

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

August 19, 2008 Board Meeting

7-2

Subject

Appropriate \$1.41 million; and authorize three projects for Metropolitan's hydroelectric power plants (Approps. 15457, 15458 and 15377)

Description

This action authorizes: (1) An assessment of the condition and reliability of Metropolitan's 16 existing hydroelectric power plants; (2) A study to evaluate the feasibility of increasing generation capacity at the existing power plants, or adding new hydroelectric power plants; and (3) Upgrades to five existing hydroelectric power plants to eliminate the discharge of lubrication water into adjacent storm drains. These projects are categorized as Infrastructure Rehabilitation, Infrastructure Upgrade, and Stewardship projects, respectively, and are budgeted within Metropolitan's Capital Investment Plan (CIP).

Background

In the early 1970s, Metropolitan embarked on a program to develop hydroelectric power generation plants throughout the conveyance and distribution system. Sixteen small hydroelectric power plants have been developed to date, ranging in capacity from 1 to 40 MW (see [Attachment 2](#)). These plants have produced \$24 million in average annual revenues over the past seven years, and are a reliable source of green energy.

Project No. 1 – Hydroelectric Power Plant Reliability Assessment – Study Phase (\$227,000)

Many of Metropolitan's hydroelectric power plants have been in continuous use for over 30 years. While the facilities have received routine preventive maintenance, the rotating equipment and complex mechanical and electrical systems are exhibiting signs of normal wear and tear. Over the past three years, the plants have been shut down over 3,800 hours as a result of repairs. Staff recommends that a reliability study be conducted to assess the current condition of the plants, and to identify cost-effective rehabilitation, repair, or replacement work. The assessment will address the condition, age, redundancy, and operating and maintenance history of equipment such as turbine runners, generators, controls, transformers, relay protection, and the structures that house this equipment. The study will provide a detailed evaluation of the reliability of the hydroelectric power plants, and will address vulnerability of plant operation to equipment failures or events such as fires or earthquakes.

Following completion of the reliability assessment, staff will prepare a comprehensive rehabilitation plan to remedy deficiencies, address regulatory compliance issues (if any), improve plant efficiency, and reduce maintenance. Any recommendations for rehabilitation, repair or replacement will be evaluated for inclusion in the CIP and will be the subject of future board actions.

This action appropriates \$227,000 and authorizes detailed assessments of Metropolitan's 16 existing hydroelectric power plants. All work will be performed by Metropolitan staff.

Project Milestone

June 2009 – Completion of assessment

Project No. 2 – Hydroelectric Power Development – Feasibility Study (\$670,000)

Metropolitan's original hydropower development program focused on the retrofit of existing pressure control structures in the conveyance and distribution system with hydroelectric turbines. Thirteen pressure control structure locations were ultimately converted into hydroelectric power plants, based on an assessment which considered economic conditions in the 1970s and then-available generation equipment. The criteria originally employed to assess feasibility included payback periods of 7-10 years or less, and an energy rate of \$0.02 per kWh. Using these criteria, a number of potential sites were deemed economically infeasible at that time. Staff recommends that a new comprehensive feasibility study be conducted to reevaluate hydropower opportunities throughout the conveyance and distribution system, based on current forecasts of energy prices and modern generation equipment.

The Hydroelectric Power Development Study will assess the feasibility of upgrading the generation capacity at existing hydroelectric power plants, as well as adding new power plants at existing pressure control structures or other potential locations. The scope of work will include evaluations of: (1) availability of land for constructing facilities; (2) proximity of proposed hydroelectric power plants to existing electrical transmission lines; (3) alternative turbine types and configurations to improve efficiency of the existing power plants, and generation capacity based on current and future operating conditions for both existing and new power plants; (4) environmental and other permitting issues that may affect the feasibility of constructing a facility at a particular location; and (5) estimated capital costs and generation revenues.

This action appropriates \$670,000 and authorizes the Hydroelectric Power Development Study. Metropolitan staff will perform the technical assessments, program management, environmental review, and coordination with external agencies.

