

- **Board of Directors**
Engineering and Operations Committee

March 11, 2003 Board Meeting

8-1

Subject

Authorize \$1.095 million for four Capital Investment Plan projects as part of the Weymouth Filtration Plant Improvements Program (Approp. 15369)

Description

Four projects are recommended at the F. E. Weymouth Filtration Plant to maintain compliance with drinking water quality regulations and to enhance the efficiency and reliability of plant operations. Over the past 12 months, the Weymouth plant has been treating a higher percentage of State project water (SPW) than was typical in the past. Coincident with this change, the Weymouth plant converted its primary coagulant from aluminum sulfate (alum) to ferric chloride. This has resulted in higher than expected ferric chloride dosages to comply with the Stage 1 Microbial/Disinfection By-Products Rule, which became effective January 1, 2002. The use of higher than expected ferric chloride dosages has resulted in increased sludge production. These four projects address improvements required to reliably treat a higher percentage of SPW until a long-term solution can be implemented.

Upgrade Sedimentation Basin Sludge Pumps and Instrumentation (\$587,000): This project will replace the existing basin sludge pumps and install sludge density and blanket level meters to improve sludge removal and transfer to the thickening and dewatering processes. This action will authorize final design and installation by Metropolitan forces.

Replace Basin Cleaning Water Supply Lines (\$236,000): The basin cleaning water lines were placed in service with the original installation of each basin. These piping systems are approximately 40 to 60 years old and have reached the end of their useful service life. To ensure efficient basin cleaning, the basin cleaning water lines need to be replaced. This action will authorize final design and Metropolitan force construction to replace this piping.

Rehabilitate Original Washwater Reclamation Plant (\$135,000): The original washwater reclamation plant is over 40 years old, lacks automation, requires interconnections to the new washwater reclamation plant, and has not been used since 1990. This project includes immediate and necessary repairs to make the original washwater reclamation plant suitable for temporary operation and a study to assess the feasibility and cost of rehabilitating the original washwater reclamation plant for normal operation. This action will authorize a feasibility study and minor repair of the original washwater reclamation plant.

Convert Filter Building No. 2 Washwater Return Pumps to Variable Frequency Drive Operation (\$137,000): The vertical turbine pumping units transfer used filter backwash water from the sump to the washwater reclamation plant. These pumps were originally placed into service in 1960. Conversion of the motor drives to variable frequency drive operation will increase treatment efficiency and allow reliable operation with the higher solids concentration that is anticipated at the reclamation plant due to elevated ferric chloride dosages. This action will authorize final design for this upgrade.

All four projects were evaluated and recommended by the Capital Investment Plan Evaluation Team. Under the Weymouth Filtration Plant Improvements Program (Approp. 15369), the Replace Basin Cleaning Water Supply Lines project is included in the fiscal year 2002/03 CIP budget. The other three projects were originally proposed for the upcoming fiscal year 2003/04 CIP budget, but have been accelerated due to increased usage of SPW supplies. Through previous board actions, \$4.057 million has been appropriated for the Weymouth Filtration Plant Improvements Program (Approp. 15369). It is recommended that the appropriation be increased by

\$1.095 million to increase the solids handling capabilities and to support operation at higher coagulant levels. Upon board approval of these recommendations, the fiscal year 2002/03 CIP expenditure plan will be adjusted. See [Attachment 1](#) for the detailed report and [Attachment 2](#) for the financial statement.

Policy

Metropolitan Water District Administrative Code § 5108: Capital Project Appropriation

California Environmental Quality Act (CEQA)

CEQA determination for Staff Recommendation:

Upgrade Sedimentation Basin Sludge Pumps & Instrumentation, Replace Basin Cleaning Water Supply Lines, and Convert Filter Building No. 2 Washwater Return Pumps to Variable Frequency Drive Operation

The proposed projects are categorically exempt under the provisions of CEQA. The overall activities involve the funding, final design, minor alterations and replacement of existing public facilities with negligible or no expansion of use and no possibility of significantly impacting the physical environment. As such, the proposed projects qualify under Class 1 and Class 2 Categorical Exemptions (Sections 15301 and 15302 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under two Categorical Exemptions (Class 1, Section 15301 and Class 2, Section 15302 of the State CEQA Guidelines).

Rehabilitate Original Washwater Reclamation Plant

The proposed project is categorically exempt under the provisions of CEQA. The proposed project involves the funding of a study and minor modifications to and replacement of existing public facilities with negligible or no expansion of use and no possibility of significantly impacting the physical environment. In addition, the proposed project will consist of basic data collection, and resource evaluation activities that do not result in a serious or major disturbance to an environmental resource. This may be strictly for information gathering purposes, or as part of a study leading to an action that a public agency has not yet approved, adopted, or funded. As such, the proposed project qualifies for a Class 1, Class 2, and Class 6 Categorical Exemptions (Sections 15301, 15302, and 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under three Categorical Exemptions (Class 1, Section 15301; Class 2, Section 15302; and Class 6, Section 15306 of the State CEQA Guidelines).

