



**MWD**

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

9-11

October 7, 1998

**To:** Board of Directors (Budget and Finance Committee—Information)  
(Engineering and Operations Committee--Information)

**From:** General Manager

**Submitted by:** Chief Engineer

**Subject:** Report on the Financial Status of the Eastside Reservoir Project

*Eduardo Medina III*  
*James P. Hays*

**RECOMMENDATION(S)**

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For information only.

**EXECUTIVE SUMMARY**

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The Eastside Reservoir Project (ESRP), along with the Final Environmental Impact Report (FEIR), was approved by your Board in October 1991. The Eastside Reservoir is a large complex civil works project with thirty-nine major contracts of varying scale. The project is well underway, and most reservoir construction contracts have been awarded by your Board or advertised for construction. Over the course of several years, the Eastside Reservoir Project Estimate has experienced additional costs resulting from condemnation settlements, changes in construction scope, additional inspection, quality control and mitigation costs, and changes driven by regulatory requirements.

Through August 1998, approximately \$1,519,653,000 has been expended on the project out of a total appropriation of \$1,972,100,000. The financial data for May, compiled in late-June, indicated that an appropriation increase was necessary to fund the project through completion. A report on the matter was agendized for the July Board, deferred to permit further staff review, verbally mentioned at the August Board, and followed by a detailed report in September. With the construction experience of the last several years it is now possible to make reasonable projections of the cost at completion of the project. Based on this experience our estimate is that the cost of the project will increase to a total appropriation of \$2,192,100,000, representing an 11% increase over the seven (7) year construction period (1994-2001).

Intensive review of the capital and other program costs is underway to absorb or minimize the effects of this cost increase on water rates. In the worst case, without such adjustments, the rate impact would be \$5-9 per acre foot by the year 2005. In addition, management has committed to the following actions and other measures as appropriate:

- Initiation of an audit of the cost overrun and chronology of events with results reported to the Board.
- Providing monthly reports to the Board highlighting project cost versus budget.
- Conducting analysis of rate impacts, reporting methodology and cash flow requirements.

### **DETAILED REPORT**

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The ESRP will be formed by two earth/rockfill dams, 4.5 miles apart, within the Domenigoni and Diamond Valleys; plus a third earth/rockfill dam at the low point in the north rim, providing storage capacity of 800,000 acre feet, and a surface area of 4,500 acres. Associated hydraulic structures consist of an Inlet/Outlet Tower, Pumping Plant, Pressure Control Structure, connecting tunnels, delivery pipeline, roadway and canal relocations, and forebay. The East Dam will be approximately 185 feet high and 10,500 feet long; the West Dam will be approximately 285 feet high and 9,100 feet long; and the Saddle Dam will be approximately 130 feet high above the low point in the ridgeline and 2,300 feet long.

In April 1992, a project cost estimate of \$1,837,000,000 was prepared based on project features contained in the Final Environmental Impact Report. The project was tracked against this estimate through October 1994 at which time it was recognized that an increase in budget was warranted based on increased cost of land, design changes and associated construction costs. At that time, a revised project estimate of \$1,972,100,000, including a \$139,000,000 contingency, was developed and has been used to track the financial performance of the project to this date. This contingency grew to \$151,300,000 by November 1995 due to a number of cost reduction factors.

Following the establishment of the project budget of \$1,972,100,000, very favorable bids were received on the West Dam in November 1995 resulting in an increase in total contingency from \$151,300,000 to \$268,500,000. Over a period of three years, the increased cost of contract administration, inspection and quality control largely absorbed the additional contingency generated by the favorable West Dam bid. Over a similar period, the cost of extra work orders, additional land and mitigation costs, and design costs during construction have reduced the remaining contingency to the point where cost growth was projected to exceed the project budget. Nevertheless, the cost of design at 11% of construction cost and the cost of contract administration at 17.8% of construction cost were found to be consistent with industry experience for similar work. As noted below, the cost of design and contract administration were initially low.

The potential for cost growth beyond the project budget was first observed in December 1997, although staff believed it could be accommodated through cost control measures. The financial data for May, compiled in late-June, indicated that an appropriation increase would be required. A report on the matter was agendized for the July Board, deferred to permit further staff briefing, verbally mentioned in August, and followed by an oral report in September.

