THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

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

1/9/2018 Board Meeting

8-1

Subject

Adopt CEQA determination and appropriate $16.45 million; authorize preliminary design to rehabilitate prestressed concrete cylinder pipe portions of the Allen-McColloch Pipeline, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder; authorize agreements with: (1) Brown and Caldwell in an amount not to exceed $2 million; (2) Black and Veatch Corporation, Inc. in an amount not to exceed $2.9 million; and (3) HDR Engineering, Inc. in an amount not to exceed $4.4 million, to provide engineering design services; and authorize increase of $150,000 to an agreement with Helix Environmental Planning, Inc., for a new total of $2.1 million, to provide environmental support (Appropriations Nos. 15496 and 15502)

Executive Summary

The Prestressed Concrete Cylinder Pipe (PCCP) Rehabilitation Program is a comprehensive, long-term effort to manage Metropolitan's PCCP feeders. Five of these feeders have been identified as priority lines that should be rehabilitated based on their history of repairs and reduced service life. Rehabilitation of the initial line to be addressed, the Second Lower Feeder, has already commenced. This action authorizes preliminary design phase activities to move forward for the four other priority lines: (1) the Allen-McColloch Pipeline (AMP), (2) the Calabasas Feeder, (3) the Rialto Pipeline, and (4) the Sepulveda Feeder. This action also authorizes three professional services agreements to provide engineering design services, an agreement for geotechnical support, and an amendment to an existing agreement for preparation of environmental documentation.

Timing and Urgency

In September 2011, as a proactive measure to maintain overall system reliability, Metropolitan initiated the PCCP Rehabilitation Program to inspect, manage, and rehabilitate its PCCP feeders. Based on trends from nearly 17 years of monitoring and urgent repairs to PCCP lines, staff concluded that 63 miles of PCCP (22 feeders) appear stable, while the remaining 100 miles of PCCP (five feeders) have deteriorated over time and are expected to continue to deteriorate. To date, Metropolitan has inspected most of its PCCP feeders at least three times. The results indicate that over 82 percent of all pipe segments with prestressing wire breaks occur in the five priority feeders: (1) the AMP, (2) the Calabasas Feeder, (3) the Rialto Pipeline, (4) Second Lower Feeder, and (5) the Sepulveda Feeder.

Final design and the first major construction contract to rehabilitate PCCP on the Second Lower Feeder are currently underway. Staff recommends moving forward with preliminary design to rehabilitate the four remaining priority PCCP lines at this time. This strategy will enable final design and construction to proceed for these feeders in a systematic, cost-efficient manner, yet will provide flexibility to adjust the sequencing of individual reaches based on up-to-date condition assessments and priorities. Rehabilitation of all 100 miles of the five priority PCCP lines is being staged over a period of approximately 20 years, with multiple construction and procurement contracts.

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 Metropolitan's capital expenditure plan for fiscal year 2017/18.

Details

Background

The PCCP Rehabilitation Program is a comprehensive long-term plan for replacement or relining of Metropolitan's at-risk PCCP feeders in order to maintain reliable water deliveries to member agencies. The strategy for maintaining reliability of these lines contains four coordinated elements: (1) continued assessment and monitoring of PCCP feeders; (2) monitoring of stray currents and installation of cathodic protection, if needed; (3) near-term repair of distressed PCCP segments; and (4) long-term rehabilitation of the priority feeders. Background information on the PCCP Rehabilitation Program appears in **Attachment 1**, along with the current status of activities within each of the four elements.

Five pipelines have been identified as priority feeders based on risk analyses that assessed the need and priority for rehabilitation of individual PCCP feeders. The risk analyses included a combination of likelihood factors such as prestressing wire breaks, soil corrosivity, and repair history, along with consequence factors such as criticality and location. The five priority feeders are: (1) the AMP, (2) the Calabasas Feeder, (3) the Rialto Pipeline, (4) the Second Lower Feeder, and (5) the Sepulveda Feeder.

Metropolitan's approach for the initial stages of the PCCP Rehabilitation Program has focused on completion of a Final Programmatic Environmental Impact Report (PEIR) for all five feeders, followed by preliminary design of the rehabilitation work for each pipeline, with additional project-specific environmental documentation to be prepared for individual reaches of each feeder, if needed. By completing preliminary design for all five feeders at an early stage of the program, Metropolitan will have the ability to re-sequence planned construction based on up-to-date condition assessments, water supply priorities, and shutdown opportunities.

The planned rehabilitation work for most of the five feeders involves lining the existing PCCP segments with steel liner pipe designed as a stand-alone pipeline which 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. Open excavations will be required to access the existing pipeline at approximately 3,000-foot intervals. New 40-foot long liner segments will be inserted at these locations, moved into position, and welded together. Most of the access sites will be located in urban areas where tight-sheet shoring is necessary, and close coordination will be required with local agencies and the surrounding communities. Installation of line-sized sectionalizing valves and meters is planned to minimize hydraulic impacts to each feeder's flow capacity due to the reduction of the pipeline's internal diameter. In addition, modifications to several interconnections with other feeders are planned to allow deliveries to continue to member agency service connections while the rehabilitation is underway.

