetlands or extend up to 400 feet away from wetland areas in uplands) and the wetland located near the nesting site. These buffers shall be indicated by temporary fencing if construction has or will begin before nesting periods end (the period from egg laying to emergence of hatchlings is normally April to November). White-Tailed Kite: For white-tailed kites, preconstruction surveys shall investigate all potential nesting trees on the project site (e.g., especially tree tops 15 to 59 feet above the ground in oak, willow, eucalyptus, cottonwood, or other deciduous trees), during the nesting season (February 15 to September 15) whenever white-tailed kites are noted on site or within the vicinity of the project site during the nesting season. Loggerhead Shrike: A setback of 100 feet from nesting areas shall be established and maintained during the nesting season for the period encompassing nest building and continuing until fledglings leave nests. This setback applies whenever construction or other ground-disturbing activities must begin during the nesting season in the				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	presence of nests which are known to be occupied. Setbacks shall be marked by brightly colored temporary fencing. Western Burrowing Owl: Burrowing owls may be discouraged from using the project area by managing vegetation and prey populations. If the project site is an unlikely occupation site for red-legged frogs, San Joaquin kit fox, or tiger salamanders, ground squirrel burrows may be destroyed to discourage occupation by burrowing owls. During the non-breeding season (September 1 through January 31) burrowing owls occupying the project site should be evicted from the project site by passive relocation as described in the CDFG's Staff Report on Burrowing Owls (CDFG, 1995). During the breeding season (February 1 through August 31) occupied burrows shall not be disturbed and shall be provided with a 75 meter protective buffer until and unless the TAC, with the concurrence of the Permitting Agencies' representatives on the TAC; or unless a qualified biologist approved by the Permitting Agencies verifies through non-invasive means that either (1) the birds have not begun egg laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. Once the fledglings are capable of independent survival, the burrow can be destroyed. Sanford's Arrowhead: Any populations of this species which occur in the project area will be completely avoided.				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	Suisun Marsh Aster, Rose Mallow, Delta Tule Pea, Mason's Lilaeopsis, Delta Mudwort, and Blue Skullcap: If the plant population is considered healthy by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC, then the parcel owner shall be approached to consider selling a conservation easement including a buffer area sufficient to maintain the hydrological needs of the plants. For blue skullcap, if the landowner rejects acquisition of the population, then the JPA shall, with the concurrence of the Permitting Agencies' representatives on the TAC, determine the appropriate mitigation measures (e.g., seed collection) for each plant population based upon the species type, relative health and abundance.				
	BIO 2b: The DWSP may impact primarily along the raw water pipeline alignment eel-grass pondweed and marsh skullcap, which are not listed species or species covered under the SJMSCP, but are CNPS List-2 species covered under CEQA *Guidelines* Section 15380. Therefore, the City shall conduct a pre-construction floristic survey for these species according to Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities (CDFG, 2000) (Appendix E). These surveys shall be conducted during the species' blooming period, which occurs between June and July (eel-grass pondweed) and June and September (marsh skullcap). If these species cannot be avoided by the project, minimization and mitigation measures will	• Review design specifications and construction contract to verify inclusion. • Perform inspections to verify compliance. Retain inspection record in project files.	City and a qualified biologist in coordination with the CDFG	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	be developed and implemented in consultation with the CDFG. These measures may include, but are not limited to the following: a) Minimizing impacts by restricting removal of plants to a few individuals of a relatively large population; b) Relocating plants to suitable habitat outside the project area, either within the project area or off-site; c) Monitoring affected populations to document potential project-related impacts; d) Implement habitat acquisition and/or mitigation bank participation to provide suitable compensation; and/or e) Protecting occupied habitat for the species on-site or at another regional location.				
BIO-3: Construction of the proposed DWSP raw and treated water pipelines could result in temporary impacts to riparian habitats or other sensitive natural communities.	**BIO-3:** Implementation of Mitigation Measures GEO-1 and BIO-1b will reduce potential impacts to less than significant. In addition, at jack and bore locations, the bore pits will be excavated at least 50 feet outside the edge of riparian vegetation to avoid impacts.	• See Measures GEO-1 and BIO-1b. • Review design specifications for jack and bore locations to see if they are at least 50 feet from riparian vegetation. • If not at least 50 feet away, revise design	City	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
		specifications and incorporate changes into construction contract.			
