



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

3/9/2010 Board Meeting

7-1

Subject

Appropriate \$1.05 million; and authorize three improvements projects at the Weymouth plant (Approps. 15369 and 15440)

Description

This action authorizes three improvements projects at the F. E. Weymouth Water Treatment Plant: (1) Final design for the Washwater Reclamation Reliability Upgrade project; (2) Design and construction of the Solids Return Pump Instrumentation project; and (3) Preliminary design of the Dry Polymer System Upgrade project.

Timing and Urgency

The washwater reclamation upgrades will replace worn-out equipment at the Weymouth Washwater Reclamation Plant (WWRP) and will make modifications that are necessary to reliably meet maximum turbidity goals for recycled washwater. The upgrades will allow the plant to reliably treat used washwater after the planned ozonation facilities are complete and the plant has transitioned to biological filtration. Installation of instrumentation at the WWRP solids return pumps is recommended to increase efficiency of the solids pumping and to reduce overall plant costs. Upgrades to the dry polymer equipment are needed to allow simultaneous mixing and feeding of two polymers used at the solids thickeners and at the filters, while treating high blends of State project water (SPW).

These projects have been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria. The first project is categorized as an Infrastructure Rehabilitation project, the second project is categorized as a Cost/Efficiency project, and the third project is categorized as an Infrastructure Upgrade project. All three projects are budgeted within Metropolitan's CIP for fiscal year 2009/10.

Background

The Weymouth plant was placed into service in 1941 with an initial capacity of 100 million gallons per day (mgd), and has been expanded twice to its current capacity of 520 mgd. The plant delivers a blend of waters from the Colorado River and State Water Project to Metropolitan's Central Pool portion of the distribution system.

Metropolitan staff conducts regular maintenance of the Weymouth plant's structures, mechanical components, and electrical equipment. Although the plant continues to perform reliably today, its systems are exhibiting signs of normal wear and tear, as may be expected from nearly 70 years of operation. Some of the plant's facilities have reached the end of their life expectancy and have become less reliable, while other facilities require improvements to enhance treatment performance to ensure compliance with water quality regulations. Three projects are recommended at this time to address needed upgrade work to ensure plant reliability in anticipation of future operational and process improvements to the plant.

Project No. 1 - Weymouth Washwater Reclamation Reliability Upgrade – Final Design (\$555,000)

In March 2008, Metropolitan's Board authorized preliminary design of upgrades to the existing reclamation facilities. Deficiencies identified during inspection in the preliminary design phase include significant corrosion of backwash sump pumps, WWRP flocculator equipment, and sedimentation basin chain-and-flight equipment. Also deficient is the decant pipeline that receives decant from the gravity thickeners and coal separator, and pressate from the belt presses. This decant line currently only drains to the Filter Building No. 2, which requires that the thickeners and belt presses be shut down to clean the sump. Correcting these deficiencies now will allow the plant to reliably meet increased future demands when the ozonation process is put into operation at the Weymouth plant and prevent future high turbidity levels in the recycled washwater. Preliminary design has been completed and staff recommends proceeding with final design to:

- Replace three significantly corroded backwash sump pumps with three new pumps with upgraded metallurgy to prevent erosion/corrosion. The new pumps will also have variable speed capability to allow for more stable flow control.
- Extend decant piping to the Filter Building No. 1 backwash sump. This will improve reliability by allowing the reclamation facilities to continue to operate when the Filter Building No. 2 backwash sump needs to be shut down for cleaning.
- Replace WWRP flocculation basin drive units, flocculation paddle arms, bull gears, drive chains, drive gears, gearboxes, gear shafts and pillow block bearings with corrosion-resistant materials, and replacing the chain-and-flight equipment.
- Upgrade the coal removal system to include two hydrogritters, which will more effectively separate the coal and sand from the water to greatly reduce corrosion of the gravity separator.

This action appropriates \$555,000, authorizes final design phase activities for upgrades to the existing reclamation facilities at the Weymouth plant. Planned activities include potholing to identify substructures; preparation of construction drawings, specifications, and pump procurement documents; detailed engineering analyses; and development of a construction cost estimate. All final design activities will be performed by Metropolitan staff. The appropriated funds include \$423,000 for final design; and \$132,000 for value engineering, receipt of bids for the pump procurement and construction contracts, and project management.

The anticipated cost of final design is approximately 12 percent of the estimated total construction cost. Engineering Services' goal for design of projects with construction cost greater than \$3 million is 9 to 12 percent. For this project, the design cost is at the upper end of the range because the work involves upgrades to an existing, operating facility. The construction cost for this project is anticipated to range from \$3 million to \$3.5 million.