In January 2017, Metropolitan's Board certified the 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 Second Lower Feeder is the initial PCCP feeder to be addressed due to that pipeline's condition, its history of repairs, the presence of corrosive soils and third-party stray currents, and its high internal operating pressure. Final design is currently underway to rehabilitate 28 miles of PCCP on the Second Lower Feeder, and in August 2017, the first major construction contract was awarded to line approximately 23,100 feet of PCCP with a steel liner.

Initiation of preliminary design to reline the PCCP portions of the four remaining priority feeders is recommended at this time to allow an orderly, planned effort for final design and construction to proceed. This approach will allow advance shutdown planning to begin with member agencies, with a goal of minimizing delivery impacts during the construction.

The four PCCP feeders addressed in this action are described below.

- **Allen-McColloch Pipeline –** The AMP delivers treated water from the Robert B. Diemer Water Treatment Plant in Yorba Linda to El Toro Reservoir in southern Orange County. The AMP is approximately 25 miles long and was installed in the late 1970s. The 16-mile-long northern reach of the

line consists of 78-inch-diameter welded steel while the southern 9-mile-long portion consists of PCCP which varies in diameter from 54 inches to 78 inches.

The AMP has been inspected three times since 1999 using the electromagnetic inspection technique. Since that time, Metropolitan has identified 19 distressed segments and relined nearly 600 feet of PCCP on the AMP. The distressed segments are spread throughout the length of the feeder.

- **Calabasas Feeder** - The Calabasas Feeder is a 54-inch-diameter PCCP line which was constructed in 1975. The pipeline is approximately 9 miles long, and delivers treated water from the Joseph Jensen Water Treatment Plant to the cities of Agoura Hills, Calabasas, Hidden Hills, and Westlake Village, and to areas of unincorporated western Los Angeles County.

  The Calabasas Feeder has been inspected three times since 1999 using the electromagnetic inspection technique. Since that time, Metropolitan has identified 65 distressed segments and relined over 335 feet of PCCP on the feeder. The distressed segments are spread throughout the length of the feeder.

- **Rialto Pipeline -** The Rialto Pipeline conveys untreated water from Lake Silverwood to Live Oak Reservoir in La Verne. It was constructed in 1972. Approximately 16 miles of the pipeline are PCCP, with diameters ranging from 96 to 120 inches, while the remaining 14 miles consist of welded steel pipe.

  The Rialto Pipeline has been inspected three times since 1999 using the electromagnetic inspection technique. Since that time, Metropolitan has identified 79 distressed segments and relined over 124 feet of PCCP on the line. The distressed segments are spread throughout the length of the feeder.

- **Sepulveda Feeder** - The Sepulveda Feeder delivers treated water from the Jensen plant to an interconnection with the Second Lower Feeder in Torrance. The feeder is 42 miles long and was installed in the early 1970s. Approximately 37 miles of the feeder is comprised of 96-inch-diameter PCCP. The remainder of the line is constructed of 96-inch-diameter welded steel pipe.

  The Sepulveda Feeder has been inspected five times since 1999 using the electromagnetic inspection technique. Since that time, Metropolitan has identified 136 distressed segments and relined over 8,300 feet of PCCP on the feeder. Most recently, urgent repairs were completed in 2016. The distressed segments are spread throughout the length of the feeder.

For the AMP, Rialto Pipeline, and Sepulveda Feeder, preliminary design is recommended to be performed by the consultants identified below. Preliminary design for the Calabasas Feeder will be performed by Metropolitan staff. The planned preliminary design phase activities include: (1) assessment of design alternatives and hydraulic analyses of options under various flow scenarios and operating conditions; (2) field investigations to assess the condition of existing geotechnical conditions and identification of geohazards to determine appropriate seismic resilience measures; (3) utilities research to identify potential access locations; (4) assessment of right-of-way and easement needs; (5) development of a phasing strategy for construction; and (6) initial permitting and outreach with local agencies. Preparation of environmental documentation is also recommended to commence at this time in order to integrate that effort with the program's site-specific design activities.

Preliminary design for the four priority feeders is scheduled to be complete by mid-2020. Staff will return to the Board in early 2021 with a detailed plan for phasing the long-term rehabilitation of all feeders included in the program, and to authorize final design for the four subject PCCP feeders.

Project No. 1 – Rehabilitation of PCCP Portions of the Allen-McColloch Pipeline – Preliminary Design Phase ($3,270,000)

The AMP delivers treated water to southern Orange County. It was installed in the late 1970s by the Municipal Water District of Orange County (MWDOC), and was acquired by Metropolitan in the mid-1990s. It serves MWDOC and its retail agencies, including Irvine Ranch Water District, Santa Margarita Water District, El Toro Water District, and Moulton Niguel Water District.