Project Milestone

June 2009 – Completion of feasibility study

Project No. 3 – Hydroelectric Power Plant Discharge Elimination – Addition to Scope of Final Design and Construction (\$513,000)

This project consists of upgrades to the Foothill, Greg Avenue, Rio Hondo, Venice, and Coyote Creek power plants to eliminate discharge of lubrication water flows into adjacent storm drains. These five facilities are the only Metropolitan hydroelectric plants that discharge lubrication water in this manner. By eliminating these discharges, the increasingly costly and time-consuming tasks of monitoring and testing discharges for compliance with National Pollutant Discharge Elimination Standards (NPDES) permits will be sharply reduced, and discharge fees will no longer be paid. Staff estimates that the payback period for these upgrades is approximately two years.

In November 2003, Metropolitan's Board authorized final design and construction to install water recycling systems for the lubrication water leakage at the Foothill, Greg Ave, Rio Hondo, and Venice power plants as a way to eliminate water discharges to the storm drain system. In 2004, as part of the Cross Connection Prevention Program, the planned lubrication water recycling systems were determined to be potential cross connections at these four power plants, which all handle potable water. An existing plant (Coyote Creek) was already in operation at that time with the new water recycling system. Coyote Creek was taken out of service when staff identified the potential cross connection.

To resolve the potential cross connections, a pilot program was initiated at Coyote Creek power plant to eliminate or substantially reduce lubrication water flows by using a custom-designed mechanical seal. The new mechanical seal has significantly reduced the water discharge from 50 gallons per minute to less than 1 gallon per day. The significant water reduction will allow Metropolitan to meet stringent regulatory compliance requirements and reduce O&M costs through the elimination of up to 320 acre-feet of treated water discharged into storm drains per year, and the annual associated discharge fees of over \$200,000.

This action appropriates \$513,000 and authorizes a revised scope of work to eliminate discharges from the five hydroelectric power plants, including full upgrades at Coyote Creek. The revised project includes design and

installation work to replace the turbine shaft seals with custom mechanical seals and to modify the water collection and discharge systems at Greg Avenue, Rio Hondo, Venice, Foothill, and Coyote Creek power plants.

Based on the previous scope of work, funds of \$384,000 were appropriated in November 2003. Expenditures to date total \$282,000, leaving a balance of \$102,000 in available funds. The additional \$513,000 included under this action will be sufficient to complete the final design, procurement of materials, and installation at all five power plants.

Final design and construction will be performed by Metropolitan staff. Requested funds include \$92,000 for final design and field engineering, \$30,000 for permitting with local agencies for the sewer connections, \$225,000 for procurement of mechanical seals, \$116,000 for installation of the seals by Metropolitan forces, and \$50,000 for remaining budget.

Project Milestones

January 2009 – Completion of final design

June 2010 – Completion of construction

Summary

This action appropriates \$1.41 million in budgeted funds and authorizes three hydroelectric power plant projects. These projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the capital budget for fiscal year 2008/09. These projects are consistent with Metropolitan's goal for sustainability by enhancing the reliability of the existing distribution system and increasing Metropolitan's use of renewable power. See [Attachment 1](#) for the Financial Statements, and [Attachment 2](#) for the Location Map.

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

California Environmental Quality Act (CEQA)

CEQA determinations for Option #1:

Project No. 1 – Hydroelectric Power Plant Reliability Assessment – Study Phase, and Project No. 2 – Hydroelectric Power Development - Feasibility Study

The proposed actions are categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed actions consist 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 actions qualify as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

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

Project No. 3 – Hydroelectric Power Plant Discharge Elimination – Addition to Scope of Final Design and Construction

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. Accordingly, the proposed action qualifies 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).

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$1.41 million in budgeted funds;
- b. Authorize a reliability assessment of Metropolitan’s existing hydroelectric power plants;
- c. Authorize a hydropower feasibility study throughout the distribution system; and
- d. Authorize final design and construction of the hydroelectric plant Discharge Elimination Project.

Fiscal Impact: \$227,000 in budgeted funds under Approp. 15458, \$670,000 in budgeted funds under Approp. 15457, and \$513,000 in budgeted funds under Approp. 15377

Business Analysis: An assessment of the condition of Metropolitan’s 16 existing hydroelectric power plants would identify needed rehabilitation and replacement work, and would enhance their reliability. The hydropower feasibility study would identify opportunities for new hydroelectric generation, while the Discharge Elimination Project would save costs associated with discharge reporting (with a payback period of approximately two years).

