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

May 11, 2004 Board Meeting

8-1

Subject

Appropriate $1.86 million for dam assessment studies; and authorize a professional services agreement for dam seepage monitoring design and installation services (Approp. 15419)

Description

In 2001, Metropolitan initiated the Infrastructure Reliability and Protection Plan to assess the condition of its conveyance, treatment, and distribution facilities, identify needed rehabilitation and replacement work, and begin implementation of the improvements. The last major element of Metropolitan's infrastructure investigations to be addressed is its dams and reservoirs. New and existing projects related to analysis and upgrades of Metropolitan's dams are being consolidated under the Dam Safety and Rehabilitation Program.

Metropolitan's conveyance and distribution system includes 28 structures that are classified as dams by the California Division of Safety of Dams (DSOD). The dams range in height from 6 feet to 285 feet, retain reservoirs in size from 18 to 800,000 acre-feet, and range from 3 to 86 years old. Most of Metropolitan's dams are over 20 years old and are located in densely populated areas in regions of high seismic activity.

The Dam Safety and Rehabilitation Program has been established to review the adequacy of Metropolitan's dams, evaluate risks and identify alternative solutions to minimize risks. This program will perform detailed assessments of Metropolitan's older dams and will re-confirm the overall safety of each facility. The program will include two studies to assess different aspects of Metropolitan's facilities. One study will review the seismic adequacy of dams and their adjunct structures, and a second study will review the current hydrologic conditions and hydraulic adequacy of dams' spillway and hydraulic structures. The program will also upgrade monitoring systems at several older dams.

Seismic Assessment Study ($640,000)

The seismic assessment study will provide an overall evaluation of the seismic safety of Metropolitan's dams and appurtenant structures. This action authorizes the initial phases of the study to gather data and prioritize structures to be addressed; develop evaluation criteria and a decision matrix; analyze available geotechnical data; identify pertinent earthquake faults; estimate earthquake magnitudes and ground accelerations at the structures; and develop a plan for later phases of work. Metropolitan staff and URS Corporation will jointly perform the initial phases of work. URS Corporation was selected through a competitive process (Request for Qualifications No. 575) to perform this type of work, and authority to enter into the agreement was approved by Metropolitan's Board in September 2003. After the initial studies are complete and the overall scope of the program is better defined, staff will return to the Board for authorization of subsequent phases of work. Subsequent phases may include performing supplemental goetechnical field investigations, performing detailed stability analyses, and implementing any remediation, if necessary.

Spill Capacity Study ($235,000)

Spillway capacity studies for Lake Mathews, Lake Skinner, Iron Mountain Reservoir and Eagle Mountain Reservoir will be performed to evaluate the effects of urbanization on the watersheds and increases of operational flows through the reservoirs. The studies will determine the Probable Maximum Flood (PMF) in the watersheds of Lake Mathews and Lake Skinner and then assess the existing spillways' ability to overflow such an event in a

controlled manner. The PMF value can change over time due to urbanization of the watershed area and changes in the methodology used to calculate the PMF.

The in-depth spillway capacity studies will be conducted by Metropolitan staff and will recommend future spillway rehabilitation work, if necessary.

Transfer of Previously Authorized Funds ($985,000)

Metropolitan's Board authorized funding in November 1997 to upgrade dam monitoring systems, improve the accuracy of facility data, and conduct water discharge studies under the former Infrastructure Review and Rehabilitation Program (Approp. 15312). In order to consolidate activities related to Metropolitan's dams, Approp. 15312 will be closed and the dam monitoring systems projects will be moved to the Dam Safety and Rehabilitation Program (Approp. 15419). With this action, funds that were previously appropriated under the former Infrastructure Review and Rehabilitation Program ($985,000) will be transferred into the new Dam Safety and Rehabilitation Program.

