

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

September 13, 2005 Board Meeting

8-3

Subject

Appropriate \$2.329 million; and authorize five improvement projects for the Colorado River Aqueduct conveyance system and pumping plants

Description

The Colorado River Aqueduct (CRA) is a 242-mile-long conveyance system designed to transport water from Lake Havasu to Lake Mathews. The CRA, which has been in operation for more than 60 years, consists of five pumping plants, 124 miles of tunnel, 63 miles of concrete-lined canal, 55 miles of cut-and-cover conduit, inverted siphons, and reservoirs. The CRA provides the only means for Metropolitan to convey water from the Colorado River to Southern California.

Rehabilitation of the CRA was initiated in 2001 and is expected to be substantially completed by 2009. As part of this rehabilitation effort, four major programs were identified within Metropolitan's Capital Investment Plan (CIP) to refurbish the CRA. Two of these programs are the CRA Pumping Plant Reliability Program and the Conveyance Reliability Program, which focus on the rehabilitation of pumping facilities and the conveyance system, respectively. There are currently twelve projects under way in these programs, and five new projects are recommended to proceed at this time. The five projects are: rehabilitation of pump plant circulating water systems; desert water tanks access assessment; pump motor exciters assessment; pump plant system vulnerability assessment; and dam sluiceways and outlets reliability assessment. All of these projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds have been included in the capital budget for fiscal year 2005/06.

CRA Pumping Plant Reliability Program (Approp. 15374)**Circulating Water System Rehabilitation – Construction (\$1.465 million)**

Cooling water circulates through the main CRA pump units to maintain their continuous operation. The circulating water system features strainers which filter out debris and sediments from the cooling water to prevent clogging of the system. The existing strainers, valves and piping are original equipment with more than 50 years of continuous usage. Recent investigations identified degradation of the strainer components and deterioration of connecting piping. Failure of the circulating water system would disable the pump-cooling system and cause a shutdown of the main CRA pump units.

In January 2003, the Board authorized final design to replace the existing circulating water system at each of the five pumping plants. A procurement contract for new circulating water strainers was competitively bid, and the contract is planned to be awarded to the lowest responsive bidder, S. P. Kinney Engineers, Inc., by the CEO under his Administrative Code authority for \$243,654. In addition, butterfly valves and piping will be procured, and Metropolitan forces will perform installation and repair work for rehabilitation of the circulating water system. These modifications will not require a shutdown of the CRA.

This action authorizes construction by Metropolitan forces for the rehabilitation of the circulating water system at the desert pumping plants.

Desert Water Tanks Access and Safety Improvement – Assessment (\$177,000)

Existing fire, circulating and domestic water tanks (total of 15 tanks at five plants) are located on steep rocky slopes, high above each of the five pumping plants. At least once per month, plant operators are required to access these tanks to perform routine maintenance work. Metropolitan's Workplace Health and Safety staff inspected the facilities in May 2005 and identified potential safety hazards in accessing the water tanks during maintenance or rescue operations. Examples of safety noncompliance items included deteriorated access covers, substandard handrails and guardrails, insufficient vehicular turnarounds, unsafe sight distances and roads that lead to periodic roadway washouts.

Staff recommends conducting an assessment to evaluate existing vehicular and personnel tank access, egress and safety requirements, and develop recommendations to ensure compliance with applicable federal and state safety regulations.

This action authorizes an assessment by District staff to identify safety improvements to the water tanks. The scope of work includes field surveys, mapping, code compliance reviews, development of remedial alternatives and cost estimate. The assessment is planned to be completed in May 2006.

Main Pump Motor Exciters – Assessment (\$190,000)

At each pumping plant, a motor exciter is housed inside each pump motor to regulate the motor speed. The original equipment installed beginning in the 1940s has experienced normal wear and tear over its 60 years of operation. At this time, the exciters require excessive maintenance and extensive refurbishment. This refurbishment currently requires a pump motor to be shut down for several weeks. There is a potential for water deliveries to be impacted if an unexpected problem arises with an exciter while another is out of service for refurbishment.

An assessment is recommended to determine the optimal method to rehabilitate the excitation system. This action authorizes an assessment by Metropolitan staff to determine the best method to rehabilitate the pump plant motor excitation system. The assessment is planned to be completed in June 2006.

