

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

January 9, 2007 Board Meeting

8-5

Subject

Appropriate \$2.16 million; and authorize (1) four rehabilitation projects at the Robert B. Diemer Water Treatment Plant; (2) amendment to an existing agreement with Ecosystems Restoration Associates; and (3) an increase in change order authority for the Diemer Surface Wash Headers Rehabilitation project (Approps. 15380 and 15446)

Description

The Robert B. Diemer Water Treatment 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 a treatment capacity of 520 mgd. The plant delivers a blend of waters from the Colorado River and State Water Project to Orange County and parts of Metropolitan's Central Pool portion of the distribution system.

Diemer Seismic Reliability Projects

The Diemer plant was originally constructed in the early 1960s by cutting approximately 55 to 70 feet of native material from the site's ridges and placing the material in adjacent ravines to produce a level pad. However, the fill material placed in these ravines was not engineered and benched into competent material as modern practices would dictate. As a result, some of the plant facilities located on or near these fill areas are potentially at risk of movement or failure during a credible seismic event. The Whittier Fault, which is located approximately one-half mile from the Diemer plant, has the capability of generating a 6.8 magnitude earthquake. To identify and mitigate seismic risks, Metropolitan is systematically assessing the seismic stability of structures at the Diemer plant. Of the 27 structures and major conduits at the plant, 17 structures have been evaluated and found to be adequate, one remains under study, and nine facilities require upgrades. Of these latter nine facilities, three projects relating to upgrade of the West Washwater Tank, backup of Washwater Reclamation Plant No. 2, and relocation of the plant's inlet conduit are currently underway. Seismic upgrades of the Finished Water Reservoir, East Washwater Tank and northeast Filter Outlet Conduit are addressed in this action. Upgrade of the plant's Administration Building and two Filter Buildings will be the subject of a future action.

In June 2004, Metropolitan's Board authorized geotechnical studies and detailed analyses to assess the seismic and soil stability of the existing Finished Water Reservoir, East Washwater Tank, and the northeast Filter Outlet Conduit. Staff recommends proceeding with preliminary design for these three facilities at this time.

Diemer Finished Water Reservoir Seismic Upgrade – Preliminary Design (\$634,000)

The Diemer plant has a single Finished Water Reservoir which provides 76.7 acre-feet of storage. The reservoir is constructed of reinforced concrete and is classified as a dam by the California Division of Safety of Dams (DSOD). Seismic analyses have concluded that in a maximum credible event, the Diemer Finished Water Reservoir could experience concrete cracking resulting in leakage through the floor slab and walls. Two foundation caissons on the south side could also displace outward due to sliding soil. However, the reservoir would remain intact and there would not be an uncontrolled release of water. As a result of the cracking and soil displacement, the reservoir would need to be shut down for repairs which would impact operation of the Diemer plant. To mitigate this seismic risk, a retaining wall is recommended to prevent slippage of the slope material underneath a section of the Finished Water Reservoir and to hold the two caissons in place.

The preliminary design and preparation of environmental documentation are recommended to be performed by Kennedy/Jenks Consultants and Ecosystems Restoration Associates, respectively, as discussed below.

Metropolitan staff will perform program management, coordination with DSOD, and coordination with other activities underway at the Diemer plant. As part of the project scope, a preliminary construction cost estimate will be developed.

This action appropriates \$634,000 and authorizes preliminary design and preparation of environmental documentation for seismic upgrades of the Diemer Finished Water Reservoir.

Diemer East Washwater Tank Seismic Upgrade – Preliminary Design (\$336,000)

The Diemer plant has two washwater tanks which store water used to backwash the plant's filters. The East Washwater Tank is a cylindrical, welded steel structure with a diameter of 60 feet and a height of 80 feet. Seismic analyses have concluded that in a maximum credible event, soil underneath the East Washwater Tank could slide toward the southeast, leaving voids under the tank's foundation. This movement could lead to rupture of the tank, which would impact the Diemer plant's ability to backwash filters. The recommended remediation work includes installation of curtain walls to restrain the soil underneath the tank.

The preliminary design is recommended to be performed by Kennedy/Jenks Consultants, as discussed below. Metropolitan staff will perform program management and coordination with other activities underway at the Diemer plant. As part of the project scope, a preliminary construction cost estimate will be developed.

