

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

September 14, 2004 Board Meeting

8-6

Subject

Appropriate \$1.87 million; and authorize an agreement with the Pressure Pipe Inspection Company (USA) Inc. to assess rehabilitation needs of prestressed concrete cylinder pipelines (Approp. 15297)

Description

Metropolitan owns and operates 163 miles of prestressed concrete cylinder pipe (PCCP) which was installed between 1965 and 1985. In response to a number of pipeline failures which several water agencies have experienced with PCCP, Metropolitan's Board authorized the PCCP Assessment Program in December 1996 to evaluate the condition of Metropolitan's PCCP lines, to investigate state-of-the-art inspection methods, and to conduct internal inspections of those pipelines that warrant attention.

In December 2000, the Board increased funding and authorized an agreement for electromagnetic inspection of all 163 miles of PCCP over a 3-year period. The results of electromagnetic testing have been used to identify distressed pipe sections and to assist in prioritizing repairs. Where results have indicated conditions of risk, urgent repairs have been implemented, most recently on the Rialto Feeder. To date, all but 20 miles of Metropolitan's PCCP lines have been inspected at least once using electromagnetic testing. The Foothill Feeder, the West Valley Feeder No. 1, and a portion of the Sepulveda Feeder could not be inspected previously due to high member agency demands.

While the initial PCCP inspections have been completed, additional work is recommended to further assess Metropolitan's PCCP lines. This work will aid in development of a long-term risk assessment of the PCCP lines, and a strategy for monitoring, repair and/or replacement of distressed sections of pipe. This action authorizes the following three studies:

- **Electromagnetic Inspections (\$1,500,000)** – This action authorizes an agreement with the Pressure Pipe Inspection Company to perform electromagnetic inspections of Metropolitan's PCCP lines for an amount not to exceed \$1.3 million. Electromagnetic inspection of the remaining 20 miles of un-inspected pipelines needs to be performed, and follow-up inspections of 75 miles of previously inspected pipelines to assess the stability of distressed pipe sections. The following pipelines are recommended for inspection: Rialto Feeder (1 mile), Box Spring Feeder (1 mile), Sepulveda Feeder (31 miles), Second Lower Feeder (31 miles), South Coast Feeder (7.2 miles), and Lake Skinner Outlet Conduit (1.3 miles), plus several lines that could not previously be inspected due to high member agency demands: the Foothill Feeder (8.3 miles), West Valley Feeder No. 1 (5.9 miles), and the Sepulveda Feeder (6.1 miles). In June 2004, Metropolitan issued Request For Proposals (RFP) No. 670 to identify qualified firms to perform electromagnetic inspection of PCCPs. Two firms responded, and following a competitive evaluation process, the Pressure Pipe Inspection Company (USA) Inc. is recommended to perform the inspection work. Once the assessments and re-analysis of the pipe sections are completed, staff will evaluate these results and if repairs are necessary, return to the Board at a later date for authorization of repairs. Metropolitan staff will provide shutdown planning and support for the electromagnetic inspections.
- **PCCP Risk Assessment (\$295,000)** – This action authorizes a study to determine the structural integrity and risk of failure of PCCP under various operating conditions. An RFP will be issued to competitively select a consultant to perform structural evaluations and risk analyses of pipe sections with different numbers of prestressing wire breaks under varying internal pressures and soils conditions. The amount of

this agreement is expected to be less than \$250,000. Metropolitan staff will use the information developed under this risk assessment to prioritize future repairs.

- Evaluate Hydrophone Listening Devices Study (\$80,000) – This action authorizes a study to evaluate hydrophone listening devices. The hydrophones detect, record and analyze sounds emanating from PCCPs. Depending on the type and frequency of the sounds emitted, it is possible to determine and locate areas where prestressing wires are breaking. An RFP will be advertised for a pilot program to evaluate test sites and determine whether a permanent or roving system would be of benefit to Metropolitan and its member agencies.

This program has been evaluated and recommended by Metropolitan's Capital Investment Plan (CIP) Evaluation Team, and has been included in the fiscal year 2004/05 capital budget. 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 § 5108: Capital Project Appropriation

Metropolitan Water District Administrative Code § 8117: Professional and Technical Consultants

California Environmental Quality Act (CEQA)

CEQA determinations for Option #1:

This program involves three components with related funding and a contractual arrangement: electromagnetic inspections, PCCP risk assessment, and hydrophone listening device evaluations.