BIO-4: Construction of the proposed DWSP raw and treated water pipelines could impact native wildlife migration corridors or nursery sites.	Impacts to riparian habitat that may serve as wildlife corridors will be avoided with the implementation of Mitigation Measure BIO-3.	• See Measure BIO-3.	City	Prior to and throughout construction activities	
BIO-5: The proposed DWSP could conflict with adopted City and County tree preservation ordinances.	**BIO-5:** The City shall ensure that the project complies with the San Joaquin County General Plan Tree Preservation and Riparian Habitat requirements, and with the City's Tree Preservation ordinance. Prior to construction the City shall conduct a survey for heritage trees that may be impacted by the project (i.e., the dripline of trees is within the treated water pipeline alignment). The City shall coordinate with City and County staff to ensure that impacts to heritage trees are avoided to the extent feasible.	• Review design specifications and construction contract for compliance with applicable requirements and ordinances. Revise as necessary in order to be compliant. • Keep permit in the project files and incorporate requirements of the permit in the design specifications and construction contract.	City in coordination with the County	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
		• Perform inspections to verify compliance. Retain inspection record in project files.			
	If it is necessary to remove a heritage tree, a permit will be obtained from the City's Parks and Recreation Department. The tree(s) will be replaced on a one for one basis at the discretion of the City's Landscape Architect. The size of the replacement tree shall be based on the size of the tree removed. If heritage trees are identified in riparian areas, the City shall implement Mitigation Measure BIO-3.				
3.6 Air Quality					
AIR-1: Construction of DWSP facilities would result in a temporary increase in air pollutant emissions.	**AIR-1a:** The City shall comply with Regulation VIII and implement its control measures during construction. The following applicable control measures listed by the Valley Air District shall be implemented, where appropriate (SJVUAPCD, 2004). • The City shall submit a Dust Control Plan subject to review and approval of the Valley Air District at least 30 days prior to the start of any construction activity on a site that includes five acres or more of disturbed surface area (SJVUAPCD, 2004) Specific control measures for construction, excavation, extraction, and other earthmoving activities listed by the Valley Air District (SJVUAPCD, 2004) include:	• If approved, keep the Plan in project files. Review design plans and specifications to verify compliance with Plan. • If revision is approved, keep revised Plan in project files and Review design plans and specifications to verify compliance.	City and County of San Joaquin	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	Pre-Activity • Pre-water site sufficient to limit visible dust emissions to 20 percent opacity, and • Phase work to reduce the amount of disturbed surface area at any one time.	• Review construction contract to verify inclusion.			
	During Active Operations • Apply water or chemical/organic stabilizers/suppressants sufficient to limit visible dust emissions to 20 percent opacity; or • Construct and maintain wind barriers sufficient to limit visible dust emissions to 20 percent opacity. If utilizing wind barriers, the above control measure shall also be implemented. • Apply water or chemical/organic stabilizers/ suppressants to unpaved haul/access roads and unpaved vehicle/equipment traffic areas sufficient to limit visible dust emissions to 20 percent opacity and meet the conditions of a stabilized unpaved road surface.	• Perform inspections to verify compliance. Retain inspection record in project files.			
	Temporary Stabilization During Periods of Inactivity • Restrict vehicular access to the area; and • Apply water or chemical/organic stabilizers/ suppressants, sufficient to comply with the conditions of a stabilized surface. If 0.5 acres or more of disturbed surface area remains unused for seven or more days, the area must comply with the conditions for a stabilized surface area as defined in Rule 8011.				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	Vehicle Movement • Limit the speed of vehicles traveling on uncontrolled unpaved access/haul roads within constructions sites to a maximum of 15 miles per hour. • Post speed limit signs that meet state and federal Department of Transportation standards at each construction site's uncontrolled unpaved access/haul road entrance. At a minimum, speed limit signs shall be posted at least every 500 feet and shall be readable in both directions of travel along uncontrolled unpaved access/haul roads. • To control wind generated fugitive dust, outdoor construction, excavation, extraction, and other earth moving activities that disturb the soil shall cease whenever the visible dust emissions exceeds 20 percent opacity. *Demolition Activities* • Apply sufficient water to building exterior surfaces, unpaved surface areas where equipment will operate, and razed building materials to limit the visible dust emissions to 20 percent opacity throughout the duration of razing and demolition activities. • Apply sufficient dust suppressants to unpaved surface areas within 100 feet where materials from razing or demolition activities will fall in order to limit the visible dust emissions to 20 percent opacity.				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	• Apply sufficient dust suppressants to unpaved surface areas where wrecking or hauling equipment will be operated in order to limit the visible dust emissions to 20 percent opacity. • Handling, storage, and transport of bulk materials on-site or off-site resulting from the demolition of buildings shall comply with the requirements specified in Rule 8031 (Bulk Materials). • Apply water within one hour of demolition to unpaved surfaces within 100 feet of the demolished structure. • Prevent and remove carryout or trackout on paved public access roads from demolition operations in accordance with Rule 8041 (Carryout and Trackout).				