Staff Recommendation

Adopt the CEQA determination and

- a. Appropriate \$1.095 million in budgeted and non-budgeted CIP funds; and
- b. Authorize all work as described in this board letter for four projects within the Weymouth Filtration Plant Improvements Program.

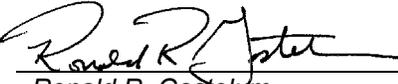
Fiscal Impact: \$236,000 of budgeted and \$859,000 of non-budgeted CIP funds under Appropriation 15369 (Weymouth Filtration Plant Improvements Program)



Roy L. Wolfe
Manager, Corporate Resources

2/7/2003

Date



Ronald R. Gastelum
Chief Executive Officer

2/16/2003

Date

Attachment 1 – Detailed Report

Attachment 2 – Financial Statement for Capital Investment Plan projects as part of the Weymouth Filtration Plant Improvements Program

BLA #1947

Detailed Report

The F. E. Weymouth Filtration Plant was placed into service in 1941 with an initial capacity of 100 mgd. The plant was expanded twice to its current capacity of 520 mgd. The plant typically treats a blend of State Project water (SPW) and Colorado River water (CRW). The plant uses conventional water treatment processes including coagulation, flocculation, sedimentation, filtration, and disinfection. The plant delivers treated water to Metropolitan's Central Pool portion of the distribution system.

The Weymouth Filtration Plant Improvements Program was established to implement multiple projects necessary to ensure plant reliability. These projects address the following objectives: achieve and/or maintain compliance with federal and state drinking water quality regulations, increase the efficiency of plant operations, and enhance the safety and reliability of plant operations.

Upgrade Sedimentation Basin Sludge Pumps and Instrumentation (\$587,000)

Background/Purpose

In November 2001, the Weymouth plant converted its primary coagulant from aluminum sulfate (alum) to ferric chloride to improve disinfection by-product precursor removal. This removal is required by the Stage 1 Microbial/Disinfection By-Products Rule, which became effective January 1, 2002. The precursors that form disinfection by-products differ widely in Metropolitan's two main sources of supply. SPW supplies contain higher concentrations of disinfection by-product precursors (e.g., total organic carbon and bromide) than CRW and form more disinfection by-products when chlorinated.

Over the last year, the Weymouth plant has been treating a higher percentage of SPW. This has necessitated the use of higher than expected ferric chloride dosages to remove total organic carbon. Average coagulant dosages have increased over the past year from 3 mg/L to 8 mg/L ferric chloride. Extended duration dosages have been higher. This trend is expected to continue. Until the Weymouth Oxidation Retrofit Program is operational, the required extended duration dosage of ferric chloride is expected to range from 12.5 mg/L to 20 mg/L to treat higher volumes of SPW. Ozonation (or an alternative disinfection technology) is scheduled to be on-line at the Weymouth plant by 2009 or 2012.

Settled sludge from the plant sedimentation basins is raked to collection sumps, removed and transferred to the sludge thickeners by the sedimentation basin sludge pumps. The Weymouth plant has eight sedimentation basins with twenty sedimentation basin sludge pumps. Basins 1 through 4 each have a single sludge removal pump and Basins 5 through 8 each have four sludge removal pumps. The use of higher coagulant dosages to treat higher volumes of SPW results in greater sludge volume in the sedimentation basins. The existing sludge removal pumps are old, undersized, and cannot reliably transfer the sludge produced today.

Frequent plugging of the basin sludge pumps and piping has become a challenge when operating at higher coagulant dosages. To alleviate this problem, sludge blanket level meters will be installed to monitor the amount of sludge buildup and sludge density meters will also be installed to control on/off operation of the sludge pumps. Better instrumentation and automation will allow improved management of the increased solids flow through the sedimentation basins.

Project Description

This project includes purchase and installation of 20 higher capacity sedimentation basin sludge pumps to replace the existing pumps, modification of the suction and discharge piping to accommodate the new higher capacity pumps, purchase and installation of sludge blanket and density meters for each of the sedimentation basins, and integration of the monitoring and alarms from these instruments into the plant's control system.

Project Milestones

- March 2003 – Initial board authorization and funding
- April 2003 – Procure equipment
- May 2004 – Complete equipment installation

Replace Basin Cleaning Water Supply Lines (\$236,000)***Background/Purpose***

The basin cleaning water lines were placed into service with the original construction of each basin in 1939, 1948 and 1960. The basin cleaning water supply lines provide water for spraying down foam and hosing down the basins during cleaning. Due to scale build-up and corrosion of the existing steel pipe, flow is inadequate for basin cleaning. Currently, a temporary booster pump is required to supply water for basin cleaning. This increases the duration and cost of a basin outage.

Due to the increased sludge that must now be processed in the basins, it is critical that a sufficient quantity of basin water supply be available for spraying and cleaning the basins when required.