Upgrade of Dam Monitoring Systems (No funds required)

In accordance with DSOD-approved plans, each Metropolitan dam includes seepage and seismic monitoring systems. Current data collection methods involve frequent site visits and extensive manual data collection. A previous investigation identified the need to improve the monitoring systems at all reservoirs, dams, and embankments, except for the dams at Diamond Valley Lake where monitoring systems were included in the original design and construction. Implementing the recommended upgrades will enable staff to remotely collect monitoring data and permit quick response to seepage rate changes. By reducing manual data collection, the upgraded systems will provide approximately $15,000 in operational savings per year. It will also provide automated alarms to Water System Operations (WSO) personnel. This real-time information permits prompt responses to public inquiries.

There are two projects underway which will upgrade existing dam monitoring systems. This action authorizes upgrades to seepage monitoring systems. Staff plan to return to the Board in the future to award a contract to upgrade the seismic monitoring systems at selected dams.

Award Agreement to Upgrade Dam Seepage Monitoring Systems: In September 2003, Metropolitan issued RFP No. 628 to identify qualified firms to assist in improving dam seepage monitoring systems. Changes in seepage patterns are typically the first indicators of possible problems with dam embankments or their foundations. The planned system would replace manual reading of seepage data, would allow for more frequent data gathering when warranted, and would improve alarms to WSO personnel. Two firms responded to RFP No. 628. Through a competitive evaluation, Roctest, Inc. has been selected to perform the upgrade work. This action authorizes an agreement with Roctest to perform the design and installation of upgraded seepage monitoring equipment for an amount not to exceed $550,000. No funds are required at this time.

The recommended projects have been evaluated and recommended by Metropolitan's Capital Investment Plan Evaluation Team and funds have been included in the capital budget for fiscal year 2003/04.

See **Attachment 1** for the detailed report, **Attachment 2** for the financial statement, and **Attachment 3** for the location map.

Policy

Metropolitan Water District Administrative Code § 5108: Capital Project Appropriation
Metropolitan Water District Administrative Code § 8117: Professionals and Technical Consultants

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

Seismic Assessment Study and Spillway Capacity Study

The proposed actions are categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed actions consist of basic data collection and resource evaluation activities, which do 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 actions qualify as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed actions qualify under a Categorical Exemption (Class 6, Section 15306 of the State CEQA Guidelines).

Transfer of Previously Authorized Funds into the Dam Safety and Rehabilitation Program, Upgrade of Dam Monitoring Systems, and Award Agreement

These activities were previously determined to be categorically exempt under the provisions of CEQA and State CEQA Guidelines. The Upgrade Seepage Monitoring System project, which is contained within the Dam Safety and Rehabilitation Program, was found to be exempt by the Board under Class 1, Section 15301 of the State CEQA Guidelines on November l8, 1997. With the current board actions associated with the upgrades, awarding a professional services agreement, and related administrative and financial arrangements, there are no new substantial changes proposed. Hence, the previous environmental documentation in conjunction with these activities 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 1997 Categorical Exemption (Class 1, Section 15301 of the State CEQA Guidelines) and that no further environmental analysis or documentation is required.

CEQA determination for Option #2:

None required

Board Options/Fiscal Impacts

Option #1

Adopt the CEQA determination and

a. Appropriate $1.86 million in budgeted funds (Approp. 15419) for:
   1. Initial phases of a seismic assessment study of Metropolitan's dams and related structures;
   2. Spillway capacity studies of Lake Mathews, Lake Skinner, Iron Mountain Reservoir and Eagle Mountain Reservoir; and
b. Authorize a professional agreement with Roctest, Inc. in an amount not to exceed $550,000 for design and installation of seepage monitoring systems (Approp. 15419).

Fiscal Impact: $985,000 of previously appropriated funds under Approp. 15312 and $875,000 of budgeted funds under Approp. 15419.

Option #2

Do not perform studies or upgrade dam seepage monitoring systems. Metropolitan will not reduce risks and liabilities associated with its dams and reservoirs.