The 16-mile-long northern reach of the feeder consists of 78-inch-diameter welded steel and extends from Yorba Linda to Irvine. The southern 9-mile long portion consists of PCCP which varies in diameter from 54 inches to

78 inches and extends from Irvine to Mission Viejo. The PCCP portion of the AMP begins just north of Rattlesnake Reservoir in the city of Irvine and extends under private roads, several toll roads, agricultural and undeveloped foothills of the Santa Ana Mountains, and through light industrial zones, commercial properties, and residential neighborhoods. The pipeline operates at pressures up to 250 pounds per square inch (psi).

The rehabilitation work for the AMP will be staged to address two to three reaches of the pipeline in sequence. Construction will take place over a period of two to three years to minimize impacts to member agency service connections.

This action appropriates $3.27 million and authorizes preliminary design phase activities for rehabilitation of the AMP. Requested funds include $2 million for technical development of the preliminary design by Brown and Caldwell (see below); $32,000 for environmental studies including biological and cultural surveys by Helix Environmental Planning, Inc. (see below); $38,000 for surveying and mapping; $60,000 for hydraulic modeling; $376,000 for detailed condition assessments and technical review by Metropolitan staff; $455,000 for shutdown planning, permitting, and project management; and $309,000 for remaining budget.

Project No. 2 – Rehabilitation of PCCP Portions of the Calabasas Feeder – Preliminary Design Phase ($3,130,000)

The Calabasas Feeder is a 54-inch-diameter PCCP line that was constructed in 1975. The Calabasas Feeder is located in the western San Fernando Valley and is approximately 9 miles long. It connects on the north to the West Valley Feeder No. 2 in Chatsworth, and extends south and west to a Las Virgenes Municipal Water District service connection in the city of Calabasas. Its route follows public right-of-way as it crosses under a major freeway and flood control channel, through residential neighborhoods, and light industrial zones. The pipeline operates at pressures up to 210 psi.

The rehabilitation work for the Calabasas Feeder will be staged to address one or two reaches of the pipeline in sequence. Construction will take place over multiple years to minimize water delivery impacts to the line's service connection.

This action appropriates $3.13 million and authorizes preliminary design phase activities for rehabilitation of the Calabasas Feeder. Requested funds include $2 million for technical development of the preliminary design by Metropolitan staff; $32,000 for environmental studies including biological and cultural surveys by Helix Environmental Planning, Inc. (see below); $150,000 for geotechnical investigations by Kleinfelder, Inc. (see below); $28,000 for surveying and mapping; $60,000 for hydraulic modeling; $32,000 for detailed condition assessments; $50,000 for third-party value engineering; $486,000 for shutdown planning, permitting, and project management; and $302,000 for remaining budget. The value engineering review will be performed by a specialized consultant, as described below. All work except for the geotechnical investigations and value engineering will be performed by Metropolitan staff.

Project No. 3 – Rehabilitation of PCCP Portions of the Rialto Pipeline – Preliminary Design Phase ($4,230,000)

The Rialto Pipeline conveys untreated water from Lake Silverwood to Live Oak Reservoir in La Verne. The feeder supplies water from the East Branch of the State Water Project to the F. E. Weymouth Water Treatment Plant, and directly serves three member agencies through 11 service connections. Approximately 16 miles of the pipeline are PCCP, with diameters ranging from 96 to 120 inches. Its route follows public right-of-way as it crosses under several freeways, flood control channels, undeveloped foothills, and residential neighborhoods. The pipeline operates at pressures up to 270 psi.

The rehabilitation work for the Rialto Feeder will be staged to address three to four reaches of the pipeline in sequence. Construction will take place over a period of three to four years to minimize water delivery impacts to member agencies.

This action appropriates $4.23 million and authorizes preliminary design phase activities for rehabilitation of the Rialto Pipeline. Requested funds include $2.9 million for technical development of the preliminary design by Black and Veatch Corporation, Inc. (see below); $28,000 for environmental studies including biological and

cultural surveys by Helix Environmental Planning, Inc. (see below); $30,000 for surveying and mapping; $60,000 for hydraulic modeling; $376,000 for detailed condition assessments and technical review by Metropolitan staff; $457,000 for shutdown planning, permitting, and project management; and $379,000 for remaining budget.

Project No. 4 – Rehabilitation of PCCP Portions of the Sepulveda Feeder – Preliminary Design Phase ($5,820,000)

The Sepulveda Feeder delivers treated water from the Jensen plant to an interconnection with the Second Lower Feeder in Torrance. Approximately 37 miles of the feeder is comprised of 96-inch-diameter PCCP. The Sepulveda Feeder's alignment follows major public streets as it extends through highly urbanized areas and the Sepulveda Pass. The feeder crosses several freeways, several flood control channels, and an airport. The pipeline operates at pressures up to 360 psi and passes through areas with highly corrosive soils. In addition, there are numerous underground utility lines, natural gas lines, and oil lines along its route, which expose the feeder to significant stray current interference. The Sepulveda Feeder supplies treated water to the Central Pool portion of Metropolitan's distribution system and serves five member agencies through six service connections.

The rehabilitation work for the Sepulveda Feeder will be staged to address ten reaches of the pipeline in sequence. Construction will take place over a 10 to 12 year period to minimize water delivery impacts to member agencies.