Electromagnetic Inspections

The proposed work involves carrying out electromagnetic inspections of the following pipelines: Rialto Feeder, Box Spring Feeder, Sepulveda Feeder, Second Lower Feeder, South Coast Feeder, Lake Skinner Outlet Conduit, Foothill Feeder, and West Valley Feeder No. 1. With the exception of the Foothill Feeder, electromagnetic inspections for these pipelines are determined to be exempt from CEQA and the State CEQA Guidelines. The proposed actions involve the funding of a study and operating of existing public equipment and facilities with negligible or no expansion of use and no possibility of significantly impacting the physical environment. In addition, the proposed actions consist of basic data collection and resource evaluation activities which does 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. In addition, the activities may involve an inspection to check for performance of an operation, or quality, health, or safety of a project. Accordingly, the proposed actions qualify for Class 1, Class 6, and Class 9 Categorical Exemptions (Sections 15301, 15306, and 15309 of the State CEQA Guidelines). With respect to the Foothill Feeder Pipeline, the professional services agreement as related to the electromagnetic inspections is in itself not defined as a project under CEQA because it involves continuing administrative activities, such as general policy and procedure making (Section 15378(b)(2) of the State CEQA Guidelines). In addition, the financial arrangement 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 implementation of the inspections themselves for the Foothill Feeder Pipeline will be contingent upon completion of the CEQA documentation and subsequent board action.

The CEQA determination is: Determine that pursuant to CEQA, the proposed actions for seven of the eight pipelines qualify under three Categorical Exemptions (Class 1, Section 15301; Class 6, Section 15306; and Class 9, Section 15309 of the State CEQA Guidelines) and determine that the proposed action associated with the contractual nature of the professional services agreement with regards to the Foothill Feeder Pipeline is not subject to CEQA pursuant to Sections 15378(b)(2) and 15378(b)(4) of the State CEQA Guidelines.

PCCP Risk Assessment Study and Hydrophone Listening Devices Study

The two proposed studies 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 for the studies qualify as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

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

CEQA determination for Option #2:

None required

Board Options/Fiscal Impacts

Option #1

Adopt the CEQA determination and

- a. Appropriate \$1.87 million in Capital Investment Plan funds; and
- b. Authorize entering into an agreement with the Pressure Pipe Inspection Company (USA) Inc. for a not-to-exceed amount of \$1.3 million to inspect approximately 95 miles of PCCP.

Fiscal Impact: \$1.87 million in budgeted Pay-As-You-Go funds under Approp. 15297

Option #2

Do not authorize increase in funds and do not award an inspection agreement.

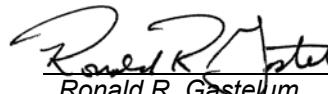
Fiscal Impact: None. The existing conditions will continue to be monitored, and repairs will be made when problems occur.

Staff Recommendation

Option #1


 Roy L. Wolfe
 Manager, Corporate Resources

8/20/2004
 Date


 Ronald R. Gastelum
 Chief Executive Officer

8/23/2004
 Date

[Attachment 1 – Detailed Report](#)

[Attachment 2 – Financial Statement](#)

[Attachment 3 – Location Map](#)

BLA #3040

Detailed Report

Purpose/Background

Prestressed Concrete Cylinder Pipe (PCCP) was introduced to the western United States in the early 1950s. By the early to mid-1960s, PCCP had gained a wide acceptance in the waterworks industry and was being installed in many municipal, industrial, and irrigation systems. The growth of PCCP use was due primarily to its competitive cost and its ability to be designed for many combinations of internal and external loads.

Metropolitan owns and operates a total of approximately 163 miles of PCCPs, which were installed between 1965 and 1985. Metropolitan's PCCP lines range in diameter from 54 to 201 inches and are located in both dense urban areas and remote rights-of-way. PCCP is fabricated with tightly wound reinforcing wire that is prestressed to approximately 200,000 psi. Operating pressure on these pipelines within Metropolitan's distribution system can exceed 280 psi. Metropolitan's experience has shown that the prestressing wire in PCCP is vulnerable to corrosion under adverse conditions such as corrosive soils or stray electrical current interference. Corrosion is the major cause of prestressing wire breakage and ultimately failure of the pipeline.

Metropolitan's PCCP Assessment Project

In response to a number of pipeline failures which several water agencies have experienced with PCCP, Metropolitan initiated the PCCP Assessment Program in December 1996 to evaluate the condition of Metropolitan's PCCP lines, to investigate state-of-the-art inspection methods, and to conduct internal inspections of those pipelines that warrant attention.

