



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

December 8, 2009 Board Meeting

7-1

Subject

Appropriate \$240,000; and authorize final design of cathodic protection system for the West Valley Feeder No. 2 (Approp. 15441)

Description

This action authorizes final design of a new galvanic cathodic protection system along West Valley Feeder No. 2 to prevent corrosion of the welded steel sections and to eliminate stray currents that can damage the Prestressed Concrete Cylinder Pipe (PCCP) sections of the feeder.

Timing and Urgency

The West Valley Feeder No. 2 pipeline delivers treated water from the Jensen plant to the Los Angeles Department of Water and Power, Las Virgenes Municipal Water District, and Calleguas Municipal Water District. The most recent corrosion survey of the West Valley Feeder No. 2 indicates that the pipeline is experiencing induced stray current corrosion damage. While the corrosion damage is not yet extensive, further deterioration of the pipeline may lead to eventual leakage. The planned cathodic protection system is a proactive and cost-effective measure to protect the pipeline against further corrosion, extend the life of the pipeline, and alleviate the potential for emergency repairs. Since the West Valley Feeder No. 2 meets firm demands of four service connections serving the San Fernando Valley, western Los Angeles County, and southern Ventura County, staff recommends that this work proceed and not be postponed.

This project has been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria, and is categorized as an Infrastructure Rehabilitation project. This project is budgeted within Metropolitan's CIP for fiscal year 2009/10.

Background

The West Valley Feeder No. 2 is located in Los Angeles County and extends west from the Sepulveda Feeder, just south of Jensen plant, to the Calabazas Feeder. The 8.7-mile-long pipeline was constructed in 1973 and consists of both 103-inch-diameter welded steel pipe and 96-inch-diameter PCCP.

Induced stray currents in soils surrounding metal pipelines are known to cause corrosion and loss of metal in the pipeline. In the case of West Valley Feeder No. 2, a high voltage power transmission line parallels approximately 2.5 miles of the pipeline and is causing interfering stray currents on the line. In 1993, an impressed current cathodic protection system was installed on the steel section of West Valley Feeder No. 2. The impressed current system has performed well in protecting the steel sections of the pipeline. However, it is causing stray current interference on the PCCP sections. The most recent electrolysis survey of West Valley Feeder No. 2, which was conducted in March 2009, indicated that stray current flow has continued to increase. PCCP is vulnerable to corrosion under adverse conditions such as stray current interference. Corrosion is the major cause of prestressing wire breakage and potential failure of PCCP sections.

In recent years, long-term use of impressed current systems on PCCP pipelines have been found to weaken the prestressing wires due to a process known as hydrogen embrittlement. Under unique conditions, the impressed current system produces hydrogen ions that are absorbed in the protected prestressing wires. Hydrogen

embrittlement causes the prestressing wires to lose their ductility, and thus the PCCP section becomes prone to sudden failure.

Replacement of the impressed current cathodic protection system on West Valley Feeder No. 2 with a different type of system, termed “galvanic cathodic protection,” would provide protection for both the steel and PCCP portions of the pipeline. Under galvanic cathodic protection, anodes are electrically connected to the pipeline metal without a power source. Because they are composed of metals that are more easily oxidized than the welded steel and PCCP pipe materials, the anodes corrode first and continue to corrode until they need to be replaced. Replacement intervals typically range from 20 to 40 years. Galvanic cathodic protection systems do not cause hydrogen embrittlement.

In September 2007, Metropolitan’s Board authorized preliminary design of a new cathodic protection system for West Valley Feeder No. 2. Due to the importance of this pipeline, staff investigated a number of options to protect the line. The recommended project will replace the impressed current system with a galvanic system, consisting of anodes at 27 locations. These anodes will prevent corrosion of the welded steel section of the feeder and eliminate the stray currents that can damage the PCCP section. Preliminary design has been completed and staff recommends proceeding with final design at this time.

