

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

May 16, 2006 Board Meeting

8-7

Subject

Appropriate \$2.37 million; and authorize nine rehabilitation projects within the distribution system (Approp. 15377)

Description

The backbone of Metropolitan's distribution system was initially constructed in the 1940s and has been in continuous service ever since. This system consists of approximately 780 miles of pipelines and related structures that convey potable water from the water treatment plants to the member agencies' service connections. This system includes hydroelectric plants, pressure control facilities, reservoirs, control structures, turnouts, and sectionalizing valves totaling nearly 5,000 individual facilities. Metropolitan staff conducts regular maintenance of the distribution system's structures, mechanical components, and electrical equipment. Although the distribution system continues to perform reliably today, portions of the system are exhibiting signs of normal wear and tear, as may be expected from over 60 years of operation.

A comprehensive assessment of the distribution system's structures and associated mechanical and electrical components was completed in December 2005. A second assessment will be initiated in fiscal year 2006/07 to inspect the physical condition of the interior of Metropolitan's pipelines. Any rehabilitation projects identified in these assessments will be evaluated for inclusion in the capital budget and will be the subject of future board actions.

Nine rehabilitation projects are recommended to move forward at this time. The recommended projects will protect Metropolitan's invested assets, increase the reliability of service to our customers, and reduce the risk of costly emergency repairs. Each of the projects has been evaluated and recommended by Metropolitan's Capital Investment Plan Evaluation Team, and funds have been included in the fiscal year 2005/06 capital budget. The nine budgeted projects are:

1. Greg Avenue Control Structure Valve and Pipe Replacement (\$667,000) – This action authorizes final design, valve procurement for the replacement of three 24-inch valves (ball, butterfly and check) and two 30-inch butterfly valves, fabrication of piping and fittings, and installation.
2. San Gabriel Tower Communication System (\$385,000) – This action authorizes final design and construction of a radio communication system to upgrade the existing 60-year-old overhead communication line.
3. Lakeview Pipeline Cathodic Protection (\$260,000) – This action authorizes final design and installation of a cathodic protection system to protect the pipeline from corrosion.
4. Wadsworth Pump Plant Conduit Protection (\$225,000) – This action authorizes final design and installation of a cathodic protection system to protect the conduit from corrosion, and installation of a pipeline/wall seal.
5. Hydroelectric Plants Fire Suppression System Modifications (\$241,000) – This action authorizes final design to upgrade the fire protection systems at 13 hydroelectric plants.
6. San Diego Pipeline No. 4 Valve Replacement (\$207,000) – This action authorizes final design and valve procurement for the replacement of six 8-inch, two 10-inch, and one 12-inch plug valves with butterfly valves.

7. Orange County Feeder Extension Lining Repair (\$150,000) – This action authorizes preliminary design for relining a portion of the feeder.
8. Middle Feeder Cathodic Protection (\$150,000) – This action authorizes final design of a cathodic protection system to protect the pipeline from corrosion.
9. St. Johns Canyon Channel Erosion Repairs (\$85,000) – This action authorizes preliminary design and acquisition of permits for erosion repairs.

Summary

This action appropriates \$2.37 million for nine distribution system rehabilitation projects. The appropriated funds include \$289,500 for preliminary design and permitting; \$335,000 for final design; \$880,500 for Metropolitan force construction and materials; \$250,000 for construction contracts; \$494,000 for all other project support; and \$121,000 for remaining budget. Support activities include permitting, environmental monitoring, field investigations, and technical assessments. Work will be performed primarily by Metropolitan staff, with specialized technical support from consultants such as geotechnical engineering, already under contract.

The total program estimate to complete all nine projects is \$10 million. See [Attachment 1](#) for the Detailed Report, [Attachment 2](#) for the Financial Statement, and [Attachment 3](#) for a Location Map.

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriation

California Environmental Quality Act (CEQA)

CEQA determinations for Option #1:

For the following seven projects under the Conveyance and Distribution System Rehabilitation Program: San Gabriel Tower Communication System, Greg Avenue Control Structure, San Diego Pipeline No. 4, Middle Feeder, Lakeview Pipeline, fire protection systems at thirteen hydroelectric plants, Wadsworth Pump Plant Conduit

The proposed actions are categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed actions involve the funding, design, and minor alterations, reconstruction or replacement of existing public facilities along with the construction of minor appurtenant structures with negligible or no expansion of use and no possibility of significantly impacting the physical environment. Accordingly, the proposed actions qualify under Class 1, Class 2, and Class 3 Categorical Exemptions (Sections 15301, 15302, and 15303 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed actions qualify under three Categorical Exemptions (Class 1, Section 15301; Class 2, Section 15302; and Class 3, Section 15303 of the State CEQA Guidelines).

