



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

12/11/2018 Board Meeting

8-4

Subject

Adopt CEQA determination that the proposed action was previously addressed in the certified Programmatic Environmental Impact Report and related CEQA actions, and award a \$23,750,060 procurement contract to Ebara Corporation to provide conical plug isolation valves for the Second Lower Feeder

Executive Summary

This action awards a procurement contract for 13 conical plug isolation valves to replace the existing valves for the Second Lower Feeder.

Timing and Urgency

The isolation valves along the Second Lower Feeder provide the primary isolation for maintenance activities, inspections, and repairs required to maintain reliable water deliveries within Metropolitan's distribution system. The existing isolation valves were installed in 1967 during the original construction of the feeder and are regularly inspected and maintained. Following 50 years of continuous service, these valves have begun to deteriorate. Many of these valves leak excessively, cannot be repaired in place, and need to be replaced. Due to the long lead-time to procure these valves, and the timing of on-going Prestressed Concrete Cylinder Pipe (PCCP) rehabilitation along the Second Lower Feeder, staff recommends award of the valve procurement contract at this time. This will allow timely delivery of the valves for installation during PCCP rehabilitation of the Second Lower Feeder.

This work has been reviewed with Metropolitan's Capital Investment Plan (CIP) prioritization criteria and is included in the PCCP Rehabilitation Program. Funds for this action are available within the appropriation for planned biennial expenditures for fiscal years 2018/19 and 2019/20.

Details

Background

The PCCP Rehabilitation Program is a comprehensive long-term plan for replacing or relining Metropolitan's at-risk PCCP feeders in order to maintain reliable water deliveries to member agencies. The objectives of the Program are to: (1) reduce the risk of unplanned outages; (2) perform rehabilitation work in a cost-effective manner; (3) minimize impacts to member agency deliveries; (4) preserve needed hydraulic capacity; and (5) take advantage of opportunities to improve system flexibility and reliability. Background information on the PCCP Rehabilitation Program appears in **Attachment 1**.

The Second Lower Feeder is the initial PCCP line to be addressed under the PCCP Rehabilitation Program. The Second Lower Feeder is 34 miles long and delivers treated water from the Diemer Plant westerly to Palos Verdes Reservoir with operating pressures up to 300 pounds per square inch. There are six pipelines which interconnect with the Second Lower Feeder; these include the Orange County Feeder, West Orange County Feeder, South Coast Feeder, Victoria-223rd Street Cross Feeder, Palos Verdes Feeder, and the Sepulveda Feeder. The Second Lower Feeder allows bi-directional flows to supply water into the Central Pool from the Diemer Plant and from the Sepulveda Feeder. The feeder has eleven service connections along its alignment serving the cities of Long Beach, Los Angeles, and Torrance; Central Basin Municipal Water District; and Municipal Water District of Orange County. The eleven existing 42-inch and 48-inch diameter conical plug isolation valves can be operated

to isolate portions of the Second Lower Feeder for inspection, maintenance, and repair activity while maintaining flow deliveries from the Diemer Plant or the Palos Verdes Reservoir to other reaches of the feeder.

In January 2015, Metropolitan's Board authorized a final design to rehabilitate the PCCP portions of the Second Lower Feeder. The planned work involves lining the existing PCCP segments with steel liner pipe designed as a stand-alone pipeline that can accommodate full internal and external pressures on the line. The annular space between the steel liner and the existing PCCP segments will be filled with concrete grout. The internal diameter of the existing PCCP is 78 inches. With the addition of the new liner pipe, the internal diameter will be reduced to 73 inches. The reduced pipe diameter increases pressure losses and reduces flow capacity of the feeder. Using a detailed hydraulic model of the entire distribution system, options were studied to identify cost-effective opportunities to recover pressure loss and to enhance system flexibility and reliability for deliveries from the Diemer or Jensen plants. Fourteen options were studied, including varying valve sizes, changing piping configurations, adding pump stations, and modifying interconnections. The study concluded that the most efficient strategy to recover pressure loss and maintain flows in both directions is to replace the existing isolation valves and meters with larger diameter units. The study determined that the existing valve vaults could be modified to accommodate larger diameter valves and that replacement of entire reaches of the feeder pipe with larger diameter pipe was not warranted.

