



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

11/9/2010 Board Meeting

7-3

Subject

Appropriate \$370,000; and authorize preliminary design of rehabilitation projects at the Foothill and Sepulveda Canyon Hydroelectric Plants (Approp. 15458)

Description

This action authorizes preliminary design of mechanical and electrical rehabilitation projects at the Foothill and Sepulveda Canyon Hydroelectric Plants. These facilities have been in continuous use for nearly 30 years, and performance of the equipment has begun to diminish.

Timing and Urgency

Inspections of the Foothill and Sepulveda Canyon Hydroelectric Plants have identified that the mechanical and electrical equipment is exhibiting signs of age-related wear. Equipment that needs to be refurbished includes electrical protection relays, control relays, and mechanical piping for the generator cooling water system. The loss of any of these components could cause the plants to shut down, with a resulting loss of revenue up to \$4,500 or \$7,500 daily, at each facility.

Staff recommends moving forward with rehabilitation projects at these two facilities to minimize the risk of expensive repairs, enhance reliability of the conveyance/distribution system, and maximize Metropolitan's generation of revenue. Both projects have been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria. Each project is categorized as an Infrastructure Rehabilitation project, and is budgeted within Metropolitan's CIP for fiscal year 2010/11.

Background

Metropolitan owns and operates 16 small hydroelectric power plants, which have produced \$24 million in average annual revenue over the past seven years. Revenue is expected to increase in the future as retail electrical rates continue to rise.

In August 2008, Metropolitan's Board authorized an assessment of the current condition of the hydroelectric power plants, in order to identify cost-effective rehabilitation or replacement work. The assessment included visual inspections and testing of the power plants, and addressed the condition, age, operation, redundancy, and maintenance history of equipment such as turbine runners, generators, controls, and transformers; along with the structures that house this equipment. In August 2009, the Board authorized rehabilitation of the San Dimas Hydroelectric Plant as the first project under this program. That work was completed in February 2010.

This action addresses the second and third projects under the Hydroelectric Power Plants Improvement Program. Staff has prioritized and scheduled the remaining facilities, and will return to the Board over the next five years to initiate those rehabilitation projects.

Project No. 1 – Foothill Hydroelectric Plant Rehabilitation – Preliminary Design Phase (\$190,000)

The Foothill Hydroelectric Plant was constructed in 1981. It receives untreated State Water Project flows from the Department of Water Resources' Castaic Lake facility. Water is then conveyed to the Jensen plant through the Foothill Feeder. This facility can produce up to 9.1 MW of electricity with its single turbine. Depending on pipeline flow rates, daily revenues can range from \$3,000 to \$7,500. When the hydroelectric plant is shut down, flows are diverted through a separate pressure control structure in order to maintain water deliveries to the Jensen plant.

Foothill Hydroelectric Plant has been in continuous use for over 29 years. While the facility has received routine preventive maintenance, the electrical and mechanical systems are exhibiting signs of normal wear and tear. The facility's condition assessment identified that electrical components such as protection relays and control relays do not always function properly, which could result in overheating or short-circuiting of the electrical system, leading to a plant shutdown. Spare parts for some of the electrical equipment are difficult to obtain or are no longer available. Replacement of deteriorated electrical and mechanical components at the plant will help minimize repair costs and unplanned shutdowns.

Recent inspections also identified that the copper piping system which supplies cooling water to the generator enclosure has begun to corrode. Due to the close proximity to high voltage equipment, any leakage or spray of water occurring as a result of pipe corrosion could damage the generator and electrical system. Staff recommends moving forward at this time with preliminary design activities to rehabilitate the hydroelectric plant.

This action appropriates \$190,000 and authorizes preliminary design phase activities to rehabilitate electrical and mechanical components of the Foothill Hydroelectric Plant. Planned activities include: detailed physical inspection which will include partial teardown of electrical panels; definition of design criteria as a result of new technological advances; review of vendor specifications for new electrical equipment, and assessment of compatibility with existing equipment; code compliance for health, safety and regulatory requirements; preparation of a preliminary design to integrate new PLC-based technology with existing electromechanical equipment; and development of a preliminary cost estimate. Requested funds include \$135,000 for the preliminary design; \$40,000 for project management and preparation of environmental documentation; and \$15,000 for remaining budget. All work will be performed by Metropolitan staff.

Project No. 2 – Sepulveda Canyon Hydroelectric Plant Rehabilitation – Preliminary Design Phase (\$180,000)

The Sepulveda Canyon Hydroelectric Plant was constructed in 1982. It receives treated State Water Project flows from the Jensen plant via the Sepulveda Feeder, and can produce up to 8.6 MW of electricity with its single turbine. Depending on pipeline flow rates, daily revenues can range from \$2,000 to \$4,500. When the hydroelectric plant is shut down, flows are diverted through a separate pressure control structure in order to maintain treated water deliveries into the Central Pool.