	AIR-1b: The City shall implement the following mitigation measures listed below to reduce ozone precursor (NO_x and ROG) emissions from off-road equipment, where appropriate. • Use of alternative fueled or catalyst equipped diesel construction equipment; • Minimize idling time (e.g., 10 minute maximum); • Limit the hours of operation of heavy duty equipment and/or the amount of equipment in use; • Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set); and	• Review construction contract to verify inclusion. • Perform inspections to verify compliance. Retain inspection record in project files.	City and County of San Joaquin	Prior to construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	• Implement activity management (e.g., rescheduling activities to reduce short-term impacts).				
AIR-2: Operation of the DWSP facilities would result in air emissions from powering of pumps, various processes, and equipment at the WTP and from vehicle trips to DWSP facilities.	**AIR-2:** The WTP shall be designed so that each piece of equipment operates in compliance with applicable Valley Air District permit requirements and regulations including the Authority to Construct and Permit to Operate. The equipment used, particularly the pumps and diesel generators, shall be operated as per the Valley Air District permit requirements and regulations.	• Review design plans and specifications and construction contract to verify compliance.	City and County of San Joaquin	Prior to construction activities	
3.7 Noise					
NOISE-1: Construction of DWSP facilities could temporarily increase noise levels at sensitive receptors.	**NOISE-1a:** Construction shall be limited to the hours of 7:00 a.m. to 10:00 p.m.	• Review construction contract to verify compliance. • Perform inspections to verify compliance. Retain inspection record in project files.	City and County of San Joaquin	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	NOISE-1b: The City shall require in construction specifications that the contractor select staging areas as far as reasonably feasible from existing residences. Activities within these staging areas shall conform to the time limitations established in Mitigation Measure NOISE-1a.	• Review construction contract to verify compliance. • Perform inspections to verify compliance. Retain inspection record in project files.	City and County of San Joaquin	Prior to and throughout construction activities	
	NOISE-1c: The City shall require in construction specifications that the contractor maintain all construction equipment with manufacturers' specified noise muffling devices.	• Review construction contract to verify compliance. • Perform inspections to verify compliance. Retain inspection record in project files.	City and County of San Joaquin	Prior to and throughout construction activities	
	NOISE-1d: The City shall require in construction specifications that the contractor place all stationary noise generating construction equipment as far away as reasonably feasible from sensitive receptors or in an orientation minimizing noise impacts (i.e., behind existing barriers or storage piles, etc.).	• Review construction contract to verify compliance. • Perform inspections to verify compliance. Retain inspection record in project files.	City and County of San Joaquin	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	NOISE-1e: The City shall develop a haul route plan to route construction traffic away from residential areas where feasible direct alternative routes exist.	• Keep plan in project files. • Review construction contract to verify inclusion. • Perform inspections to verify compliance and retain inspection record in project files.	City and County of San Joaquin	Prior to and throughout construction activities	
NOISE-2: Operation of the intake facility and WTP could increase noise levels at nearby sensitive receptors.	**NOISE-2:** The design of the WTP and intake structure shall ensure that operational noise levels at the property line do not exceed a noise level of 70 dBA from the stationary equipment sources. Shielding and other specified measures as deemed appropriate and effective by the design engineer to comply with this performance standard shall be incorporated in final WTP and intake facility designs. Noise reduction measures may include, but are not necessarily limited to: • Incorporation of equipment enclosures, fan silencers, mufflers, acoustical louvers, noise barriers, acoustical panels, etc.; • Location of particularly noisy equipment as far away as feasibly possible from the property line and away from surrounding sensitive land uses;	• Review design plans and specifications to verify compliance.	City and County of San Joaquin	Prior to construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	• Orientation of acoustical exits away from sensitive receptors; and • Incorporation of buildings, landscaping, where possible, to absorb and/or redirect noise.				
3.8 Hazardous Materials/Public Health					
HAZ-1: Construction of the proposed DWSP facilities could result in the disturbance of contaminated soil and/or groundwater.	**HAZ-1a**: Prior to construction, the City shall conduct a Phase 1 Environmental Site Assessment according to ASTM protocol for intake and WTP sites and the pipeline alignments.	• Keep Phase 1 Environmental Site Assessment in project files.	City	Prior to construction activities	
	HAZ-1b: The City shall consult with the CVRWQCB to determine the precautions for installing the raw water pipelines within any area of contamination identified in the Phase 1 Environmental Site Assessment along Eight Mile Road. If soil and/or groundwater contamination are encountered, samples shall be collected prior to construction along the pipeline alignment in the area of known contamination to at least the depth of the proposed pipeline excavation. The samples shall be analyzed for the contaminants of concern identified for this area. In addition, if any unidentified contaminated soil and/or groundwater are encountered or if suspected contamination is encountered during any construction activities, work will be halted in the area of potential exposure, and the type and extent of the contamination will be identified. A qualified professional, in consultation with the appropriate regulatory agencies, i.e., DTSC, CVRWQCB,	• Keep record of consultation in the project files. • Keep results of sampling in the project files. • Review design plans and specifications and construction contract to verify inclusion. • Keep contract for remediation and record of consultation in the project file. Perform inspections to	City in coordination with the CVRWQCB	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	SJCEHD, and the Stockton Fire Department, will then remediate the contamination and properly dispose of the contaminated material.	verify compliance and retain inspection record in project files.			