For the following two projects under the Conveyance and Distribution System Rehabilitation Program: St. Johns Canyon Channel and Orange County Feeder

The proposed actions of funding and authorizing preliminary design are not subject to CEQA because they involve 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). In addition, 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 also qualify for a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that the proposed actions are exempt from CEQA pursuant to Sections 15306 and 15378(b)(4) of the State CEQA Guidelines.

CEQA determination for Option #2:

None required

Board Options/Fiscal Impacts

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$2.37 million in budgeted funds; and
- b. Authorize nine projects under the Conveyance and Distribution System Rehabilitation Program:
 - Final design, procurement and installation of five replacement valves and piping for the Greg Avenue Control Structure.
 - Final design and construction for replacement of the San Gabriel Tower Communication System.
 - Final design and construction to protect the Wadsworth Pump Plant Conduit.
 - Final design and construction of a cathodic protection system for the Lakeview Pipeline.
 - Final design to upgrade the fire protection systems at thirteen hydroelectric plants.
 - Final design, procurement and installation of nine valves on San Diego Pipeline No. 4.
 - Preliminary design for relining a portion of the Orange County Feeder.
 - Final design of a cathodic protection system for the Middle Feeder.
 - Preliminary design to protect the St. Johns Canyon Channel from erosion.

Fiscal Impact: \$2.37 million of budgeted funds under Approp. 15377

Option #2

Do not authorize design and repairs to the distribution system. The existing pipelines and facilities will continue to be monitored, and repairs will be made when problems occur.

Fiscal Impact: None

Staff Recommendation

Option #1


 _____ 4/17/2006
 Gordon L. Johnson Date
 for Roy L. Wolfe
 Manager, Corporate Resources


 _____ 4/21/2006
 Jeffrey Kightlinger Date
 General Manager

Attachment 1 – Detailed Report

Attachment 2 – Financial Statement

Attachment 3 – Location Map

Detailed Report

Purpose/Background

Metropolitan's distribution system is comprised of 780 miles of pipelines and numerous reservoirs, pressure control structures, flow meters, sectionalizing valves, and hydroelectric power plants. A comprehensive assessment of the distribution system's structures and associated mechanical and electrical components was completed in December 2005. This assessment identified facilities in need of repair, refurbishment, or replacement.

Staff recommends that nine budgeted projects proceed at this time. The projects are: (1) Greg Avenue Control Structure Valve Replacement; (2) San Gabriel Tower Communication System; (3) Wadsworth Pump Plant Conduit Protection; (4) Lakeview Pipeline Cathodic Protection; (5) Hydroelectric Plants Fire Suppression System Modifications; (6) San Diego Pipeline No.4 Valve Replacement; (7) Orange County Feeder Extension Lining Repair; (8) Middle Feeder Cathodic Protection; and (9) St. Johns Canyon Channel Erosion Repair.

Greg Avenue Control Structure Valve and Pipe Replacement (\$667,000)

The Greg Avenue Control Structure was constructed in 1962 and is located on the East Valley Feeder within Sun Valley. The control structure can regulate or shut off flows using two 24-inch ball valves and two 30-inch butterfly valves. These valves are critical to operate, maintain or repair the feeder.

These pneumatically actuated valves were installed in the mid-1960s and are approaching the end of their useful life. They do not seal properly, leaking approximately 25 gallons per minute. This leakage requires Metropolitan staff to use sump pumps to drain the water during routine maintenance activities. In addition, the valve indicators do not provide accurate information when the valves are either 100 percent open or 100 percent closed, making it difficult to operate the pump/generation station at Greg Avenue efficiently.

Replacement of the existing valves will increase system reliability and eliminate leaks. The valves will be electric motor actuated, with position indicators and control capability throughout Metropolitan's SCADA system.

This action authorizes final design, procurement and installation of five valves by Metropolitan staff.

Actions and Milestones

November 2006 – Complete design

April 2008 – Complete valve installation

San Gabriel Tower Communication System (\$385,000)

The San Gabriel Tower was constructed in 1936 and is located on the Upper Feeder in the San Gabriel Mountains, north of the city of Azusa. In 1940, a 1,500-foot long aboveground communication cable was installed to remotely monitor and control flows to the San Gabriel Control Tower and to service connection USG-3. Metropolitan's Operations Control Center regularly relies on this line to make changes in flow deliveries to the Upper San Gabriel Valley Water District.