This action appropriates $5.82 million and authorizes preliminary design phase activities for rehabilitation of the Sepulveda Feeder. Requested funds include $4.4 million for technical development of the preliminary design by HDR Engineering, Inc. (see below); $68,000 for environmental studies including biological and cultural surveys by Helix Environmental Planning, Inc. (see below); $46,000 for surveying and mapping; $60,000 for hydraulic modeling; $376,000 for detailed condition assessments and technical review by Metropolitan staff; $70,000 for third-party value engineering; $507,000 for shutdown planning, permitting, and project management; and $293,000 for remaining budget. The value engineering review will be performed by a specialized consultant, as described below.

Engineering Design Services (Brown and Caldwell, Black and Veatch, HDR Engineering) – New Agreements

Brown and Caldwell, Black and Veatch Corporation, Inc., and HDR Engineering, Inc. are recommended to perform preliminary design to rehabilitate PCCP portions of the AMP, Rialto Pipeline, and Sepulveda Feeder, respectively.

The planned scope for each of the agreements includes: (1) conducting field, utility, geotechnical, and hazardous materials investigations; (2) assessing temporary right-of-way needs; (3) initiating permitting and traffic control with local agencies; (4) evaluating pipeline hydraulics and identifying design alternatives; (5) preparing project descriptions, conceptual drawings, and a preliminary design report; (6) developing contract and procurement strategies; and (7) developing preliminary construction cost estimates. These firms were selected through a competitive process via Request for Proposals (RFP) No. 1168. The firms were selected based on their experience with PCCP and with large diameter pipelines, expertise in traffic control in dense urban settings, and experience in permitting with local agencies. For each of these agreements, Metropolitan has established a Small Business Enterprise (SBE) participation level of 25 percent. Each of the firms has agreed to meet this level of participation. The planned subconsultants for each firm are listed in **Attachment 2.**

This action authorizes agreements with the following firms to provide engineering design services to rehabilitate PCCP portions of the specific pipeline indicated:

- Brown and Caldwell to perform preliminary design to rehabilitate the AMP, under an agreement with a not-to-exceed total of $2 million.
- Black and Veatch Corporation, Inc. to perform preliminary design to rehabilitate the Rialto Pipeline, under an agreement with a not-to-exceed total of $2.9 million.
- HDR Engineering, Inc. to perform preliminary design to rehabilitate the Sepulveda Feeder, under an agreement with a not-to-exceed total of $4.4 million.

Specialized Environmental Services (Helix Environmental Planning, Inc.) - Amendment to Agreement

The Final PEIR for the PCCP Rehabilitation Program established a framework for tired or project-level environmental documents to address specific environmental impacts for individual reaches of the five priority PCCP feeders. Helix Environmental Planning, Inc. is recommended to prepare environmental documentation for the project-level environmental documents to address specific environmental impacts for (1) the AMP, (2) the Calabasas Feeder, (3) the Rialto Pipeline, and (4) the Sepulveda Feeder. The planned scope of work includes performing technical studies which address issues such as air quality, traffic, noise and cultural resources; and preparing environmental documentation and related CEQA correspondence. Helix Environmental Planning, Inc. is an SBE firm, and thus achieves 100 percent SBE participation. The subconsultants for this agreement are listed in **Attachment 2**.

This action authorizes an increase of $150,000 to the existing agreement with Helix Environmental Planning, Inc., for a new not-to-exceed total of $2.1 million, to prepare environmental documentation for four feeders under the PCCP Rehabilitation Program.

Geotechnical Engineering Support (Kleinfelder, Inc.) - No Action Required

The geotechnical investigations for the Calabasas Feeder are recommended to be performed by Kleinfelder, Inc. under an existing board-authorized agreement. Geotechnical investigations are a technical specialty for which Metropolitan does not maintain in-house expertise. Kleinfelder, Inc. was selected through a competitive process via Request for Qualifications No. 1134. For this agreement, Metropolitan established an SBE participation level of 25 percent. Kleinfelder, Inc. has agreed to meet this level of participation.

The planned scope of work includes reviewing geologic, geotechnical, and seismic data along the pipeline alignment; and performing geotechnical field and laboratory investigations. The estimated cost for Kleinfelder, Inc. to provide these services is $150,000. No board action is required for this agreement.

Value Engineering Support – No Action Required

The third-party value engineering for the Calabasas Feeder and Sepulveda Feeder will be performed by a specialty firm under an agreement planned to be executed under the General Manager's Administrative Code authority to award contracts of $250,000 or less. The estimated cost for this support is $120,000. No board action is required for this agreement.

Value engineering for the rehabilitation of PCCP within the AMP and Rialto Pipeline will be performed at a later date.

Summary

This action appropriates $16.45 million; authorizes preliminary design to rehabilitate PCCP portions of the AMP, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder; authorizes agreements with Brown and Caldwell, Black and Veatch Corporation, Inc., and HDR Engineering, Inc. to provide engineering design services for specific pipelines; and authorizes an amendment to an existing agreement with Helix Environmental Planning, Inc. for preparation of environmental documentation.

