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REGIONAL WATER SYSTEM IMPROVEMENT PROGRAM 2005

Response to AB 1823 Legislation

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REGIONAL WATER SYSTEM IMPROVEMENT PROGRAM 2005

A. Introduction

This document presents the revised Water System Improvement Program (WSIP), formerly known as the Capital Improvement Program (CIP), which was adopted by the San Francisco Public Utilities Commission initially in 2002 and again in 2003. The revised report responds to the Wholesale Regional Water System Security and Reliability Act (AB 1823) reporting requirements on proposed changes to the program. The document contains five sections: Background, Proposed WSIP Program Description, WSIP Changes, WSIP Implementation Status and Conclusion.

B. Background

On May 28, 2002, the San Francisco Public Utilities Commission (SFPUC) approved a Long-Term Strategic Plan for Capital Improvements, a Long-Range Financial Plan and a Capital Improvement Program and Appendices (Resolution No. 02-0101). These reports document the SFPUC Capital Improvement Program (CIP). On November 5, 2002, the voters in San Francisco approved Proposition A, a $1.6 billion revenue bond measure to fund the Capital Improvement Program. The CIP contained 77 water infrastructure projects designed to replace or repair, improve facilities' seismic condition, enhance water quality, and to improve water supply reliability. Projects were chosen and ranked based on the need to reduce risk and improve reliability.

The Local Water CIP, representing 37 projects and approximately $715 million, was designed to enhance reliable water deliveries within the City limits, update outmoded equipment, and rehabilitate aging infrastructure to withstand seismic events. The Regional Water CIP, representing 40 projects and approximately $2.9 billion of the overall Water CIP, was designed to increase reliability of the transmission and facilities that bring water from the Sierra Nevada to the San Francisco Bay Area.

In 2003 through August 2004, the CIP was modified slightly for greater efficiency. The SFPUC added one new project, the Programmatic Environmental Impact Report (PEIR). The PEIR addresses system-wide environmental impacts of the WSIP.

C. WSIP Program Description

In October 2004, the SFPUC General Manager ordered a thorough review of the Water System Improvement Program (WSIP).

The proposed WSIP is structured to bring about, in an expeditious manner, water quality, seismic reliability, delivery reliability and water supply improvements. The process to develop this program involved seven program specific public hearings from October, 2004 – January, 2005 and many hours of staff and public comment at regularly scheduled SFPUC hearings. The concerns and comments of stakeholders, including but not limited to the Bay Area Water Supply and Conservation Agency (BAWSCA) and Bay Area Water Stewards (BAWS), were taken into consideration in the preparation of the changed WSIP.

At the final workshop the SFPUC Commission established direction on levels of service for the program. Based upon these levels of service, the scope, schedule, and budget of the program were refined and changed.

The new WSIP is described in a document entitled "Water System Improvement Program: Prepared for the Programmatic Environmental Impact Report" (dated February 28, 2005). The document serves as the SFPUC program description and was submitted to the San Francisco Planning Department for its preparation of a Program Environmental Impact Report (PEIR).

The 'Program Description' describes the levels of service, scope, and schedule for the WSIP and the projects that fulfill them. The process began by refining the SFPUC goals and developing objectives, or Levels of Service. The outcome of this process allowed the SFPUC to develop project specific criteria for the program that were consistent with the SFPUC's mission for the water system: providing high quality water to its customers in a reliable, affordable and environmentally sustainable manner.

There are two fundamental principles of this program: a clean unfiltered water source and a gravity driven system. All measures of reliability evolve from these principles. Projects within the WSIP will incorporate environmental stewardship policies and principles of the SFPUC.

The objectives of the program are to:

1. Furnish system improvements to provide high quality water that reliably meets current and foreseeable local, state, and federal requirements.

2. Reduce vulnerability of the water system to damage from earthquakes.

3. Increase reliability of the system to deliver water by improving redundancy needed to accommodate planned outages for maintenance and unplanned outages resulting from facility failure.

4. Provide near-term improvement of water supply/drought protection.

5. Set forth long-term water supply/drought management options for technical evaluation, cost analysis, and environmental review.

6. Enhance sustainability through improvements that optimize protection of the natural and human environment.

7. Provide improvements resulting in a cost-effective fully operational water system.

Levels of Service

The Commission provided direction on level of service goals for water quality, seismic reliability, delivery reliability, and water supply. These levels of service goals were the basis for developing the scope and magnitude of projects comprising the WSIP. Levels of service for these program objectives are summarized below.