HAZ-2: Construction of the proposed DWSP would involve the use and storage of hazardous materials such as gasoline and diesel fuels, oils, and solvents. Depending on the relative hazard of the hazardous material, if a spill of significant quantity were to occur, the accidental release could pose both a hazard to construction employees and the environment.	**HAZ-2:** The City or its designated construction contractor shall prepare a Hazardous Materials Management Plan (HMMP) for construction. The HMMP will address storage, containment, and transfers of hazardous materials related to project construction. This plan will also address equipment maintenance, monitoring, training of employees, and emergency response related to hazardous materials. The San Joaquin County Office of Emergency Services staff will review the HMMP, training documents, and general safety conditions during routine inspections.	• Keep HMMP in the project files. • Review construction contract to verify inclusion.	City in coordination with the County of San Joaquin, Office of Emergency Services	Prior to construction activities	
HAZ-3: Operation of the WTP could expose individuals to existing and/or potential future use of hazardous materials and generation of hazardous wastes.	**HAZ-3a:** The design engineer shall design the WTP to comply with all pertinent sections of the UBC, Uniform Fire Code, and HMMP. Final project design shall include, but not be limited to, the following design features and measures: • Incompatible chemicals will be physically separated; • Fire suppression and control systems in chemical storage areas will utilize the appropriate fire retardant; • All spill collection systems, containment, and aprons will be contained on site for truck pick up and not routed to any storm drain system;	• Review design plans and specifications and construction contract to verify compliance.	City	Prior to construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	• Outdoor storage vessels will be protected from accidental vehicle contact; and • Bulk liquid hazardous materials delivery areas will include a delivery vehicle spill containment with collection sump.				
	HAZ-3b: The City shall consult with the appropriate authorities regarding its responsibilities concerning hazardous materials and their inventory, handling, and emergency response training. The City shall also consult with the CUPA regarding compliance with all relevant sections of the State Health and Safety Code. Upon consultation with these agencies, the project applicant shall prepare and implement all required/requested documentation.	• Keep record of consultation in the project files. • Keep documentation in the project files. • Review design plans and specifications and construction contract to verify compliance. • Perform inspections to verify compliance and retain inspection record in project files.	City	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
3.9 Transportation and Traffic					
TR-1: Construction of the raw and treated water pipelines could temporarily reduce the number of, or the available width of, travel lanes on roads, resulting in an unacceptable level of service (LOS) or volume-to-capacity (v/c) ratio.	**TR-1a:** The City shall prepare and implement a Traffic Control Plan for all project-affected roadways and intersections. The Traffic Control Plan will comply with requirements in encroachment permits issued by the County. The Traffic Control Plan may include, but not be limited to, the following measures: • Limit the construction work zone to a width that, when feasible, maintains one-way traffic flow past the construction zone. Where this is not feasible, construct temporary widening within the construction right of-way to maintain alternate one way traffic flow, or use detour signing on alternate access streets when temporary full street closure is required. • Restrict construction to non-peak traffic periods as required for work sites on roadways and intersections operating at less than LOS D. • During non-construction periods provide traffic controls and safety signage at all construction sites to manage traffic control and flows. • Coordinate construction activities (time of year and duration) to minimize traffic disturbances adjacent to commercial areas (e.g., Christmas holiday shopping period) and schools. • Post advisories of construction activities (e.g., signs, articles in newspapers, the City's website, notices on radio/TV, etc.) to allow motorists to select alternative routes in advance.	• Keep Plan in the project files. • Review construction contract to verify inclusion. • Perform inspections to verify compliance and retain inspection record in project files.	City in coordination with the County of San Joaquin	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	TR-1b: In consultation with the County, the City shall identify areas where night construction may be appropriate. Candidate locations would be in non-residential zones operating at less than LOS D and where there are no sensitive noise receptors.	• Retain consultation record in the project files. • Review construction contract to verify inclusion. • Perform inspections to verify compliance and retain inspection record in project files.	City in coordination with the County of San Joaquin	Prior to and throughout construction activities	
	TR-1c: The City shall arrange for a 24-hour telephone hotline and/or website to address public questions and complaints during project construction, and to offer information about detours, carpooling opportunities, and traffic delays and congestion.	• Verify that a website and/or hotline has been created. Retain record of verification in the project files.	City	Prior to and throughout construction activities	
TR-2: Construction of the proposed DWSP facilities would generate short-term increases in vehicle trips by construction workers and construction vehicles that could cause a substantial decrease in the LOS to that less than LOS D, i.e., approaching unstable operations where small	**TR-2a:** As part of the Traffic Control Plan (see Mitigation Measure TR-1a), the City and the construction contractor shall specify designated haul routes for the project after consultation with agencies with local roadway jurisdiction.	• See Measure TR-1a.Keep plan in project files. • Review construction contract to verify inclusion. • Perform inspections to verify compliance	City in coordination with the County of San Joaquin	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
increases in volume produce substantial increases in delay and decreases in speed.		and retain inspection record in project files.			