Projects Nos. 1, 2, and 3 are included within capital Appropriation No. 15502, the Allen-McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline PCCP Rehabilitation Appropriation. This is the initial action for Appropriation No. 15502. The total estimated cost to complete the rehabilitation of these three pipelines is anticipated to be approximately $970 million.

Project No. 4 is included within capital Appropriation No. 15496, the Sepulveda Feeder PCCP Rehabilitation Appropriation, which was initiated in fiscal year 2016/17. With this action, the total funding for this appropriation will increase from $15 million to $20.82 million. The total estimated cost to complete the rehabilitation of this pipeline is anticipated to be approximately $660 million.

These projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal year 2017/18 capital expenditure plan. See **Attachment 1** for the Background and Program Status, **Attachment 2** for the Financial Statements, **Attachment 3** for the listing of Subconsultants for

the Agreements with Brown and Caldwell, Black and Veatch Corporation, Inc., HDR Engineering, Inc., Helix Environmental Planning, Inc., and Kleinfelder, Inc., and **Attachment 4** for the Location Map.

Project Milestones

February 2018 – Award of procurement contracts for steel liner pipe and valves for the Second Lower Feeder

June 2018 – Award of construction contract to rehabilitate Reach 2 of the Second Lower Feeder

December 2019 – Completion of preliminary design to rehabilitate PCCP portions of the AMP, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

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

By Minute Item 48801, dated September 13, 2011, the Board authorized initiation of the PCCP Rehabilitation Program.

By Minute Item 50699, dated January 10, 2017, the Board certified the Final PEIR for the PCCP Rehabilitation Program, and approved the program for the AMP, Calabasas Feeder, Rialto Pipeline, Second Lower Feeder, and Sepulveda Feeder for the purposes of the CEQA.

By Minute Item 50919, dated August 15, 2017, the Board awarded a construction contract to line a portion 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 program were evaluated in the PCCP Rehabilitation Program's Final PEIR, 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 actions are solely based on appropriation of funds and authorization of agreements, 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 actions.

The CEQA determination is: Determine that the proposed actions were previously addressed in the certified 2017 Final PEIR, findings, SOC, and MMRP, and that no further environmental analysis or documentation is required.

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt the CEQA determination that the proposed actions were previously addressed in the certified 2017 Final PEIR, findings, SOC, and MMRP; and

a. Appropriate $16.45 million;
b. Authorize preliminary design to rehabilitate PCCP portions of the AMP, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder;
c. Authorize agreement with Brown and Caldwell in an amount not to exceed $2 million to provide engineering design services for rehabilitation of the AMP;

d. Authorize agreement with Black and Veatch Corporation, Inc. in an amount not to exceed $2.9 million to provide engineering design services for rehabilitation of the Rialto Pipeline;

e. Authorize agreement with HDR Engineering, Inc. in an amount not to exceed $4.4 million to provide engineering design services for rehabilitation of the Sepulveda Feeder; and

f. Authorize increase of $150,000 to an agreement with Helix Environmental Planning, Inc., for a new not-to-exceed total of $2.1 million, to provide environmental support.

Fiscal Impact: $10.63 million of capital funds under Appropriation No. 15502, and $5.82 million of capital funds under Appropriation No. 15496

Business Analysis: This option will protect Metropolitan's assets; enhance delivery reliability to member agencies; allow critical pipeline repairs to proceed in a planned, proactive, and cost-effective manner; and reduce the risk of emergency repairs of PCCP lines.

Option #2

Do not authorize preliminary design of the long-term rehabilitation of the AMP, Calabasas Feeder, Rialto Pipeline, or Sepulveda Feeder.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to enhance reliability and extend the service life of PCCP portions of the four feeders. This option could lead to higher repair costs, more extensive repairs, and unplanned shutdowns.

Staff Recommendation

Option #1

12/18/2017
Gordon Johnson *Date*
Manager/Chief Engineer
Engineering Services

12/21/2017
Jeffrey Kightlinger *Date*
General Manager

Attachment 1 – Background and Program Status

Attachment 2 – Financial Statements

Attachment 3 – Subconsultants for Agreements with Brown and Caldwell, Black and Veatch Corporation, Inc., HDR Engineering, Inc., Helix Environmental Planning, Inc., and Kleinfelder, Inc.

