



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

9/12/2023 Board Meeting

7-1

Subject

Award a \$3,895,000 contract to Miller Pipeline to furnish and install internal seals along Freda Siphon Barrel No. 1 on the Colorado River Aqueduct; the General Manager has determined that the proposed action is exempt or otherwise not subject to CEQA

Executive Summary

Several leaks were detected on the three-mile-long Freda Siphon Barrel No. 1 along the Colorado River Aqueduct (CRA) conveyance system in January 2021. At that time, staff excavated around the siphon, exposed the buried conduit, and filled the cracks with a rubber sealant as a temporary measure. During a follow-up inspection of the CRA in March 2022, multiple cracks with the potential for future leakage were discovered on the Freda Siphon. While the cracks do not immediately jeopardize the structural integrity of the aqueduct, leakage over time could erode adjacent soil, undermine the siphons, and cause extensive damage to the siphon structures. This action awards a construction contract to furnish and install internal seals at 82 locations within the 3-mile-long Freda Siphon Barrel No. 1. The work will be performed during a planned CRA shutdown in March 2024.

Details

Background

The CRA is a 242-mile-long water conveyance system placed into service in 1941. It consists of five pumping plants, 124 miles of tunnels, 63 miles of canals, and 55 miles of conduits, siphons, and reservoirs. As the aqueduct traverses the desert, it must cross numerous drainage channels, ravines, and other natural depressions. At each crossing, the aqueduct's open channel transitions into a buried conduit (an inverted siphon), which drops below ground and passes beneath the natural surface feature. Water re-emerges into the open aqueduct at the downstream end of the siphon. Typically, siphons are cast-in-place reinforced concrete conduits that vary in length from 150 feet to 5 miles.

The Freda Siphon is a 148-inch diameter double-barrel monolithic concrete siphon located 20 miles east of Iron Mountain Pumping Plant. It is a 3-mile-long buried siphon that was constructed in two phases. The first barrel was part of the original CRA construction, while Barrel No. 2 was built in the early 1950s.

When Barrel No. 1 was constructed in the 1930s, the original design did not include expansion joints. Expansion joints accommodate length changes caused by thermal expansion and contraction of siphon conduits, which reduces the susceptibility to cracking. As a result, Barrel No. 1 has experienced periodic cracks in the interior of the conduits. While the cracks in the liners do not compromise the structural integrity of the conduits, over time, the cracks may propagate through the siphon walls and result in subsurface leaks, which could cause damage to the siphons. The design for Barrel No. 2 included expansion joints, and it does not experience the same cracking and leakage as Barrel No. 1.

In January 2021, six new subsurface leaks were discovered on Freda Siphon Barrel No. 1. The siphon was uncovered in the area of the leaks, and the leaks were temporarily repaired by filling the cracks with an epoxy sealant. Metropolitan forces performed all work. During the February 2022 CRA shutdown, staff conducted a detailed inspection of the entire siphon. Numerous internal circumferential cracks were observed, which varied from 6- to 42-inches long, with crack widths from 1/16 inch to 1 inch. In addition, previously repaired cracks utilizing coal tar filler or mortar patching have deteriorated over time and must be resealed. Staff has identified

76 additional locations of concern besides the six identified in 2021. Installation of internal seals at the identified areas is critical to prevent further crack progression and subsurface leaks. Final design of the internal seal installation is complete, and staff recommends award of a construction contract at this time. This work is planned to be completed during an upcoming CRA shutdown in March 2024.

Budget Impact

In accordance with the April 2022 action on the biennial budget for fiscal years 2022/23 and 2023/24, the General Manager authorized staff to proceed with the installation of the internal seals at Freda Siphon Barrel No. 1, pending board award of the construction contract described below. Based on the current Capital Investment Plan (CIP) expenditure forecast, funds for the work to be performed pursuant to this action during the current biennium are available within the CIP Appropriation for Fiscal Years 2022/23 and 2023/24 (Appropriation No. 15525). This project anticipates an expenditure of \$5.3 million in capital funds. Approximately \$5.3 million will be incurred in the current biennium and has been previously authorized. This project has been reviewed in accordance with Metropolitan's CIP prioritization criteria and was approved by Metropolitan's CIP evaluation team to be included in the CRA Reliability Program.

Freda Siphon Barrel No. 1 Internal Seal Installation – Construction

The scope of the construction contract includes furnishing and installing internal seals at 82 locations in the CRA Freda Siphon Barrel No. 1. The internal seals used for this project are comprised of flexible rubber liner material that is clamped around the full inside circumference of the pipe joint with a metal band to ensure a noncorrodible, water-tight seal. In some locations, depending on the severity of the cracks, multiple seals will be installed to fill the crack gap, and staff anticipates approximately 144 seals will be installed during the construction contract. Metropolitan forces will dewater the siphon, establish safety clearances, provide access, and return the aqueduct to service.

A total of \$5.3 million is allocated for this work. In addition to the amount of the contract described below, other funds to be allocated include: \$468,000 for construction management and inspections; \$142,000 for Metropolitan force activities, as described above; \$269,000 for submittal review, technical support during construction, responding to request for information, and preparation of record drawings; \$276,000 for environmental monitoring, contract administration, and project management; and \$250,000 for remaining budget.

Attachment 1 provides the allocation of the required funds. The total estimated cost to complete the siphon internal seal installation, including the amount appropriated to date, and funds allocated for the work described in this action, is approximately \$5.4 million.

