

- **Board of Directors**
Engineering and Capital Programs Committee

September 9, 2008 Board Meeting

8-1

Subject

Appropriate \$3.45 million; and authorize five rehabilitation projects at the Robert B. Diemer Water Treatment Plant (Approp. 15436)

Description

This action authorizes five rehabilitation projects at the Robert B. Diemer Water Treatment Plant. Two projects include construction by Metropolitan forces to (1) replace the east basins perimeter water line, and (2) improve the Washwater Reclamation Plant No. 2 flocculators. Two projects include final design of (3) a new fire and potable water pump station, and (4) upgrades to the plant's public address system. The final project includes preliminary design to (5) replace filter valves. All projects are categorized as Infrastructure Rehabilitation and Replacement projects and are budgeted within Metropolitan's Capital Investment Plan (CIP).

Background

The Diemer plant was placed into service in 1963 with an initial capacity of 200 million gallons per day (mgd). In 1969, the plant was expanded to its present treatment 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 Diemer 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 expected from over 40 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. Five projects are recommended to proceed at this time to address needed improvements to enhance plant reliability.

These projects will be coordinated with other planned and ongoing work at the Diemer plant to minimize interferences between the Diemer Oxidation Retrofit Program (ORP) contract, construction by Metropolitan forces, and work by other contractors.

Project No. 1 - Diemer East Basins Perimeter Water Line Replacement – Procurement and Installation (\$550,000)

The Diemer plant has eight flocculation and sedimentation basins in two modules. The four east basins were placed into service in 1963, while the four west basins were added in 1969. Flocculation and sedimentation basins are components of a conventional treatment train and aid in removing turbidity and other particulate material. These basins must be dewatered and washed down before major equipment maintenance or repairs can occur.

The east basins perimeter water line, which was installed in 1963, provides untreated water to abate foam buildup, hose algae off the basin launders, and wash down the basins before maintenance or repairs occur. This 45-year-old water line consists of 3-inch diameter galvanized steel pipe that is at the end of its useful life. Pipe breaks have occurred at corroded joints, allowing discharge of large quantities of water into the plant's storm drain system. Staff recommends replacing the existing water line with new galvanized steel pipe. In order to maintain the Diemer plant's treatment capacity, the east basins will remain in service during pipe replacement.

This action appropriates \$550,000 and authorizes replacement of the existing east basins perimeter water line at the Diemer plant. Requested funds include \$447,000 for Metropolitan force construction; \$31,000 for engineering support and program management; and \$72,000 for remaining budget. All work will be performed by Metropolitan staff.

Project No. 2 - Diemer Washwater Reclamation Plant No. 2 Flocculator Improvements – Procurement and Installation (\$987,000)

The Diemer plant's Washwater Reclamation Plant (WWRP) No. 2 was built in 1992 with a capacity of 25 mgd, and primarily treats used filter backwash water. WWRP No. 2 has two identical treatment trains, each equipped with four flocculator drives and 20 pillow blocks, which are used to enclose and support the drive shafts. Sand and coal from the used backwash water frequently enter the space between the flocculator bearing and its shaft, causing premature wear or damage to both. Replacing the shaft or bearing requires shutting down half of the reclamation plant, which significantly reduces the reclamation plant capacity and, ultimately, overall treatment plant capacity.

Staff recommends replacing the worn and damaged WWRP No. 2 flocculator stub shafts, bearings, and pillow blocks, and installing new NSF-61 certified lubricating grease lines and fittings to improve performance of the flocculators. Replacing the pillow blocks will (1) ensure that the flocculators are returned to proper working condition; (2) extend the service life of the flocculators and bearings by preventing sand and coal from getting between each bearing and shaft; and (3) improve reliability of the flocculator shafts. The pillow block material will be upgraded from cast iron to ultra-high-molecular-weight polyethylene with an improved block design.

This action appropriates \$987,000 and authorizes procurement and installation to improve the WWRP No. 2 flocculators. Requested funds include \$420,000 for Metropolitan force construction; \$358,000 for materials and hazardous material removal; \$80,000 for surveying, engineering support, and program management; and \$129,000 for remaining budget. All work will be performed by Metropolitan staff.

Project No. 3 - Diemer Fire and Potable Water Pump Station – Final Design Phase (\$1,361,000)

The Diemer plant has two washwater tanks that store water used to backwash the plant's filters. Potable and fire-protection water is also supplied from the two washwater tanks. When the Diemer ORP is completed in 2012, the filters will be allowed to become biologically active, which will enable more effective removal of disinfection byproduct precursors and other organic material that may impact water quality. To promote the biologically active filter operation, the backwash water stored in the washwater tanks will no longer be continuously chlorinated. Instead, occasional backwash chlorination will be used to control the filter biomass buildup and prevent excessive filter headloss. Due to the lack of a disinfectant residue, the water stored in the two washwater tanks will no longer be potable.