Water Quality

- Provide a high quality water supply that reliably meets current and foreseeable local, state and federal requirements.

- Maintain filtration avoidance for Hetch Hetchy supply.

- Implement watershed protection through land acquisition and management projects.

Seismic Reliability

- Deliver minimum system demand (winter month demand) within 24 hours after a major earthquake. Minimum winter month demand is estimated at 215 MGD in 2030.

- Deliver minimum system demand equally to three regions within the service area to the extent possible. These regions include: 1) the East and South Bay Area, 2) the Peninsula, and 3) City of San Francisco. At least 70 percent of the turnouts within each region should receive flow to achieve minimum month demand for the region. Estimated 2030 minimum month demands for the three regions noted above are 96 MGD, 37 MGD, and 82 MGD respectively.

- Restore facilities to meet average demand within 30 days after a major earthquake.

- Design facilities to meet the established seismic upgrade criteria. Various levels of hardening will be required for different components of the system, depending upon site-specific conditions and system functions.

Delivery Reliability

- Deliver average demand under the condition of one unplanned outage concurrent with one planned outage of major facilities. Average demand in 2030 is estimated at 300 MGD.

- Provide redundancy to enable maintenance on a schedule required for reliable water delivery.

- Provide system capacity to replenish local area reservoirs as needed to maintain reliable water deliveries.

Water Supply

- Accommodate a target delivery reduction during a design drought of 8.5 years that is time-phased. During the first three years, the average reduction is anticipated at 3.3%. During the second three years, the average reduction is anticipated at 13.3%. (Six years is historically the longest drought experienced.) For the last 2.5 years of the design drought, the average reduction is anticipated at 20%. This represents an increase in firm yield from 226 MGD to 254 MGD.

- Increase long-term water supply for drought management through consideration of conservation, recycling, ground water storage, and transfers.

- Set forth long term supply options for evaluation and review to occur concurrent with implementation of projects required for seismic reliability, delivery reliability and meeting water quality requirements.

The following table provides a summary of the levels of service chosen by the SFPUC Commission with their associated flow rates:

Table 1 – Levels of Service

Performance Criteria	Level of Service	Level of Service Objective by Flow Rate (MGD)*
Water Quality	Meet current and foreseeable requirements	N/A
Seismic Reliability	Basic Service (Average Winter Month Delivery)	215
Delivery Reliability	Average Day Delivery	300**
Water Supply	Gradual reduction from 3.3% up to 20% over 8.5 years	254

* Represents system-wide delivery, not customer or turnout specific
** 300 MGD meets the 2030 customer purchase requests (209 MGD for suburban customers and 91 MGD for San Francisco)

D. WSIP 2005 Changes

1. Overview

The scope review resulted in a revised program to ensure high water quality, seismic reliability throughout the entire system, expanded drought protection and enhanced environmental responsibility and review. The detailed schedule changes will be outlined in a subsequent report.

The high-level changes are summarized below:

- **Bay Division Pipeline (BDPL) - Hydraulic Capacity Upgrade:**
  As originally scoped, this project provided for 17 miles of pipeline within the existing right-of way of the BDPL Nos. 3 & 4. The initial 17-mile project did not meet the system performance criteria. For example, it did not provide a necessary link between the Irvington and Pulgas Tunnels. Therefore, the SFPUC is proposing to construct a new 21-mile Bay Division Pipeline (BDPL No. 5) from Irvington Tunnel Portal in Fremont to Pulgas Tunnel Portal near Redwood City, including a tunnel section under San Francisco Bay and adjacent marshlands. Building this option with longer pipeline sections and a tunnel provides seismic reliability as well as delivery reliability. This option would also provide a more

environmentally appropriate project, given the extreme environmental sensitivity of the Bay shoreline and salt marshes at the northern point where the BDPL traverses the Bay.

- **Improving water delivery reliability to the northern peninsula and San Francisco:** Modeling the entire system and how it is likely to behave after a major seismic event on the San Andreas Fault line demonstrated that the current proposals would only guarantee 24 percent of normal daily water delivery to the northern end of the peninsula and San Francisco, while the other parts of the system would receive 70 percent. The additional scope changes would ensure system parity between Peninsula customers and the other wholesale customers and assure water is available to San Francisco and northern San Mateo County within 24 hours after a major earthquake on the San Andreas Fault. This improvement is mainly comprised of the Baden and San Pedro Valve Lot Improvements.