Fiscal Impact: None

Staff Recommendation

Option #1

4/12/2004
Roy L. Wolfe *Date*
Manager, Corporate Resources

4/20/2004
Ronald R. Gastelum *Date*
Chief Executive Officer

Attachment 1 – Detailed Report

Attachment 2 – Financial Statement for the Dam Safety and Rehabilitation Program

Attachment 3 – Location Map

BLA #1924

Detailed Report

Purpose/Background

Within the next fiscal year, the Division of Safety of Dams (DSOD) plans to require California dam owners to reassess those California dams that DSOD judges to be high-hazard structures based on their proximity to seismic hazards and the risks to the surrounding populated areas. Metropolitan has many dams that have not been re-analyzed for over twenty years. The Dam Safety and Rehabilitation Program has been established to assess and implement projects that will ensure the safety of Metropolitan's dams and reservoirs. The proposed studies will reconfirm the overall safety of each facility using current dam safety criteria governing existing dams. Three projects have been identified initially: (1) the Seismic Assessment Study, (2) the Spillway Capacity Study, (3) Upgrade Dam Monitoring Systems.

Seismic Assessment Study ($640,000)

The seismic assessment study will provide an overall evaluation of the seismic safety of Metropolitan's dams and appurtenant structures. The study will be completed in four phases: Phase 1 - Evaluation criteria and a decision matrix will be developed and structures will be identified and prioritized for study. Dams will be prioritized based on age, seismic risk and population density. High-ranking dams will move on to subsequent phases. All geotechnical and geologic data will be gathered and analyzed for the identified structures. Phase 2 - Fault maps and earthquake recurrence data will be collected, earthquake magnitudes will be established for the respective faults, and maximum accelerations will be determined for each dam structure. Phase 3 - Field and lab investigations will be performed to supplement available geotechnical information. Phase 4 - Static and seismic analyses will be performed of the dams and related structures. This action authorizes Phases 1 and 2. Based on the evaluation criteria and decision matrix established in Phase 1, Phases 3 and 4 will be performed as needed. Future board approval will be sought for Phases 3 and 4.

Metropolitan staff and URS Corporation will perform phases 1 and 2 of the seismic assessment. URS Corporation was selected through a competitive process (Request for Qualifications No. 575) to perform this type of work, and authority to enter into the agreement was approved by Metropolitan's Board in September 2003.

Actions and Milestones

May 2004 – Begin Phases 1 & 2 work

May 2006 – Phases 1 & 2 work completed

Spillway Capacity Study ($235,000)

Spillway capacity studies will be performed for Lake Mathews, Lake Skinner, Iron Mountain and Eagle Mountain Reservoirs in order to evaluate effects of urbanization in the watersheds and increases in the operational flows through these reservoirs.

Metropolitan staff will determine the Probable Maximum Flood (PMF) in the watersheds of Lake Mathews and Lake Skinner and then assess the ability of the existing spillways to pass it in a controlled manner. Most of Metropolitan's reservoirs are configured in such a way that rain inflows do not affect reservoir storage, either because the tributary area is small or because the drainage pattern flows away from the reservoir.

Lake Mathews and Skinner are exceptions; they have significant tributary areas that can generate substantial flows. Metropolitan has not re-analyzed the PMF at Lake Mathews and Lake Skinner since their last construction in 1960 and 1970, respectively, and the watershed area around the lakes has changed considerably. If the existing spillway structures are found to be inadequate, this study will identify rehabilitation work and/or improvements to correct the deficiencies.

Previous studies of the Iron Mountain Reservoir and Eagle Mountain Reservoir indicated that the spillways might be undersized. The recommended studies will confirm the previous work and, if necessary, recommend

modifications to permit the maximum design discharge. This work is being transferred from the Colorado River Aqueduct Conveyance Reliability Program (Approp. 15373).