Pumping Plant Vulnerability – Assessment (\$120,000)

Field investigations of facilities on the CRA have identified the need to replace or repair components that can no longer perform reliably due to their age and condition. In addition to these field investigations, staff has initiated assessments within the distribution system to assess the vulnerability of facilities to events such as fires, vehicle collision, and random equipment failures. This assessment will evaluate the five CRA pumping plants to determine the extent to which the pumping capacity could be impacted by these postulated events. The findings from the assessment may lead to recommendations to improve electrical or mechanical redundancy, to place restrictions on the storage location of combustible materials, or to relocate sensitive equipment.

This action authorizes an assessment by Metropolitan staff to evaluate CRA pumping plant vulnerability. The assessment is planned to be completed by December 2006.

CRA Conveyance Reliability Program (Approp. 15373)**Dam Sluiceways and Outlets Reliability Investigations and Assessments (\$377,000)**

Gene Wash and Copper Basin reservoirs are located downstream of the Intake and Gene pumping plants. The reservoirs provide regulatory water storage during pumping operation. For each reservoir, the existing sluiceway located at the bottom of the dam allows for reservoir drawdown in the event of an emergency.

Each sluiceway consists of a trash rack, a slide gate valve and a Howell-Bunger fixed cone valve. Investigations conducted during previous CRA shutdowns identified leakage through the valves. Corrosion and other signs of deterioration to the fixed cone valve components were also observed. The leakage and corrosion do not jeopardize the overall stability of the dam. However, the California Division of Safety of Dams requires that the valves be operational in case of an emergency reservoir drawdown.

An assessment is recommended to investigate the cause of the leaks, perform a detailed inspection of the existing valves, and identify alternative rehabilitation methods and costs. No shutdown of the CRA is necessary for this investigation, but two new bulkheads will be fabricated and installed by divers to stop water flow prior to investigation of the sluiceway. The estimated cost to fabricate and install the bulkheads is \$150,000.

The outlet facility at Copper Basin reservoir controls water flowing out of the reservoir. The outlet facility consists of the outlet structure, motor-driven slide gates, and electrical control systems. An assessment is recommended to evaluate their existing condition and to identify alternative rehabilitation methods and costs. The detailed investigations will consist of underwater inspection of gates and outlet gate components during a zero pump flow.

This action authorizes an assessment of the reliability of the Gene Wash and Copper Basin Dam sluiceways and outlet facilities. This project will be coordinated with work under way in Metropolitan's Dam Rehabilitation and Safety Improvements program. The assessment is planned to be completed in June 2006.

See [Attachment 1](#) for the Financial Statements, and [Attachment 2](#) for the Location Map.

Policy

Metropolitan Water District Administrative Code Section 5108: Capital Project Appropriation

California Environmental Quality Act (CEQA)

CEQA determinations for Option #1:

CRA Pumping Plant Reliability Program (Approp. 15374)

Circulating Water System Rehabilitation Construction

The project was previously determined to be categorically exempt under the provisions of CEQA (Class 1, Section 15301; Class 2, Section 15302; and Class 3, Section 15303 of the State CEQA Guidelines) on January 14, 2003. A Notice of Exemption (NOE) was filed on the project at that time and the statute of limitations has ended. With the current board actions, there are no substantial changes proposed to the project since the original NOE was filed. 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 regards to the proposed actions.

The CEQA determination is: Determine that the proposed actions have been previously addressed in the January 2003 NOE (Class 1 Section 15301; Class 2, Section 15302; and Class 3 Section 15303 of the State CEQA Guidelines) and that no further environmental analysis or documentation is required.

Desert Water Tanks Access and Safety Improvement Assessment, Main Pump Motor Exciters Assessment, and Pumping Plant Vulnerability Assessment

The proposed actions are categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed actions involve entering into agreement, basic data collection, and may include minor modifications in the condition of land, water, and/or vegetation, which do not involve removal of healthy, mature, scenic trees. These activities would result in negligible or no expansion of use and no possibility of significantly impacting the physical environment. Accordingly, the proposed actions qualify under Class 1, Class 4, and Class 6 Categorical Exemptions (Sections 15301, 15304, and 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed actions qualify under three Categorical Exemptions (Class 1, Section 15301; Class 4, Section 15304; and Class 6, Section 15306 of the State CEQA Guidelines).