Project Description

This project includes preparation of design documents and specifications, and construction via a competitively bid contract to add an 8-inch-diameter basin cleaning water supply line main and 3-inch-diameter headers at all eight basins.

Project Milestones

- March 2003 – Initial board authorization and funding
- June 2004 – Complete installation

Rehabilitate Original Washwater Reclamation Plant (\$135,000)***Background/Purpose***

The Weymouth plant's original washwater reclamation plant (WWRP) was built in 1960 as part of Weymouth Plant Expansion No. 2, with a capacity of 11 mgd. A new WWRP expansion was built in 1990 with a capacity of 22 mgd. This new WWRP has four modules, each rated at 5.5 mgd. Of the four modules, one is dedicated to the Oxidation Demonstration Plant and is used to evaluate alternative disinfectants. The remaining three modules (16.5 mgd) are routinely used by the Weymouth plant to process sludge. Since construction and operation of the new WWRP, the original WWRP has not been used. This project includes minor repairs required to reliably utilize the original WWRP for additional washwater treatment capacity.

With the increased coagulant dose, the full capacity of the new WWRP is required for normal operation. Since no spare capacity is available, staff is unable to take a WWRP module out of service for cleaning or maintenance. The new WWRP has insufficient capacity to process additional washwater generated during a basin cleaning. Rehabilitating the original WWRP would provide added flexibility and capacity to improve the solids handling operations at Weymouth. This study will determine hydraulic constraints, establish tie-in connections between the original and the new washwater reclamation plants, and identify the more extensive repairs required to make it suitable for continuous operation.

Project Description

This project includes minor repairs to make the original WWRP suitable for temporary, manual operation and a study to assess the feasibility and cost of rehabilitating the original WWRP plant for continuous operation.

Project Milestones

- March 2003 – Initial board authorization and funding
- September 2003 – Complete initial minor repairs
- December 2003 – Complete study and provide recommendations for rehabilitating original WWRP.

Convert Filter Building No. 2 Washwater Return Pumps to Variable Frequency Drive Operation (\$136,700)***Background/Purpose***

Weymouth Filter Building No. 2 was constructed in 1960 as part of Expansion No. 2. During filter backwash operations, all backwash water from the 24 filters in Filter Building No. 2 and decant water from the sludge thickeners drain into a sump in Filter Building No. 2. From this sump, the backwash water is pumped to the Washwater Reclamation Plant via two return pumps. These are the original return pumps that were installed as part of Expansion No. 2. These motors are rated at 2300 volts with an on/off start. This project will replace the pump motors with 480-volt motors and add variable-frequency drives (VFDs).

Higher solids loading resulting from higher coagulant usage requires improved performance of the WWRP. Conversion of the existing drives to VFDs will increase water distribution efficiency to the reclamation plant. The use of VFDs will allow the pumps to regulate the flows into the WWRP, reduce start/stop cycles, and prolong the life of the electric motors. Water quality pilot studies have shown that washwater reclamation plants operate best with continuous flows. Sudden spikes of higher flow result in poor water quality exiting the reclamation plant. This improvement will enhance the overall treatment efficiency and water quality.

Project Description

This project includes preliminary design, final design and a detailed cost estimate of the conversion of Filter Building No. 2 washwater return pumps to VFD operation.

Project Milestones

- March 2003 – Initial board authorization and funding of design
- October 2003 – Return to the board to authorize installation
- June 2004 – Complete installation

Cost Estimate

Attachment 2 shows the breakdown of the total estimated cost of this project through design.

Financial Statement for Weymouth Filtration Plant Improvements Program

A breakdown of Board Action No. 5 for Appropriation No. 15369 for the Weymouth Improvements Program is as follows:

	Previous Board Action No. 4 (Jan. 2003)	Current Board Action No. 5 (Mar. 2003)	New Total Appropriated Amount
Labor			
Studies and Investigations	682,000	67,000	749,000
Design and Specifications	304,000	85,000	389,000
Owner Costs (Program Management, Bidding)	332,000	111,000	443,000
Construction Inspection and Support	198,000	2,000	200,000
Metropolitan Installation and Construction	219,000	172,000	391,000
Materials and Supplies	205,000	368,000	573,000
Incidental Expenses	12,000	2,000	14,000
Professional/Technical Services	456,000	0	456,000
Contracts	1,122,000	145,000	1,267,000
Remaining Budget	527,000	143,000	670,000
Total	\$4,057,000	\$1,095,000	\$5,152,000

Funding Request

Program Name:	Weymouth Filtration Plant Improvements Program		
Source of Funds:	Construction Funds (Pay-As-You-Go Fund)		
Appropriation No.:	15369	Board Action No.:	5
Requested Amount:	\$ 1,095,000	Capital Program No.:	15369-I
Total Appropriated Amount:	\$ 5,152,000	Capital Program Page No.:	E-76
Total Program Estimate:	\$34,882,000*	Program Goal:	I – Infrastructure Reliability

* Total Program Estimate includes budget for three new projects authorized in the board action.