



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

4/13/2010 Board Meeting

7-1

Subject

Appropriate \$1.24 million; and authorize four Colorado River Aqueduct rehabilitation projects (Approp. 15438)

Description

This action authorizes four Colorado River Aqueduct (CRA) rehabilitation projects: (1) final design of a standby generator station and procurement of a replacement generator and transformer at Hinds pumping plant; (2) procurement of four aqueduct isolation gates; (3) preliminary design to rehabilitate the Desert Water/Coachella Valley Service Connection DW-CV-2T; and (4) preliminary design of the Intake Power Line Relocation.

Timing and Urgency

Replacement of the 50-year-old standby generator at Hinds pumping plant is needed because the existing generator has reached the end of its service life. Additionally, upgrades to ancillary facilities for the generator are required to meet current fire codes and environmental regulations. This project improves the reliability of emergency power for critical auxiliary systems at the plant such as the fire protection pumps and the potable water treatment and delivery system.

Isolation gates for the Iron Mountain Pumping Plant region have severely corroded and are no longer usable. The approximately 50-year-old isolation gates are used to shut off flows at 50 double-barrel siphons in order for repairs to proceed on one siphon while flow is diverted to the parallel siphon. Failure to replace the corroded isolation gates would interrupt CRA water deliveries in the event of a leak in one of the siphons.

Replacement of valves and piping at Service Connection DW-CV-2T is needed to maintain deliveries to the Desert Water Agency (DWA) and Coachella Valley Water District (CVWD) under the existing Metropolitan/CVWD/ DWA Water Agency Exchange and Advance Delivery Agreements. These 25- to 50-year-old valves have deteriorated due to wear and corrosion, and are difficult to operate. Failure of components within the service connection could lead to an outage and possible damage to the related facilities.

Relocation of the Intake power line is needed because the existing wood pole line, which was installed in the 1950s, has deteriorated substantially over the years and requires frequent repairs to maintain in service. The Intake power line is the primary source of power to Metropolitan facilities that are required to operate the CRA, which are located between the Gene and Intake Pumping Plants.

These projects have been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria, and are categorized as Infrastructure Upgrade projects. All projects are budgeted within Metropolitan's CIP for fiscal year 2009/10.

Project No. 1 - Hinds Pumping Plant Standby Generator Replacement – Final Design Phase and Equipment Procurement (\$750,000)

Original construction of the Hinds pumping plant was completed in 1939. The pumping plant's auxiliary systems rely on an emergency standby diesel generator for onsite power generation in the event of loss of primary power. Critical auxiliary systems powered by the generator include fire protection pumps, the potable water treatment and

delivery system, cooling water pumps, emergency lighting, and sump pumps which prevent flooding of the pumping plants.

In April 2008, Metropolitan's Board authorized preliminary design to replace the standby generators at each of the five CRA pumping plants. The existing standby generators were installed in the 1960s and have reached the end of their service life. Over the past two years, the 50-year-old generators have required continual repairs; replacement parts are no longer available. In addition, unlike modern generators, the existing generators must be manually started in the event of a power loss. The manual startup routine results in a relatively lengthy time delay between loss of primary power and availability of standby power. Until the standby power can be activated, many critical auxiliary systems are inoperable which could result in overheating of the main pumps and flooding of the pumping plant. Replacement of each pumping plant's standby generator has been staged to minimize operational disruptions to the CRA conveyance system, to effectively manage the geographically diverse projects, and to resolve local agency permitting issues on a case-by-case basis. This action addresses the Hinds pumping plant generator. Final design for replacement of the Eagle Mountain Pumping Plant generator was authorized in June 2009. Staff will return to the Board at a later date to request design authorization for the three remaining pumping plants.

Staff recommends proceeding with procurement of a replacement standby generator and transformer at this time, along with final design of the generator station and ancillary facilities at Hinds pumping plant. Upgrades to appurtenant facilities are required to meet current fire codes and environmental regulations. Upgrades will include a fuel unloading area with spill containment, additional alarms, valves, and meters. The replacement generator will also include a control system capable of automatic start-up upon loss of normal power, automatic transfer back to normal power once the normal source is reestablished, and remote status monitoring. In addition, a step-up transformer will be required to increase the generator's voltage to match the driven equipment at the pumping plant. The transformer is necessary because small generators are no longer manufactured in the higher voltages used by the existing pumping plant equipment.

All design activities will be performed by Metropolitan staff. These activities include engineering design and permitting; preparation of procurement packages and receipt of bids for the standby generator and transformer; preparation of plans and specifications for the construction contract and receipt of bids; preparation of an engineer's estimate; and all other activities in advance of award of the construction contract.