Recent inspections have revealed that 24 of the 25 communication lines within the cable are no longer capable of service. If the communication line were to fail, staff would need to traverse rugged terrain and cross the San Gabriel River to make flow changes manually. Seasonally high flows in the San Gabriel River would prevent manual access to the control tower and service connection. In addition, the existing communication line is routed through Morris Dam, which was transferred from Metropolitan to the Los Angeles County Department of Public Works in 1995. Staff recommends that the existing communication cable be removed and replaced with a radio communication system in order to improve the reliability of water deliveries and vacate the Morris Dam facility.

This action authorizes final design and construction by Metropolitan staff.

Actions and Milestones

December 2006 – Complete design

June 2007 – Complete construction

Lakeview Pipeline Cathodic Protection (\$260,000)

The Lakeview Pipeline was constructed in 1971 and extends from the Lake Perris Control Structure to the junction of the San Diego and Casa Loma Canals, north of the city of Hemet. It is a mortar-coated welded-steel pipeline with a diameter of 132 inches and a length of approximately 7 miles. A solar-powered cathodic protection system was installed in 1984 to prevent corrosion damage to the pipeline. Solar power was used because the local power provider had not extended its service into this region.

Recent tests have determined that the cathodic protection system and its solar power source are malfunctioning due to age. The solar panels can no longer deliver sufficient power to run the cathodic protection system, and the sacrificial anodes which are intended to corrode in place of the pipeline have been depleted and no longer protect the line. The anodes are 50 feet deep. Staff recommends that the existing cathodic protection system be replaced with an up-to-date system, which relies on power from a local utility, which has since been brought into the area.

This action authorizes final design and construction of a cathodic protection system to be installed on the Lakeview Pipeline.

Actions and Milestones

December 2006 – Complete design

June 2007 – Complete construction

Wadsworth Pump Plant Conduit Protection (\$225,000)

The Hiram W. Wadsworth Pump Plant Conduit was constructed in 1999 and links the Wadsworth Pump Plant to Diamond Valley Lake's inlet/outlet conduit. It is a welded steel pipeline with a diameter of 145 inches and a length of approximately 300 feet. When the lake is being filled, water is pumped from the pump plant's forebay through the pump plant conduit into the lake. When power is being generated, water flows from the lake through the conduit into the pump plant.

In September 2004, an internal inspection of the pipe revealed that the conduit is slightly elliptical, by up to one-half inch, as it passes through a flow meter structure. It is suspected that the conduit was installed with this elliptical shape. This condition has damaged an external mechanical seal used to fill the gap between the pipe and the structure's wall, allowing groundwater to leak into the flow meter structure and damage electrical components in the vault. The elliptical shape has also cracked the pipe's mortar coating, exposing the conduit to accelerated rates of corrosion. Staff recommends that the mechanical seal be replaced to prevent further leakage into the conduit's structure, and that a cathodic protection system be installed to protect the conduit from accelerated rates of corrosion.

This action authorizes final design and construction for the protection of the pump plant conduit.

Actions and Milestones

December 2006 – Complete installation of replacement mechanical seal

April 2007 – Complete design of cathodic protection system

July 2007 – Complete construction of cathodic protection system

Hydroelectric Plants Fire Suppression System Modifications (\$241,000)

Metropolitan owns and operates 16 hydroelectric plants throughout its distribution system. These plants tap available energy from water moving through the distribution system to supply a small portion of Southern California's energy demands. To protect Metropolitan's assets and to comply with fire codes and Federal Energy Regulatory Commission requirements, 13 of these plants have been equipped with carbon dioxide-based fire suppression systems.

A recent evaluation of the fire suppression systems, in conjunction with recertification of the plants, identified that these systems are not in compliance with current fire codes. A specialized consultant evaluated each of the hydroelectric plants' fire protection systems and recommended the upgrade of piping, valves, and related

electrical and mechanical controls. Staff recommends that the existing systems be upgraded to comply with current codes.

This action authorizes final design of upgrades to fire suppression systems at 13 of Metropolitan's hydroelectric plants.

Actions and Milestones

March 2007 – Complete design

December 2007 – Complete construction

San Diego Pipeline No. 4 Valve Replacement (\$207,000)

San Diego Pipeline No. 4 was constructed in 1970 and extends from the Lake Skinner Outlet Conduit to San Diego County. It is a prestressed concrete cylinder pipeline with a diameter of 89 inches and a length of approximately 22 miles. Valves are located regularly along the pipeline in meter structures, air release and vacuum valve structures, pumping wells, blow-off structures, and service connections.

A reconnaissance survey conducted in September 2005 identified six 8-inch, two 10-inch, and one 12-inch plug valves that are extremely difficult to operate or are inoperable. These valves show signs of significant corrosion and have reached the end of their useful life. The valves are located in six structures.