CRA Conveyance Reliability Program (Approp. 15373)

Dam Sluiceways and Outlets Reliability Investigations and Assessments

The proposed actions are categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed actions involve entering into agreement, basic data collection, and may include minor modifications in the condition of land, water, and/or vegetation, which do not involve removal of healthy, mature, scenic trees. These activities would result in negligible or no expansion of use and no possibility of significantly impacting the physical environment. Accordingly, the proposed actions qualify under Class 1, Class 4, and Class 6 Categorical Exemptions (Sections 15301, 15304, and 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed actions qualify under three Categorical Exemptions (Class 1, Section 15301; Class 4, Section 15304; and Class 6, Section 15306 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

Board Options/Fiscal Impacts

Option #1

Adopt the CEQA determinations and

- a. Appropriate \$2,329,000 in budgeted funds;
- b. Authorize construction to rehabilitate the circulating water systems at the five CRA pumping plants; and
- c. Authorize desert water tanks access assessment, main pump motor exciters assessment, pumping plant vulnerability assessment, reservoir dam sluiceways and outlet reliability assessment.

Fiscal Impact: \$377,000 of budgeted funds under Approp. 15373 (CRA Conveyance Reliability Program), and \$1,952,000 of budgeted funds under Approp. 15374 (CRA Pumping Plant Reliability Program)

Option #2

Do not authorize the improvements to the CRA facilities and the assessments. This option forgoes an opportunity to rehabilitate the existing CRA pumping and conveyance systems.

Fiscal Impact: Unknown

Staff Recommendation

Option #1


 Roy L. Wolfe
 Manager, Corporate Resources

8/17/2005
 Date


 Dennis B. Underwood
 CEO/General Manager

8/23/2005
 Date

Attachment 1 – Financial Statements

Attachment 2 – Location Map

Financial Statement for CRA Pumping Plant Reliability Program

A breakdown of Board Action No. 5 for Appropriation No. 15374 to rehabilitate pumping plant circulating water systems and conduct three studies is as follows:

	Previous Board Action No. 4 <u>(Oct. 2003)</u>	Current Board Action No. 5 <u>(Sept. 2005)</u>	New Total Appropriated Amount
Labor			
Studies and Investigations	\$ 560,000	\$ 297,000	\$ 857,000
Design, Specifications and As-built	1,014,700	42,000	1,056,700
Owner Costs (Program management)	1,144,800	122,000	1,266,800
Construction Inspection and Support	599,800	155,000	754,800
Metropolitan Force Construction	1,970,000	691,500	2,661,500
Materials and Supplies	2,015,000	342,000	2,357,000
Incidental Expenses	26,800	11,000	37,800
Professional/Technical Services	0	30,000	30,000
Equipment Use	35,200	7,500	42,700
Contracts	260,000	0	260,000
Remaining Budget	1,154,700	254,000	1,408,700
Total	<u>\$ 8,781,000</u>	<u>\$ 1,952,000</u>	<u>\$ 10,733,000</u>

Funding Request

Program Name:	Colorado River Aqueduct Pumping Plant Reliability Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15374	Board Action No.:	5
Requested Amount:	\$ 1,952,000	Capital Program No.:	01204
Total Appropriated Amount:	\$ 10,733,000	Capital Program Page No.:	E-20
Program Estimate:	\$ 61,700,000	Program Goal:	I-Infrastructure Reliability