This action appropriates \$750,000 in budgeted funds and authorizes final design phase activities to replace the emergency standby generator at Hinds pumping plant. These activities include pre-purchase of the generator and transformer, which have long delivery times. Both items are planned to be awarded under the General Manager's Administrative Code authority. The appropriated funds include \$334,000 for final design; \$155,000 for purchase of the generator; \$100,000 for purchase of the transformer; \$40,000 for permitting with regulatory agencies; \$80,000 for receipt of multiple bids and project management; and \$41,000 for remaining budget. The final design cost as a percentage of the estimated total cost is approximately 13.4 percent. Engineering Services' goal for design of projects with construction cost less than \$3 million is 9 to 15 percent. Staff will return to the Board at a later date for award of the construction contract.

Project No. 2 – Aqueduct Isolation Gates Replacement – Procurement (\$170,000)

The CRA crosses ravines, creeks and other natural depressions using underground pipes called siphons. These siphons are the only conduits along the CRA conveyance system which are subjected to high water pressures. These pressures can reach 55 pounds per square inch (psi), and leaks along these pressurized conduits can result in significant losses of water. In March 2003, a leak occurred in the Big Morongo Siphon portion of the CRA which resulted in a loss of thousands of gallons of water. Most CRA siphons, including the Big Morongo, are double-barrel-type siphons with a typical diameter of 12 to 13 feet per barrel. These siphons are configured with slots at both ends of the barrel for the installation of isolation gates. In the event of a leak in one barrel, gates can be installed in the inlet and outlet of one barrel to shut it off while water continues to flow in the parallel barrel. The siphon gate slots were constructed in five different widths that range from 8¼ to 13¾ feet wide. The isolation gates are approximately 20 feet high.

In order to repair leaks in any of the CRA's double-barrel siphons with minimum interruption to water deliveries, at least one set of isolation gates is required for each of the five typical slot widths. A recent inspection has determined that two existing adjustable-width isolation gates which serve either the 13¼-foot-wide or the 13¾-foot-wide isolation gate slots are severely corroded and are no longer usable. The CRA has 28 siphons with 13¼-foot-wide isolation gate slots, and 22 siphons with 13¾-foot-wide isolation gate slots. A leak in one of these siphons could lead to a shutdown of the CRA until repairs are completed.

The adjustable-width isolation gates have proven difficult to install and are prone to leakage. Therefore, staff recommends that the two corroded adjustable-width isolation gates be replaced with new fixed-width isolation gates in each of the two widths. In recent years, all adjustable-width gates have been replaced with fixed-width gates as they reach the end of their service life. After replacement of the corroded adjustable-width gates discussed above, only two adjustable-width gates (which are for the smaller siphon slots) will remain in service until they reach the end of their service life.

This action appropriates \$170,000 in budgeted funds and authorizes procurement of four siphon isolation gates for the Aqueduct Isolation Gates project. Requested funds include: \$124,000 for gate procurement; \$15,100 for final design; \$17,000 for receipt of bids and project management; \$4,500 for submittal review and as-builts; \$6,500 for fabrication inspection; and \$2,900 for remaining budget. The procurement contract is planned to be awarded under the General Manager's Administrative Code authority. All procurement activities will be performed by Metropolitan staff.

Project No. 3 – Service Connection DW-CV-2T Rehabilitation – Preliminary Design Phase (\$150,000)

Metropolitan delivers Colorado River water to the DWA and CVWD in exchange for State Water Project (SWP) entitlements under the existing Metropolitan/CVWD/DWA Water Agency Exchange and Advance Delivery Agreements. Agreements with these two agencies allow Metropolitan to pre-deliver water to them periodically when it is available from the Colorado River, in exchange for a more constant supply of SWP water. Service Connection DW-CV-2T serves both agencies with a delivery capacity of up to 70 cubic feet per second (cfs). This service connection is one of several located at Whitewater Canyon in Riverside County, which are together capable of delivering up to 720 cfs of Colorado River water to CVWD and DWA's spreading basins.

Service Connection DW-CV-2T is a converted CRA siphon outlet structure. It consists of two valves arranged in series, each in its own vault, and approximately 72 feet of 24-inch diameter piping. The first valve, which is a 16-inch gate valve in operation since the 1950s, is used to isolate the service connection from the CRA for maintenance. The second valve, which is a 16-inch diameter plug valve in operation for 25 years, is used to control the rate of flows discharged to the groundwater recharge basins. After many years of service, both valves have deteriorated and have become difficult to operate. The isolation gate valve currently leaks several gallons per minute. If both valves were to fail simultaneously, an outage of the CRA would be required to isolate the structure for replacement of the valves.

