



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

12/12/2017 Board Meeting

7-2

Subject

Adopt CEQA determination and appropriate \$1.95 million; and authorize design to replace the water distribution systems and pavement at the Colorado River Aqueduct pumping plants (Appropriation No. 15483)

Executive Summary

This action authorizes design of three rehabilitation projects at Metropolitan's Colorado River Aqueduct (CRA) pumping plants and villages. The projects will replace: (1) the aging domestic water distribution systems; (2) the aging nonpotable water distribution systems; and (3) deteriorated asphalt pavement throughout the villages.

Timing and Urgency

The CRA pumping plants and villages are isolated facilities that rely on a local domestic water system for the supply of treated drinking water, and a parallel nonpotable system to supply untreated water for the cooling of pumps and service water needs. These water systems are 75 years old; major components are deteriorating and need to be replaced. Staff recommends proceeding with final design to replace the two water distribution systems at this time.

The existing asphalt roadways at the CRA pumping plants are over 30 years old and have deteriorated due to the harsh desert conditions and poor drainage. In addition, the replacement of the water distribution and sewer systems (under an ongoing project) will require extensive cutting and trenching, which will further distress the pavement. Staff recommends proceeding with a coordinated pavement renewal project that will replace the pavement in stages, as the subsurface utility work is completed at each village.

These projects have been reviewed with Metropolitan's Capital Investment Plan (CIP) prioritization criteria and are included in the CRA Reliability Program. Funds for this action are available within Metropolitan's capital expenditure plan for fiscal year 2017/18.

Details

Background

The CRA is a 242-mile-long conveyance system that transports water from the Colorado River to Lake Mathews. It consists of five pumping plants, 124 miles of tunnels, 63 miles of canals; and 55 miles of conduits, siphons, and reservoirs. The aqueduct was constructed in the late 1930s and was placed into service in 1941. The CRA pumping plants are located in remote areas of Riverside and San Bernardino Counties, where municipal water supplies are not available and where the harsh desert conditions cause deterioration of infrastructure and roadways. Three projects are recommended to move forward at this time to address aging water infrastructure and deteriorating pavement at the pumping plants.

Project No. 1 - CRA Domestic Water Distribution Systems Replacement – Final Design Phase (\$1,150,000)

The CRA pumping plants and villages are isolated facilities that rely on local domestic water systems for the supply of potable water. The water distribution systems are over 75 years old, while the water treatment

equipment has been in operation for nearly 25 years. Major components of the distribution piping and treatment systems are deteriorating and need to be replaced.

The domestic water system at each pumping plant includes water treatment equipment that features membrane filtration, activated carbon adsorption, and chemical feed systems; a 12,600-gallon water storage tank; and a domestic water distribution system. Water from the aqueduct is pumped to the on-site treatment systems for purification to meet potable water standards. Following treatment, the water is pumped to the storage tank located on the hill above each pump house, and is then conveyed through distribution piping to the pump house, guest lodge and kitchen, employee houses, and support buildings. The distribution systems contain a total of more than 8.5 miles of piping, while each treatment system can process up to 30,000 gallons per day. Metropolitan staff regularly monitors and tests water quality within the domestic water systems in accordance with state Division of Drinking Water requirements.

Most of the distribution system piping and ancillary features were installed in the 1940s. Major components of the domestic water distribution systems have deteriorated over time through continuous use in the harsh desert conditions. The distribution piping is prone to pipe breaks and leaks, resulting in expensive repairs. The domestic water systems are critical components of the infrastructure that supports the CRA pumping plants, and their replacement will maintain compliance with drinking water regulations, reduce the frequency of repairs, and simplify maintenance.

In January 2016, Metropolitan's Board authorized preliminary design to replace the domestic water treatment and distribution systems. Preliminary design to replace the distribution systems has been completed, and due to the condition of the systems, staff recommends proceeding with final design at this time. Preliminary design of the domestic water treatment systems is scheduled to be completed by April 2018. Staff will return to the Board to authorize final design to replace the water treatment systems at that time.

The planned work to upgrade the domestic water distribution systems includes the installation of new mainline piping from the treatment units up to the storage tanks, and then down to the villages and pumping plant buildings, along with addition of new backflow prevention devices, valves, meters, and remote water quality analyzers. The new domestic water distribution systems will have isolation valves and metering downstream of the storage tanks, and will be expandable to meet future needs.

Based on recent condition assessments of each water system, the domestic water distribution systems will be replaced via two construction contracts: (1) an initial contract for Eagle Mountain Pumping Plant; and (2) a subsequent contract for the four other pumping plants.

Planned final design phase activities include: (1) field investigations and potholing of utilities; (2) preparation of drawings and specifications for the construction contracts; (3) preparation of environmental documentation; (4) development of construction cost estimates; (5) value engineering; (6) local agency permitting; and (7) receipt of competitive bids. All design activities except for geotechnical investigations will be performed by Metropolitan staff. Geotechnical support will be provided by Fugro USA Land, Inc., as discussed below.