Project No. 2 - Weymouth Solids Return Pump Instrumentation – Design and Construction (\$232,000)

Solids captured within the Weymouth plant's four WWRP sedimentation basins are raked to collection sumps, removed and transferred to the solids thickeners by pumps, and then dewatered at a belt press facility. Each solids return pump operates continuously when its train is in service. This project will install a flow meter downstream of each pump and a solids density meter on the header pipe to the thickeners. This will allow control of the solids return pumps using the solids density meter.

Installation of this instrumentation will reduce the wear on mechanical equipment, reduce the demand on the thickeners, and reduce operating costs at the Weymouth plant. Staff evaluated the current pumping and equipment maintenance costs versus the estimated cost of installing the instrumentation. The cost analysis showed that the added instrumentation would save approximately \$32,000 per year in power and maintenance costs, providing an estimated payback of 7 years.

This action appropriates \$232,000 and authorizes design and construction of the Weymouth WWRP Solids Return Pump instrumentation. All work will be performed by Metropolitan staff. The total cost of construction is estimated to be \$145,000. Installation of the instrumentation using a contractor is not recommended because the work is to be performed inside operating facilities, and flexibility is required to schedule the work to minimize impacts to the WWRP process. The appropriated funds include \$8,000 for final design; \$73,000 for Metropolitan

construction labor; \$72,000 for materials; \$57,000 for environmental documentation, as-built drawings and project management; and \$22,000 for remaining budget. The anticipated cost of final design is approximately 5.2 percent of the estimated total construction cost. Engineering Services' goal for design of projects with construction cost less than \$3 million is 9 to 15 percent.

Project No. 3 - Weymouth Dry Polymer System Upgrade – Preliminary Design (\$263,000)

The Weymouth plant's dry polymer system was constructed in 1991 and consists of: a single dry polymer mixing system that is used to liquefy the dry polymer with water; liquid polymer storage tanks; and liquid polymer feed and injection equipment. Two different types of polymers are used at the plant: a cationic polyacrylamide polymer which is used as a coagulant aid at the WWRP and thickeners; and a nonionic polyacrylamide polymer (also called filter aid) which is used to improve filter performance when treating high blends of SPW. The cationic polymer and filter aid polymer are incompatible and must be liquefied separately to avoid mixer clogging. When high blends of SPW are to be treated, the two different types of polymer solutions are prepared in batches and the mixing system and piping must be thoroughly cleaned before switching between the two polymer types.

In March 2008, Metropolitan's Board authorized a study of the Weymouth Dry Polymer System to increase the reliability and capacity of the system. Study results indicate that the existing dry polymer system has several deficiencies and needs to be replaced to meet future needs of the plant. The batch mixing system is not fully automated and does not have sufficient capacity to produce the number of batches required when high blends of SPW are to be treated. Components of the mixing equipment have failed repeatedly; the system is unreliable and clogs easily. When maintenance is required, all polymer production ceases because a redundant polymer mixing train is not provided. The dry polymer bags and the mixing system are housed within an air conditioned, but non-insulated, corrugated sheet metal building; excessive humidity inside the building degrades the polymer. Components of the feed and injection equipment have also failed repeatedly. Some equipment is not compatible with the piping configuration and is currently bypassed, and metering equipment must be installed when treating high SPW blends.

Staff recommends proceeding with preliminary design at this time to provide two automated trains of new dry polymer mixing equipment to allow simultaneous mixing of both polymer types, to improve reliability, and to provide redundancy. Staff also recommends insulating the Dry Polymer Building to reduce the dehumidification load and refurbishing the feed and injection equipment to restore operational flexibility.

This action appropriates \$263,000 and authorizes preliminary design phase activities to upgrade the dry polymer system at the Weymouth plant. Planned activities include field investigations, detailed engineering analyses, code review, preparation of environmental documentation, development of a construction cost estimate, completion of a value engineering study, and preparation of a preliminary design report. All preliminary design work will be performed by Metropolitan staff.

All three projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the fiscal year 2009/10 capital budget. See [Attachment 1](#) for the Financial Statements and [Attachment 2](#) for the Location Map.

All three projects are consistent with Metropolitan's goals for sustainability by enhancing the reliability of the Weymouth plant, in order to maintain reliable water deliveries in the future.

