



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

5/8/2018 Board Meeting

8-7

Subject

Adopt CEQA determination and appropriate \$3 million; award \$939,000 contract to CSI Electrical Contractors, Inc. to replace the Uninterruptable Power Supply systems at the Colorado River Aqueduct pumping plants; and authorize preliminary design to rehabilitate the auxiliary power system at Iron Mountain Pumping Plant (Appropriation No. 15384)

Executive Summary

This action awards a construction contract to replace the Uninterruptable Power Supply (UPS) systems at all five Colorado River Aqueduct (CRA) pumping plants, and authorizes preliminary design to rehabilitate the 480 Volt auxiliary power system at Iron Mountain Pumping Plant. These systems are critical components of the utility infrastructure at the pumping plants.

Timing and Urgency

Each CRA pumping plant has a UPS system to prevent fluctuations in power quality for the 480 V systems, and to serve as a backup power supply for key data in case of loss of normal station power. The existing UPS systems are outdated and are beginning to fail. Replacement of the UPS systems is needed to reduce the risk of damage to Metropolitan's data systems, and the loss of critical data. These systems support emergency response, communications, security, and the control system used to operate and monitor the pumping plants.

The existing auxiliary power systems at the CRA pumping plants were installed during the original construction of the CRA, and were augmented during the pumping plant expansions of the 1950s. These systems provide power to the support equipment for the main pumps. After nearly 80 years of continuous service, the auxiliary power systems have begun to deteriorate and need to be rehabilitated. Staged upgrades to the systems are planned for all five pumping plants, beginning with Iron Mountain Pumping Plant.

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

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, siphons, and reservoirs; 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 pumping plants were expanded in the 1950s.

Electrical power for the CRA pumping plants is transmitted via 237 miles of 230 kV overhead power lines. At each of the pumping plants, the incoming 230 kV power is stepped down to a medium voltage of 6.9 kV to serve the main pump motors. The 6.9 kV power is also stepped down to 480 V, which is used in the auxiliary power systems. These systems power the cooling water and lubricating oil systems for the main pumps, as well as the fire pumps, sump pumps, and other pumping plant equipment. The UPS systems provide instantaneous backup power to key data systems in the event of loss of normal power.

After decades of continuous operation, many components of the auxiliary power systems are showing signs of deterioration. In addition, the UPS systems have begun to fail. In order to maintain reliability of the CRA electrical systems and reduce the risk of unplanned outages, staff recommends proceeding with two rehabilitation projects: (1) construction to replace the UPS systems at all five pumping plants; and (2) preliminary design to upgrade the auxiliary power system at Iron Mountain Pumping Plant.

Project No. 1 – Replacement of CRA UPS Systems – Construction (\$2,040,000)

At each CRA pumping plant, several UPS units are installed to provide isolated, filtered power as well as backup power to essential electronic equipment. The UPS systems are comprised of rectifiers/chargers, inverters, static transfer switches with manual bypass, and storage batteries. The existing UPS systems are over 20 years old and are beginning to fail. Typically, UPS systems have a reliable service life of approximately 10-15 years. The existing UPS units are also undersized based on current power demands at the pumping plants, and lack up-to-date features typical of newer systems, such as built-in redundancy. Due to the age of the existing units, replacement parts are no longer available. In June 2014, Metropolitan's Board authorized design to replace the UPS systems at all five pumping plants. Staff has completed final design and recommends proceeding with construction at this time.

The scope of the construction contract includes adding new UPS units and replacing existing units. Many of the existing individual units will be eliminated and replaced with a single large-capacity unit that is more efficient, reliable, and economical. The contract will provide uniform equipment at each of the pumping plants, which will simplify maintenance and stocking of spare parts. Metropolitan forces will establish electrical clearances and will coordinate the switchover of power and equipment by the contractor. Metropolitan forces will also integrate the UPS systems with the Supervisory Control and Data Acquisition (SCADA) system at each pumping plant.

Award of Construction Contract (CSI Electrical Contractors, Inc.)

Specifications No. 1810 for the replacement of UPS systems at the CRA pumping plants was advertised for bids on March 5, 2018. As shown in **Attachment 2**, two bids were received and opened on April 10, 2018. The low bid from CSI Electrical Contractors, Inc. in the amount of \$939,000 complies with the requirements of the specifications. The second bid was \$989,000, while the engineer's estimate was \$1.4 million. For this contract, Metropolitan established a Small Business Enterprise (SBE) participation level of at least 15 percent of the bid amount. CSI Electrical Contractors, Inc. has agreed to meet this level of participation. The subcontractors for this contract are listed in **Attachment 3**.