To meet the post-ORP potable and fire water needs of the plant, staff recommends that a new fire and potable water pump station be added to draw chlorinated water directly from the finished water reservoir outlet conduit. Connection of the new fire and potable water pump station to the existing plant-wide fire and potable water loop will be constructed under the recently awarded Diemer ORP construction contract.

This action appropriates \$1,361,000 for final design of the fire and potable water pump station. Final design phase activities include engineering design, preparation of drawings and specifications, hazardous materials survey, permitting, development of a construction cost estimate, receipt of bids, and all other activities in advance of award of a construction contract. Final design will be performed by Metropolitan staff. 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. The construction cost for the pump station and associated electrical duct banks is estimated to range from \$8.5 million to \$9.5 million.

Staff will return to the Board to award a construction contract for the pump station.

Project No. 4 - Diemer Public Address System Upgrade – Final Design Phase (\$356,000)

The backbone components of the existing public address (PA) system at the Diemer plant were installed in 1963, during the plant's original construction. The original equipment included an amplifier with distributed speakers.

This PA system has since been expanded several times during various plant expansions and building additions, without replacing the original equipment components. The Diemer plant currently has a total of 147 PA speakers and horns located throughout the plant.

The plant's chlorine system leak alarm and emergency alarm notifications, and general evacuation instructions, are transmitted over the PA system. An evacuation drill in June 2006 revealed that the existing PA system cannot broadcast understandable evacuation messages to numerous areas at the Diemer plant.

Because the 45-year-old system was not designed to support the added speakers, the existing PA system has become overtaxed and underpowered. This creates poor and distorted audio quality, inaudible volume levels, and a high probability for system failure. Due to the limited capacity of the existing PA system, recently added facilities such as the Vehicle Maintenance Center and Plant Maintenance Facility were built with stand-alone PA systems that are not fully integrated into the plant-wide system.

In November 2006, the Board authorized preliminary design of the expansion and upgrade of the Diemer plant's PA system as part of the IT Network Upgrade initiative. Staff recommends upgrading the PA system to provide clear and reliable broadcasting of notifications and evacuation instructions throughout the plant in accordance with Metropolitan's emergency action plan, as required by Cal-OSHA regulations for a means of evacuation.

Preliminary design has been completed to integrate the various local systems with an upgraded plant-wide system. Staff recommends upgrading the PA Central Control Unit in the Administration Building, supplementing the existing speakers to provide plant-wide coverage, adding local interface modules at new facilities where necessary, and connecting fiber optic lines between the Central Control Unit and all plant facilities. The proposed plant-wide PA system will accommodate and be compatible with the local PA equipment.

This action appropriates \$356,000 and authorizes final design phase activities for upgrade of the Diemer public address system. These activities include engineering design, preparation of drawings and specifications, hazardous materials survey, development of a construction cost estimate, receipt of bids, and all other activities in advance of award of a construction contract. Final design will be performed by Metropolitan staff. The anticipated cost of final design is approximately 15 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. The construction cost for the PA system upgrade is estimated to range from \$0.9 million to \$1.3 million.

Staff will return to the Board to award a construction contract for the PA system upgrade project.

Project No. 5 - Diemer Filter Valve Replacement – Preliminary Design Phase (\$196,000)

The existing filter valves at the Diemer plant were installed with the original plant construction in 1963, and with the plant expansion in 1969. Each of the 48 filters is equipped with five valves serving different functions: filter inlet, outlet, drain, backwash, and surface wash. The valves have received routine maintenance, but are now over 40 years in age and their design life expectancy has been exceeded. Several valves leak excessively, resulting in filter inefficiency, inability to isolate portions of the filters, and increased pumping costs through the reclamation plant. The filter backwash valves have begun to fail, requiring refurbishment. When this occurs, the associated filter must be removed from service, which reduces treatment capacity. Post-ORP filter operation may also accelerate the corrosion rate in the filter valves due to the intermittent higher chlorine-content backwash water and the potential for different pH adjustment of filter inlet flows.

Staff inspected several filter valves during the March 2007 Diemer plant shutdown. Among the valves inspected, the filter backwash valves appeared to be in the worst condition, with severely corroded discs, and were recommended for immediate replacement. The filter outlet valves on the west side showed heavy signs of deterioration in the rubber seats, which may be attributed to the throttling service. Replacement within two years was recommended for the west side filter outlet valves. The east side filter outlet valves appeared to be in reasonable condition and still have an expected useful life of 5 to 10 years. The filter inlet and drain valves also appeared to be in acceptable condition, with a projected useful life of 5 to 10 years. Re-inspection of the valves within three years was recommended. The surface wash valves were not inspected but have also shown signs of deterioration.