	TR-2b: Where feasible, the City shall schedule the multiple daily work sites such that their relative locations shall disperse truck trips over a number of different haul routes, thereby lessening the number of truck trips on any one road at one time.	• Review construction contract to verify inclusion. • Perform inspections to verify compliance. Retain inspection record in project files.	City	Prior to and throughout construction activities	
TR-3: Construction of the proposed raw and treated water pipelines could adversely affect access to adjacent land uses and streets for both commercial and emergency traffic, and bicycle/pedestrian access.	**TR-3a:** As part of the Traffic Control Plan for roadway segments and intersections (refer to Measure TR-1a), the City shall develop a plan for maintaining emergency access and schools in consultation with local jurisdictions. The plans will include, but not be limited to, providing access through the construction zone, parking of fire trucks outside the firehouse on the side of the street opposite the construction during affected work hours, and identification of alternate routing around construction zones. Also, police, fire, and other emergency service providers will be notified of the timing, location, and duration of construction activities throughout the project, and the location of detours and lane closures.	• Review construction contract to verify inclusion. • Perform inspection to verify compliance. Retain inspection record in project files.	City in coordination with the County of San Joaquin	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	TR-3b: The City shall use detour signing on alternate access streets established when temporary full street closure is required.	• Review construction contract to verify inclusion. • Perform inspection to verify compliance. Retain inspection record in project files.	City	Prior to and throughout construction activities	
	TR-3c: The City shall provide 72-hour advance notice of access restrictions for residents and businesses.	• Review construction contract to verify compliance. • Perform inspection to verify compliance. Retain inspection record in project files.	City	Prior to and throughout construction activities	
TR-4: Construction of the proposed raw and treated water pipelines could generate a temporary demand for construction worker parking, and construction activity could temporarily displace existing on-street parking on pipeline alignment routes.	**TR-4:** The City shall require the contractor(s) to provide off-street parking for construction worker's vehicles in the vicinity of the work zone, and if sufficient parking cannot be locally provided, workers will be van-pooled to the work site from an off-site parking location.	• Review construction contract to verify inclusion. • Review construction contract to verify inclusion. • Perform inspection to verify	City	Throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
		compliance. Retain inspection record in project files.			
TR-5: Construction of the proposed raw and treated water pipelines could increase potential traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways.	**TR-5a:** As part of the Traffic Control Plan for roadway segments and intersections (refer to Mitigation Measure TR-1a), the City shall ensure that the plan includes installation of advance warning signs and speed controls to achieve required speed reductions for safe traffic flow through the work zone.	• Review construction contract to verify inclusion. • Perform inspection to verify compliance. Retain inspection record in project files.	City	Prior to and throughout construction activities	
	TR-5b: The City shall incorporate into contract specifications for all DWSP facilities, the requirement that traffic control plans (see Mitigation Measure TR-1a) include detours for bicyclists and pedestrians in all areas potentially affected by DWSP construction.	• Review construction contract to verify inclusion. • Perform inspection to verify compliance. Retain inspection record in project files.	City	Prior to and throughout construction activities	
TR-6: Construction of the DWSP facilities could increase wear-and-tear on the designated haul routes used by construction vehicles to access the project work sites.	**TR-6:** Roads damaged by construction activities will be repaired to a structural condition equal to that which existed prior to construction activity.	• Keep agreement in the project files and review construction contract to verify inclusion.	City in coordination with the County of San Joaquin	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
		• Perform inspection to verify compliance with agreement. Retain inspection record in project files.			