This action appropriates \$2.04 million and awards a \$939,000 contract to CSI Electrical Contractors, Inc. to replace the UPS systems at the five CRA pumping plants. In addition to the amount of the contract, the requested funds include: \$250,000 for the Metropolitan force activities described above; \$204,000 for construction inspection; \$56,000 for submittals review and record drawing preparation by Metropolitan staff; \$145,000 for technical support during construction by HDR Engineering, as discussed below; \$151,000 for contract administration and project management; and \$295,000 for remaining budget.

Metropolitan staff will perform inspection of the construction. For this project, the anticipated cost of inspection is approximately 17 percent of the total construction cost. Engineering Services' goal for inspection of projects with construction less than \$3 million is 9 to 15 percent. Inspection costs for this project are expected to exceed the goal because of the remote locations and the numerous equipment switchovers required within multiple local shutdowns at each plant. For this project, the total cost of construction, which includes the amount of the contract (\$939,000) and Metropolitan force construction (\$250,000), is \$1.19 million.

The total estimated cost to complete the replacement of the UPS systems, including the amount appropriated to date and current funds requested, is \$2.66 million.

Project No. 2 – Rehabilitation of the Auxiliary Power System at Iron Mountain Pumping Plant – Preliminary Design Phase (\$960,000)

The auxiliary power systems for the CRA pumping plants were originally installed in the 1930s and were expanded in the 1950s. At each pumping plant, the auxiliary power distribution system consists of transformers

to step down the voltage; dozens of distribution panels and hundreds of circuit breakers; thousands of feet of conduits and cable trays; and many miles of electrical wiring.

Over the decades, additional electrical loads have been added at the pumping plants without upgrading the capacity of the auxiliary power systems. The distribution panels' circuit breakers, which protect electrical circuits from damage caused by an overload or short circuit, are now obsolete. Spare parts are no longer available, and the power and control cables have exceeded their expected service life. Most of the distribution panels do not have space to add breakers to feed additional loads. In March 2016, Metropolitan's Board authorized investigations to assess the options for rehabilitation of the auxiliary power systems. The investigations at Iron Mountain Pumping Plant have been completed, and staff recommends proceeding with preliminary design at this time. In order to minimize the duration of shutdowns and improve construction efficiency for the entire project, a single pumping plant will be addressed initially so that lessons learned may be applied to the four other plants. Iron Mountain Pumping Plant was selected as the first plant, and its improvements are planned to be constructed in conjunction with other electrical projects at the site. The project approach developed for Iron Mountain Pumping Plant will then be used for the other plants as those projects move forward.

Planned preliminary design phase activities include: (1) determining current electrical loads; (2) estimating future loads; (3) tracing wiring and conduits between panels; (4) evaluating the condition of existing cable trays and conduits; (5) determining replacement needs, including quantities of panels, cables, conduits, and cable trays; (6) developing a routing plan for the distribution panels and cables; (7) conducting arc-flash and short circuit analyses; and (8) preparing a summary design report. Preliminary design is recommended to be performed by CDM Smith, Inc., as discussed below.

This action appropriates \$960,000 and authorizes preliminary design to rehabilitate the auxiliary power system at Iron Mountain Pumping Plant. The requested funds include \$565,000 for the technical activities described above; \$60,000 for a third-party value engineering assessment; \$246,000 for preparation of environmental documentation, development of a conceptual cost estimate, technical oversight by Metropolitan staff, and project management; and \$89,000 for remaining budget. The value engineering assessment will be performed by a specialized consultant, as described below. Staff will return to the Board at a later date for authorization of final design.

Technical Support for Replacement of UPS Systems (HDR Engineering) – No Action Required

HDR Engineering performed final design to replace the UPS systems at the five CRA pumping plants under a board-authorized agreement. As the engineer of record, HDR Engineering is recommended to provide technical support during construction. Planned activities include responding to requests for information (RFIs) from the contractor, advising staff on technical issues as they may arise, and assisting with testing and commissioning of the new system. The new agreement with HDR Engineering is planned to be executed under the General Manager's Administrative Code authority to award contracts of \$250,000 or less. The estimated cost for these services is \$145,000.