Given the long lead time for procuring new valves, staff recommends proceeding with preliminary design to replace the filter valves at the Diemer plant, and performing a value engineering study to finalize the selection of valve type and material. The number and scheduling of filter valves to be replaced for the Diemer plant will be finalized during preliminary design.

This action appropriates \$196,000 and authorizes preliminary design phase activities for replacing deteriorated filter valves at the Diemer plant. These activities include performing a value engineering study (jointly with the Jensen Filter Valves Replacement Project), hazardous materials survey, development of procurement options and a construction cost estimate, and preparation of a preliminary design report. Preliminary design will be performed by Metropolitan staff.

Summary

This action appropriates \$3.45 million and authorizes five rehabilitation projects at the Diemer plant. Each project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the fiscal year 2008/09 capital budget. See [Attachment 1](#) for the Financial Statement and [Attachment 2](#) for the Location Maps.

These projects are consistent with Metropolitan's goals for sustainability by enhancing the reliability of the existing treatment, conveyance and distribution system, in order to maintain reliable water deliveries in the future.

Project Milestones

September 2009 – Completion of the Diemer East Basins Perimeter Water Line Replacement project

April 2010 – Completion of the Diemer WWRP No. 2 Flocculator Improvements project

May 2009 – Completion of final design of the Diemer Fire and Potable Pump Station

September 2009 – Completion of final design of the Diemer Public Address System Upgrade project

January 2009 – Completion of preliminary design of the Diemer Filter Valve Replacement project

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

Metropolitan Water District Administrative Code Section 8121: General Authority of the General Manager to Enter Contracts

California Environmental Quality Act (CEQA)

CEQA determination for Options #1 and #2:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The overall activities involve the funding, 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. The proposed action also 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 under Class 1, 2 and 6 Categorical Exemptions (Class 1, Sections 15301, Class 2, Section 15302, and Class 6, Section 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).

CEQA determination for Option #3:

None required

Board Options

Option #1

Adopt the CEQA determination and

- a. Appropriate \$3.45 million in budgeted funds;
- b. Authorize procurement and installation for the Diemer East Basins Perimeter Water Line Replacement;
- c. Authorize procurement and installation for the Diemer WWRP No. 2 Flocculator Improvements;
- d. Authorize final design of the Diemer Fire and Potable Water Pump Station;
- e. Authorize final design of the Diemer Public Address System Upgrade; and
- f. Authorize preliminary design of the Diemer Filter Valve Replacement project.

Fiscal Impact: \$3.45 million of budgeted funds under Approp. 15436

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

Option #2

Adopt the CEQA determination and

- a. Appropriate \$2.27 million in budgeted funds;
- b. Authorize procurement and installation for the Diemer East Basins Perimeter Water Line Replacement;
- c. Do not authorize procurement and installation for the Diemer WWRP No. 2 Flocculator Improvements;
- d. Authorize final design of the Diemer Fire and Potable Water Pump Station;
- e. Authorize final design of the Diemer Public Address System Upgrade; and
- f. Do not authorize preliminary design of the Diemer Filter Valve Replacement project.

Fiscal Impact: \$2.27 million of budgeted funds under Approp. 15436

Business Analysis: Under this option, work would proceed on those projects which are needed to meet regulations, ensure safety, and maintain water quality. Staff would continue to maintain and repair the existing WWRP No. 2 flocculators and the plant’s filter valves. As these components age and continue to deteriorate, repair costs will increase and treatment plant capacity will be reduced on a more regular basis.

Option #3

Do not proceed with the five Diemer improvement projects at this time.

Fiscal Impact: None

Business Analysis: This option would likely decrease the reliability of Diemer plant operations. Process equipment would be repaired when it fails.