3.10 Public Services and Utilities/Energy					
PUB-1: DWSP pipeline construction could result in temporary, planned, or accidental disruption to utility services.	**PUB-1:** A detailed study identifying utilities within the facility sites/alignments shall be conducted during the pre-design stages of the project. For DWSP facilities with adverse impacts, the following mitigation measures are identified: • Utility excavation or encroachment permits shall be required from the appropriate agencies. These permits will include measures to minimize utility disruption. The City and its contractors shall comply with permit conditions, and such conditions shall be included in construction contract specifications. • Utility locations shall be verified through field survey (potholing) and use of the Underground Service Alert services.	• Keep study in the project files. • Review construction contract to verify inclusion. • Perform inspection to verify compliance. Retain inspection report in project files.	City	Prior to construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	• Detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and fill of areas around utility cables and pipes. All affected utility services shall be notified of the City's construction plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services. • The City shall employ special construction techniques in areas where the water pipelines will parallel wastewater pipelines. These special measures, which will be included in the engineering specifications, shall include trench wall-support measures to guard against trench wall failure and possible resulting loss of structural support for the water main. • Residents and businesses in the project area shall be notified of planned utility service disruption two to four days in advance, in conformance with county and state standards.				
PUB-2: Construction in specific segments of the proposed pipeline alignments could result in utility conflicts.	**PUB-2:** In order to reduce potential impacts associated with utility conflicts, the following measures shall be implemented in conjunction with Mitigation Measure PUB-1: • Disconnected cables and lines shall be reconnected as soon as possible. • Based on the utilities investigation to be conducted under Mitigation Measure PUB-1, the City shall consult with any entities having utility conflicts with the proposed DWSP to negotiate relocation efforts or other plans to resolve the conflict.	• Review construction contract to verify inclusion. • Perform inspection to verify compliance. Retain inspection record in project files.	City	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	• The City shall observe DHS standards which require (1) a 10-foot horizontal separation between parallel sewer and water mains (gravity or force mains); (2) one-foot vertical separation between perpendicular water and sewer line crossings. (In the event that separation requirements could not be maintained, the City shall obtain DHS variance through provisions of sewer encasement, or other means deemed suitable by DHS); and (3) encasing water pipelines in protective sleeves where the pipeline crosses under or over an existing wastewater pipeline.				
PUB-3: Pipeline construction could temporarily block access routes for city police departments, San Joaquin County Sheriff's Department, fire departments, and emergency services.	**PUB-3a:** The City shall coordinate with the Stockton Fire Department to maintain the required 24-hour access to Fire Station #14.	• Keep record of coordination in the project files. • Review construction contract to verify inclusion. • Perform inspection to verify compliance. Retain inspection report in project files.	City	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	PUB-3b: In order to avoid blocking access to any nearby hospital, the City and its contractors shall schedule work on sections of the alignment so that multiple access points to the hospital are not blocked simultaneously.	• Review construction contract to verify inclusion. • Perform inspection to verify compliance. Retain inspection report in project files.	City	Throughout construction activities	
	PUB-3c: The City shall provide, upon request, a copy of the Traffic Control Plan to the sheriff's departments, local police departments, county fire departments, and local fire departments for their review prior to construction. The City shall provide 72-hour notice to the local emergency service providers prior to construction of individual pipeline segments.	• Retain record of contact with local agencies in the project files. • Review construction contract to verify inclusion. Perform inspections to verify compliance. Retain inspection record in project files.	City in coordination with local jurisdictions	Prior to construction activities	
	PUB-3d: The City shall include, as part of construction contract specification provisions, steel trench plates at the construction site to maintain emergency access.	• Review construction contract to verify inclusion. • Perform inspection to verify compliance.	City	Prior to construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
		Retain inspection report in project files.			
PUB-4: DWSP construction could require short-term police and fire protection services to assist in traffic management or to respond to a construction-related accident.	Implementation of Mitigation Measure PUB-3c, above, will reduce potential impacts to less than significant. No additional measures will be required.	• See Measure PUB-3c.	City in coordination with local jurisdictions	Prior to construction activities	
3.11 Cultural Resources					
CUL-1: Construction of DWSP facilities could damage unidentified buried archaeological, historical, or paleontological resources within the project area.	**CUL-1:** Work shall be stopped in affected areas if cultural resources are discovered during project construction and appropriate measures will be implemented.	• Review construction contract to verify inclusion.	City in coordination with the NAHC	Prior to and throughout construction activities	
	Pursuant to CEQA Guidelines 15064.5 (f), "provisions for historical or unique archaeological resources accidentally discovered during construction" shall be instituted. Therefore, in the event that any prehistoric or historic subsurface cultural resources are discovered during ground disturbing activities, all work potentially affecting the resources shall be halted and the project proponent and/or lead agency shall consult with a qualified archaeologist or paleontologist to assess the significance of the find. If any find is determined to be significant, representatives of the project proponent and/or lead agency and the qualified archaeologist and/or paleontologist shall meet to determine the appropriate avoidance	• Perform inspections to verify compliance. Retain inspection record in project files.			