For the selection of the new valves, a global valve study was initiated. Over 68 valve manufacturers worldwide were contacted to assess alternate valve types, establish the availability of valves in large diameters, determine valve capabilities for bi-directional operation at 300 psi, and, finally, verify their use in the water and hydropower industry. The study identified five types of valves for further evaluation, including (1) butterfly, (2) conical plug, (3) eccentric plug, (4) knife gate, and (5) spherical. The evaluation consisted of a two-step process: evaluation of each valve type on a technical basis and then on a commercial basis. The valve types were reviewed technically for minimal head loss, ability to handle high water velocities and high pressures, and bi-directional flows and sealing capabilities. Of the five valve types evaluated, only the conical plug and the spherical valve types were suitable for the high velocities and high pressures necessary to operate the Second Lower Feeder under bi-directional flows. Both use full port designs which exhibit minimal head loss. A comparison of the two valves from a commercial viewpoint indicated that the total costs for the conical plug valves were significantly lower than that for spherical valves because, for a given diameter, spherical valves are much larger and would require significant valve vault modifications.

Staff recommends upsizing the 11 existing valves on the Second Lower Feeder from 42-inch to 48-inch diameter and from 48-inch to 54-inch diameter. This solution was determined to be technically and commercially feasible and represents the optimal approach to minimize hydraulic losses along the pipeline. In addition, providing a 12th isolation valve within a 7-mile reach of the feeder, where there are no isolation valves and three existing service connections, is planned. The additional 54-inch diameter valve would shorten reach downtime, improve water quality, and reduce the number of affected member agency service connections during future shutdowns. Finally, providing a valve (13th valve) at the interconnection of the Second Lower Feeder and the Sepulveda Feeder is also planned. Installation of the Sepulveda Feeder 48-inch diameter isolation valve simultaneously with the Second Lower Feeder valve installation and relining activities would avoid repeated service connection interruptions and surface impacts to residents near the intersection of 220th Street and Western Avenue. This was considered a cost-saving approach as it reduces the number of excavations required to access the pipe. The deteriorated isolation valves will be refurbished at the La Verne shops for future use.

Second Lower Feeder Isolation Valve Replacement – Procurement

The Request for Qualifications (RFQ No. 1105) was issued on May 31, 2017. There are few manufacturers capable of making conical plug valves of this size. To encourage competition, several potential manufacturers were contacted prior to release of the RFQ. Of the firms contacted, five manufacturers expressed interest in bidding. Of the five firms which expressed an interest in the work, only two manufacturers submitted a Statement of Qualifications (SOQ) on July 11, 2017. Staff investigated the reasons why no other manufacturers responded. The three valve manufacturers that did not respond to the RFQ declined due to the major investment required for production and their business decision to maintain their standard product line. Of the two firms which submitted a SOQ, Ebara Corporation from Tokyo, Japan was the only firm that met all prequalification criteria. Staff

recommends moving forward with procuring the isolation valves at this time to allow timely valve delivery and installation during PCCP rehabilitation.

Specifications No. 1912 for furnishing 13 conical plug isolation valves for the Second Lower Feeder PCCP rehabilitation was completed on September 5, 2018. With Ebara Corporation, as the sole prequalified manufacturer, competitive procurement would not produce an advantage over sole-source negotiations. As such, under Metropolitan's Administrative Code Section 8140.1(d), competitive procurement is not required. Staff has negotiated the terms and conditions of a contract with Ebara Corporation for the new valves. The contract is consistent in price (plus escalation) with the 2005 procurement of large conical plug valves by the U.S. Army Corps of Engineers from Ebara for the McCook Reservoir project in Chicago, Illinois.

This action awards a \$23,750,060 contract to Ebara Corporation to furnish three 48-inch and ten 54-inch conical plug isolation valves for the Second Lower Feeder. This lump sum amount shall be paid in increments based on procurement milestones for the design, testing, delivery, and final acceptance of the valves. The total cost includes tariffs and delivery but does not include taxes imposed by the state of California. Sales and use taxes will be paid directly to the state of California by Metropolitan. Due to the specialized nature of the equipment, no Small Business Enterprise (SBE) participation level was established for the contract. There are no subcontracting opportunities for this procurement contract.