Since 2000, all but 20 miles of Metropolitan's 163 miles of PCCPs have been inspected at least once using the electromagnetic method. The inspections have revealed that approximately one percent of Metropolitan's PCCPs have wire breaks, as compared to an industry average of four percent. The vast majority of the distressed pipe segments are reported to have five or less wire breaks. In a few cases, a significant number of wire breaks were discovered. Where results have indicated conditions of risk, urgent repairs have been implemented, such as those performed on the Allen-McColloch Pipeline, the Box Springs Feeder, the Second Lower Feeder, and most recently, the Rialto Feeder.

The Foothill Feeder, the West Valley Feeder No. 1, and a portion of the Sepulveda Feeder are the only pipelines which have not been previously inspected due to high member agency demands. These pipelines will be available for inspection during winter 2004/05.

The following additional work is recommended in order to continue monitoring the pipelines and evaluating new technologies:

Electromagnetic Inspections (\$1,500,000)

This action authorizes an agreement with the Pressure Pipe Inspection Company (USA) Inc. (PPIC) to perform electromagnetic inspections of Metropolitan's PCCP lines for an amount not to exceed \$1.3 million. Staff recommends that follow-up inspections be performed on all of the PCCP lines which previously showed signs of wire breaks: Rialto Feeder (1 mile), Box Spring Feeder (1 mile), Sepulveda Feeder (31 miles), Second Lower Feeder (31 miles), South Coast Feeder (7.2 miles), and Lake Skinner Outlet Conduit (1.3 miles), plus several lines that could not previously be inspected due to high member agency demands: The Foothill Feeder (8.3 miles), West Valley Feeder No. 1 (5.9 miles), and the Sepulveda Feeder (6.1 miles). By comparing the number of wire breaks in a new inspection to the results of the original inspection, staff can better determine the rate of wire degradation and better estimate the need and priority of future repairs.

In June 2004, Metropolitan issued RFP No. 670 to identify qualified firms to perform electromagnetic inspection of PCCPs. Two firms responded to RFP No. 670. Following a competitive evaluation process, the Pressure Pipe Inspection Company is recommended to perform the inspection work. Metropolitan staff will provide shutdown planning and support for the electromagnetic inspections.

Actions and Milestones

April 2007 – Completion of electromagnetic testing

PCCP Risk Assessment (\$295,000)

This action authorizes a study to determine the structural integrity and risk of failure for PCCP under different internal pressures and soil covers. An RFP will be issued to competitively select a consultant to perform structural evaluations and risk analyses under various conditions. The amount of this contract is expected to be within the Chief Executive Officer's authority for award. A number of pipe segments will be analyzed that will together provide a representative sample of Metropolitan's PCCP within the distribution system. Metropolitan will use the information developed under this risk assessment to establish formal repair criteria and to prioritize future repairs.

Actions and Milestones

September 2005 – Completion of study

Evaluate Hydrophone Listening Devices Study (\$80,000)

This action authorizes a study to evaluate hydrophone listening devices. This technology uses listening devices that are suspended in the flow stream of a pipeline. The hydrophones pick up sounds emanating from the PCCP which are then recorded, processed, and analyzed. Depending on the type of frequency of the sounds emitted, it is possible to determine and locate areas of broken prestressing wires. An RFP will be advertised for a pilot program to evaluate test sites and determine whether a permanent or roving system would be of benefit to Metropolitan and its member agencies.