Project Milestones

September 2010 – Completion of design and construction of Weymouth WWRP solids pump instrumentation project

November 2010 – Completion of final design of the Weymouth WWRP reliability upgrades project

December 2010 – Completion of preliminary design of Weymouth Dry Polymer System upgrade project

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

Weymouth Washwater Reclamation Reliability Upgrade – Final Design; and Weymouth Solids Return Pump Instrumentation – Design and Construction

The environmental effects of the Weymouth Washwater Reclamation Reliability Upgrade Project and the Weymouth Solids Return Pump Instrumentation Project were evaluated in the F. E. Weymouth Filtration Plant Ozonation Facilities and Site Improvements Program Final Environmental Impact Report (Final EIR), which was certified by the Board on April 12, 2005. The Board also approved the Findings of Fact (Findings), the Statement of Overriding Considerations, the Mitigation Monitoring and Reporting Program (MMRP), and the projects themselves. The current board actions are solely based on authorization of final design and pump procurement (Washwater Reclamation Reliability project) and design, procurement and construction (Solids Return Instrumentation Project) and not on any changes to the approved projects themselves. Hence, the previous environmental documentation acted on by the Board in conjunction with the proposed action fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further CEQA documentation is necessary for the Board to act on the proposed action.

The CEQA determination is: Determine that the proposed action has been previously addressed in the certified 2005 Final EIR, findings, SOC, and MMRP and that no further environmental analysis or documentation is required.

Weymouth Dry Polymer System Upgrade Project – Preliminary Design

The proposed action consists of preliminary design for the Weymouth Dry Polymer System Upgrade, and is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of basic data collection and resource evaluation activities, which 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 which a public agency has not yet approved, adopted, or funded. Accordingly, the proposed action qualifies as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a Categorical Exemption (Class 6, Section 15306 of the State CEQA Guidelines).

CEQA determination for Option #2:

The environmental effects of the Weymouth Washwater Reclamation Reliability Upgrade Project and the Weymouth Solids Return Pump Instrumentation Project were evaluated in the F. E. Weymouth Filtration Plant Ozonation Facilities and Site Improvements Program Final Environmental Impact Report (Final EIR), which was certified by the Board on April 12, 2005. The Board also approved the Findings of Fact (Findings), the Statement of Overriding Considerations, the Mitigation Monitoring and Reporting Program (MMRP), and the projects themselves. The current board actions are solely based on authorization of final design and pump procurement (Washwater Reclamation Reliability project) and design, procurement and construction (Solids Return Instrumentation Project) and not on any changes to the approved projects themselves. Hence, the previous environmental documentation acted on by the Board in conjunction with the proposed action fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further CEQA documentation is necessary for the Board to act on the proposed action.

The CEQA determination is: Determine that the proposed action has been previously addressed in the certified 2005 Final EIR, findings, SOC, and MMRP and that no further environmental analysis or documentation is required.

CEQA determination for Option #3:

The proposed action consists of preliminary design for the Weymouth Dry Polymer System Upgrade, and is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of basic data collection and resource evaluation activities, which 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 which a public agency has not yet approved, adopted, or funded. Accordingly, the proposed action qualifies as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a Categorical Exemption (Class 6, Section 15306 of the State CEQA Guidelines).

CEQA determination for Option #4:

None required

Board Options

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$1,050,000;
- b. Authorize final design of the Weymouth washwater reclamation reliability upgrades;
- c. Authorize design and construction of the Weymouth solids return pump instrumentation; and
- d. Authorize preliminary design of the Weymouth dry polymer system upgrade.

Fiscal Impact: \$1,050,000 in budgeted funds under the following appropriations:

Approp. 15369: \$555,000 (Weymouth Improvements Program)

Approp. 15440: \$495,000 (Weymouth Improvements Program – Phase II)

Business Analysis: This option will aid in maintaining reliability of the Weymouth plant and in meeting Metropolitan's water quality goals.

Option #2

Adopt the CEQA determination and

- a. Appropriate \$787,000;
- b. Authorize final design of the Weymouth washwater reclamation reliability upgrades;
- c. Authorize design and construction of the Weymouth solids return pump instrumentation; and
- d. Do not authorize preliminary design of the Weymouth dry polymer system upgrade.

Fiscal Impact: \$787,000 in budgeted funds under the following appropriations:

Approp. 15369: \$555,000 (Weymouth Improvements Program)

Approp. 15440: \$232,000 (Weymouth Improvements Program – Phase II)

Business Analysis: Deferral of the Weymouth dry polymer system upgrades project would forego an opportunity to improve the Weymouth plant's ability to treat source waters of varying water quality. Increased operating costs due to continued maintenance are likely, and operators will have less time to dedicate to other plant functions.

Option #3

Adopt the CEQA determination and

- a. Appropriate \$263,000;
- b. Do not authorize final design of the Weymouth washwater reclamation reliability upgrades;
- c. Do not authorize design and construction of the Weymouth solids return pump instrumentation; and
- d. Authorize preliminary design of the Weymouth dry polymer system upgrade.