A total of \$27.86 million has been budgeted for this work; besides the amount of the contract, other allocated funds include the following: \$2,260,000 for State of California sales and use tax; \$860,000 for factory fabrication inspection; \$340,000 for review of submittals and responding to technical requests for information; \$330,000 for contract administration and project management; and \$319,940 for remaining budget.

Metropolitan staff will perform submittal review. Inspection of the fabrication work will primarily be performed by Metropolitan staff with local inspection support.

This project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal years 2018/19 and 2019/20 capital expenditure plan. Background information of the PCCP Rehabilitation Program is included in **Attachment 1**. See **Attachment 2** for the Location Map.

A total of \$27.86 million is required for this work. No appropriation of funds is required for work planned over fiscal years 2018/19 and 1019/20 as sufficient funds are available in the Capital Investment Plan for Fiscal Years 2018/19 and 1029/20 within Appropriation No. 15509.

The total estimated cost to complete the rehabilitation of the Second Lower Feeder, including the amount appropriated to date, current funds requested, and future design and construction costs is anticipated to range from \$505 million to \$575 million.

Project Milestone

June 2023 – Completion of delivery of the Second Lower Feeder isolation valves

Policy

Metropolitan Water District Administrative Code Section 8121: General Authority of the General Manager to Enter Contracts

Metropolitan Water District Administrative Code Section 8140: Competitive Procurement

By Minute Item 51353, dated October 9, 2018, the Board appropriated a total of \$290 million for projects identified in the Capital Investment Plan for Fiscal Years 2018/19 and 2019/20.

By Minute Item 50699, dated January 10, 2017, the Board certified the final Programmatic Environmental Impact Report for the PCCP Rehabilitation Program and approved the Program for the Second Lower Feeder, Sepulveda Feeder, Calabasas Feeder, Rialto Pipeline, and Allen-McColloch Pipeline for the purposes of the California Environmental Quality Act.

By Minute Item 50009, dated January 13, 2015, the Board authorized the first phase of final design to rehabilitate the PCCP portions of the Second Lower Feeder.

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

The environmental effects from the design, construction, and operation of the proposed project were evaluated in the Prestressed Concrete Cylinder Pipe Rehabilitation Program Final Programmatic Environmental Impact Report (SCH No. 2014121055), which was certified by the Board on January 10, 2017. The Board also approved the Findings of Fact (Findings), the Statement of Overriding Considerations (SOC), the Mitigation Monitoring and Reporting Program (MMRP), and the Program itself. The current action is solely based on procurement of conical plug isolation valves for the Second Lower Feeder and not on any changes to the approved Program itself. Hence, the previous environmental documentation acted on by the Board in conjunction with the proposed action fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further CEQA documentation is necessary for the Board to act on the proposed action.

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt CEQA determination that the proposed action was previously addressed in the certified Programmatic Environmental Impact Report and related CEQA actions, and

Award \$23,750,060 procurement contract to Ebara Corporation to furnish conical plug isolation valves for the Second Lower Feeder.

Fiscal Impact: \$27.86 million in capital funds from Appropriation No. 15509.

Business Analysis: This option will enhance the long-term reliability of the Second Lower Feeder.

Option #2

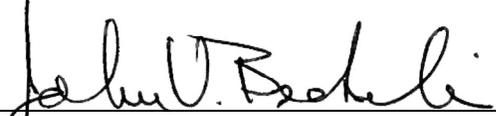
Do not proceed with the project at this time.

Fiscal Impact: None

Business Analysis: Under this option, staff would procure and replace the isolation valves as they fail. The isolation valves may be out of operation for an extended time. This option may require unplanned shutdowns and would impact system isolation and deliveries to member agency service connections.

Staff Recommendation

Option #1


 _____ 12/3/2018
 John V. Bednarski Date
 Group Manager/Chief Engineer
 Engineering Services


 _____ 12/3/2018
 Jeffrey Kightlinger Date
 General Manager

Attachment 1 – Background and Program Status

Attachment 2 – Location Map

Ref# ES12659313

**PRESTRESSED CONCRETE CYLINDER PIPE REHABILITATION PROGRAM
BACKGROUND AND PROGRAM STATUS**

Metropolitan’s water delivery system includes approximately 830 miles of large-diameter pipelines, of which 154.6 miles are currently comprised of prestressed concrete cylinder pipe (PCCP). The total original length of PCCP was 163 miles. There are PCCP reaches within 27 feeders, with diameters ranging from 54 to 201 inches. These PCCP lines were installed between 1965 and 1985, and are located in both dense urban regions and remote areas.