Option #2

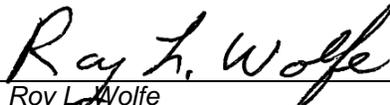
Do not authorize the projects at this time.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to increase reliability of the existing hydroelectric plants; would defer efforts to identify new sources of renewable energy; and may limit operation of Metropolitan’s hydroelectric plants to remain within discharge permit limits.

Staff Recommendation

Option #1


 _____ 7/29/2008
 Roy L. Wolfe Date
 Manager, Corporate Resources


 _____ 8/4/2008
 Jeffrey Kightlinger Date
 General Manager

Attachment 1 – Financial Statements

Attachment 2 – Location Map

BLA #6175

Financial Statement for Hydroelectric Power Plant Improvements Program

A breakdown of Board Action No. 1 for Appropriation No. 15458 for the Hydroelectric Power Plant Reliability Assessment is as follows:

	Current Board Action No. 1 (Aug. 2008)	New Total Appropriated Amount
Labor		
Studies & Investigations	\$ 180,000	\$ 180,000
Owners Costs (Program mgmt)	27,000	27,000
Professional/Technical Services	-	-
Materials and Supplies	-	-
Incidental Expense	-	-
Equipment Use	-	-
Contracts	-	-
Remaining Budget	20,000	20,000
Total	\$ 227,000	\$ 227,000

Funding Request

Program Name:	Hydroelectric Power Plant Improvements Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15458	Board Action No.:	1
Requested Amount:	\$ 227,000	Capital Program No.:	15458
Total Appropriated Amount:	\$ 227,000	Capital Program Page No.:	E-33
Total Program Estimate:	\$ 227,000	Program Goal:	R-Reliability

Financial Statement for Hydroelectric Power Development Program

A breakdown of Board Action No. 1 for Appropriation No. 15457 for the Hydroelectric Feasibility Study is as follows:

	Current Board Action No. 1 (Aug. 2008)	New Total Appropriated Amount
Labor		
Studies & Investigations	\$ 450,000	\$ 450,000
Owners Costs (Program mgmt, permitting, right-of-way)	150,000	150,000
Professional/Technical Services	-	-
Materials and Supplies	-	-
Incidental Expenses	-	-
Equipment Use	-	-
Contracts	-	-
Remaining Budget	70,000	70,000
Total	\$ 670,000	\$ 670,000

Funding Request

Program Name:	Hydroelectric Power Development Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15457	Board Action No.:	1
Requested Amount:	\$ 670,000	Capital Program No.:	15457
Total Appropriated Amount:	\$ 670,000	Capital Program Page No.:	E-32
Total Program Estimate:	\$ 670,000	Program Goal:	Stewardship

Financial Statement for Conveyance and Distribution System Rehabilitation Program

A breakdown of Board Action No. 25 for Appropriation No. 15377 for the power plant Discharge Elimination Project is as follows:

	Previous Total Appropriated Amount (May 2008)	Current Board Action No. 25 (Aug. 2008)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 3,204,700	\$ -	3,204,700
Final Design	4,190,920 *	92,000	4,282,920
Owners Costs (Program mgmt, permitting)	4,017,550	28,000	4,045,550
Construction Inspection & Support	1,540,050	-	1,540,050
Metropolitan Force Construction	11,967,505	116,000	12,083,505
Materials and Supplies	4,710,075	225,000	4,935,075
Incidental Expenses	1,257,620	2,000	1,259,620
Professional/Technical Services	836,500	-	836,500
Equipment Use	772,350	-	772,350
Contracts	15,072,955 *	-	15,072,955
Remaining Budget	942,475 *	50,000	992,475
Total	\$ 48,512,700	\$ 513,000	\$ 49,025,700

*Reflects reallocation of \$484,000 from Remaining Budget to Contracts for increased material costs on the Foothill Feeder Cathodic Protection Project (\$64,000); and to Final Design for the Lake Skinner East Bypass Screening Structure Rehabilitation Project (\$420,000) for increased scope related to shutdown tie-ins and emergency operation.

Funding Request

Program Name:	Conveyance and Distribution System Rehabilitation Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15377	Board Action No.:	25
Requested Amount:	\$ 513,000	Capital Program No.:	15377-I
Total Appropriated Amount:	\$ 49,025,700	Capital Program Page No.:	E-14
Total Program Estimate:	\$ 63,790,000	Program Goal:	R-Reliability

Metropolitan Small Hydro Power Plants