This action appropriates \$1.15 million and authorizes final design to replace the domestic water distribution systems at Metropolitan's pumping plants and villages along the CRA. Requested funds include: \$610,000 for final design; \$130,000 for geotechnical investigations by Fugro USA Land, Inc.; \$365,000 for preparation of environmental documentation, permitting, value engineering, bidding, and project management; and \$45,000 for remaining budget. An agreement with a specialty firm to perform the third-party value engineering assessment is planned to be executed under the General Manager's Administrative Code authority to award contracts of \$250,000 or less.

The anticipated cost of final design to replace the domestic water distribution systems at all five pumping plants is approximately 11.9 percent of the estimated construction cost. Engineering Services' goal for design of projects with construction greater than \$3 million is 9 to 12 percent.

The total estimated cost to replace the domestic water distribution systems, including the current funds requested and future construction costs, is anticipated to range from \$6 million to \$7 million.

Project No. 2 – CRA Nonpotable Water Distribution Systems Replacement – Final Design Phase (\$627,000)

The nonpotable water distribution systems supply: (1) untreated water for all cooling water needs at each pump house; (2) service water to buildings such as storage warehouses, fleet services, machine shops, and carpenter shops; and (3) irrigation water for the pumping plants and villages. The existing nonpotable water systems were installed during the original construction of the CRA. The nonpotable systems reduce demand on the domestic water systems, thereby extending the life of the on-site treatment systems and reducing capital and operating costs for those systems.

In May 2000, Metropolitan's Board authorized a project to separate the fire water systems from the nonpotable water systems at all five pumping plants. This work was completed in 2001. The fire water systems remain code-compliant, and no additional improvements to those systems are needed at this time.

The nonpotable water distribution systems at the CRA pumping plants vary in capacity depending on the number of buildings and their use. The nonpotable systems feature a total of five water storage tanks and approximately 8.7 miles of piping. Recent inspections of these systems have found numerous leaks and breaks. The planned upgrades to the nonpotable water distribution systems will be incorporated into the two construction contracts that will replace the domestic water distribution systems.

Planned final design phase activities include: (1) field investigations and potholing of utilities; (2) preparation of drawings and specifications for the construction contracts; (3) preparation of environmental documentation; (4) development of construction cost estimates; (5) value engineering; and (6) receipt of competitive bids. All design activities except for geotechnical investigations will be performed by Metropolitan staff. Geotechnical support will be provided by Fugro USA Land, Inc., as discussed below.

This action appropriates \$627,000 and authorizes final design to replace the nonpotable water distribution systems at the CRA pumping plants. Requested funds include: \$465,000 for final design; \$77,000 for preparation of environmental documentation; value engineering, receipt of bids, and project management; \$50,000 for geotechnical investigations by Fugro USA Land, Inc.; and \$35,000 for remaining budget.

The anticipated cost of final design to upgrade the nonpotable water distribution systems is approximately 11.9 percent of the estimated construction cost. Engineering Services' goal for design of projects with construction greater than \$3 million is 9 to 12 percent.

The total estimated cost to replace the nonpotable water distribution systems, including the current funds requested and future construction costs, is anticipated to range from \$4 million to \$5 million.

Project No. 3 – CRA Roadway Pavement Replacement – Preliminary Design Phase (\$173,000)

The asphalt roadways at the pumping plants provide access between buildings and the villages for Metropolitan staff, residents, and visitors. There is a total of approximately 30 acres of asphalt-paved roadways and surfaces at all five pumping plants, and these asphalt surfaces are over 30 years old. Due to the harsh desert conditions and deterioration of the subgrade over time, potholes and cracks have developed throughout the villages. In many areas, poor drainage has also contributed to deterioration of the roadways. Replacement of the domestic and nonpotable water distribution systems, along the ongoing sewer replacement project, will require cutting and trenching of the existing roadways. This work will further distress the asphalt surfaces, leaving the roadways in very poor condition and in need of replacement.

Staff will develop a pavement renewal schedule to rehabilitate or replace the roadway pavement in stages, in coordination with the other planned subsurface utility work at the pumping plants. The utility work includes the water systems contained in Projects Nos. 1 and 2 above, sewer system replacements which are currently underway, and electrical duct bank installations.

The planned upgrades to the roadway pavement include placement of a new layer of asphalt on less distressed areas throughout the CRA villages; removal and replacement of more heavily damaged roadways; and grading and installation of culverts to improve drainage.

Planned preliminary design phase activities include: (1) field surveys, mapping, and analysis of topographic surveys to evaluate surface drainage patterns; (2) a condition assessment and sampling of the subgrade in areas of significantly distressed asphalt to assess the supporting soils; (3) preparation of conceptual layout drawings; (4) development of a construction cost estimate; and (5) preparation of environmental documentation. All design activities except for geotechnical investigations will be performed by Metropolitan staff.