Over the last several decades, water agencies throughout the United States and other countries have found that under certain conditions, PCCP lines may have a reduced service life and elevated risk of failure versus other types of pipe. PCCP failures can be catastrophic and may occur without forewarning, which may compromise system reliability and result in significant costs due to interruption of service, unplanned major repairs, and potential third-party damages.

In September 2011, as a proactive measure to maintain overall system reliability, Metropolitan initiated a comprehensive program to inspect, manage, and rehabilitate its PCCP feeders. This effort included preparation of a risk analysis to assess the need and priority for rehabilitation of individual PCCP lines. Through this process, five of Metropolitan’s 27 PCCP lines were identified to have experienced a disproportionate share of all prestressing wire breaks, repair length to date, and cost of repairs. The five priority lines are: (1) the Allen-McColloch Pipeline (AMP), (2) the Calabasas Feeder, (3) the Rialto Pipeline, (4) the Second Lower Feeder, and (5) the Sepulveda Feeder. The PCCP within these five lines is expected to continue to deteriorate, as indicated by a progression of wire breaks over time. While Metropolitan’s other PCCP feeders contain prestressing wire breaks in some pipe segments, they do not exhibit the same trend of increasing wire breaks over time. These other feeders may eventually need to be rehabilitated, but appear to be stable at present. Their condition will be reevaluated on a regular basis, and adjustments will be made to the program if additional feeders are determined to be at risk in the future.

The PCCP Rehabilitation Program has been organized to provide flexibility in the timing and priority of the work. In January 2015, final design commenced to rehabilitate the initial pipeline, the Second Lower Feeder. In January 2017, Metropolitan’s Board certified the Final Programmatic Environmental Impact Report (Final PEIR) for the entire PCCP Rehabilitation Program, and approved the program for all five priority PCCP lines for the purpose of compliance with the California Environmental Quality Act (CEQA). The inclusion of all five lines within a single programmatic CEQA document provides flexibility to adjust construction sequencing by enabling the rehabilitation of specific reaches of PCCP to move forward based on up-to-date condition assessments and priorities. In August 2018, the initial construction contract under the program was completed, rehabilitating 4.4 miles of the Second Lower Feeder.

The comprehensive strategy for managing Metropolitan’s PCCP lines and maintaining their reliability is comprised of four coordinated elements. The following describes these elements and summarizes the status of activities for each.

No.	Element	Status
1.	<p>Continued Assessment and Monitoring of PCCP Lines – Metropolitan currently inspects all PCCP lines within the distribution system every three to seven years. In order to increase knowledge of the pipelines’ baseline condition to track prestressing wire breaks over time, and to identify distressed PCCP segments, staff will continue to aggressively inspect PCCP lines using state-of-the-art inspection techniques.</p>	<p>At present, electromagnetic inspection continues to be the industry’s primary technique for identification of wire breaks. A complete cycle of inspections of Metropolitan’s feeders takes approximately five to seven years to complete.</p> <p>To date, three cycles of electromagnetic inspections have been performed on most of the PCCP feeders.</p> <p>The fourth cycle of inspections commenced in November 2017. Inspections of portions of the AMP, the Jensen plant’s Balboa Outlet Tunnel, the La Verne Pipeline, Orange County Feeder, Second Lower Feeder, and Yorba Linda Feeder were completed.</p>