Attachment 4 – Location Map

Ref# es12654875

PCCP REHABILITATION PROGRAM
BACKGROUND AND PROGRAM STATUS

Metropolitan's water delivery system includes approximately 830 miles of large-diameter pipelines, of which 159 miles are currently comprised of prestressed concrete cylinder pipe (PCCP). A contract is currently underway to line 4.4 miles of PCCP within the Second Lower Feeder. Following its completion in June 2018, a total of 154.6 miles of PCCP will remain. 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, compromising system reliability and resulting 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 Second Lower Feeder, (2) the Sepulveda Feeder, (3) the Rialto Pipeline, (4) the Calabasas Feeder, and (5) the Allen-McColloch Pipeline (AMP). 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 2017, the initial construction contract under the program was awarded to rehabilitate a reach 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	**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.	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 years to complete. To date, three cycles of electromagnetic testing have been performed on the PCCP feeders. The 4th cycle of electromagnetic inspections commenced in November 2017. Inspections of portions of the Second Lower

No.	Element	Status
		Feeder have been completed, while inspections of portions of the AMP, Box Springs Feeder, Lake Perris Bypass, Sepulveda Feeder, and Orange County Feeder are scheduled to be completed during the 2017/18 shutdown season.
2	**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.	To date, stray current protection has been installed in 22.5 miles of PCCP lines. This protection includes both current drain stations and impressed current systems. Most recently, current drain stations were installed in PCCP portions of the Calabasas Feeder, the Second Lower Feeder, the Sepulveda Feeder, and West Valley Feeder No. 2.
3	**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.	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.
4	**Long-Term Rehabilitation -** The PCCP Rehabilitation Program will complete the rehabilitation or replacement of all PCCP segments within the five priority feeders.	Design is underway to rehabilitate PCCP within the Second Lower Feeder. Following is a summary of work in progress for that feeder: • Construction of Reach 1 to line approximately 23,100 feet is underway. • Final design of Reaches 2 and 3 is underway. • Design for the procurement of coiled steel liner pipe and valves is underway. • Geotechnical investigations and specialized analyses of Reach 9, which crosses the Newport-Inglewood Fault zone, has been initiated. • Continued coordination is underway with member agencies to address construction phasing, isolation points, shutdown durations, and water quality-related issues. • Continued coordination is underway with local agencies to minimize traffic and other potential impacts to the public. **This Action –** • **Authorizes preliminary design to rehabilitate PCCP portions of the AMP, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder.** • **Authorizes three agreements for preliminary engineering design services to rehabilitate PCCP on the AMP, Rialto Pipeline, and Sepulveda Feeder.** • **Authorizes an amendment to an agreement for project-level environmental support for the**

No.	Element	Status
		AMP, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder.

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: updated assessments of risk; supply availability and operational needs for specific feeders; impacts to member agency service connections; and 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 line-sized units is an example of an approach for maintaining feeder hydraulic capacity.

Staff will return to the Board in early 2020 to certify environmental documentation for the AMP, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder, and to authorize final design for the rehabilitation of those feeders.

Financial Statement for Allen-McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline PCCP Rehabilitation Appropriation

A breakdown of Board Action No. 1 for Appropriation No. 15502[1] is as follows:

	Current Board Action No. 1 (Jan. 2018)
Labor	
Studies & Investigations	$ 3,060,000
Final Design	-
Owner Costs (Program mgmt., permitting, right-of-way, & envir doc.)	1,395,000
Submittals Review & Record Drwgs	-
Construction Inspection & Support	-
Metropolitan Force Construction	-
Materials & Supplies	-
Incidental Expenses	3,000
Professional/Technical Services	-
Brown and Caldwell	2,000,000
Black & Veatch Corporation, Inc.	2,900,000
Helix Environmental Planning, Inc.	82,000
Kleinfelder, Inc.	150,000
Value engineering firm	50,000
Right-of-Way	-
Equipment Use	-
Contracts	-
Remaining Budget	990,000
Total	**$ 10,630,000**

Funding Request

Appropriation Name:	Allen McColloch Pipeline, Calabasas Feeder, and Rialto Feeder PCCP Rehabilitation		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15502	**Board Action No.:**	1
Requested Amount:	$10,630,000	**Budget Page No.:**	N/A
Total Appropriated Amount:	$10,630,000	**Total Appropriation Estimate**	$ 976,000,000

[1] This is the initial action to rehabilitate PCCP within the Allen-McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline. The total estimated cost to complete the rehabilitation of these pipelines, including the amount appropriated to date, current funds requested, and future design and construction costs, is anticipated to be approximately $970 million.

Financial Statement for Sepulveda Feeder PCCP Rehabilitation Appropriation

A breakdown of Board Action No. 3 for Appropriation No. 15496[1] is as follows:

	Previous Total Appropriated Amount (Feb. 2016)	Current Board Action No. 3 (Dec. 2017)	New Total Appropriated Amount
Labor			
Studies & Investigations	$ 20,000	$ 482,000	$ 502,000
Final Design	668,000	-	668,000
Owner Costs (Program mgmt., permitting, right-of-way, & envir doc.)	552,000	506,000	1,058,000
Submittals Review & Record Drwgs.	160,000	-	160,000
Construction Inspection & Support	1,270,000	-	1,270,000
Metropolitan Force Construction	1,260,000	-	1,260,000
Materials & Supplies	90,000	-	90,000
Incidental Expenses	165,000	1,000	166,000
Right-of-Way	265,000		265,000
Equipment Use	15,000	-	15,000
Professional/Technical Services	-	-	-
HDR Engineering, Inc.	-	4,400,000	4,400,000
Helix Environmental Planning, Inc.	-	68,000	68,000
Value engineering firm		70,000	70,000
Contracts	9,150,000	-	9,150,000
Remaining Budget	1,385,000	293,000	1,678,000
Total	**$ 15,000,000**	**$ 5,820,000**	**$ 20,820,000**