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	measures or other appropriate mitigation. All significant cultural materials recovered shall be subject to scientific analysis, professional museum curation, and a report prepared by the qualified archaeologist according to current professional standards. If the discovery includes human remains, CEQA Guidelines 15064.5 (e)(1) shall be followed: (e) In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps shall be taken: (1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until: (A) The San Joaquin County coroner must be contacted to determine that no investigation of the cause of death is required, and (B) If the coroner determines the remains to be Native American: 1. The coroner shall contact the NAHC within 24 hours. 2. The NAHC shall identify the person or persons it believes to be the most likely descended from the deceased Native American.				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	3. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98, or (2) Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance. (A) The NAHC is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission. (B) The descendant identified fails to make a recommendation; or (C) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the NAHC fails to provide measures acceptable to the landowner.				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
3.12 Cumulative Impacts					
CUM-1: Implementation of the DWSP would contribute to the cumulative loss of important farmland in San Joaquin County.	Implement Mitigation Measure LU-5b – contribute in-lieu fees to a "farmland trust" fund for San Joaquin County for future acquisition of equivalent ACEs.	• See Measure LU-5b.	City in coordination with the County of San Joaquin	Prior to and throughout project implementation	
CUM-2: Construction activities associated with the proposed DWSP facilities would temporarily generate cumulatively considerable levels of PM_{10} and ozone precursor (ROG and NO_x) emissions to the SJVAB.	**CUM-2:** The City shall implement appropriate SJVAPCD enhanced additional control measures (SJVAPCD, 2002b). These measures may include the following: 1. Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than 1 percent; 2. Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site; 3. Install wind breaks at windward side(s) of construction areas; 4. Suspend excavation and grading activity when winds exceed 20 mph; (regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation); 5. Limit area subject to excavation, grading, and other construction activity at any one time; 6. Minimize construction equipment idling time (e.g., 10 minute maximum);	• Review construction contract to verify inclusion. • Perform inspections to verify compliance. Retain inspection record in project files.	City in coordination with the County of San Joaquin	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
Chapter 4. Delta Water and Fisheries Resources					
FISH-1: Construction of the DWSP intake could temporarily affect fisheries by increasing turbidity and thus degrading water quality.	**FISH-1:** Installation of the cofferdam for construction of the intake structure is expected to result in short-term increases in local suspended sediment concentrations that may affect the distribution and behavior of sensitive fish species and their habitat. To avoid and minimize these impacts, site preparation and installation of the sheet pile cofferdam will occur during the summer and fall.	• Review construction contract to verify inclusion. • Perform inspections to verify compliance. Retain inspection record in project files.	City	Prior to and throughout construction activities	
FISH-2: Noise generated by in-river construction could temporarily affect the behavior and local distribution of fish and macroinvertebrates.	**FISH-2:** To avoid and minimize noise impacts to the fisheries, a vibration hammer will be used to install the sheet pile cofferdam during the summer and early fall (mid-June through mid-September).	• Review construction contract to verify inclusion. • Perform inspections to verify compliance. Retain inspection record in project files.	City	Prior to and throughout construction activities	
FISH-3: Dewatering of the cofferdam during intake construction could result in stranding fish and other aquatic species.	**FISH-3:** The City will ensure that a qualified fisheries biologist will design and conduct a fish rescue and relocation effort to collect fish from the area within the cofferdam involving the capture and return of those fish to suitable habitat within the lower San Joaquin River. To ensure compliance, a fisheries biologist shall provide observation during initial dewatering activities within the cofferdam. The fish rescue plan (Appendix F) will be provided	• If approved, keep the design in project files. Review design plans and specifications to verify compliance with fish rescue and relocation	City in coordination with NMFS, USFWS, and CDFG	Prior to and throughout construction activities	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	for review and comment to NMFS, USFWS, and CDFG prior to implementation.	design. • If revision is approved, keep revised design in project files and review design plans and specifications to verify compliance. • Review construction contract to verify inclusion. • Perform inspections to verify compliance and retain inspection record in project files.			