Actions and Milestones

May 2004 – Begin spillway capacity studies

February 2005 – Complete spillway capacity studies

Upgrade Dam Monitoring Systems (No funds required)

Metropolitan dams are required by DSOD to have instruments that record dam seepage rates. Existing instrumentation at most sites is older, non-digital equipment, which cannot be remotely monitored, and which provides only limited data. Moreover, existing instruments require considerable manual monitoring and adjustment. In order to monitor dams more efficiently and better assess their stability, there is a need to upgrade the dam seepage systems at several older dams.

There are two projects underway which will upgrade existing dam monitoring systems. This action authorizes upgrades to seepage monitoring systems. Staff plans to return to the Board in the future to award a contract to upgrade the seismic monitoring systems at selected dams. Funds for these projects were previously appropriated under Approp. 15312 and have been included in the capital budget for fiscal year 2003/04. In order to consolidate activities related to Metropolitan's dams, Approp. 15312 will be closed and the dam monitoring systems projects will be moved to the Dam Safety and Rehabilitation Program (Approp. 15419).

Award Agreement to Upgrade Dam Seepage Monitoring Systems

Changes in seepage patterns at a dam are important indicators of changes in embankments and foundations. The planned systems will provide more frequent data gathering and the ability to set alarms more flexibly than the existing systems. In addition, existing dated seepage sensors will be replaced with more reliable sensors capable of recording seepage flow rates, of being remotely accessed, and of providing alarms when dam seepage limits are exceeded.

In September 2003, Metropolitan issued RFP No. 628 for design and installation of upgraded dam seepage systems. Two firms responded to RFP No. 628. Through a competitive evaluation, Roctest, Inc. has been selected to perform the upgrade work. This action authorizes an agreement with Roctest to perform the design and installation of upgraded seepage monitoring equipment for an amount not to exceed $550,000. No funds are required at this time.

Actions and Milestones

December 2004 – Complete design and installation of upgraded seepage monitoring systems

Financial Statement for Dam Safety and Rehabilitation Program

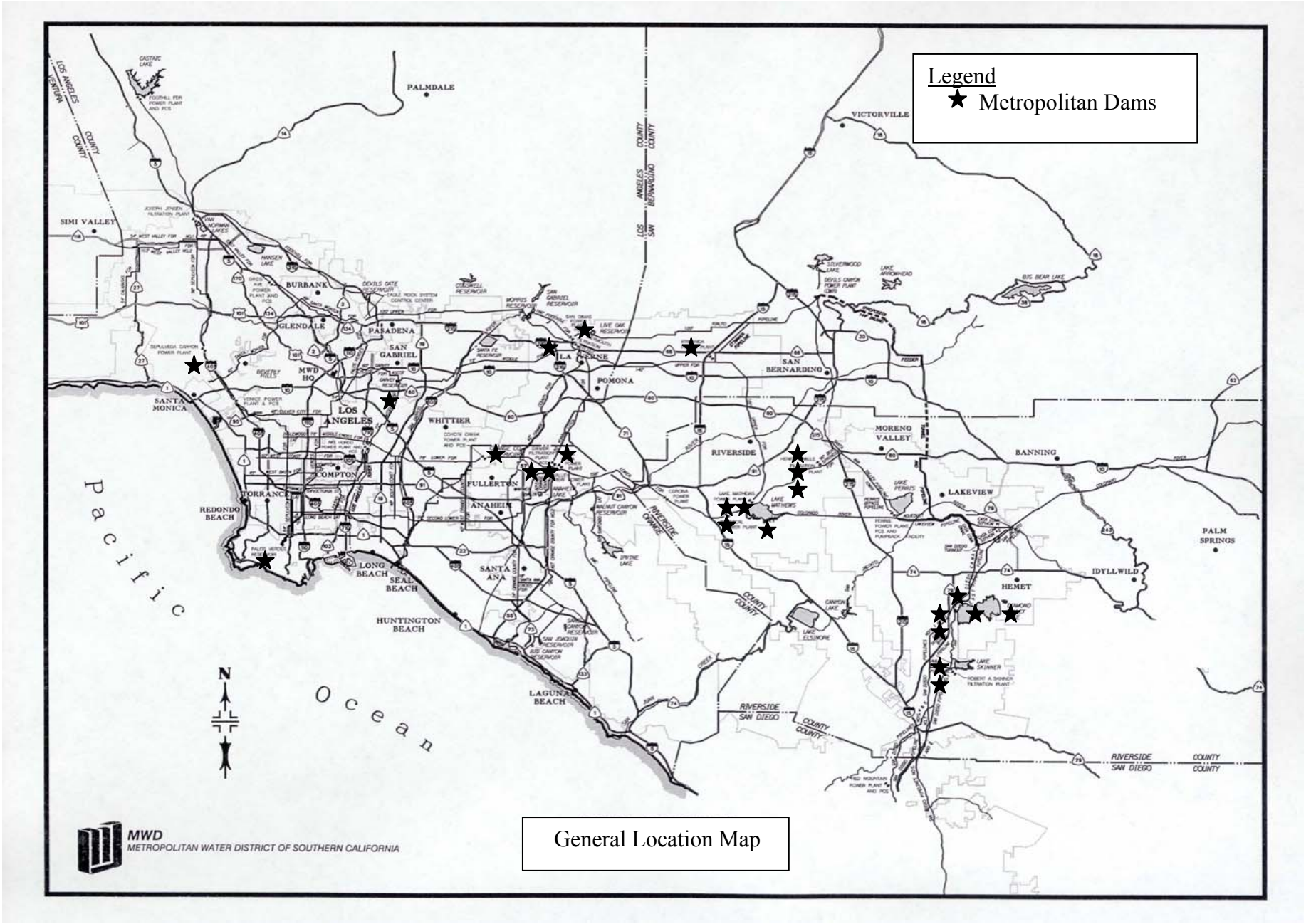
A breakdown of Board Action No. 1 for Appropriation No. 15419 for the Dam Safety and Rehabilitation Program is as follows:

	Initial Board Action (May 2004)	Reallocation* To Dam Safety and Rehabilitation Program * (November 1997)	New Total Appropriated Amount (May 2004)
Labor			
Studies and Investigations	$ 327,000	$ 0	327,000
Owner Costs (Program management)	40,000	0	40,000
Incidental Expenses	15,000	0	15,000
Professional/Technical Services			
URS Corp.	375,000	0	375,000
Roctest, Inc.	0	550,000	550,000
Remaining Budget	118,000	435,000	553,000
Total	$ 875,000	$ 985,000*	**$1,860,000**

Funding Request

Program Name:	Dam Rehabilitation and Safety Program		
Source of Funds:	Construction Funds (General Obligation, Revenue Bonds, Pay-As-You-Go Fund)		
Appropriation No.:	15419	**Board Action No.:**	1
Requested Amount:	$ 1,860,000	**Capital Program No.:**	15419
Total Appropriated Amount:	$ 1,860,000	**Capital Program Page No.:**	E-23 (Approp. 03414-S)
Program Estimate:	$ 5,962,000	**Program Goal:**	S-Supply & Delivery Reliability

*In order to consolidate activities related to Metropolitan's dams, the Infrastructure Review and Rehabilitation Program will be closed and dam monitoring activities will be included in the Dam Safety and Rehabilitation Program. The $985,000 was previously authorized in November 1997.


Legend
Metropolitan Dams
PALMDALE
VICTORVILLE
SIMI VALLEY
BURBANK
GLENDALE
PASADENA
SAN GABRIEL
MWD HQ
LA VERNE
POMONA
SAN BERNARDINO
SANTA MONICA
LOS ANGELES
WHITTIER
MORENO VALLEY
RIVERSIDE
BANNING
COMPTON
FULLERTON
ANAHEIM
LAKEVIEW
TORRANCE
REDONDO BEACH
LONG BEACH
SEAL BEACH
SANTA ANA
PALM SPRINGS
IDYLLWILD
HEMET
HUNTINGTON BEACH
LAGUNA BEACH
Pacific Ocean
N
MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
General Location Map