This action appropriates \$173,000 and authorizes preliminary design to replace the roadway pavement at the CRA pumping plants and villages. Requested funds include: \$92,000 for the preliminary design activities described above; \$49,000 for preparation of environmental documentation, value engineering, and project management; \$20,000 for geotechnical investigations by Fugro USA Land, Inc.; and \$12,000 for remaining budget. Staff will return to the Board to authorize final design to replace the pavement under a series of staged contracts.

Geotechnical Investigations (Fugro USA Land, Inc.) – No Action Required

Geotechnical investigations will be conducted by Fugro USA Land, Inc. under an existing board-authorized agreement. Fugro USA Land, Inc. was selected based on its expertise with similar projects including: drilling, coring, and sampling of steep, rocky terrain in remote desert conditions. The planned scope of work includes conducting exploratory borings of the underlying soil and rock conditions, and development of design recommendations for foundations and excavations for the water distribution systems and pavement throughout the pumping plant villages. The estimated cost for these services is \$200,000.

No amendment is needed to the existing agreement with Fugro USA Land, Inc. to provide these services. Metropolitan established a Small Business Enterprise (SBE) participation level of 25 percent for this work, and Fugro USA Land Inc. has agreed to meet this level of participation. The subconsultants for this agreement are Gregg Drilling and Testing, Inc., Advanced Geosciences, Inc., and Rice General, Inc.

Summary

This action appropriates \$1.95 million and authorizes design to replace the water distribution systems and pavement at the CRA pumping plants and villages. This project is included within capital Appropriation No. 15483, the CRA Reliability Appropriation – FY 2012/13 Through FY 2017/18, which was initiated in fiscal year 2012/13. With the present action, the total funding for Appropriation No. 15483 will increase from \$12.32 million to \$14.27 million.

This project has 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 Financial Statement and **Attachment 2** for the Location Map.

Project Milestones

August 2018 – Award of construction contract to replace the water distribution systems at Eagle Mountain Pumping Plant

December 2018 – Award of construction contract to replace the water distribution systems at Hinds, Iron Mountain, Gene, and Intake Pumping Plants

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

By Minute Item 50356, dated January 12, 2016, the Board authorized preliminary design to replace the domestic water systems at the CRA pumping plants.

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 that the proposed action is categorically exempt, and

- a. Appropriate \$1.95 million;
- b. Authorize final design to replace the domestic and nonpotable water distribution systems at the CRA pumping plants; and
- c. Authorize preliminary design to replace roadway pavement throughout the CRA villages.

Fiscal Impact: \$1.95 million of capital funds under Appropriation No. 15483

Business Analysis: This option will enhance reliability of critical infrastructure that supports efficient operation and reliability of the CRA pumping plants.

Option #2

Do not proceed with the rehabilitation projects at this time.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to maintain reliability of the domestic water and nonpotable systems at the CRA pumping plants, and to repair deteriorated roadways.

Staff Recommendation

Option #1


 _____ 11/20/2017
 Gordon Johnson Date
 Manager/Chief Engineer
 Engineering Services


 _____ 11/27/2017
 Jeffrey Knightlinger Date
 General Manager

Attachment 1 – Financial Statement

Attachment 2 – Location Map

Financial Statement for CRA Reliability Appropriation – FY 2012/13 Through FY 2017/18

A breakdown of Board Action No. 8 for Appropriation No. 15483¹ is as follows:

	Previous Total Appropriated Amount (Dec. 2017)	Current Board Action No. 8 (Dec. 2017)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 2,054,000	\$ 92,000	\$ 2,146,000
Final Design	2,236,000	1,075,000	3,311,000
Owner Costs (Program mgmt., bidding, & permitting)	1,068,000	386,000	1,454,000
Submittals Review & Record Drwgs.	88,000	-	88,000
Construction Inspection & Support	591,000	-	591,000
Metropolitan Force Construction	947,000	-	947,000
Materials & Supplies	104,000	-	104,000
Incidental Expenses	17,000	5,000	22,000
Professional/Technical Services	882,000		882,000
Value engineering firm	-	100,000	100,000
Fugro USA Land, Inc.	-	200,000	200,000
Equipment Use	63,000	-	63,000
Contracts	2,975,254	-	2,975,254
Remaining Budget	1,294,746	92,000	1,386,746
Total	\$ 12,320,000	\$ 1,950,000	\$ 14,270,000

Funding Request

Appropriation Name:	CRA Reliability Appropriation – FY 2012/13 Through FY 2017/18		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15483	Board Action No.:	8
Requested Amount:	\$ 1,950,000	Budget Page No.:	222
Total Appropriated Amount:	\$ 14,270,000	Total Appropriation Estimate:	\$ 67,600,000

¹ The total amount expended to date to replace the domestic water distribution systems at all five CRA pumping plants is approximately \$584,000. This is the initial action to replace nonpotable water distribution systems and roadway pavement at the CRA pumping plants. The total estimated cost to complete the three projects, including the amount appropriated to date, current funds requested, and future construction costs, is anticipated to range from \$18 million to \$20 million.

Location Map