In addition to the deteriorated valves, adjacent piping has corroded and needs to be replaced. Due to the compact size of the vaults and the extent of pipe corrosion, the vaults must be removed in order to access the full work area.

Staff recommends replacing both service connection valves, replacing corroded piping, and modifying/replacing the vaults in order to maintain present water delivery capabilities at Whitewater, and to enhance CRA reliability. Preliminary design phase activities will include: selection of replacement valves; preparation of procurement specifications and receipt of bids; preparation of a preliminary design report; development of a conceptual cost estimate; and preparation of environmental documentation. Staff will return to the Board to authorize final design and to appropriate funds for valve procurement. All preliminary design activities will be performed by Metropolitan staff.

This action appropriates \$150,000 and authorizes preliminary design phase activities to rehabilitate Service Connection DW-CV-2T. Requested funds include: \$70,100 for valve design, preparation of procurement specifications, and receipt of bids; \$16,400 for hazardous materials testing; \$51,600 for environmental documentation and project management; and \$11,900 for remaining budget.

Project No. 4 - Intake Power Line Relocation – Preliminary Design Phase (\$170,000)

Metropolitan's existing Intake 2.4 kV power pole line extends approximately 2 miles over mountainous terrain from Gene Pumping Plant to Intake Pumping Plant. This wood-pole line, which was installed in the 1950s, carries the primary source of power for critical facilities including Gene Wash Dam, Intake Pumping Plant's access gate, Black Metal Mountain communication towers, and Intake Village.

The power pole line has deteriorated substantially over the years. Its cross arms, insulators, and pole extensions require frequent repairs. Some poles are inaccessible by motor vehicle, making repairs difficult, lengthy and costly. In order to ensure reliable power service to critical Metropolitan facilities, staff recommends moving the pole line and cables to a new alignment that is more accessible. In addition, staff will investigate the feasibility of relocating an existing communication line onto the new power line in order to improve the efficiency of maintenance and repair activities.

In April 2008, Metropolitan's Board authorized a study to perform topographic surveys to establish parameters for a new alignment that meets current electrical codes for sag and overhead clearances. Staff has completed the study and recommends that preliminary design proceed at this time. Preliminary design phase activities include development of alternate alignments; assessment of pole options; preparation of a preliminary design report; and development of a conceptual cost estimate. All activities will be performed by Metropolitan staff.

This action appropriates \$170,000 in budgeted funds and authorizes preliminary design phase activities for the Intake Power Line Replacement project. The appropriated funds include \$110,000 for preliminary design; \$45,000 for preparation of environmental documentation and project management; and \$15,000 for remaining budget. Staff will return to the Board at a later date for authorization of final design.

Summary

This action appropriates \$1.24 million and authorizes four CRA rehabilitation projects. Each project has been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the fiscal year 2009/10 capital budget. See [Attachment 1](#) for the Financial Statement, and [Attachment 2](#) for the Location Map.

These projects are consistent with Metropolitan's goals for sustainability by enhancing reliability of the existing conveyance and distribution system in order to maintain reliable water deliveries in the future.

Project Milestones

August 2010 – Completion of preliminary design of Service Connection DW-CV-2T

October 2010 – Completion of equipment procurement for the Hinds Pumping Plant Standby Generator Replacement

November 2010 – Completion of procurement of aqueduct isolation gate and preliminary design for the Intake Power Line Relocation

December 2010 – Completion of final design for the Hinds Pumping Plant Standby Generator Replacement

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

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

California Environmental Quality Act (CEQA)

CEQA determinations for Option #1:

Project No. 1 – Hinds Pumping Plant Standby Generator Replacement – Final Design Phase and Equipment Procurement, and Project No. 4 – Intake Power Line Relocation – Preliminary Design Phase

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed project involves the funding of a study and minor modifications to and replacement of existing public facilities with negligible or no expansion of use and no possibility of significantly impacting the physical environment. In addition, the proposed project will consist of basic data collection, and resource evaluation activities which does not result in a serious or major disturbance to an environmental resource. This may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded. Accordingly, the proposed action qualifies for a Class 1, Class 2, and Class 6 Categorical Exemptions (Sections 15301, 15302, and 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under three Categorical Exemptions (Class 1, Section 15301; Class 2, Section 15302; and Class 6, Section 15306 of the State CEQA Guidelines).

Project No. 2 – Aqueduct Isolation Gates Replacement – Procurement, and Project No. 3 – Service Connection DW-CV-2T Rehabilitation – Preliminary Design Phase

The proposed actions are 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 actions qualify 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 actions qualify under two Categorical Exemptions (Class 1, Section 15301 and Class 2, Section 15302 of the State CEQA Guidelines).