Funding Request

Appropriation Name:	Sepulveda Feeder PCCP Rehabilitation		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15496	**Board Action No.:**	3
Requested Amount:	$5,820,000	**Budget Page No.:**	255
Total Appropriated Amount:	$20,820,000	**Total Appropriation Estimate**	$657,000,000

[1] The total amount expended to date on the rehabilitation of PCCP within the Sepulveda Feeder is approximately $15,198,633. The total estimated cost to complete the rehabilitation of the pipeline, including the amount appropriated to date, current funds requested, and future design and construction costs, is anticipated to be approximately $660 million.

The Metropolitan Water District of Southern California

Subconsultants for Agreement with Brown & Caldwell
Agreement No. 176583

Subconsultant and Location
DDB Engineering, Inc., Huntington Beach, CA
Epic Land Solutions, Inc., Torrance, CA
IEM, San Pedro, CA
Katz & Associates, Inc., Los Angeles, CA
KDM Meridian, Inc., Lake Forest, CA
KTUA, San Diego, CA
Lettis Consultants International, Inc., Valencia, CA
Mott MacDonald LLC, Los Angeles, CA
Ninyo & Moore, Inc., Los Angeles, CA
ProjectLine Technical Services, Inc., Costa Mesa, CA
Scott Foster Engineering, Inc., La Canada, CA
The Terrazas Group LLC, Pasadena, CA
Traffic Control Engineering, Inc., Brea, CA
UltraSystems Environmental, Inc., Irvine, CA

The Metropolitan Water District of Southern California

Subconsultants for Agreement with Black & Veatch Corporation, Inc.
Agreement No. 176584

Subconsultant and Location
The Alliance Group Enterprises, Inc., Los Angeles, CA
C Below, Inc., Chino, CA
DDB Engineering, Inc., Irvine, CA
Flow Science Incorporated, Pasadena, CA
GeoPentech, Inc., Irvine, CA
KOA Corporation, Monterey Park, CA
ProjectLine Technical Services, Inc., Costa Mesa, CA
SC Solutions, Inc., Sunnyvale, CA
UltraSystems Environmental, Inc., Irvine, CA

The Metropolitan Water District of Southern California

Subconsultants for Agreement with HDR Engineering, Inc.
Agreement No. 176585

Subconsultant and Location
Brierley Associates Corporation, Woodland Hills, CA
C Below, Inc., Chino, CA
CDM Smith, Inc., Los Angeles, CA
Cordoba Corporation, Los Angeles, CA
David Rendon Consulting, Monrovia, CA
DRP Engineering, Inc., Alhambra, CA
Guida Surveying, Inc., Los Angeles, CA
Henry H. Bardakjian, Glendale, CA
Hushmand Associates, Inc., Irvine, CA
Kenny Consulting Services, Inc., Carlsbad, CA
KOA Corporation, Monterey Park, CA
Scott Foster Engineering, Inc., La Canada, CA
Simpson Gumpertz & Heger, Inc., Los Angeles, CA

The Metropolitan Water District of Southern California

Subconsultants for Agreement with Helix Environmental Planning, Inc.
Agreement No. 173841

Subconsultant and Location
LG2WB, Inc., Irvine, CA
Minagar & Associates, Inc., Irvine, CA
Rincon Consultants, Inc., Ventura, CA