For this agreement, Metropolitan established an SBE participation level of 25 percent. HDR Engineering has agreed to meet this level of participation. The sole subconsultant planned for this agreement is TJC and Associates, Inc.

Engineering Design Services for Rehabilitation of the Auxiliary Power System at Iron Mountain Pumping Plant (CDM Smith, Inc.) – No Action Required

Preliminary design to rehabilitate the auxiliary power system at Iron Mountain Pumping Plant will be performed by CDM Smith, Inc. under an existing board-authorized agreement. CDM Smith, Inc. was prequalified to provide these services through a competitive process via Request for Qualifications No. 1131. Subsequently, CDM Smith, Inc. was selected based on its expertise with electrical projects including the evaluation of electrical equipment and staged rehabilitation of systems as they remain in service. The estimated cost for CDM Smith, Inc. to provide these services is \$565,000. No amendment is required to the existing agreement with CDM Smith, Inc. for this work.

For this agreement, Metropolitan established an SBE participation level of 25 percent. CDM Smith, Inc. has agreed to meet this level of participation. The planned subconsultants for this agreement are Beyaz & Patel, Inc. and TJC and Associates, Inc.

Value Engineering Support – No Action Required

The third-party value engineering assessment for rehabilitation of the auxiliary power system at Iron Mountain Pumping Plant 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 \$60,000.

Summary

This action appropriates \$3 million; awards a construction contract to replace the UPS systems at the CRA pumping plants; and authorizes preliminary design to rehabilitate the auxiliary power system at Iron Mountain Pumping Plant. 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 Financial Statement, **Attachment 2** for the Abstract of Bids, **Attachment 3** for the listing of Subcontractors for Low Bidder, and **Attachment 4** for the Location Map.

These projects are included within capital Appropriation No. 15384, the CRA Electrical/Power System Reliability Appropriation, which was initiated in fiscal year 2002/03. With the present action, the total funding for Appropriation No. 15384 will increase from \$23,565,000 to \$26,565,000.

Project Milestone

March 2019 – Completion of preliminary design to rehabilitate the auxiliary power system at Iron Mountain Pumping Plant

May 2019 – Completion of construction to replace the UPS systems at all five CRA pumping plants

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 49800, dated June 10, 2014, the Board authorized design to replace the power cables and UPS system at each CRA pumping plant.

By Minute Item 50406, dated March 8, 2016, the Board authorized preliminary investigations to rehabilitate the auxiliary power systems at the CRA pumping plants.

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

Project No. 1 – Replacement of CRA UPS Systems - Construction

The proposed action was determined by the Board to be categorically exempt under Classes 1 and 2 (Sections 15301 and 15302 of the State CEQA Guidelines) on June 10, 2014. Since that time, the statute of limitations on the project has ended. With the current action, there is no substantial change proposed since the original project was first approved in 2014. Hence, the previous environmental documentation in conjunction with the project fully complies with CEQA and the State CEQA Guidelines. Accordingly, no further CEQA documentation is necessary for the Board to act with regard to the proposed action.

The CEQA determination is: Determine that the proposed action has been previously addressed in the 2014 categorical exemption (Classes 1 and 2; Sections 15301 and 15302 of the State CEQA Guidelines) and that no further environmental analysis or documentation is required.

Project No. 2 – Rehabilitation of the Auxiliary Power System at Iron Mountain Pumping Plant – Preliminary Design Phase

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The overall activities involve the funding, design, minor alterations, and replacement of existing public facilities with negligible or no expansion of use and no possibility of significantly impacting the physical environment. Accordingly, the proposed action qualifies under Class 1 and Class 2 Categorical Exemptions (Sections 15301 and 15302 of the State CEQA Guidelines).

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

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt the CEQA determination that the proposed action for Project No. 1 was previously determined to be categorically exempt, and the proposed action for Project No. 2 is categorically exempt, and

- a. Appropriate \$3 million;
- b. Award \$939,000 contract to CSI Electrical Contractors, Inc. to replace the Uninterruptible Power Supply systems at the CRA pumping plants; and
- c. Authorize preliminary design to rehabilitate the auxiliary power system at Iron Mountain Pumping Plant.