A summary of key scope changes of the project and an assessment of costs was presented at the September Board. A more detailed summary of project cost growth is summarized by project feature in Attachment 1 and further detailed in the following paragraphs:

**Contract Administration.** Staff had originally envisioned moderate personnel needs for inspection and quality control based a more traditional field staffing approach. Upon initiation of the contracts, contractors uniformly assigned multiple-shift or even triple-shift operations to the work. Upon our reevaluation, considerably higher personnel needs were identified to keep pace with the work of the contractors including necessary inspection and quality control staff, and soils and concrete laboratory field operations. The need for a much more extensive grouting inspection force was also recognized as the contractor work plans were developed, resulting in an immediate 25% increase in inspection needs for the project. Several of the major contracts have also experienced delays of up to 5 months requiring a longer period of service which resulted in additional costs. On numerous occasions, Metropolitan has performed a review of the minimum personnel need based on work plans of the contractors. On all occasions, it was found that the CA staff was the minimum required to perform the necessary inspection, quality control, surveying, and resident engineering work for each shift and construction operation.

The CA cost, including post design services, is 17.8% of construction value, or in the range of industry experience for this type of work.

It should be noted that the field operations at the Eastside Reservoir Project are the largest that we are aware of anywhere in the United States. Over 200,000 cubic yards per day of earth and rock are regularly placed. Total movement of earth and rock exceeds 150,000,000 cubic yards, more than two times the total excavation of the "Chunnel" linking England and France and the seventh largest undertaking of this type accomplished worldwide.

**Dams.** The projected cost of the West Dam reflects cumulative extra work orders equivalent to 17% of original contract value. The projected cost of the East Dam reflects cumulative extra work orders equivalent to 9% of original contract value. Extra work orders relate to such items as changes in zonation of the dams to accommodate the types of materials excavated from the borrow areas, and overruns or underruns due to differing elevations of bedrock from that contained in the contract plans. In addition, claims have been filed or are expected to be filed by the contractor from which litigation may result. Funding for this contingency is not included in this revised project estimate. Staff disputes these claims.

**Hydraulic Structures.** Original estimates for major structures, including the separately fabricated pumps and valves, were generally lower than actual cost. Pumps, valves, and fittings have been procured separately due to the two to three year lead time needed for fabrication. These items were originally included in the cost of the hydraulic structures but later broken out for advance fabrication to avoid a delay in the commissioning of these structures and to ensure that the total project schedule was not delayed. Changes in construction drawings for the hydraulics structures have been required before these fabricated items could be installed. Modifications to construction work have resulted from vendor submittals, control wiring diagrams, contractor furnished equipment, and regulatory requirements driven by the State of California Division of Safety of Dams. The projected cost of the Pumping Plant reflects cumulative change orders equivalent to 15% of original contract value. The projected cost of the Inlet/Outlet Tower reflects cumulative change orders equivalent to 16% of original contract value.

**Ancillary Contracts.** Ancillary facilities have experienced moderate cost growth. Actual costs were lower than projected for the Eastside Pipeline and Habitat Clearing, and are expected to be under budget for Site Completion and the OCIP program. Certain operational roads were not considered in the original design, such as Dam Access Roads, the Quarry Road, and modifications to the High Water Road. Operation roads are included as a project cost. Roads accessing recreation areas are included as a recreation cost. Likewise, State Street & Highway 79 Improvements and Aesthetic Treatment of the Spoil Areas were not included in the original scope. State Street improvements are a project commitment of the Newport Road Improvement MOU. Highway 79 improvements are included as a project mitigation feature based on updated traffic studies. Aesthetic treatment of spoil areas (tree planting and irrigation only) are included as part of the project.

**Design.** Design costs have experienced growth consistent with expanded post design needs during the construction phase. The design staff consisted primarily of consultant personnel and Metropolitan staff co-located at the Cal Plaza office. This resulted in an efficient method of performing the work, with ease of communication between the consultant and Metropolitan staff.

All work was accomplished within assigned schedules at a cost of 11% of construction value, or well within industry experience for this type of work.