- **Improving water delivery reliability to the South Bay:** Bay Division Pipeline No. 4 has sections that are built with pre-stressed concrete cylinder pipe. Therefore, to reduce seismic risk, slip-lining (or other retrofitting methods) is being considered.

- **Programmatic Environmental Impact Report (PEIR), Project specific EIRs and environmental mitigation:** The SFPUC, in 2004, initiated a focused Programmatic Environmental Impact Report (PEIR) to address environmental impacts of the WSIP. In addition, project-specific EIRs and related environmental mitigations were identified.

- **Groundwater:** Additional changes include investment in a groundwater project to provide alternative water supplies during a drought. This groundwater project will provide approximately three million gallons per day through groundwater wells largely located on the west side of the City. In addition, the project will be expanded into the Regional System and will provide up to seven million gallons per day of additional supply during drought years. This water source would free up Hetch Hetchy water for other customers, and therefore adds water to the system.

- **Project scope changes/refinements to meet system delivery goals set by the SF Public Utilities Commission and Re-estimating:** As a result of the SFPUC Commission establishing water system delivery goals on January 13, 2005, the Department re-evaluated all projects and their associated cost estimates, and re-scoped a number of existing projects. These changes will add missing elements to ensure that the system can work together in an integrated fashion.

2. Projects Reassigned/Replaced

Seven projects were reassigned; and, one project replaced from the Regional Water System list.

- ***Bay Division (BDPL) Nos. 1 & 2 - Repair of Caisson & Pipe Bridge***: The original scope was to: (1) Conduct a condition assessment of the structures; (2) Develop seismic rehabilitation/replacement plans for the pipes, pipe bridge, caisson, submarine pipelines; pipe exterior coating, and internal lining of pipes; and, (3) Implement improvement plans. However, the alternative chosen for the BDPL Hydraulic Upgrade Project makes the BDPL Nos. 1 & 2 Project redundant along the sections associated with the Pipe Bridge and the Caisson structure. To ensure operability of the system until the new BDPL No. 5 Tunnel is constructed, condition assessment to determine survivability of pipes, pipe bridge, caisson, and submarine pipelines for the next 15 years will be performed under this project.

- ***Water System Automation (Hetch Hetchy)*** was reassigned to align with preferred system service levels, identified in the SFPUC Commission workshop of January 13, 2005.

- ***Early Intake Reservoir Resurface Dam - Hetch Hetchy Project*** was reassigned from the WSIP. Work will be completed under the Repair & Replacement Program (R&R).

- ***Mountain Tunnel Lining (Hetch Hetchy) Project*** was reassigned. Work will be completed under the R&R Program.

- ***Early Intake Reservoir - Lower Spillway & Adjustable Weir Project*** was reassigned. Work will be completed under the R&R Program.

- ***Foothill Tunnel Repairs Project*** was reassigned. Work will be completed under R&R Program.

- ***Sunol Quarry Reservoirs*** was reassigned. Development of the quarry pits will require the design and construction of needed infrastructure to move water in and out of the pits for use. A number of quarry operator pipelines that currently intersect the quarry pits will need to be relocated. Coordination of these activities will need to be linked to the current and future lease of the quarries.

- ***Enlarge Sunol Treatment Capacity to 240 MGD*****:** This project was to address the planning, design and construction of the Sunol Valley Treatment Plant (SVWTP) expansion to 240 MGD peak capacity. However, the 240 MGD supply is more than the policy service levels established by the SFPUC Commission that require the provision of 300

MGD sustainable supply with the Hetch Hetchy system out of service. This project will be replaced by the "Additional 40 MGD Treated Water Supply Project" described below.

3. New Projects Added to WSIP

Six projects have been added to the Regional WSIP since the 2003 Update (four added; 2 expanded into the regional WSIP):

- ***Programmatic Environmental Impact Report***: The Programmatic Environmental Impact Report will facilitate the programmatic environmental review process for the WSIP. This change was discussed in the 2004 CIP Status Report and Update.

- ***Baden and San Pedro Valve Lots Improvements***: Disruption of flow at these valve lots in an earthquake isolates Peninsula and City of San Francisco customers from all three of the SFPUC's water sources. Therefore it is critical that these facilities are seismically retrofitted in order remain operational after an earthquake. In addition, improvements are needed at these locations to allow backflow to the South Bay from the HTWTP.

- ***BDPL No. 4 Slip-line PCCP Sections:*** Based on preliminary condition assessment and evaluation of rehabilitation needs of the Bay Division Pipelines, it was determined that the Prestressed Concrete Cylinder Pipe (PCCP) sections of Bay Division Pipeline No. 4 have to be rehabilitated to meet seismic reliability requirements.