This action authorized final design, procurement, and installation of the valves by Metropolitan staff.

Actions and Milestones

November 2006 – Complete design

March 2007 – Complete valve installation

Orange County Feeder Extension Lining Repair (\$150,000)

The Orange County Feeder conveys water from the Weymouth Water Treatment Plant to communities within Orange County. Construction of the feeder was completed in three stages. The second stage is known as the Orange County Feeder Extension, which was constructed in 1942. The Orange County Feeder Extension runs along Bristol Street in the cities of Santa Ana and Costa Mesa. The pipeline is a coal tar enamel-lined welded-steel pipeline with a diameter of 36 to 39 inches and a length of approximately nine miles. The extension was constructed with used pipe due to steel shortages during the Second World War.

A video inspection performed in April 2005 identified large areas of internal lining degradation, such as blistering, disbonding, and rust. If the lining is not repaired, the pipe's steel walls will rust and eventually begin to leak. Staff recommends that mortar lining be added to the existing coal tar enamel lining. The re-lining of the Orange County Feeder Extension will halt any further deterioration of the pipe and will extend the life of the feeder.

This action authorizes preliminary design for the rehabilitation of the Orange County Feeder Extension's interior liner.

Actions and Milestones

November 2006 – Complete preliminary design

December 2007 – Complete design

Middle Feeder Cathodic Protection (\$150,000)

The Middle Feeder was constructed in 1957 and extends from the Weymouth Treatment Plant to Garvey Reservoir. It is a mortar-coated welded-steel pipeline with a diameter of 73 inches and a length of approximately 21 miles. Mortar coating typically provides superior corrosion protection for steel pipe. However, over time, the mortar may lose its protective properties due to chlorides in the soil or stray currents, and the steel can become increasingly susceptible to corrosion.

A recently completed corrosion survey has indicated that the pipeline is experiencing corrosion damage associated with the age of the pipeline and its environment. Metropolitan's Board authorized preliminary design of a cathodic protection system for the Middle Feeder in September 2004. Eight cathodic protection stations are required to be installed. Addition of the cathodic protection system will protect the feeder from corrosion and extend its life span.

This action authorizes final design of a cathodic protection system to be installed on the Middle Feeder. Staff will return to the Board for award of a construction contract at a later date.

Actions and Milestones

December 2006 – Complete design

August 2007 – Complete construction

St. Johns Canyon Channel Erosion Mitigation (\$85,000)

The St. Johns Canyon Channel was constructed in 1999 as an element of site work for the Diamond Valley Lake East Dam. The concrete-lined channel varies in width from 51 to 63 feet, from 9 to 16 feet in depth, and is approximately 300 feet long. It was designed to capture storm water runoff and protect Newport Road from flooding. The channel was constructed on predominantly silty sands that are fine-grained and may be susceptible to erosion.

The concrete channel has been degraded by erosion caused by storm runoff, which has created voids on the underside of the concrete lining. In some locations, the concrete lining has cracked and has displaced sufficiently to require replacement. Prompt repairs are warranted to arrest the degradation of the lining.

This action authorizes preliminary design for repair of erosion damage and the acquisition of environmental permits.

Actions and Milestones

November 2006 – Complete design

February 2007 – Complete construction

Financial Statement for Conveyance and Distribution System Rehabilitation Program

A breakdown of Board Action No. 17 for Appropriation No. 15377 is as follows:

	Previous Total Appropriated Amount (Feb. 2006)	Current Board Action No. 17 (May 2006)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 2,571,200	\$ 289,500	\$ 2,860,700
Final Design	2,249,920	335,000	2,584,920
Owners Costs (Program management, permitting & environmental documentation)	2,907,800	399,750	3,307,550
Construction Inspection & Support	1,318,800	39,250	1,358,050
Metropolitan Force Construction	8,969,830	218,500	9,188,330
Materials and Supplies	3,843,075	662,000	4,505,075
Incidental Expenses	1,042,620	35,000	1,077,620
Professional/Technical Services	666,500	5,000	671,500
Equipment Use	750,350	15,000	765,350
Contracts (Lakeview Pipeline Cathodic Protection & Wadsworth Pump Plant Conduit Protection)	11,592,400	250,000	11,842,400
Remaining Budget	3,479,205	121,000	3,600,205
Total	\$ 39,391,700	\$ 2,370,000	\$ 41,761,700

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.:	17
Requested Amount:	\$ 2,370,000	Capital Program No.:	15377-I
Total Appropriated Amount:	\$ 41,761,700	Capital Program Page No.:	E-16
Total Program Estimate:	\$ 55,100,000	Program Goal:	R-Reliability