This action appropriates \$336,000 and authorizes preliminary design of seismic upgrade for the Diemer East Washwater Tank.

Diemer Filter Outlet Conduit Seismic Upgrade – Preliminary Design (\$255,000)

The Diemer plant's northeast Filter Outlet Conduit traverses under the plant's east-west access road along the north side of Basin No. 4 (see [Attachment 2](#)). A portion of the conduit passes through a zone of fill material. Seismic analyses have concluded that in a maximum credible event, soil underneath the 10-foot diameter Filter Outlet Conduit north of Basin No. 4 could slide down the plant's north slope and potentially rupture the pipeline. The recommended remediation work includes installation of curtain walls to restrain the soil immediately north of the pipeline.

The preliminary design is recommended to be performed by Kennedy/Jenks Consultants, as discussed below. Metropolitan staff will perform program management and coordination with other activities underway at the Diemer plant. As part of the project scope, a preliminary construction cost estimate will be developed.

This action appropriates \$255,000 and authorizes preliminary design of seismic upgrade to the Diemer Filter Outlet conduit.

Yorba Linda Power Plant Modifications – Preliminary Design (\$935,000)

The Diemer plant has two inlet pipelines for the delivery of untreated water: the Lower Feeder from Lake Mathews, and the Yorba Linda Feeder from the Weymouth Junction Structure at that plant's inlet works. Due to its high delivery pressure, flow from the Yorba Linda Feeder is controlled through either the Yorba Linda Pressure Control Structure (PCS) or the Yorba Linda Power Plant, both of which are located at the Diemer plant. Completed in 1981 and adjoining the PCS, the Yorba Linda Power Plant is capable of generating 5.1 megawatts (MWs) of power and has been a reliable source of revenue for Metropolitan. There is presently an Energy Sale Agreement with the California Department of Water Resources (DWR) for purchase of power generated by the Yorba Linda Power Plant. Annual revenue from power generation varies with distribution system operations, but typically ranges from \$1 million to \$3 million.

The existing turbine is positioned above the operating water surface of the Diemer plant due to the type of turbine originally selected (an impulse turbine). When the planned Diemer ozonation facilities are completed, the water surface at the discharge of the power plant must rise to provide sufficient hydraulic head for the untreated flow to pass through the ozone contactors. This increase in the discharge water surface will prevent operation of the power plant in its current configuration. Staff has completed a study to investigate various options for mitigating the change, and recommends replacement of the existing turbine with a Francis turbine capable of operating under a submerged-discharge condition.

While evaluating modifications to the power plant, staff has also assessed the capacity of the Yorba Linda Power Plant to support the future electrical demands of the Diemer Oxidation Retrofit Program (ORP). Upon completion of the planned ORP, peak power demand at the Diemer plant will increase from 1.9 MW to 8.9 MW. Presently, the Yorba Linda Power Plant is connected to Southern California Edison's (SCE's) electrical grid, rather than serving the Diemer plant directly. Staff recommends interconnecting the Yorba Linda Power Plant to the new Diemer ORP switchyard to support the higher plant electrical power demands.

A preliminary cost/benefit analysis concluded that the power plant modifications and electrical interconnection between the power plant and the new ORP switchyard would result in a capital investment pay-back period of eight years or less. Staff recommends proceeding with the Yorba Linda Power Plant Modifications, which includes replacement of the existing turbine with a Francis turbine; modification of the turbine housing and power plant building; and electrical interconnection to the ORP switchyard.

The preliminary design effort will include identification of options and manufacturers for the custom-designed replacement turbine; verification and detailed layouts of modifications to the existing power plant structure and intake/discharge conduits; detailed hydraulic performance and surge analysis modeling; establishment of instrumentation and control requirements for the equipment, and integration with Diemer plant and distribution SCADA system; identification of electrical interconnection and new power metering requirements; routing of ductbanks to the new SCE service entrance at the Diemer plant's northwest hill; evaluation of DWR and SCE power purchase contractual issues; and preparation of environmental documentation. The preliminary design will be performed by Metropolitan staff. Environmental documentation is recommended to be prepared by Ecosystems Restoration Associates, as discussed below.