Sepulveda Canyon Hydroelectric Plant has been in continuous use for over 28 years. While the facility has received routine preventive maintenance, the electrical and mechanical systems are exhibiting signs of normal wear and tear. The facility's condition assessment identified that the power transformer is approaching the end of its useful life and is experiencing high internal oil temperatures, which could lead to breakdown of the equipment. Electrical components such as protection relays and control relays do not always function properly. In addition, spare parts for some of the electrical equipment are difficult to obtain or are no longer available.

Inspections have also revealed that coatings on internal components of the turbine, including the scroll case and tailrace, are deteriorating. Water travels through the scroll case to the needle valves and then exits through the tailrace. The internal coatings at both areas are original and require recoating. Staff recommends moving forward at this time with preliminary design activities to rehabilitate the hydroelectric plant, which will help minimize future repair costs and unplanned shutdowns.

This action appropriates \$180,000 and authorizes preliminary design phase activities to rehabilitate electrical and mechanical components of the Sepulveda Canyon Hydroelectric Plant. Planned activities include: detailed physical inspection which will include partial teardown of electrical panels; definition of design criteria as a result

of new technological advances; review of vendor specifications for new electrical equipment, and assessment of compatibility with existing equipment; code compliance for health, safety and regulatory requirements; preparation of a preliminary design to integrate new PLC-based technology with existing electromechanical equipment; and development of a preliminary cost estimate. Requested funds include \$125,000 for preliminary design; \$40,000 for project management and preparation of environmental documentation; and \$15,000 for remaining budget. All work will be performed by Metropolitan staff.

Summary

This action appropriates \$370,000 and authorizes preliminary design to rehabilitate electrical and mechanical components at Foothill and Sepulveda Canyon Hydroelectric Plants. This work will be performed under the Hydroelectric Power Plant Improvements Program (Appropriation No. 15458), which was initiated in fiscal year 2008/09. The total appropriated amount for this program will increase from \$1,647,000 to \$2,017,000. Past work completed under Appropriation No. 15458 includes rehabilitation of the needle valves and turbine at San Dimas Hydroelectric Plant.

See [Attachment 1](#) for the Financial Statement, and [Attachment 2](#) for the Location Map.

These projects are consistent with Metropolitan's goals for sustainability by enhancing the reliability of the distribution system and increasing Metropolitan's use of renewable power.

Project Milestones

November 2011 – Completion of Foothill Hydroelectric Plant preliminary design

November 2011 – Completion of Sepulveda Canyon Hydroelectric Plant preliminary design

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

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 #2:

None required

Board Options

Option #1

Adopt the CEQA determination and

- a. Appropriate \$370,000; and
- b. Authorize preliminary design of rehabilitation projects at the Foothill and Sepulveda Canyon Hydroelectric Plants.

Fiscal Impact: \$370,000 of budgeted funds (Approp. 15458)

Business Analysis: This option will enhance reliability of the Foothill and Sepulveda Canyon Hydroelectric Plants, and will reduce the risk of damage to major equipment. The plants will continue to provide renewable, energy that will contribute to Metropolitan's sustainability goals.

Option #2

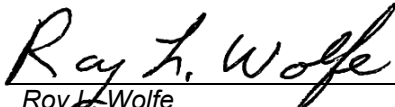
Do not authorize the two projects at this time.

Fiscal Impact: None

Business Analysis: This option would forgo an opportunity to refurbish the Foothill and Sepulveda Canyon Hydroelectric Plants, which could lead to increased annual operating costs. Further, this option would not support Metropolitan's goals to provide long-term power reliability, protect against energy market price volatility, and hedge against overall cost risks for operation of Metropolitan's distribution system and the Colorado River Aqueduct.

Staff Recommendation

Option #1


Roy L. Wolfe
Manager, Corporate Resources

10/26/2010
Date


Jeffrey Lightinger
General Manager

10/26/2010
Date

Attachment 1 – Financial Statement

Attachment 2 – Location Map

Ref# cr12606714

Financial Statement for Hydroelectric Power Plant Improvements Program

A breakdown of Board Action No. 3 for Appropriation No. 15458 for the Foothill and Sepulveda Canyon Hydroelectric Plants rehabilitation projects* is as follows:

	Previous Total Appropriated Amount (Aug. 2009)	Current Board Action No. 3 (Nov. 2010)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 347,000	\$ 260,000	\$ 607,000
Owner Costs (Proj. mgmt, envir. doc.)	58,000	80,000	138,000
Metropolitan Force Construction	920,000	-	920,000
Professional/Technical Services	-	-	-
Materials and Supplies	55,000	-	55,000
Incidental Expenses	7,000	-	7,000
Equipment Use	27,000	-	27,000
Contracts	10,000	-	10,000
Remaining Budget	223,000	30,000	253,000
Total	\$ 1,647,000	\$ 370,000	\$ 2,017,000

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.:	3
Requested Amount:	\$ 370,000	Capital Program No.:	15458
Total Appropriated Amount:	\$ 2,017,000	Capital Program Page No.:	224
Total Program Estimate:	\$ 18,469,000	Program Goal:	R-Reliability

*This action is the initial appropriation for the Sepulveda Canyon and Foothill Hydroelectric Plants rehabilitation projects.

Foothill and Sepulveda Canyon Hydroelectric Plants