Staff Recommendation

Option #1


 Roy L. Wolfe
 Manager, Corporate Resources

8/26/2008
 Date


 Jeffrey Lightlinger
 General Manager

8/26/2008
 Date

Attachment 1 – Financial Statement

Attachment 2 – Location Maps

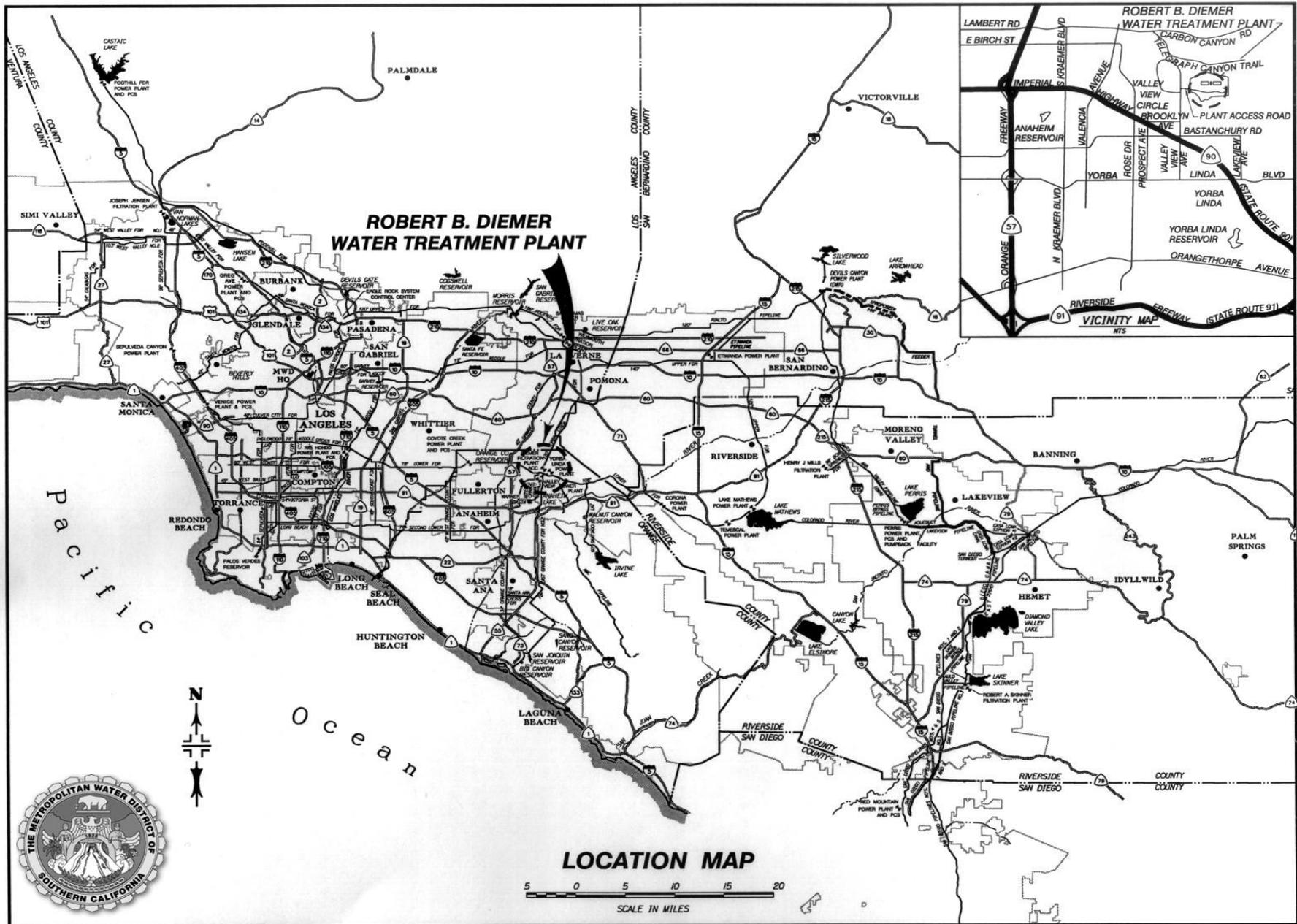
Financial Statement for Diemer Improvements Program – Phase II

A breakdown of Board Action No. 3 for Appropriation No. 15436 is as follows:

	Previous Total Appropriated Amount (March 2008)	Current Board Action No. 3 (Sep. 2008)	New Total Appropriated Amount
Labor			
Studies and Preliminary Design	\$ 59,000	\$ 53,000	\$ 112,000
Final Design	63,000	1,238,000	1,301,000
Owner Costs (Program mgmt., env. support)	245,038	536,000	781,038
Construction Inspection & Support	134,200	-	134,200
Metropolitan Force Construction	370,000	737,000	1,107,000
Materials and Supplies	122,000	484,000	606,000
Incidental Expenses	8,000	48,000	56,000
Professional/Technical Services	95,125	-	95,125
Hazardous Material Testing & Disposal	-	25,000	25,000
Value Engineering	-	105,000	105,000
Equipment Use	22,000	-	22,000
Contracts	481,932	-	481,932
Remaining Budget	184,168	224,000	408,168
Total	\$ 1,784,000	\$ 3,450,000	\$ 5,234,000

Funding Request

Program Name:	Diemer Improvements Program – Phase II		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15436	Board Action No.:	3
Requested Amount:	\$ 3,450,000	Capital Program No.:	15436-I
Total Appropriated Amount:	\$ 5,234,000	Capital Program Page No.:	E-27
Total Program Estimate:	\$ 83,874,800	Program Goal:	I- Infrastructure Reliability





WWRP No. 2
Flocculator
Improvements

Public Address
System Upgrade

East Basins
Perimeter Water Line
Replacement

Filter Valve
Replacement

Fire and Potable
Water Pump Station



Photo Date: May 2007