  This project will slip-line (insert new welded steel pipe and grout the annular space between new and old pipe) reaches of BDPL No. 4 that are constructed of PCCP: from Irvington Tunnel to Calaveras Valve Lot and from Stanford Tunnel West Portal to Pulgas Portal. The slip lining will improve seismic performance, extend life, and improve service reliability of BDPL No. 4 and the entire Bay Division Pipelines system.

- ***Water Treatment Plant - Additional 40 MGD*****:** This project will provide an additional 40 MGD treatment capacity in order to sustain a reliable water filtration capacity of 300 MGD for the case when the Hetch Hetchy water supply is not available. The project will require construction of a new flocculation and sedimentation system, 3 dual media filters, addition of a flow distribution chamber, filtered water piping, chemical feed and piping system, upgrade of electrical supply system, piping, valves, mechanical and electrical work, site excavation and grading.

Projects Expanded into the Regional WSIP: Two projects were expanded to also cover the Regional WSIP:

- ***Regional Groundwater Project*** includes 10 groundwater production wells, estimated to be 600 feet deep, in San Mateo County to allow for increased groundwater production during a drought or an emergency. Well pump stations, disinfection units, and 250 feet of piping are assumed. Additional funds are also reserved to cover stormwater reinfiltration projects in Daly City and San Francisco that would increase basin yield and reduce flooding from the Vista Grande Canal to Lake Merced. Projects being considered are (1) Re-alignment of the Vista Grande canal to provide additional flood capacity, promote stormwater infiltration and create wetland and riparian habitat as mitigation for other WSIP Projects; (2) Stormwater Pretreatment (Continuous Deflection System); (3) Route a portion of Daly City/Vista Grande Stormwater into Impound Lake portion of Lake Merced to recharge the Westside Groundwater Basin and maintain lake levels; and, (4) Construct infiltration basins in Daly City.

- ***Regional Recycled Water Project:*** The SFPUC is partnering with North Coast County Water District on a recycled water project to irrigate areas of Pacifica and Sharp Park Golf Course.

  The SFPUC is also partnering with the cities of South San Francisco, San Bruno, and Cal Water (South SF) in a recycled water feasibility study to evaluate potential reductions in both potable water use and groundwater pumping.

E. WSIP Implementation Status

This section provides a description of the progress to date on the implementation of scope changes in the WSIP. A detailed schedule will be forthcoming in a subsequent report.

WSIP Projects:

With the adoption of the WSIP by the SFPUC Commission, 71 projects comprise the Water System Improvement Program of which 35 are Regional Water and 36 Local Water. Current Project Development Status and Scope are shown on Table 2 for Regional Water System Projects as required by AB 1823. Note the number of Local Water projects has decreased by two as Groundwater and Recycled Water have been moved to the Regional Water System. Reference Appendix C for more detailed descriptions of the changes made to scope and schedule between 2003 and 2005.

Table 2
REGIONAL WATER PROJECTS
WSIP Project Implementation Status

Control Number	Project Title	Project Phase & Status REGIONAL PROJECTS	
		PHASE Feb. 25, 2005	**SCOPE CHANGES 2003 vs. 2005**
9935	Adit Leak Repairs - Crystal Springs/ Calaveras	PPL	No Change
105	Alameda Creek Fishery Enhancement	PL	No Change
202135	Calaveras Dam Replacement*	DS	No Change
201667	Capuchino Valve Lot Capacity Improvements	PPL	No Change
201069	Cross Connection Controls	DS	No Change
201671	Crystal Springs / San Andreas Transmission Upgrade*	PL	No Change
9891	Crystal Springs Bypass Tunnel*	DS	No Change
202215	Crystal Springs No. 2 Replacement	PL	No Change
202435	Hetch Hetchy Advanced Disinfection, UV	PL	No Change
201185	HTWTP Long-Term Improvements	PL	No Change
201183	HTWTP Short-Term Improvements	BA	No Change
200424	Lawrence Livermore Filtration	PL	No Change
130	Lower Crystal Springs Dam Improvements	PL	No Change
201669	Pipeline Repair Plan & Readiness Improvements	DS	No Change
200189	Pulgas Balancing Reservoir Rehabilitation	BA	No Change
202217	San Andreas No. 3 Pipeline Installation	PL	No Change
202515	San Antonio Pump Station Upgrade	PL	No Change
202035	San Joaquin Pipeline System	PL	No Change
128	Seismic Upgrade of BDPLs @ Hayward Fault*	DS	No Change
203040	SFPUC/EBMUD Intertie	CN	No Change
339	Standby Power Facilities, Various Locations	PL	No Change