West Valley Feeder No. 2 Cathodic Protection – Final Design Phase (\$240,000)

This action appropriates \$240,000 in budgeted funds and authorizes final design phase activities for the cathodic protection system. These activities include engineering design, preparation of drawings and specifications, receipt of competitive bids, development of a construction cost estimate, and all other activities in advance of award of a construction contract. Final design will be performed by Metropolitan staff. A test installation at one location is also included to determine design parameters and to specify the number of anodes for the remaining 26 locations. Metropolitan staff will procure and install the equipment for the test installation. The requested funds include \$112,500 for final design; \$18,600 for the test installation; \$79,500 for permitting, coordination with property owners for all 27 locations, and project management; and \$29,400 in remaining budget. The final design cost as a percentage of the estimated construction cost is approximately 11.5 percent. Engineering Services’ goal for design of projects with construction cost less than \$3 million is 9 to 15 percent. The construction cost for this project is anticipated to range from \$850,000 to \$1 million. Staff will return to the Board at a later date for award of a construction contract.

This project has been evaluated and recommended by Metropolitan’s CIP Evaluation Team, and funds have been included in the fiscal year 2009/10 capital budget. See [Attachment 1](#) for the Financial Statement, and [Attachment 2](#) for the Location Map.

This project is consistent with Metropolitan’s goals for sustainability by enhancing reliability of the existing conveyance and distribution system in order to maintain reliable water deliveries in the future.

Project Milestone

June 2010 – Completion of final design phase

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. In particular, the proposed action consists of the leasing, licensing, maintenance, and operating of existing equipment and facilities with negligible or no expansion of use beyond that existing at the time of the lead agency's determination. In addition, it will not have a significant effect on the environment. Accordingly, this proposed action qualifies as a Class 1 Categorical Exemption (Section 15301 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a Categorical Exemption (Class 1, Section 15301 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt the CEQA determination and

- a. Appropriate \$240,000; and
- b. Authorize final design of a cathodic protection system for West Valley Feeder No. 2.

Fiscal Impact: \$240,000 of budgeted funds under Approp. 15441

Business Analysis: This option will protect Metropolitan’s assets by reducing the risk of costly emergency repairs to West Valley Feeder No. 2, maintain reliable water deliveries, and take advantage of the current highly competitive bidding climate.

Option #2

Do not authorize final design phase activities.

Fiscal Impact: Unknown

Business Analysis: The West Valley Feeder No. 2 will remain vulnerable to corrosion damage from stray current, thus reducing the useful life of the pipeline. The risk of failure due to corrosion damage will increase with time.

Staff Recommendation

Option #1


 Roy L. Wolfe
 Manager, Corporate Resources

11/17/2009
 Date


 Jeffrey Nightlinger
 General Manager

11/20/2009
 Date

Attachment 1 – Financial Statement

Attachment 2 – Location Map

BLA #6900

Financial Statement for Conveyance and Distribution System Rehabilitation Program - Phase II

A breakdown of Board Action No. 17 for Appropriation No. 15441 for the West Valley Feeder No. 2 Cathodic Protection project* is as follows:

	Previous Total Appropriated Amount (Nov. 2009)	Current Board Action No. 17 (Dec. 2009)	New Total Appropriated Amount
Labor			
Studies and Investigations	\$ 1,156,800	\$ -	\$ 1,156,800
Preliminary Design	141,600	-	141,600
Final Design	1,353,050	112,500	1,465,550
Owner Costs (Program mgmt, permitting, bidding process)	1,970,850	79,500	2,050,350
Construction Inspection and Support	328,500	-	328,500
Metropolitan Force Construction	3,792,000	12,000	3,804,000
Materials and Supplies	637,100	5,000	642,100
Incidental Expenses	502,500	400	502,900
Professional/Technical Services	750,500	-	750,500
Equipment Use	148,000	1,200	149,200
Contracts	2,286,000	-	2,286,000
Remaining Budget	1,395,100	29,400	1,424,500
Total	\$ 14,462,000	\$ 240,000	\$ 14,702,000

Funding Request

Program Name:	Conveyance and Distribution System Rehabilitation Program – Phase II		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15441	Board Action No.:	17
Requested Amount:	\$ 240,000	Capital Program No.:	15441
Total Appropriated Amount:	\$ 14,702,000	Capital Program Page No.:	277
Total Program Estimate:	\$ 53,850,000	Program Goal:	Infrastructure Reliability

*The total amount expended to date on the West Valley Feeder No. 2 Cathodic Protection project is approximately \$30,000.

West Valley Feeder No. 2