This action appropriates \$935,000 and authorizes preliminary design of modifications to the Yorba Linda Power Plant at the Diemer plant. Staff will return to the Board at a later date to authorize final design and to approve power agreements.

Consulting Engineering Support (No Action Required)

Preliminary design of the three Diemer seismic reliability projects is recommended to be performed by Kennedy/Jenks Consultants under an existing board-authorized agreement. For this agreement, Metropolitan established a SBE participation level of 20 percent. No amendment to the existing Kennedy/Jenks agreement is required for this work.

The surge analysis for the Yorba Linda Power Plant Modifications project is recommended to be performed by Montgomery Watson Harza (MWH) under an existing board-authorized agreement. For this agreement, Metropolitan established a SBE participation level of 21 percent. No amendment to the existing MWH agreement is required for this work.

Amendment to Agreement for Preparation of Environmental Documentation

Ecosystems Restoration Associates (ERA) has been selected to provide environmental permitting services and prepare environmental documentation for projects at the Diemer plant. ERA was selected through a competitive process (Request for Proposals No. 732), and a professional services agreement in the amount of \$1.5 million was authorized by the Board in May 2005. This action authorizes an increase of \$300,000 to the existing agreement with ERA, for a new not-to-exceed total of \$1.8 million, to prepare environmental documentation for the Diemer Finished Water Reservoir Seismic Upgrade project and for the Yorba Linda Power Plant Modifications. The SBE participation level established for this agreement is 20 percent.

Change Order Authority for Diemer Surface Wash Headers Rehabilitation (No Funds Required)

In September 2005, Metropolitan's Board awarded a \$1,849,331 construction contract to Norman A. Olsson Construction, Inc. (Olsson) for the Diemer Surface Wash Headers Rehabilitation project (Specifications No. 1528). This project involves rehabilitation at the Diemer plant's surface wash systems at the 24 east filters and 24 west filters. At the east filters, the work consists of complete replacement of the surface wash mains with new stainless steel pipe, and the removal, refurbishment, and reinstallation of the existing surface wash headers and valves. At the west filters, the work consists of installation of two new manual valves in the existing mains to

expand filter isolation capabilities and surface preparation and recoating of existing surface wash mains in 11 filters. (Rehabilitation of the existing surface wash mains in the remaining 13 west filters was previously completed by Metropolitan forces.) At both the east and west filters, all pipe supports are also being replaced. The project was designed by Carollo Engineers, under an existing professional services agreement authorized by the Board in June 2003.

To date, construction is approximately 80 percent complete and surface wash systems for 12 of the east filters have been completely rehabilitated. The remainder of the work is scheduled to be completed during the winter low-flow demand period of 2006/07.

To perform the filter modifications, each filter must be removed from service. Based on planning projections of Diemer plant demands and Metropolitan's distribution system operations, Specifications No. 1528 stated that the contractor would be given access to 12 of the east filters at a time. Due to unanticipated plant demands and distribution system operations, fewer than 12 east filters were able to be out of service at any one time. This restriction effectively lengthened the duration of the contract work.

Conditions inside the filters were also discovered to be much worse than previous investigations indicated. It was discovered that: (1) Due to excessive pitting discovered after sandblasting, additional repairs are required where dissimilar metals are in contact between the filter valves and the header pipes; and (2) Due to tight working conditions, new mechanical couplings were required to be installed inside the filter beds.

This action authorizes an increase in the General Manager's authority to execute change orders with Olsson from \$250,000 (per Metropolitan's Administrative Code) to an aggregate amount not to exceed \$350,000 (an increase of \$100,000). No additional funds are required, as sufficient funds are available within the existing appropriation.

These projects have been evaluated and recommended by Metropolitan's Capital Investment Plan (CIP) Evaluation Team. Funds have been included within the fiscal year 2006/07 capital budget for the Diemer Finished Water Reservoir, East Washwater Tank, and Filter Outlet Conduit Seismic Upgrades. Funds for the Yorba Linda Power Plant Modifications were not included in the fiscal year 2006/07 capital budget because cost estimates were developed after investigations and turbine vendor discussions concluded in November 2006; the project is recommended to move forward at this time to continue power generation, to coordinate construction with the Diemer ORP, and to offset power demand increases from the ORP. Upon approval of this action, the fiscal year 2006/07 capital expenditure plan will be adjusted to reflect the new Yorba Linda Power Plant Modifications project.