Control Number	Project Title	Project Phase & Status REGIONAL PROJECTS	
		PHASE Feb. 25, 2005	SCOPE CHANGES 2003 vs. 2005
9960	Sunset Reservoir - North Basin	BA	No Change
202535	Tesla Portal Disinfection Station	PL	No Change
202015	University Mound Reservoir - North Basin	PPL	No Change
202166	Early Intake Reservoir Resurface Dam - Hetch Hetchy	PPL	Reassigned
202180	Early Intake Reservoir Spillway + Adjacent Weir - Hetch Hetchy	PL	Reassigned
202415	Foothill Tunnel Repairs - Hetch Hetchy	PL	Reassigned
202167	Mountain Tunnel Lining - Hetch Hetchy	PL	Reassigned
99079	Sunol Quarry Reservoirs	PL	Reassigned
200307	Water System Automation - Hetch Hetchy	DS	Reassigned
99	BDPL Nos. 1 & 2 Repair of Caisson & Pipe Bridge*	PL	Reassigned. Caisson and Pipe Bridge to be replaced by BDPL No. 5 Tunnel.
202375	Enlarge Sunol Treatment Capacity to 240 MGD	PPL	Replaced with new Additional 40 MGD Treated Water Plant located west of Coast Range Tunnel.
201441	Bay Division Pipeline - Hydraulic Capacity Upgrades*	PL	Selected BDLP No 5, aligned parallel with BDPL Nos. 1 & 2 with Tunnel under SF Bay.
9970/ 9897	Irvington Tunnel / Alameda Siphons Alternatives*	PL	Selected Tunnel Alternative located parallel to existing Irvington Tunnel.
202339	BDPL Nos. 3 & 4 Cross Connections*	PL	Crossover vault sites reduced from 4 to 3.
200328	Installation of SCADA System - Phase II	PPL	Review of completed Phase I SCADA project initially indicates reduced scope of Phase II will achieve goals.
202397	SVWTP - New Treated Water Reservoir	DS	Reservoir capacity reduced to 22.5 MG.

Control Number	Project Title	Project Phase & Status REGIONAL PROJECTS	
		PHASE Feb. 25, 2005	SCOPE CHANGES 2003 vs. 2005
	Additional 40 MGD Water Treatment Plant	PPL	New project that replaces Enlarge Sunol Treatment Capacity to 240 MGD.
	Baden / San Pedro Valve Lots	PPL	Project added to allow distribution of water to peninsula and south bay customers following disruption in HH and SVWTP water supplies.
	BDPL No. 4 Slip-line PCCP Sections	PPL	Project added to correct reliability during a seismic event.
	Groundwater Projects	PL	Project moved to Regional Water Program. Expanded to include sites along the peninsula.
	Programmatic EIR	PL	Added Program Report
	Recycled Water Projects	PL	Project moved to Regional Water Program.

Key: PPL = Pre-Planning; PL = Planning; DS = Design; BA = Bid & Award; CN = Construction

* Projects identified in AB 1823

Table 3 summarizes the status of the Regional WSIP projects by scope.

TABLE 3

Summary of Changes to Regional WSIP Projects*	
SCOPE	**No.**
No Change	24
Reassigned/Replaced	(8)
Selected Alternative/Study	2
Reduced Scope	3
New Projects	6
Total	**35**

*Comparison between 2003 and 2005 Regional Scopes

F. Conclusion

The SFPUC has worked diligently over the past six months to create an effective and efficient water system improvement program, describing detailed levels of service for the WSIP to meet. Based upon these levels of service, the scope, schedule and associated budget for the WSIP was refined and refocused.

As outlined in this document, scope changes have been made to meet the SFPUC levels of service. Schedule changes will be forthcoming in a subsequent document.

The SFPUC is confidant that the proposed WSIP will bring about, in an expeditious manner, water quality, seismic reliability, delivery reliability and water supply improvements for the Bay Area for the next 30 years.

APPENDIX

Appendix A - Capital Improvement Program Status Report and Update 2003

Appendix B - Capital Improvement Program Status Report and Update 2004

Appendix C - "Water System Improvement Program: Prepared for the Programmatic Environmental Impact Report" (February 28, 2005)