Award of Construction Contract (Miller Pipeline)

Specifications No. 2057 for furnishing and installing internal seals along the Freda Siphon Barrel No. 1 was advertised for bids on June 29, 2023. As shown in **Attachment 2**, 3 bids were received and opened on August 8, 2023. The low bid from Miller Pipeline in the amount of \$3,895,000 complies with the requirements of the specifications. The other bids ranged from \$6.14 million to \$6.95 million, while the engineer's estimate for this project was \$3.94 million. For this contract, Metropolitan did not establish a Small Business Enterprise participation level due to the specialized nature of the work. The subcontractors for this contract are listed in **Attachment 3**.

As described above, Metropolitan staff will perform construction management and inspection. Engineering Services' performance metric target range for construction management and inspection of projects with construction greater than \$3 million is 9 to 12 percent. For this project, the performance metric goal for construction management and inspection is 11.6 percent of the total construction cost. The total cost of construction for this project is \$4,037,000, which includes the amount of the contract (\$3.895 million), and Metropolitan force activities and supplies (\$142,000).

Alternatives Considered

Staff considered several alternatives for the rehabilitation of the Freda Siphon, including a complete relining of the tunnel using a steel liner system and concrete liner. However, this alternative would require a months' long shutdown of a portion of the CRA, ranging in cost from \$30 million to \$45 million, and reduce the interior diameter of the siphon, thereby reducing the flow capacity of the CRA. Staff is currently investigating other lining

options such as polyurethane or epoxy lining; however, additional time is required to determine the best combination of long-term performance, rate of application and curing, as well as installation and maintenance cost. The selected alternative has been successfully used in the past and will allow for the rehabilitation of the siphon to be completed within the planned 19-day CRA 2024 shutdown. This approach also extends the service life of the concrete siphon.

Summary

This action awards a \$3,895,000 contract to Miller Pipeline for furnishing and installing internal seals in the Freda Siphon Barrel No. 1 along the CRA conveyance system. See **Attachment 1** for the Allocation of Funds, **Attachment 2** for the Abstract of Bids, **Attachment 3** for the Listing of Subcontractors for Low Bidder, and **Attachment 4** for the Location Map.

Project Milestone

April 2024 – Completion of construction

Policy

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

Metropolitan Water District Administrative Code Section 11104: Delegation of Responsibilities

By Minute Item 52778, dated April 12, 2022, the Board appropriated a total of \$600 million for projects identified in the Capital Investment Plan for Fiscal Years 2022/2023 and 2023/2024.

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 action consists of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of existing or former use and no possibility of significantly impacting the physical environment. Accordingly, the proposed action qualifies as a Class 1 Categorical Exemption (Section 15301 of the State CEQA Guidelines).

CEQA determination for Option #2:

None

Board Options

Option #1

Award a \$3,895,000 contract to Miller Pipeline to furnish and install internal seals in Freda Siphon Barrel No. 1 along the CRA conveyance system.

Fiscal Impact: Expenditure of \$5.3 million in capital funds. Approximately \$5.3 million will be incurred in the current biennium and has been previously authorized.

Business Analysis: This option will enhance reliability of the CRA and reduce the risk of unplanned outages and costly emergency repairs.

Option #2

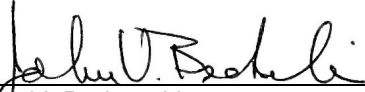
Do not proceed with the project at this time.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to repair the siphons during a scheduled shutdown. Deferral of the repairs could result in additional leakage and damage to the siphons.

Staff Recommendation

Option #1



John V. Bednarski
Manager/Chief Engineer
Engineering Services

8/22/2023

Date



Adel Hagekhalil
General Manager

8/24/2023

Date

Attachment 1 – Allocation of Funds

Attachment 2 – Abstract of Bids

Attachment 3 – Listing of Subcontractors for the Low Bidder

Attachment 4 – Location Map

Ref# es12693258

Allocation of Funds for Freda Siphon Barrel No. 1 Internal Seal Installation

	Current Board Action (Sep. 2023)
Labor	
Investigations & Conceptual Design	\$ -
Final Design	
Owner Costs (Program mgmt., envir. documentation)	258,000
Submittals Review & Record Drwgs.	269,000
Construction Inspection & Support	468,000
Metropolitan Force Construction	132,000
Materials & Supplies	-
Incidental Expenses	18,000
Professional/Technical Services	-
Right-of-Way	-
Equipment Use	10,000
Contracts	
Miller Pipeline	3,895,000
Remaining Budget	250,000
Total	\$ 5,300,000

The total amount expended to date for Freda Siphon Barrel No. 1 Internal Seal Installation is approximately \$133,000. The total estimated cost to complete, including the amount appropriated to date and funds allocated for the work described in this action, is \$5.4 million.

The Metropolitan Water District of Southern California

Abstract of Bids Received on August 8, 2023, at 2:00 P.M.

Specifications No. 2057

Freda Siphon Barrel No. 1 Internal Seal Installation

The project consists of furnishing and installing internal seals at 82 locations along the Colorado River Aqueduct's Freda Siphon Barrel No. 1.

Engineer's estimate: \$3,940,000

Bidder and Location	Total	SBE \$	SBE %	Met SBE¹
Miller Pipeline Alameda, CA	\$3,895,000	\$0	0%	-
Structural Preservation Systems Garden Grove, CA	\$6,138,316	-	-	-
Nationwide Contracting Services Inc. Huntington Beach, CA	\$6,950,000	-	-	-

¹ Small Business Enterprise (SBE) participation level not established for this contract.

The Metropolitan Water District of Southern California

Subcontractors for Low Bidder

Specifications No. 2057

Freda Siphon Barrel No. 1 Internal Seal Installation

Low bidder: Miller Pipeline

Subcontractor	Service Category; Specialty
National Safety Services Inc. Huntington Beach, CA	Confined Space Safety Services

Location Map