Following completion of the main design effort, a contingent of design personnel were required to perform post-design services during construction. These personnel have responded to the submittal of numerous vendor drawings for pumps, motors, valves, and other fabricated equipment, as well as significant shop drawing submittals from the construction contractors. It has been necessary to retain these personnel through much of the construction phase to respond to these needs. As necessary, these personnel were supplemented with Metropolitan staff for efficient performance of work.

**Recreation.** The recreation budget was increased from \$33,000,000 to \$58,000,000 based on a refined estimate which was presented to the Board in December 1997, excluding initial start up costs which will be repaid in the initial years of operation.

**Land.** Land costs have increased mainly due to condemnation settlements, principally the Domenigoni settlement.

**Mitigation.** Mitigation costs have increased in response to expanded field operations and more focused emphasis on compliance efforts. Increased staff has been required to monitor dust control measures due to enhanced AQMD presence and the threat of punitive enforcement actions. Enhanced groundwater mitigation measures have been prompted by legislative intervention substantially exceeding anticipated FEIR needs, including injection wells and installation of surface water connections. Monitoring and recovery of paleontological finds exceeded any prediction of the quantity of these artifacts. Four full time staff (two on each shift at each dam) have been required to monitor the work. Native American monitoring has continued for a period of several years at varying levels of presence.

Intensive review of the capital program and other program cost is underway to absorb or minimize the effects of this cost increase on water rates. In the worst case, without such adjustments, the rate impact would be \$5-9 per acre foot by the year 2005. In addition, management is committed to the following actions and other measures as appropriate:

- Initiation of an audit of the cost overrun and chronology of events with results reported to the Board.
- Providing monthly reports to the Board highlighting project cost versus budget.
- Conducting analysis of rate impacts, reporting methodology and cash flow requirements.

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Attachment(s)

# Eastside Reservoir Project - Budget Summary

Description	Oct-94	Aug-98	Variance
<b>DAMS</b>			
West Dam Foundation Excavation	\$0(*)	\$22,051,434	\$22,051,434
East Dam North Excavation	\$0(*)	\$3,545,361	\$3,545,361
West & Saddle Dam Embankment & Forebay/Chnl	\$469,769,000	\$448,655,474	-\$21,113,526
East Dam Embankment	\$374,948,000	\$300,257,574	-\$74,690,426
West Dam Grading - Retention Basin	\$0(*)	\$20,048,819	\$20,048,819
Spillway	\$3,957,000	\$2,200,000	-\$1,757,000
North Rim Remediation	\$5,585,000	\$11,448,468	\$5,863,468
<b>Total Dams</b>	<b>\$854,259,000</b>	<b>\$808,207,130</b>	<b>-\$46,051,870</b>
<b>HYDRAULICS</b>			
Secondary Inlet	\$0	\$16,488,103	\$16,488,103
P-1 Pressure Tunnel	\$11,484,000	\$13,206,686	\$1,722,686
I/O Tower	\$33,389,000	\$47,040,687	\$13,651,687
P-1 Pumping Plant	\$74,756,000	\$71,671,504	-\$3,084,496
Power Line to P-1	\$0(**)	\$1,518,260	\$1,518,260
Construction Utilities	\$0(**)	\$1,900,000	\$1,900,000
Pressure Control Structure	\$32,399,000	\$22,379,179	-\$10,019,821
Pump Procurement	\$0(***)	\$24,723,045	\$24,723,045
Fixed Cone/Spherical Valve Procurement	\$0(***)	\$2,402,332	\$2,402,332
Butterfly Valve Procurement	\$0(***)	\$12,480,176	\$12,480,176
Fabricated Fittings for P-1	\$0(***)	\$6,391,088	\$6,391,088
Vertical Sleeve Valve Procurement	\$0(***)	\$2,932,995	\$2,932,995
<b>Total Hydraulics</b>	<b>\$152,028,000</b>	<b>\$223,134,055</b>	<b>\$71,106,055</b>
<b>Ancillary</b>			
Eastside Pipeline	\$90,000,000	\$46,456,372	-\$43,543,628
San Diego Canal Relocation	\$10,463,920	\$10,103,368	-\$360,552
San Diego Canal Demolition	\$0	\$752,235	\$752,235
Newport Road Relocation	\$19,809,000	\$17,453,308	-\$2,355,692
Construction Access Roads	\$0	\$1,827,584	\$1,827,584
Field Office	\$1,294,033	\$1,326,590	\$32,557
Temporary Visitor Center	\$450,000	\$455,377	\$5,377
High Water Road - Pioneering	\$0	\$818,175	\$818,175
Site/Habitat Clearing	\$4,848,000	\$786,734	-\$4,061,266
Landscape Screening - Dams & Domenigoni Parkway	\$600,000	\$1,209,097	\$609,097
High Water and Quarry Operation Roads	\$0	\$22,000,000	\$22,000,000
Recreation Start-up	\$0	\$4,000,000	\$4,000,000
State St. & Highway 79 Improvements	\$0	\$16,966,000	\$16,966,000
Site Completion	\$28,565,000	\$9,800,000	-\$18,765,000
Spoil Area Aesthetic Treatment	\$0	\$30,239,753	\$30,239,753
Dam Access Roads	\$0	\$4,500,000	\$4,500,000
Fencing	\$0	\$3,000,000	\$3,000,000
Misc. Construction Contracts	\$1,477,000	\$9,581,400	\$8,104,400
Misc. Construction Consultants	\$7,208,578	\$9,900,780	\$2,692,202
OCIP	\$41,000,000	\$30,204,615	-\$10,795,385
<b>Total Ancillary</b>	<b>\$205,715,531</b>	<b>\$221,381,388</b>	<b>\$15,665,857</b>
<b>Total Construction</b>	<b>\$1,212,002,531</b>	<b>\$1,252,722,573</b>	<b>\$40,720,042</b>

