THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

- Board of Directors
  Engineering and Operations Committee

4/9/2013 Board Meeting

7-2

Subject

Appropriate $300,000; and authorize final design of cathodic protection system for the Allen-McColloch Pipeline (Approp. 15441)

Executive Summary

This action authorizes final design of a cathodic protection system for the Allen-McColloch Pipeline (AMP). Thirteen impressed current stations are planned to be installed to protect nine miles of the pipeline from corrosion due to stray electrical currents.

Timing and Urgency

A recent corrosion survey of the AMP identified that this prestressed concrete cylinder pipeline (PCCP) is experiencing induced stray current corrosion damage. While the corrosion damage is not yet extensive, continued deterioration of the pipeline could lead to eventual leakage and possible rupture. The planned cathodic protection system is a proactive and cost-effective measure to mitigate against stray current interference, and will reduce the risk of costly emergency repairs. Given the importance of this pipeline in delivering treated water to southern Orange County, staff recommends moving forward with final design at this time.

This project has been reviewed with Metropolitan's Capital Investment Plan (CIP) prioritization criteria, and is categorized as an Infrastructure Rehabilitation and Replacement project. Funds for this action are available within Metropolitan's capital expenditure plan for fiscal year 2012/13.

Details

Background

Buried metallic pipelines are often protected from corrosive soils through the use of cathodic protection systems. Installation of these systems is required by state regulation on pipelines that transport hazardous materials such as oil or gas. However, the use of these systems may induce corrosion in other adjacent pipelines through the introduction of stray currents into the surrounding soil. Stray currents may flow onto adjacent pipelines in one area, travel along the pipeline, and then leave the pipe (with resulting corrosion) to reenter the earth. These induced stray currents are known to cause corrosion on metallic pipes and may cause significant loss of metal. PCCP segments are fabricated with tightly wound steel reinforcing wire which is covered with cement mortar. Corrosion is the major cause of prestressing wire breakage and potential failure of PCCP segments.

Metropolitan's distribution system contains 830 miles of pipelines, which are tested for stray currents every one to two years. When stray currents are detected, cathodic protection systems are installed to extend the life of the pipelines and reduce the potential for emergency repairs. Two types of cathodic protection systems are used: galvanic cathodic protection and impressed current cathodic protection. The type of system to be installed is determined based on the level of stray current interference, soil conditions, installation and maintenance costs, and availability of a power source. Under galvanic systems, which are also referred to as current drain stations, anodes are electrically connected to the pipeline metal without using a power source. Because the anodes are composed of metals that are more easily oxidized than the materials in welded steel and PCCP lines, the anodes

corrode first and continue to corrode until they need to be replaced. Replacement intervals for the anodes typically range from 10 to 20 years. Impressed current systems use an external power source to apply a protective current to the pipeline. This protective current is then discharged through anodes in a similar manner as current drain stations.

The AMP delivers treated water from the Robert B. Diemer Water Treatment plant in Yorba Linda to El Toro Regional Reservoir in Mission Viejo. The AMP line is approximately 25 miles long and was installed in the late 1970s. The northern 16-mile portion of the line consists of 78-inch diameter welded steel pipe, while the southern 9-mile portion consists of PCCP that varies in diameter from 54 to 84 inches.

The PCCP portion of the AMP is paralleled by numerous cathodically protected pipelines along its route. Eight PCCP segments with up to 25 prestressing wire breaks have been previously repaired in the southern portion of the AMP. Testing performed by Metropolitan staff has identified that the AMP is experiencing both general corrosion from corrosive soils and stray current conditions from adjacent pipelines.

In 1998, Metropolitan installed three stray current drain stations on the southern reach of the AMP to mitigate stray current interference. Recent field testing has identified that these three drain stations are no longer effective in protecting the pipeline. Due to the high level of stray currents measured on the AMP, a more effective impressed current system needs to be installed. In June 2010, Metropolitan's Board authorized preliminary design to replace the existing current drain stations with an impressed current system. During preliminary design, staff concluded that a total of 13 impressed current stations are required to adequately protect the AMP in this 9-mile reach. Preliminary design has been completed, and staff recommends moving forward with final design at this time.

Allen-McColloch Pipeline Cathodic Protection – Final Design Phase ($300,000)

Planned final design phase activities include identifying and locating utilities, local agency permitting, preparation of drawings and specifications, development of a construction cost estimate, receipt of competitive bids, and all other activities in advance of award of a construction contract. All work will be performed by Metropolitan staff.

This action appropriates $300,000 and authorizes final design of impressed current cathodic protection at 13 locations on the AMP. The requested funds include $160,000 for final design; $54,000 for electrical service connection fees with Southern California Edison; $59,000 for permitting, bidding, and project management; and $27,000 for remaining budget. The final design cost as a percentage of the estimated construction cost is approximately 14.5 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 $1.1 million to $1.4 million. Staff will return to the Board at a later date for award of the construction contract.

