THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

- Board of Directors
  Engineering and Operations Committee

10/9/2012 Board Meeting

7-3

Subject

Appropriate $1.88 million; and authorize final design of two seismic upgrade projects at the Robert B. Diemer Water Treatment Plant (Approp. 15436)

Executive Summary

This action authorizes final design of seismic upgrades for the Administration Building and Filter Buildings at the Robert B. Diemer Water Treatment Plant. These buildings house critical plant functions which could be impacted by a major seismic event, potentially impacting treated water deliveries. The planned upgrades will reduce the risk of structural failure of these facilities in the event of a major earthquake.

Timing and Urgency

Metropolitan has an ongoing program to evaluate the seismic stability of its facilities in order to maintain reliable operation and to meet current seismic design practices and code requirements. Although Metropolitan facilities have always been designed to meet up-to-date codes that were in place at the time of their construction, industry practices and code requirements are periodically updated, particularly following a major earthquake.

A seismic assessment of the Diemer Administration Building and Filter Buildings identified that these structures require structural upgrades. Due to the critical nature of these facilities in delivering treated water, staff recommends proceeding with final design of the upgrades at this time.

These projects have been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria and are categorized as Infrastructure Reliability projects. Funds for this action are available within Metropolitan's capital expenditure plan for fiscal year 2012/13.

Details

Background

The Diemer plant was placed into service in 1963 with an initial capacity of 200 million gallons per day (mgd). In 1969, the plant was expanded to its present treatment capacity of 520 mgd. It delivers a blend of waters from the Colorado River and the State Water Project to Orange County and to Metropolitan's Central Pool portion of the distribution system. The Diemer plant is located within the city of Yorba Linda, approximately one-half mile south of the Whittier Fault, which is capable of generating a 6.8-magnitude earthquake.

At the time the Diemer plant was constructed, it was designed to meet the then-current building codes of the early 1960s. Since that time, knowledge of earthquakes and seismic design has greatly improved, which has resulted in more stringent building codes. Staff initiated a seismic assessment of the Diemer plant in 2004. Through this effort, several buildings were identified to be in need of structural upgrade. The resulting projects have been prioritized and their schedules coordinated with other work planned at the plant.

In May 2011, Metropolitan's Board authorized preliminary design of seismic upgrades for the Diemer Administration Building and Filter Buildings. As part of this effort, comprehensive material testing was conducted to evaluate the condition of the existing concrete and the reinforcement steel strength, in accordance

with guidelines specified by the American Society of Civil Engineers (ASCE). A seismic evaluation was then conducted which incorporated three-dimensional computer analyses of the buildings, the material testing results, up-to-date geotechnical information for the Diemer site, and current seismic provisions for rehabilitation of existing buildings (ASCE-41) as specified in the 2010 California Building Code. Preliminary design is now complete, and staff recommends proceeding with final design of structural upgrades to improve the capability of the Administration and Filter Buildings to withstand a major seismic event.

Project No. 1 – Diemer Administration Building Seismic Upgrades – Final Design Phase ($750,000)

The Diemer Administration Building is a three-story, 35,000-square-foot reinforced concrete building which was completed in 1963 as part of the original plant construction. The building houses the plant's control room, Incident Command Center, water quality laboratory, staff meeting rooms, and offices. The 72-foot-wide by 158-foot-long building has a flat roof, which includes a clerestory pop-up at the main entrance. The plant's inlet conduit runs below the full length of the building.

The seismic analysis identified that some of the building's interior and exterior walls, the clerestory roof, the south side entry floor, and the plant's inlet conduit could be damaged in a major earthquake. Recommended upgrades include the addition of a new 12-inch thick concrete wall extending from the basement to the roof; strengthening of perimeter walls with concrete infills at some of the exterior windows; reinforcement of the clerestory roof system in the area of the main entry; and reinforcement of structural elements such as floors, piers, and beams.