FISH-6: Operation of the DWSP intake facility would cause entrainment and impingement mortality of fish and macroinvertebrates.	**FISH-6a:** The City will reduce or curtail diversion operations during periods when Delta smelt larvae are present in the vicinity of the intake or exclude larval Delta smelt entrainment using an aquatic filter barrier. Either alternative 1 or alternative 2 will be selected as directed by the resource agencies and as regulated through the Biological Opinion.	• Review operational procedures to verify inclusion. • Perform inspections to verify compliance. Retain inspection record in project files.	City in coordination with NMFS, USFWS, and CDFG	Throughout project operation	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	Alternative 1: The City will manage and operate the DWSP intake to reduce and avoid the increased risk of fish egg and larval entrainment during the spring months using reductions and/or curtailment in diversions. The actual reduction or curtailment period would be flexible and managed, to the extent possible, to respond to variation in the seasonal timing and geographic distribution of sensitive fish species vulnerable to entrainment into the intake. The primary focus will be on the protection of larval Delta smelt. Measures taken to protect Delta smelt would also protect Chinook salmon and other fish and macroinvertebrates. Using data from CDFG's 20-mm Delta smelt surveys, the City, in coordination with the CDFG and USFWS, will determine the potential diversion reduction or curtailment period each year, based on the geographic distribution of larval Delta smelt and its density in the immediate vicinity of the intake during the spring (April through June). Diversion operations will be managed in direct proportion to the concentration of larval Delta smelt (less than 20 mm in length) occurring in the lower San Joaquin River at CDFG's sampling stations 906, 910, and 912 during each survey. Diversion operations will range from zero to 100 percent curtailment. Based on results of CDFG's 20-mm Delta smelt surveys at approximately two-week intervals using actual survey schedules and available CDFG data, from April 1 through June 30 each year, will be used to determine curtailment/reduction. The City will maintain records and other documentation on the				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	actual diversion operations and will provide the CDFG and USFWS a brief letter report each year documenting the curtailment of diversion operations designed to avoid and minimize the risk of fish entrainment. In the event that the CDFG does not conduct the 20 mm Delta smelt surveys in any given year, the City will implement a monitoring program at the DWSP intake to determine the potential occurrence of larval Delta smelt entrainment. The entrainment monitoring program will be conducted from April 1 through June 30. Fishery sampling (entrainment monitoring) would be performed at two-day intervals to determine the densities and estimated number of larval Delta smelt in the vicinity of the DWSP intake. Sampling will occur downstream of the intake screens, using techniques similar to those employed to monitor larval fish entrainment at Contra Costa Water District's Old River intake. Based on results of the entrainment monitoring, water diversions would be reduced by 50 percent if Delta smelt larvae are present in samples collected on two consecutive sampling days. The reduction in diversions will continue until no larval Delta smelt are detected in the samples over three consecutive sampling days. These measures are designed to reduce and avoid the risk of larval Delta smelt entrainment through seasonal reductions in diversions while continuing to effectively operate the WTP.				

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	To further reduce the potential for entrainment of larval Delta smelt and other fish eggs and larvae during the spring months, the City will schedule, to the extent practicable, routine WTP maintenance outages during these months (April through June). **Alternative 2:** The City will install and maintain an aquatic filter barrier (e.g., Gunderboom's MLES^{TM}) that would serve to exclude fish eggs and larvae from entrainment into the DWSP intake from April 1 through June 30 each year. The fine-mesh curtain would completely surround the intake extending throughout the water column. The City will conduct a biological survey (fish egg and larval sampling) over the first three years of DWSP operations to demonstrate performance of the fine-mesh curtain in effectively excluding larval Delta smelt and other fish eggs and larvae from entrainment. In the event that the performance monitoring does not demonstrate that the fine-mesh curtain is effective in excluding larval Delta smelt from entrainment into the diversion, the City will implement the seasonal reduction and/or curtailment diversion operation alternative.				
	FISH-6b: To minimize potential impingement of juvenile and adult fish, the City will conduct long-term monitoring and maintenance of the intake fish screens to ensure that the screens operate as intended and incidental mortality associated with diversions will conform to the goals and objectives of the project. Monitoring will include approach velocity measurements immediately after initiation of screen operations, with fine-tuning of velocity	• Keep long-term monitoring program and maintenance of the intake fish screens documentation in the project files. • Review operational	City in coordination with NMFS, USFWS, and CDFG	Throughout project operation	

Table 5-1 (Continued)
Mitigation Monitoring and Reporting Program

Impact	Mitigation Measure	Monitoring and Reporting Task	Implementing/ Monitoring Responsibility	Timing	Verification of Compliance (Initials and Date)
	control baffles or other modifications as necessary, to achieve uniformity of velocities in conformance with the CDFG, USFWS, and NMFS criteria (0.2 ft/sec). The City will also monitor the condition of the positive barrier screen on an annual basis, and will do periodic visual inspections to remove accumulated debris and repair screen panels as necessary. CDFG, USFWS, and NMFS will have access to the fish screens for underwater inspections following completion of the screen construction. The standards for success will be long-term reliable operation of the fish screens, and conformance with intake screen design criteria.	procedures to verify inclusion. Keep record of monitoring and maintenance in the project files. • Periodically review record of monitoring and maintenance to verify compliance. Retain verification record in project files.			

Chapter 6
List of FPEIR Preparers

CHAPTER 6

LIST OF FPEIR PREPARERS

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