Requested funds are included under two capital programs within Metropolitan's CIP. See [Attachment 1](#) for the Financial Statements and [Attachment 2](#) for the Location Maps.

Project Milestones

May 2007 – Completion of construction of the Diemer Surface Wash Headers Rehabilitation

June 2007 – Completion of preliminary designs of Diemer Finished Water Reservoir Seismic Upgrade, East Washwater Tank Seismic Upgrade, and northeast Filter Outlet Conduit Seismic Upgrade

January 2008 – Completion of Yorba Linda Power Plant Modifications preliminary design

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)

Preliminary Design of the Diemer Finished Water Reservoir, East Washwater Tank, and Filter Outlet Conduit Seismic Upgrade Projects and the Yorba Linda Power Plant Modifications

CEQA determination for Options #1 and #2:

The proposed action 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 #3:

None required

Amendment with Ecosystems Restoration Associates

CEQA determination for Options #1 and #2:

The proposed action is not defined as a project under CEQA because it involves continuing administrative activities (Section 15378(b)(2) of the State CEQA Guidelines). In addition, the proposed action is not subject to CEQA because it involves other government fiscal activities, which do not involve any commitment to any specific project which may result in a potentially significant physical impact on the environment (Section 15378(b)(4) of the State CEQA Guidelines).

The CEQA determination is: Determine that the proposed action is not subject to the provisions of CEQA pursuant to Sections 15378(b)(2) and 15378(b)(4) of the State CEQA Guidelines.

CEQA determination for Option #3:

None required

Increase in change order authority for the Diemer Surface Wash Headers Rehabilitation project

CEQA determination for Option #1:

The project was previously determined to be categorically exempt under the provisions of CEQA (Class 2, Section 15302 of the State CEQA Guidelines) on November 20, 2001. A Notice of Exemption (NOE) was filed on the project at that time and the statute of limitations has ended. With the current board actions, there are no substantial changes proposed to the project since the original NOE was filed. Hence, the previous environmental documentation in conjunction with the project fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further CEQA documentation is necessary for the Board to act with regards to the proposed actions.

The CEQA determination is: Determine that the proposed actions have been previously addressed in the 2001 NOE (Class 2, Section 15302 of the State CEQA Guidelines) and that no further environmental analysis or documentation is required.

CEQA determination for Options #2 and #3:

None required

Board Options/Fiscal Impacts

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$2.16 million;
- b. Authorize preliminary design of the Diemer Finished Water Reservoir, East Washwater Tank, and Filter Outlet Conduit Seismic Upgrade projects;
- c. Authorize preliminary design of the Yorba Linda Power Plant Modifications;
- d. Authorize an increase of \$300,000 to the existing agreement with Ecosystems Restoration Associates for a new not-to-exceed total of \$1.8 million; and
- e. Authorize an increase of \$100,000 in the General Manager's change order authority for the Diemer Surface Wash Headers Rehabilitation project.

Fiscal Impact: \$1.225 million of budgeted funds under Approp. 15380 and \$935,000 of non-budgeted funds (of which approximately \$440,000 will be incurred in the current fiscal year) under Approp. 15446

Business Analysis: This option will enhance reliability and continued operation of the Diemer Treatment Plant in the event of a significant earthquake. This option will also allow the Yorba Linda Power Plant to continue generation and offset power demand increases from the Diemer ORP.

Option #2

Adopt the CEQA determinations and

- a. Appropriate \$2.16 million;
- b. Authorize preliminary design of the Diemer Finished Water Reservoir, East Washwater Tank, and Filter Outlet Conduit Seismic Upgrade projects;
- c. Authorize preliminary design of the Yorba Linda Power Plant Modifications;
- d. Authorize an increase of \$300,000 to the existing agreement with Ecosystems Restoration Associates for a new not-to-exceed total of \$1.8 million; and
- e. Do not authorize an increase in the General Manager's change order authority for the Diemer Surface Wash Headers Rehabilitation project.