Actions and Milestones

June 2005 – Completion of study

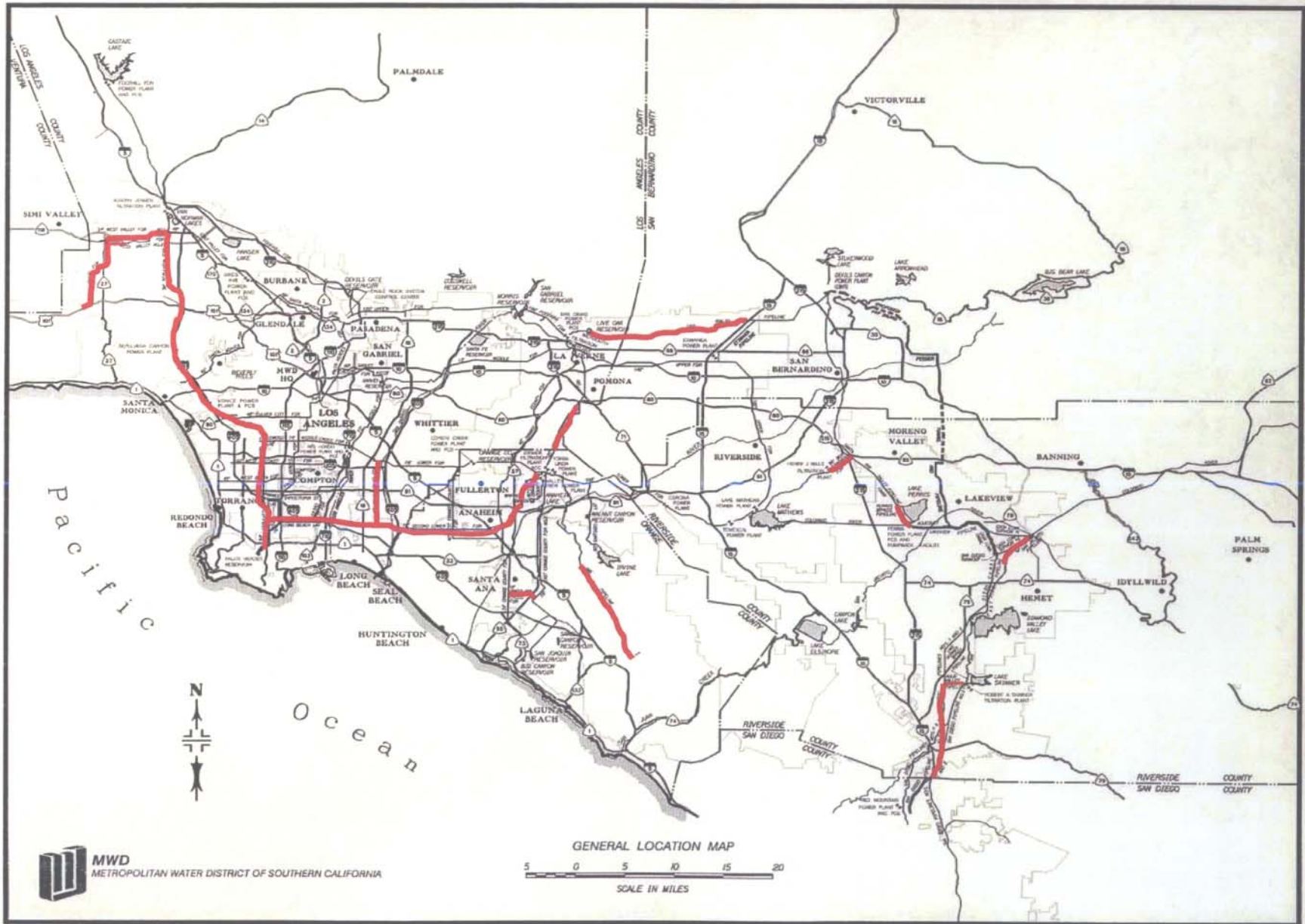
Financial Statement for Prestressed Concrete Cylinder Pipeline Assessment Program

A breakdown of Board Action No. 3 for Appropriation No. 15297 for Metropolitan’s PCCP Assessment Program is as follows:

	Previous Board Action No. 2 (Dec. 2000)	Current Board Action No. 3 (Sept. 2004)	New Total Appropriated Amount
Labor			
Studies and Investigations	\$ 350,000	\$ 60,000	\$ 410,000
Final Design	354,000	0	354,000
Owner Costs (Program management)	60,000	100,000	160,000
Water System Operations	62,000	20,000	82,000
Materials and Supplies	38,000	0	38,000
Incidental Expenses	10,000	10,000	20,000
Professional/Technical Services	2,294,000	1,500,000	3,794,000
Equipment Use	35,000	5,000	40,000
Remaining Budget	197,000	175,000	372,000
Total	\$ 3, 400,000	\$ 1,870,000	\$ 5,270,000

Funding Request

Program Name:	Assess Condition of Metropolitan’s Prestressed Concrete Cylinder Pipe		
Source of Funds:	Construction Funds (Pay-As-You-Go Fund)		
Appropriation No.:	15297	Board Action No.:	3
Requested Amount	\$1,870,000	Capital Program No.:	15297-A
Total Appropriated Amount:	\$5,270,000	Capital Program Page No.:	E-3
Total Program Estimate:	\$9,200,000	Program Goal:	R-Reliability



— Metropolitan's Concrete Cylinder Pipe