The Metropolitan Water District of Southern California

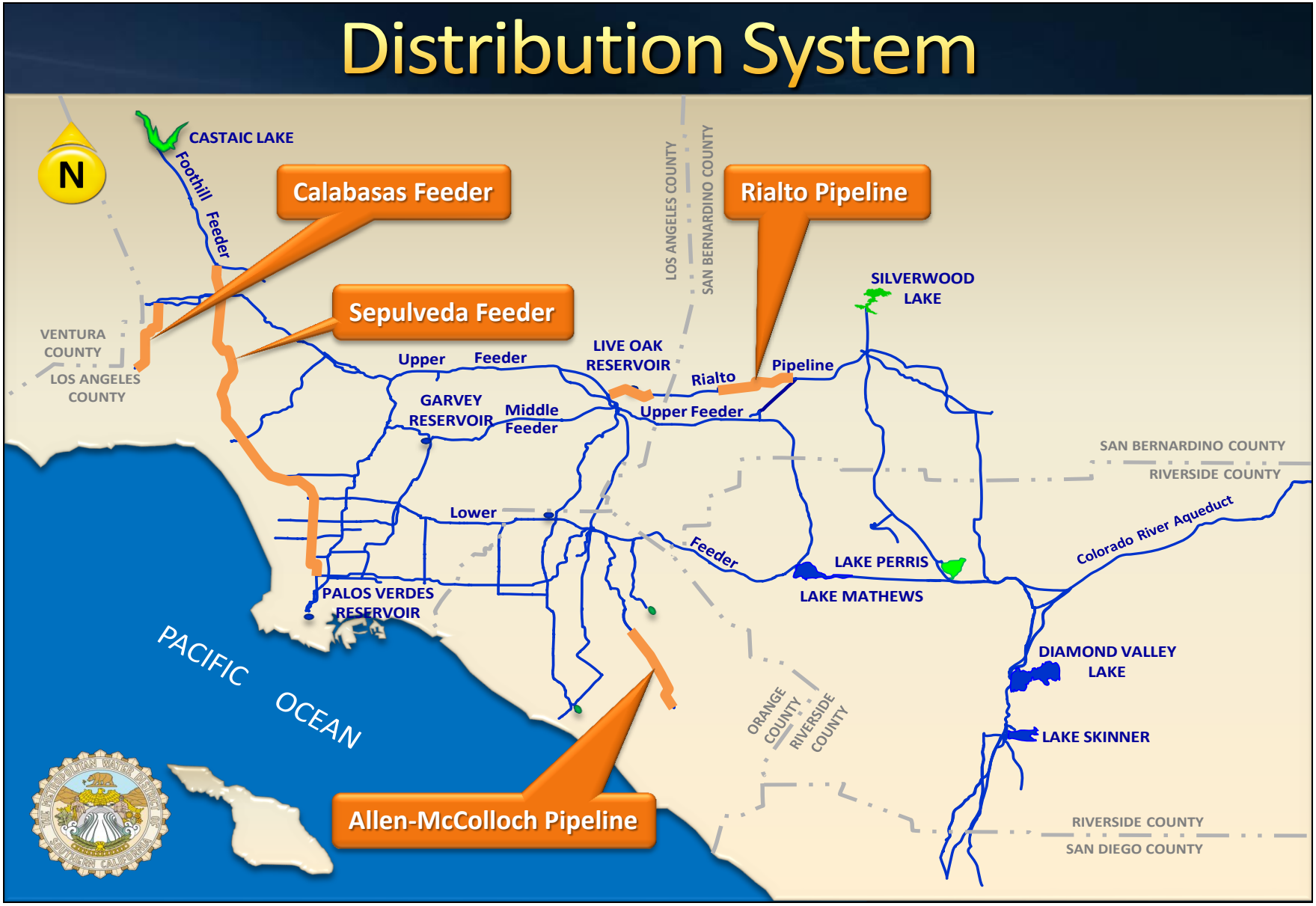
Subconsultants for Agreement with Kleinfelder, Inc.
Agreement No. 168729

Subconsultant and Location
A Cone Zone, Inc., Corona, CA
Advanced Geoscience, Inc., Torrance, CA
Alroy Drilling Services, Inc., Yorba Linda, CA
AP Engineering and Testing, Inc., Pomona, CA
Belshire Environmental Services, Inc., Foothill Ranch, CA
Bluesky Helicopters, Inc., Redlands, CA
C&L Drilling Co., La Habra, CA
California Barricade, Inc., Santa Ana, CA
California Pacific Drilling, Calimesa, CA
Cascade Drilling, LLC, Upland, CA
Crux Subsurface Exploration, Inc., Spokane Valley, WA
CT Concrete Cutting, Inc., Murrieta, CA
Earth Mechanics Institute, Golden, CO
Enviro-Chem, Inc., Pomona, CA
GEOVision, Inc., Corona, CA
Great West Drilling, Inc., Fontana, CA
Gregg Drilling & Testing, Inc., Signal Hill, CA
Griffin Dewatering Corporation, Ontario, CA
Guida Surveying, Inc., Irvine, CA

The Metropolitan Water District of Southern California

Subconsultants for Agreement with Kleinfelder, Inc.
Agreement No. 168729
(Continued)

Subconsultant and Location
HDR|Schiff, Claremont, CA
Hushmand Associates, Inc., Irvine, CA
Kehoe Testing & Engineering, Inc., Huntington Beach, CA
Layne Christensen Company, Redlands, CA
Ruen Drilling, Inc., Clark Fork, ID
Staib Backhoe and Excavation, Inc., San Dimas, CA
SubSurface Surveys & Associates, Inc., Carlsbad, CA
Tonon USA, Austin, TX
Western Helicopters, Inc., Riverside, CA
Woodward Drilling Company, Rio Vista, CA


Distribution System
N
CASTAIC LAKE
Foothill Feeder
Calabasas Feeder
Sepulveda Feeder
Rialto Pipeline
VENTURA COUNTY
LOS ANGELES COUNTY
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
SILVERWOOD LAKE
Upper Feeder
LIVE OAK RESERVOIR
Rialto Pipeline
GARVEY RESERVOIR
Middle Feeder
Upper Feeder
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
Lower Feeder
Colorado River Aqueduct
LAKE PERRIS
LAKE MATHEWS
PALOS VERDES RESERVOIR
PACIFIC OCEAN
DIAMOND VALLEY LAKE
ORANGE COUNTY
RIVERSIDE COUNTY
LAKE SKINNER
Allen-McColloch Pipeline
RIVERSIDE COUNTY
SAN DIEGO COUNTY