Fiscal Impact: \$1.225 million of budgeted funds under Approp. 15380 and \$935,000 of non-budgeted funds (of which approximately \$440,000 will be incurred in the current fiscal year) under Approp. 15446

Business Analysis: Under this option, portions of the rehabilitation work on the Diemer surface wash headers will be performed under a future competitively bid construction contract; deferring the rehabilitation work will allow continued surface wash header pipe corrosion and reduction in treatment plant performance.

Option #3

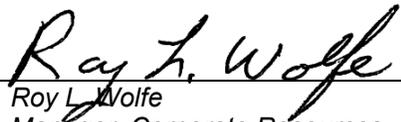
- a. Do not authorize preliminary design of the Diemer Seismic Reliability projects;
- b. Do not authorize preliminary design of the Yorba Linda Power Plant Modifications project;
- c. Do not authorize an increase of \$300,000 to the existing agreement with Ecosystems Restoration Associates; and
- d. Do not authorize an increase of \$100,000 in the General Manager's change order authority for the Diemer Surface Wash Headers Rehabilitation project.

Fiscal Impact: None

Business Analysis: This option will forego an opportunity to enhance reliability of the Diemer Treatment Plant in the event of a significant earthquake, will defer modification of the Yorba Linda Power Plant Modifications until completion of the Diemer ORP, and will potentially impact treatment performance.

Staff Recommendation

Option #1



Roy L. Wolfe
Manager, Corporate Resources

12/18/2006
Date



Jeffrey Kightlinger
General Manager

12/19/2006
Date

Attachment 1 – Financial Statements

Attachment 2 – Location Maps

BLA #4862

Financial Statement for Diemer Water Treatment Plant Improvements Program

A breakdown of Board Action No. 12 for Appropriation No. 15380 is as follows:

	Previous Total Appropriated Amount (May 2006)	Current Board Action No. 12 (Jan. 2007)	New Total Appropriated Amount
Labor			
Studies and Investigations	\$ 1,245,500	\$ 113,000	\$ 1,358,500
Final Design	752,900	-	752,900
Owner Costs (Program management, envir. documentation)	1,549,850	76,000	1,625,850
Construction Inspection and Support	355,350 *	-	355,350
Metropolitan Force Construction	1,445,000	-	1,445,000
Materials and Supplies	641,000	-	641,000
Incidental Expenses	36,000	3,000	39,000
Professional/Technical Services	4,560,000	-	5,510,000
Kennedy/Jenks	-	660,000	-
Ecosystem Restoration Assoc.	-	150,000	-
CH2M Hill -Value Engineering	-	130,000	-
CDM (geotechnical investigation)	-	10,000	-
Equipment Use	66,500	-	66,500
Contracts	3,365,000	-	3,365,000
Remaining Budget	1,878,900 *	83,000	1,961,900
Total	\$ 15,896,000	\$ 1,225,000	\$ 17,121,000

*Reflects reallocation of \$33,100 from Remaining Budget to Construction Inspection and Support for the Administration Building Re-roofing project, due to rainwater damage and extended construction duration.

Funding Request

Program Name:	Diemer Water Treatment Plant Improvements Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15380	Board Action No.:	12
Requested Amount:	\$ 1,225,000	Capital Program No.:	15380-I
Total Appropriated Amount:	\$ 17,121,000	Capital Program Page No.:	E-25
Total Program Estimate:	\$ 79,300,000	Program Goal:	I – Infrastructure Reliability

Financial Statement for Yorba Linda Power Plant Modifications Program

A breakdown of Board Action No. 1 for Appropriation No. 15446 is as follows:

	Board Action No. 1 (Jan. 2007)
Labor	
Studies and Investigations	\$ 434,000
Final Design	-
Owner Costs (Program management, envir. documentation, utility negotiations)	210,000
Materials and Supplies	2,000
Incidental Expenses	6,000
Professional/Technical Services	-
Ecosystems Restoration Assoc.	150,000
Montgomery Watson Harza	13,000
Equipment Use	-
Contracts	-
Remaining Budget	120,000
Total	\$ 935,000

Funding Request

Program Name:	Yorba Linda Power Plant Modifications Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15446	Board Action No.:	1
Requested Amount:	\$ 935,000	Capital Program No.:	15446
Total Appropriated Amount:	\$ 935,000	Capital Program Page No.:	N/A
Total Program Estimate:	\$ 24,010,000	Program Goal:	N/A