Fiscal Impact: \$3 million of capital funds under Appropriation No. 15384

Business Analysis: This option will enhance the reliability of water deliveries through the CRA system.

Option #2

Do not proceed with the two rehabilitation projects at this time.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to reduce the risk of unplanned outages of the CRA, and to reduce the risk of loss of critical data systems.

Staff Recommendation

Option #1


 _____ 4/24/2018
 Gordon Johnson Date
 Manager/Chief Engineer
 Engineering Services


 _____ 4/26/2018
 Jeffrey Lightlinger Date
 General Manager

Attachment 1 – Financial Statement

Attachment 2 – Abstract of Bids

Attachment 3 – Subcontractors for Low Bidder

Attachment 4 – Location Map

Ref# es12662546

Financial Statement for CRA Electrical/Power System Reliability Appropriation

A breakdown of Board Action No. 11 for Appropriation No. 15384¹ is as follows:

	Previous Total Appropriated Amount (Mar. 2016)	Current Board Action No. 11 (May 2018)	New Total Appropriated Amount
Labor			
Studies & Investigations	\$ 1,396,000	\$ 156,000	\$ 1,552,000
Final Design	2,149,700	-	2,149,700
Owner Costs (Program mgmt., contract admin.)	1,932,100	231,000	2,163,100
Submittals Review & Record Drwgs.	88,000	56,000	144,000
Construction Inspection & Support	1,930,500	204,000	2,134,500
Metropolitan Force Construction	2,382,500	250,000	2,632,500
Materials & Supplies	691,000	-	691,000
Incidental Expenses	112,300	10,000	122,300
Professional/Technical Services	822,000	-	822,000
CDM Smith, Inc.	-	565,000	565,000
HDR Engineering	-	145,000	145,000
Value engineering firm	-	60,000	60,000
Equipment Use	29,000	-	29,000
Contracts	10,853,222	-	10,853,222
CSI Electrical Contractors, Inc.	-	939,000	939,000
Remaining Budget	1,178,678 ²	384,000	1,562,678
Total	\$ 23,565,000	\$ 3,000,000	\$ 26,565,000

Funding Request

Appropriation Name:	CRA Electrical/Power System Reliability		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15384	Board Action No.:	11
Requested Amount:	\$ 3,000,000	Budget Page No.:	218
Total Appropriated Amount:	\$ 26,565,000	Total Appropriation Estimate:	\$ 48,600,000

¹ The total amount expended to date to replace the UPS systems at the CRA pumping plants is approximately \$622,325. The total estimated cost to complete this project, including the amount appropriated to date and current funds requested, is approximately \$2.66 million.

The total amount expended to date to rehabilitate the auxiliary power systems at the CRA pumping plants is approximately \$302,184. The total estimated cost to complete the work at all five locations, including the amount appropriated to date, current funds requested, and future design and construction costs, is anticipated to range from \$35 million to \$40 million.

² Includes previous reallocation of \$449,000 from Remaining Budget as follows: \$64,000 for the Iron Mountain Pumping Plant switchyard for preparation of detailed wiring record drawings; \$160,00 for the CRA Power Cable Replacement for a third-party review of alternatives for replacing the CRA main pump power cables; \$225,000 for the CRA UPS systems for design to improve the functionality and maintenance; and \$257,778 to Remaining Budget as the 230kV switchyards project was completed under budget.

The Metropolitan Water District of Southern California

Abstract of Bids Received on April 10 at 2:00 P.M.

**Specifications No. 1810
CRA Uninterruptible Power Supply Replacement**

The work consists of replacement of the Uninterruptible Power Supply systems at the five Colorado River Aqueduct pumping plants.

Engineer's estimate: \$1,480,000

Bidder and Location	Total	SBE \$	SBE %	Met SBE¹
CSI Electrical Contractors, Inc.	\$939,000	\$234,000	25%	Yes
Southern Contracting Company	\$989,000	-	-	-

¹ Small Business Enterprise (SBE) participation level was established at 15 percent for this contract.

The Metropolitan Water District of Southern California

Subcontractors for Low Bidder

**Specifications No. 1810
CRA Uninterruptible Power Supply Replacement**

Low Bidder: CSI Electrical Contractors, Inc.

Subcontractor and Location
Performance Abatement Services, Inc., Anaheim, CA
Halco Testing Services, Los Angeles, CA

Location Map