The recommended upgrades will result in relocation of some existing mechanical and electrical equipment, and minor architectural modifications near the areas of seismic strengthening. In addition, to take advantage of cost-saving opportunities while this work proceeds, the plant's control room will be provided with an independent high-efficiency heating, ventilating, and air conditioning (HVAC) system, to improve reliability of water treatment operation and enhance smoke control in the event of a local fire occurrence. Final design activities will include: detailed structural analyses and engineering design of the seismic upgrades, equipment relocation, architectural modifications, and the HVAC system; preparation of drawings and specifications; development of a construction cost estimate; advertisement and receipt of competitive bids; and all other activities in advance of award of a construction contract.

Project No. 2 – Diemer Filter Buildings Seismic Upgrades – Final Design Phase ($1,130,000)

The Diemer plant has 48 filters in two modules. The East Filter Control Building and underlying east filters, which are part of Module No. 1, were completed in 1963 during the original plant construction. The West Filter Control Building and underlying west filters, which are part of Module No. 2, were completed in 1969 when the plant was expanded. The filter basins on the east and west sides of the plant are essentially two perforated reinforced concrete shear-wall structures which are 177 feet wide by 424 feet long and 18 feet deep. The filter basins contain pipe galleries, box conduits, and 24 multimedia filters. Each filter control building, which is a reinforced concrete superstructure approximately 24 feet wide and 11 feet tall, is located at the operating deck on top of the filters and extends the full length of the filter structure (424 feet) in the north-south direction. The two filter control buildings house process control equipment.

The filters are supported by concrete walls and piers on a concrete mat foundation. Below the filters is an open sump which collects used filter backwash water. The seismic evaluation identified that the wall piers located in this difficult-to-access sump at the bottom of the filters would likely be damaged in a major earthquake. Another area that could be damaged is the walkway area at the top of the filters where large openings result in weakened decks. Each filter control building would likely sustain seismic damage at the central clerestory roof and at the interior concrete frames.

Recommended structural upgrades to the filter buildings include: installation of steel frames in each filter control building; reinforcement of each clerestory at the roof line; and strengthening of the perforated concrete shear walls. To perform these upgrades, some existing mechanical and electrical equipment in the filter control buildings needs to be relocated. Retrofit work will be staged to avoid limiting the Diemer plant's water production capability. Final design phase activities will include: detailed structural analyses and engineering

design of seismic upgrades and equipment relocation; preparation of drawings and specifications; development of a construction cost estimate; advertisement and receipt of competitive bids; and all other activities in advance of award of a construction contract.

Summary

This action appropriates $1.88 million and authorizes final design of seismic upgrades for the Diemer Administration Building and Filter Buildings. Due to the similar nature of work for each project and the proximity of their locations, staff recommends consolidating the final design efforts and a portion of the construction work. All final design activities will be performed by Metropolitan staff.

Requested funds include $1,557,000 for the detailed design activities described above; $154,000 for receipt of bids, shutdown planning, and project management; and $169,000 for remaining budget. The cost of final design is approximately 12 percent of the estimated construction cost. Engineering Services' goal for design of projects with construction cost greater than $3 million is 9 to 12 percent. The combined construction cost for the two projects is anticipated to range from $12.5 million to $14 million. Staff will return to the Board at a later date for award of the two construction contracts.

These projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal year 2012/13 capital expenditure plan. See **Attachment 1** for the Financial Statement and **Attachment 2** for the Location Map.

The Diemer Administration Building and Filter Buildings seismic upgrade projects are included within the Diemer Improvements Program - FY 2006/07 Through FY 2011/12 (Appropriation No. 15436), which was initiated in fiscal year 2006/07. Other projects authorized under Appropriation No. 15436 include the Hatch Cover Replacement, Lower Maintenance Road Rehabilitation, and the East Washwater Tank Roof Refurbishment. With the present action, the total funding for Appropriation No. 15436 will increase from $25,039,000 to $26,919,000.