## Eastside Reservoir Project - Budget Summary

Description	Oct-94	Aug-98	Variance
<b>Total Contract Administration</b>	<b>\$100,523,499</b>	<b>\$223,872,990</b>	<b>\$123,349,491</b>
<b>Total Design</b>	<b>\$86,263,904</b>	<b>\$132,634,795</b>	<b>\$46,370,891</b>
<b>Total Program Management</b>	<b>\$6,000,000</b>	<b>\$27,807,000</b>	<b>\$21,807,000</b>
<b>Total Land</b>	<b>\$334,000,000</b>	<b>\$365,617,970</b>	<b>\$31,617,970</b>
<b>Total Recreation</b>	<b>\$33,000,000</b>	<b>\$58,000,000</b>	<b>\$25,000,000</b>
<b>Planning</b>			
Planning	\$15,000,000	\$15,000,000	\$0
Misc. Consultants	\$2,189,780	\$3,433,335	\$1,243,555
<b>Total Planning</b>	<b>\$17,189,780</b>	<b>\$18,433,335</b>	<b>\$1,243,555</b>
<b>Total Legal</b>	<b>\$6,111,014</b>	<b>\$9,581,400</b>	<b>\$3,470,386</b>
<b>Mitigation</b>			
Multi-Species Reserve	\$13,886,000	\$13,886,000	\$0
Archeological	\$10,185,024	\$15,969,000	\$5,783,976
Paleontological	\$3,055,507	\$4,790,700	\$1,735,193
Hazardous Material	\$2,546,256	\$3,992,250	\$1,445,994
Dust Mitigation	\$3,055,507	\$4,790,700	\$1,735,193
Ground Water Mitigation	\$2,749,956	\$4,311,630	\$1,561,674
Traffics Studies	\$1,018,502	\$1,596,900	\$578,398
Native American Monitoring	\$1,527,754	\$2,395,350	\$867,596
<b>Total Mitigation</b>	<b>\$38,024,506</b>	<b>\$51,732,530</b>	<b>\$13,708,024</b>
<b>Total Contingency</b>	<b>\$138,984,765</b>	<b>\$51,697,407</b>	<b>-\$87,287,358</b>
<b>Total Project Budget</b>	<b>\$1,972,100,000</b>	<b>\$2,192,100,000</b>	<b>\$220,000,000</b>

\* Not in original estimate for West Dam

\*\* Included in original estimate for the Pumping Plant

\*\*\* Included in original cost for the Pumping Plant, Pressure Control Structure and the Inlet/Outlet Tower