CEQA determinations for Option #2:

Project No. 1 – Hinds Pumping Plant Standby Generator Replacement – Final Design Phase and Equipment Procurement, and Project No. 2 – Aqueduct Isolation Gates Replacement – Procurement

None required

Project No. 3 - Service Connection DW-CV-2T Rehabilitation – 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 actions qualify under two Categorical Exemptions (Class 1, Section 15301 and Class 2, Section 15302 of the State CEQA Guidelines).

Project No. 4 – Intake Power Line Relocation – 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 #3:

None required

Board Options

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$1.24 million;
- b. Authorize preliminary design to rehabilitate Service Connection DW-CV-2T;
- c. Authorize preliminary design of the Intake Power Line Relocation;
- d. Authorize final design and equipment procurement to replace the standby generator at Hinds pumping plant; and
- e. Authorize procurement of four aqueduct isolation gates.

Fiscal Impact: \$1.24 million in budgeted funds under Approp. 15438

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

Option #2

Adopt the CEQA determinations and

- a. Appropriate \$320,000;
- b. Authorize preliminary design to rehabilitate Service Connection DW-CV-2T;
- c. Authorize preliminary design of the Intake Power Line Relocation;
- d. Do not authorize final design and equipment procurement to replace the standby generator at Hinds pumping plant; and
- e. Do not authorize procurement of the aqueduct isolation gates.

Fiscal Impact: \$320,000 in budgeted funds under Approp. 15438

Business Analysis: Under this option, emergency repairs of 50 CRA siphons will require a full shutdown of the CRA. This option would also forego an opportunity to improve critical pumping plant auxiliary systems in the event of a power loss. Staff will continue to perform repairs on the Hinds pumping plant standby generator; repairs are expected to increase in frequency. Relocation of the Intake power line would improve power service to critical Metropolitan facilities located near Intake Pumping Plant.

Option #3

Do not proceed with the four projects at this time.

Fiscal Impact: None

Business Analysis: At Service Connection DW-CV-2T, in the event of valve failure, a shutdown of the CRA may be required to make repairs. Deferral of the isolation gates project will also disrupt CRA deliveries in the event of a leak at one of the 50 CRA siphons. Deferral of the relocation of the Intake power line and the replacement of the Hinds standby generator would forego an opportunity to improve power reliability for critical Metropolitan facilities and would not provide a consistent level of reliability of Metropolitan facilities throughout the CRA system.

Staff Recommendation

Option #1



Roy L. Wolfe
Manager, Corporate Resources

3/26/2010

Date



Jeffrey Kightlinger
General Manager

3/29/2010

Date

Attachment 1 – Financial Statement

Attachment 2 – Location Map

Ref# cr1264084

Financial Statement for CRA Reliability – Phase II Program

A breakdown of Board Action No. 9 for Appropriation No. 15438 for the Service Connection DW-CV-2T Rehabilitation*, the Aqueduct Isolation Gates Replacement*, Hinds Pumping Plant Standby Generator Replacement** and the Intake Power Line Relocation*** is as follows:

	Previous Total Appropriated Amount (Mar. 2010)	Current Board Action No. 9 (Apr. 2010)	New Total Appropriated Amount
Labor			
Studies and Investigations	\$ 1,006,400	\$ 179,600	\$ 1,186,000
Final Design	860,000	348,900	1,208,900
Owner Costs (Program mgmt., envir. doc.)	1,392,990 ****	240,900	1,633,890
Submittals review	126,000	2,900	128,900
Construction Inspection and Support	606,800	6,000	612,800
Metropolitan Force Construction	934,300	-	934,300
Materials and Supplies	1,563,405	259,000	1,822,405
Incidental Expenses	58,400	11,900	70,300
Professional/Technical Services	1,120,000	-	1,120,000
Equipment Use	-	-	-
Contracts	5,181,000	120,000	5,301,000
Remaining Budget	806,705	70,800	877,505
Total	\$ 13,656,000 ****	\$ 1,240,000	\$ 14,896,000

Funding Request

Program Name:	CRA Reliability – Phase II Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15438	Board Action No.:	9
Requested Amount:	\$ 1,240,000	Capital Program No.:	15438-I
Total Appropriated Amount:	\$ 14,896,000	Capital Program Page No.:	283
Total Program Estimate:	\$ 25,350,000	Program Goal:	I-Infrastructure Reliability

* This action is the initial appropriation for the Service Connection DW-CV-2T Rehabilitation and the Aqueduct Isolation Gates Replacement.

** The total amount expended to date on the Hinds Pumping Plant Standby Generator Replacement is approximately \$38,000.

*** The total amount expended to date on the Intake Power Line Relocation is approximately \$119,604.

**** Corrects a summation error from Board Action No. 8.

Location Map