Fiscal Impact: \$263,000 in budgeted funds under Approp. 15440

Business Analysis: Deferral of the washwater reclamation and solids return pump upgrade projects would forego an opportunity to improve the Weymouth plant's reliability and reduce operating costs. After ozone is added at the Weymouth plant and the filters become biologically active, the full capacity of the WWRP will be needed. If this project is deferred, WWRP equipment down-time could limit the plant's capacity.

Option #4

Do not proceed with the three Weymouth projects.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to maintain reliability of the Weymouth plant, to meet Metropolitan's water quality goals, to reduce operating costs, and to improve the Weymouth plant's ability to treat varying sources of water quality.

Staff Recommendation

Option #1



Roy L. Wolfe
Manager, Corporate Resources

2/19/2010
Date



Jeffrey Nightlinger
General Manager

2/22/2010
Date

Attachment 1 – Financial Statements

Attachment 2 – Location Map

Ref# CR12603124

Financial Statement for Weymouth Improvements Program

A breakdown of Board Action No. 31 for Appropriation No. 15369 for the Weymouth Washwater Reclamation Reliability Upgrade project* is as follows:

	Previous Total Appropriated Amount (Nov. 2009)	Current Board Action No. 31 (Mar. 2010)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 1,896,477	\$ -	\$ 1,896,477
Owner Costs (Project mgmt., bidding process)	6,693,740 **	132,000	6,825,740
Final Design	6,847,641	418,000	7,265,641
Submittals Review, O&M Manuals & As-builts	2,392,223	-	2,392,223
Construction Inspection & Support	10,929,704	-	10,929,704
Metropolitan Force Construction	5,975,680	-	5,975,680
Materials and Supplies	2,525,848	-	2,525,848
Incidental Expenses	343,400	5,000	348,400
Professional/Technical Services	12,376,032 **	-	12,376,032
Contracts	94,942,574 **	-	94,942,574
Remaining Budget	7,989,681 **	-	7,989,681
Total	\$ 152,913,000	\$ 555,000	\$ 153,468,000

Funding Request

Program Name:	Weymouth Improvements Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment, or General Funds		
Appropriation No.:	15369	Board Action No.:	31
Requested Amount:	\$ 555,000	Capital Program No.:	15369-I
Total Appropriated Amount:	\$ 153,468,000	Capital Program Page No.:	249
Total Program Estimate:	\$ 272,390,000	Program Goal:	I-Infrastructure & Reliability

*The total amount expended to date on the Weymouth Washwater Reclamation Reliability Upgrade project is approximately \$250,000.

** Includes previous reallocation of \$829,834 from Remaining Budget to Owner’s Costs (\$140,000), Professional/Technical Services (\$246,000), and Contracts (\$443,834) for Weymouth O&M Building construction and Weymouth Junction Structure Seismic Upgrade constructability review and design.

Financial Statement for Weymouth Improvements Program – Phase II

A breakdown of Board Action No. 8 for Appropriation No. 15440 for the Weymouth Solids Return Pump Instrumentation and Dry Polymer System Upgrade projects* is as follows:

	Previous Total Appropriated Amount (Jan. 2010)	Current Board Action No. 8 (Mar. 2010)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 452,000	\$ 173,000	\$ 625,000
Owner Costs (Program mgmt., as-built drawings)	657,000	104,000	761,000
Filter Testing Program	110,500	-	110,500
Final Design	152,000	8,000	160,000
Construction Inspection & Support	260,300	-	260,300
Metropolitan Force Construction	214,700	73,000	287,700
Materials and Supplies	309,000	66,000	375,000
Incidental Expenses	24,800	16,000	40,800
Professional/Technical Services	889,000	-	889,000
Equipment Use	2,500	-	2,500
Contracts	1,588,122 **	-	1,588,122
Remaining Budget	526,078 **	55,000	581,078
Total	\$ 5,186,000	\$ 495,000	\$ 5,681,000

Funding Request

Program Name:	Weymouth Improvements Program - Phase II		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15440	Board Action No.:	8
Requested Amount:	\$ 495,000	Capital Program No.:	15440-I
Total Appropriated Amount:	\$ 5,681,000	Capital Program Page No.:	324
Total Program Estimate:	\$ 37,100,000	Program Goal:	I-Infrastructure & Reliability

*This action is the initial appropriation for the Weymouth Solids Return Pump Instrumentation project. The total amount expended to date on the Weymouth Dry Polymer System Upgrade project is approximately \$133,000.

** Includes a correction for previous Action No. 7 in January 2010.

F.E. Weymouth Water Treatment Plant