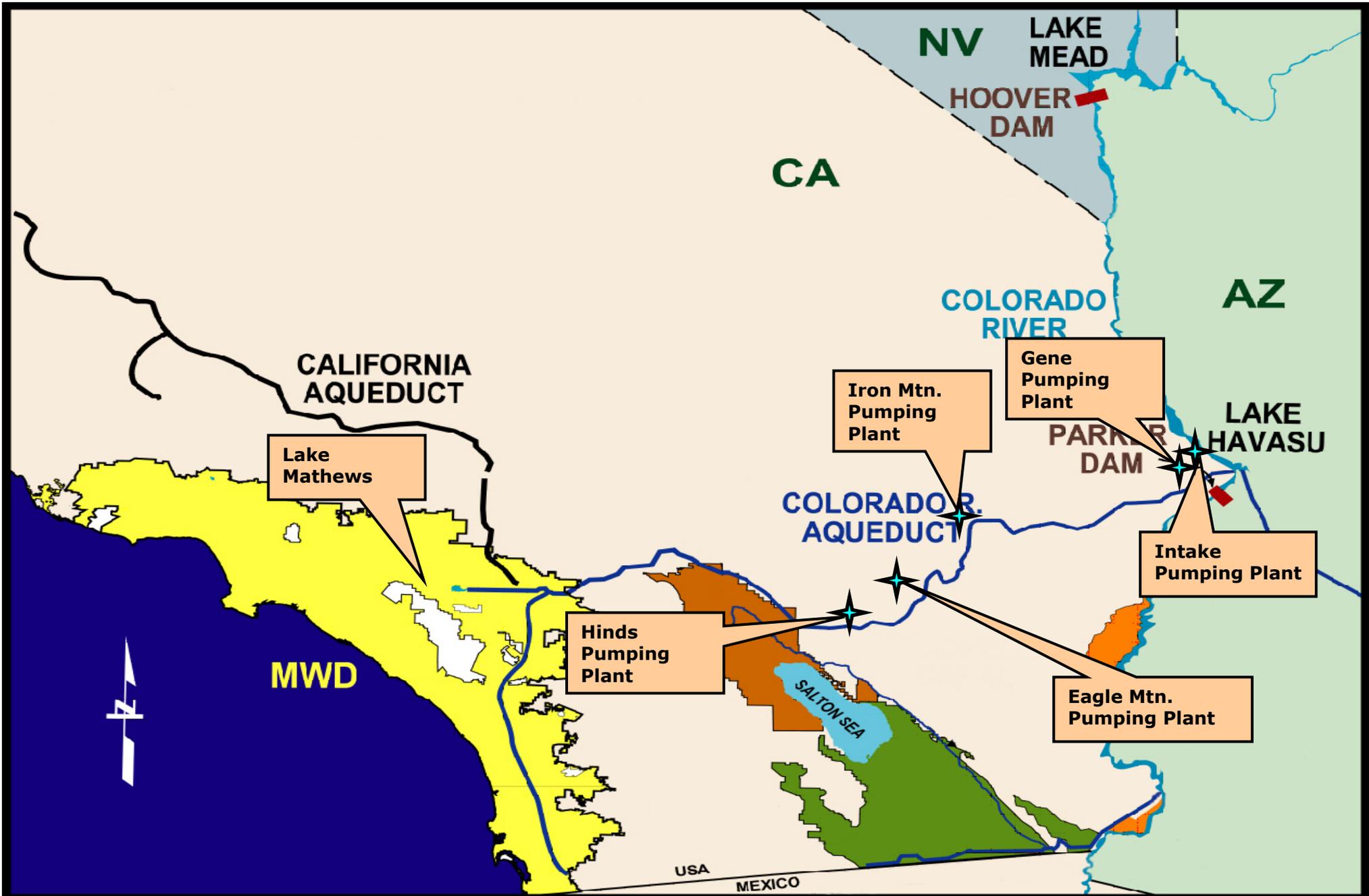
Financial Statement for CRA Conveyance Reliability Program

A breakdown of Board Action No. 8 for Appropriation No. 15373 to authorize one study is as follows:

	Previous Board Action No. 7 <u>(Aug. 2004)</u>	Current Board Action No. 8 <u>(Sept. 2005)</u>	New Total Appropriated Amount
Labor			
Studies and Investigations	\$ 2,443,000	\$ 80,000	\$ 2,523,000
Design and Specifications	1,050,000	0	1,050,000
Owner Costs (Program management)	2,659,000	22,000	2,681,000
Construction Inspection and Support	4,474,220	11,000	4,485,220
Metropolitan Force Construction	5,072,870	82,000	5,154,870
Materials and Supplies	1,316,300	70,000	1,386,300
Incidental Expenses	244,400	3,000	247,400
Professional/Technical Services	1,180,000	60,000	1,240,000
Right of Way	10,000	0	10,000
Equipment Use	101,450	0	101,450
Contracts	26,571,751	0	26,571,751
Remaining Budget	3,228,009	49,000	3,277,009
Total	\$ 48,351,000	\$ 377,000	\$ 48,728,000

Funding Request

Program Name:	Colorado River Aqueduct Conveyance Reliability Program		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15373	Board Action No.:	8
Requested Amount:	\$ 377,000	Capital Program No.:	01204
Total Appropriated Amount:	\$ 48,728,000	Capital Program Page No.:	E-17
Program Estimate:	\$ 56,300,000	Program Goal:	I-Infrastructure Reliability



CRA Conveyance Reliability Program