No.	Element	Status
		<p>Inspections of portions of the Box Springs Feeder, Foothill Feeder, Lake Perris Bypass Pipeline, and Rialto Pipeline are scheduled to be completed during the 2018/19 shutdown season.</p>
2.	<p>Monitoring of Stray Currents and Installation of Cathodic Protection – Metropolitan will continue to perform corrosion surveys and monitor stray currents on a one to two-year cycle. Where indicated by corrosion monitoring, staff will install stray current drain stations or impressed current systems to minimize continued deterioration from stray current interference, which is a major cause of corrosion damage.</p>	<p>To date, stray current protection has been installed in 31.5 miles of PCCP lines. This protection includes both current drain stations and impressed current systems. In November 2017, current drain stations were installed in PCCP portions of the AMP.</p>
3.	<p>Near-Term Repair of Distressed PCCP Segments – Metropolitan will continue to prioritize and repair PCCP segments with elevated numbers of prestressing wire breaks, broken-back cracks, or other indications of risk or distress. During the course of the PCCP Rehabilitation Program, individual PCCP segments may be identified as distressed prior to the scheduled rehabilitation of an entire feeder. If needed, staff will recommend moving forward with near-term repairs to those individual PCCP segments.</p>	<p>To date, over 14,400 feet of distressed PCCP segments have been repaired. Most recently, urgent repairs of distressed PCCP on the Second Lower Feeder were completed in 2013, 2014, and 2016, and on the Sepulveda Feeder in 2016.</p> <p>(December 2018 action awards contract to reline 400 feet of the Sepulveda Feeder)</p>
4.	<p>Long-Term Rehabilitation – The PCCP Rehabilitation Program will complete the rehabilitation or replacement of all PCCP segments within the five priority feeders.</p>	<p>For the Second Lower Feeder, following is a summary of work to date:</p> <ul style="list-style-type: none"> • Preliminary Design <ul style="list-style-type: none"> ○ Reach 9, which crosses the Newport-Inglewood Fault zone: Geotechnical investigations and seismic studies are underway. • Final Design <ul style="list-style-type: none"> ○ Reaches 2 and 3: Design is underway. ○ The procurement specifications for large-diameter conical plug valves is complete. (This action awards the procurement contract.) • Procurement <ul style="list-style-type: none"> ○ Pipe liner fabrication for Reaches 2 and 4 is underway. • Construction <ul style="list-style-type: none"> ○ Reach 1: Rehabilitation of 23,100 feet of PCCP is complete. ○ Reach 4: Rehabilitation of 10,000 feet of PCCP is underway. • Outreach <ul style="list-style-type: none"> ○ Currently underway with member agencies to address construction phasing, isolation points, shutdown durations, and water quality-related issues. ○ Currently underway with local agencies to minimize traffic and other potential impacts to the public. <p>For the AMP, Calabajas Feeder, Rialto Pipeline, and Sepulveda Feeder, following is a summary of work to date:</p> <ul style="list-style-type: none"> • Preliminary design activities are underway.

The goal of this comprehensive strategy for managing PCCP lines is to maintain reliable deliveries to Metropolitan's member agencies while optimizing the remaining useful life of PCCP lines. The effort includes development of a multi-year schedule and conceptual-level cost estimates with a long-term rehabilitation and replacement plan for the five priority PCCP lines. The overall schedule, cost estimates, and sequencing of work will be reassessed regularly during the development of Metropolitan's biennial capital budget.

While the Second Lower Feeder is the initial pipeline to be addressed under the PCCP Rehabilitation Program, staff's strategy for the four other priority feeders is to complete preliminary design of the rehabilitation work for the entire length of each feeder at an early stage of the program. This approach will provide flexibility to adjust construction sequencing of individual reaches if priorities change. The sequencing for rehabilitation will be determined by several factors, including: (1) updated assessments of risk; (2) Metropolitan's water supply availability and the operational needs for specific feeders; (3) impacts to member agency service connections; and (4) readiness for construction.

System-wide hydraulic analyses are underway to assess hydraulic impacts of the PCCP rehabilitation work on Metropolitan's distribution system. The results of the analyses have been used to develop alternatives to minimize the loss of hydraulic capacity, to evaluate impacts of extended shutdowns on individual service connections, and to identify options for maintaining deliveries. The replacement of small-diameter sectionalizing valves and meters with larger units is an example of an approach for maintaining feeder hydraulic capacity. In light of the consolidation of the valve industry and the limited number of manufacturers that can furnish the recommended valves, staff has conducted outreach and survey to gauge manufacturer's interest and capability. Furthermore an independent investigation was conducted by consultant to identify global valve manufacturers capable of fabricating the valves.

Preliminary design to rehabilitate the AMP, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder has been authorized and is underway. Staff will return to the Board in 2020 to certify environmental documentation for these priority feeders and to authorize final design for their rehabilitation.

Distribution System