This project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal year 2012/13 capital expenditure plan. This work is included within capital Appropriation No. 15441, the Conveyance and Distribution System Rehabilitation Program – FY 2006/07 Through 2011/12, which was initiated in fiscal year 2006/07. Other projects authorized under Appropriation No. 15441 include the Santa Ana River Bridge Seismic Retrofit, Eagle Rock and Puddingstone Spillway Gates Rehabilitation, and the Sepulveda Feeder Repairs. With the present action, the total funding for Appropriation No. 15441 will increase from $44,154,000 to $44,454,000. See **Attachment 1** for the Financial Statement and **Attachment 2** for the Location Map.

Project Milestone

December 2013 – Completion of final design of a cathodic protection system for the AMP

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 project involves the funding, final design, and minor alterations, reconstruction or replacement of existing public facilities along with the construction of minor appurtenant structures with no expansion of use and no possibility of significantly impacting the physical environment. In addition, the proposed project involves minor modifications in the condition of land, water, and/or vegetation which does not involve removal of healthy, mature, scenic trees. Accordingly, the proposed action qualifies under Class 1, Class 2, Class 3, and Class 4 Categorical Exemptions (Sections 15301, 15302, 15303, and 15304 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under four Categorical Exemptions (Class 1, Section 15301; Class 2, Section 15302; Class 3, Section 15303; and Class 4, Section 15304 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt the CEQA determination and

a. Appropriate $300,000; and
b. Authorize final design of a cathodic protection system for the Allen-McColloch Pipeline.

Fiscal Impact: $300,000 of capital funds under Approp. 15441

Business Analysis: This project will protect Metropolitan's assets, increase water delivery reliability, and reduce the risk of costly emergency repairs.

Option #2

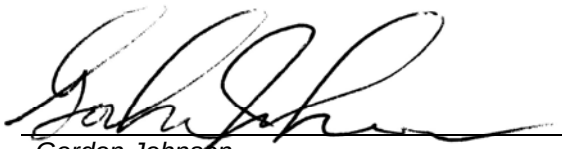
Do not authorize the cathodic protection system at this time.

Fiscal Impact: None

Business Analysis: Under this option, staff will continue to monitor levels of stray currents and corrosion. This option would forgo an opportunity to enhance reliability and extend the AMP's service life, and could lead to higher costs, more extensive repairs, and unplanned shutdowns.

Staff Recommendation

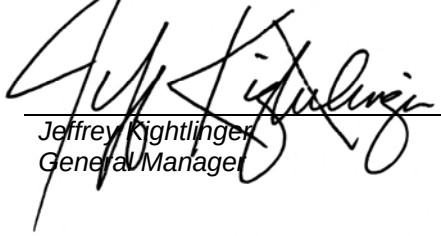
Option #1



3/20/2013

Gordon Johnson
Manager/Chief Engineer,
Engineering Services

Date



3/26/2013

Jeffrey Kightlinger
General Manager

Date

Attachment 1 – Financial Statement

Attachment 2 – Location Map

Ref# es12622928

Financial Statement

A breakdown of Board Action No. 54 for Appropriation No. 15441 for the Allen-McColloch Pipeline Cathodic Protection[1] project is as follows:

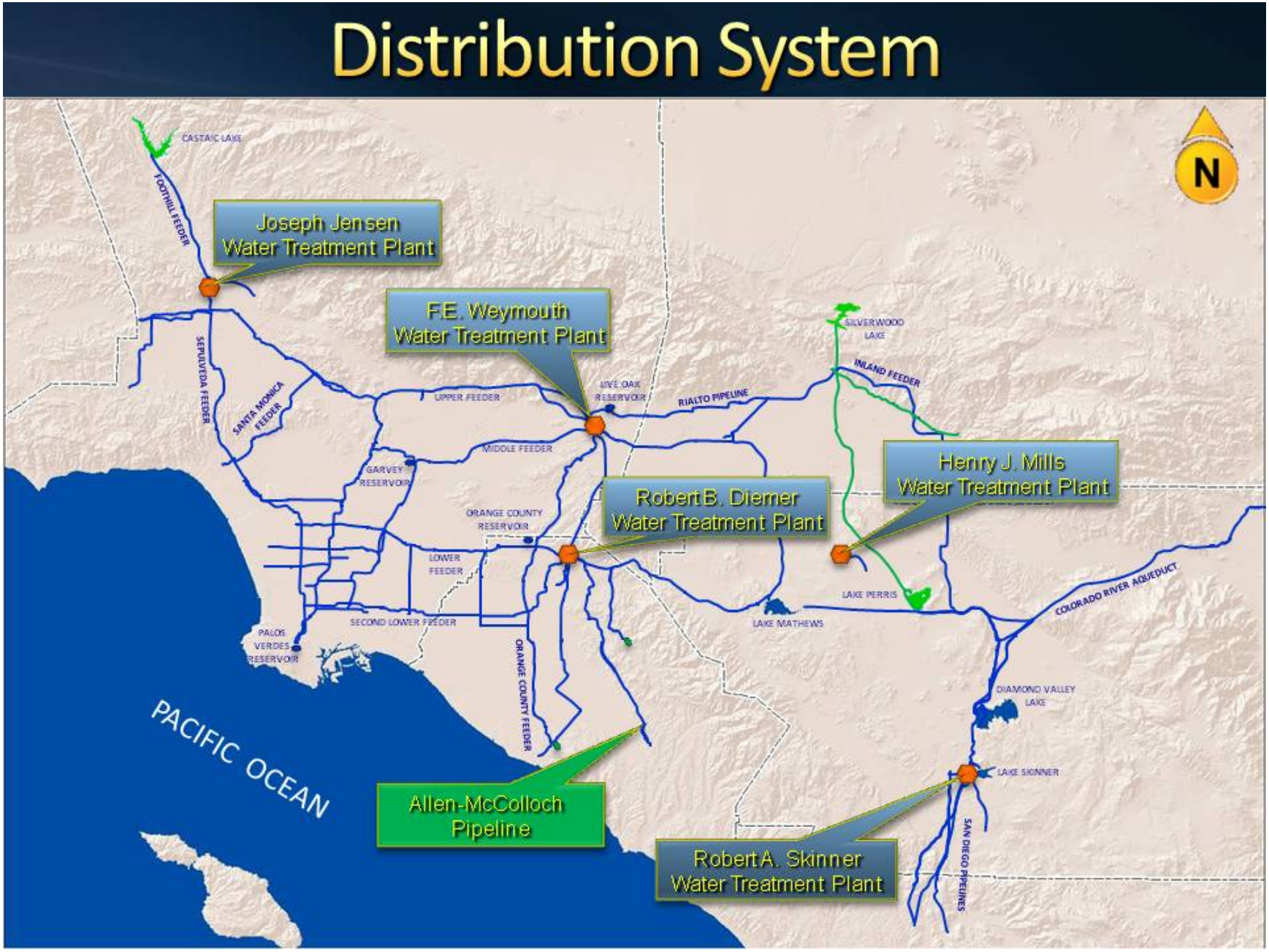
	Previous Total Appropriated Amount (Feb. 2013)	Current Board Action No. 54 (Apr. 2013)	New Total Appropriated Amount
Labor			
Studies & Investigations	$ 2,880,000	$ -	$ 2,880,000
Final Design	4,126,293	160,000	4,286,293
Owner Costs (Program mgmt., permitting, bidding)	5,306,400	59,000	5,365,400
Submittals Review & Record Drwgs	296,670	-	296,670
Construction Inspection & Support	2,012,550	-	2,012,550
Metropolitan Force Construction	8,923,710	-	8,923,710
Materials & Supplies	2,325,400	-	2,325,400
Incidental Expenses	885,900	54,000	939,900
Professional/Technical Services	2,551,000	-	2,551,000
Right-of-Way	550,000	-	550,000
Equipment Use	325,200	-	325,200
Contracts	11,981,524	-	11,981,524
Remaining Budget	1,989,353 [2]	27,000	2,016,353
Total	**$ 44,154,000**	**$ 300,000**	**$ 44,454,000**

Funding Request

Program Name:	Conveyance and Distribution System Rehabilitation Program – FY 2006/07 Through FY 2011/12		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15441	**Board Action No.:**	54
Requested Amount:	**$** 300,000	**Budget Page No.:**	284
Total Appropriated Amount:	**$** 44,454,000	**Total Program Estimate:**	**$** 106,335,000

[1]The total amount expended to date on the Allen-McColloch Pipeline Cathodic Protection project is approximately $85,000.

[2]Includes previous reallocation from remaining budget for the following projects: (1) $164,000 for Sepulveda Canyon Water Storage Tanks for hydraulic analyses of operational alternatives with Tank #2 out of service; and (2) $20,000 for the Temescal and Corona Power Plants Standby Generator Replacement project for design modifications to improve ability to monitor performance and reliability.


Distribution System
N
CASTAIC LAKE
FOOTHILL FEEDER
Joseph Jensen
Water Treatment Plant
F.E. Weymouth
Water Treatment Plant
SEPULVEDA FEEDER
SANTA MONICA FEEDER
UPPER FEEDER
LIVE OAK RESERVOIR
RIALTO PIPELINE
SILVERWOOD LAKE
INLAND FEEDER
MIDDLE FEEDER
GARVEY RESERVOIR
Robert B. Diemer
Water Treatment Plant
Henry J. Mills
Water Treatment Plant
ORANGE COUNTY RESERVOIR
LOWER FEEDER
LAKE PERRIS
COLORADO RIVER AQUEDUCT
LAKE MATHEWS
SECOND LOWER FEEDER
PALOS VERDES RESERVOIR
ORANGE COUNTY FEEDER
DIAMOND VALLEY LAKE
PACIFIC OCEAN
LAKE SKINNER
Allen-McColloch
Pipeline
Robert A. Skinner
Water Treatment Plant
SAN DIEGO PIPELINES