Project Milestone

December 2013 – Completion of final design of seismic upgrades for the Diemer Administration and Filter Buildings

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

California Environmental Quality Act (CEQA)

Option #1:

Diemer Administration Building Seismic Upgrades – Final Design Phase, and
Diemer Filter Buildings Seismic Upgrades – Final Design Phase

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of funding, design, basic data collection, and resource evaluation activities, which do not result in a serious or major disturbance to an environmental resource. Accordingly, the proposed action qualifies as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

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

Option #2:

Diemer Administration Building Seismic Upgrades – Final Design Phase

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action consists of funding, design, basic data collection, and resource evaluation activities, which do not

result in a serious or major disturbance to an environmental resource. Accordingly, the proposed action qualifies as a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

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

Diemer Filter Buildings Seismic Upgrades – Final Design Phase

None required

Board Options

Option #1

Adopt the CEQA determination and

a. Appropriate $1.88 million; and
b. Authorize final design of seismic upgrades for the Diemer Administration and Filter Buildings.

Fiscal Impact: $1.88 million in capital funds under Approp. 15436

Business Analysis: These projects will protect Metropolitan's assets, enhance worker safety, enhance reliability of deliveries to member agencies, and reduce the risk of costly emergency repairs.

Option #2

Adopt the CEQA determination and

a. Appropriate $750,000;
b. Authorize final design of seismic upgrades for the Diemer Administration Building; and
c. Do not proceed with seismic upgrades of the Diemer Filter Buildings.

Fiscal Impact: $750,000 in capital funds under Approp. 15436

Business Analysis: This option would move forward with higher priority seismic upgrades that focus on occupied areas, in order to enhance worker safety in the event of a major earthquake. This option would upgrade the filters at a later date, foregoing an opportunity to enhance reliability of deliveries to member agencies, and to reduce the risk of costly emergency repairs.

Staff Recommendation

Option #1

9/18/2012
Gordon Johnson *Date*
Manager/Chief Engineer
Engineering Services

9/26/2012
Jeffrey Kightlinger *Date*
General Manager

Attachment 1 – Financial Statement

Attachment 2 – Location Map

Ref# es12619926

Financial Statement for Diemer Improvements Program – FY 2006/07 Through FY 2011/12

A breakdown of Board Action No. 15 for Appropriation No. 15436 for seismic upgrades of the Diemer Administration Building and Diemer Filter Buildings[1] is as follows:

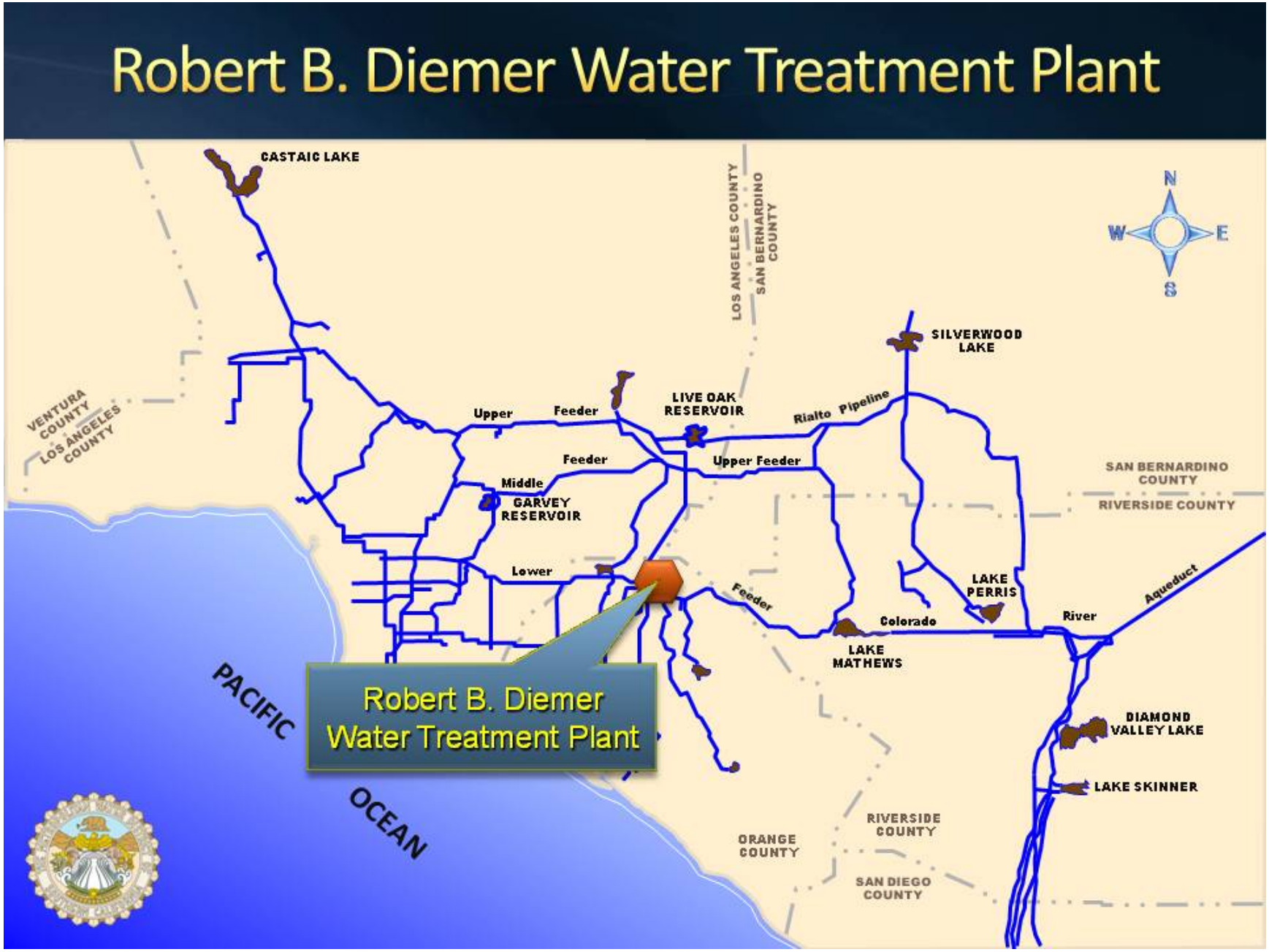
	Previous Total Appropriated Amount (Aug. 2011)	Current Board Action No. 15 (Oct. 2012)	New Total Appropriated Amount
Labor			
Studies & Investigations	$ 766,600	$ -	$ 766,600
Final Design	2,757,600	1,552,000	4,309,600
Owner Costs (Program mgmt., bidding process)	2,277,438	154,000	2,431,438
Submittals Review & Record Dwgs.	632,100	-	632,100
Construction Inspection & Support	1,693,791	-	1,693,791
Metropolitan Force Construction	2,512,400	-	2,512,400
Materials & Supplies	1,602,914	-	1,602,914
Incidental Expenses	107,993	5,000	112,993
Professional/Technical Services	1,001,943	-	1,001,943
Equipment Use	43,155	-	43,155
Contracts	10,577,795	-	10,577,795
Remaining Budget	1,065,271 [2]	169,000	1,234,271
Total	**$ 25,039,000**	**$ 1,880,000**	**$ 26,919,000**

Funding Request

Program Name:	Diemer Improvements Program – FY 2006/07 Through FY 2011/12		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15436	**Board Action No.:**	15
Requested Amount:	**$** 1,880,000	**Capital Program No.:**	15436-I
Total Appropriated Amount:	**$** 26,919,000	**Capital Program Page No.:**	298
Total Program Estimate:	**$** 90,377,000	**Program Goal:**	I- Infrastructure Reliability

[1] The total amount expended to date on the Diemer Administration Building Seismic Upgrade project is approximately $220,000. The total amount expended to date on the Diemer Filter Buildings Seismic Upgrade project is approximately $410,000.

[2] Includes previous reallocation of $500,000 from Remaining Budget to Contracts ($180,000), Owner Costs ($45,000), Construction Inspection & Support ($80,000) and Submittals Review ($195,000) for the Diemer Fire and Potable Water Pump Station project to avoid electrical and piping interferences with the Diemer Oxidation Retrofit construction project; and $305,000 from Remaining Budget to Contracts ($135,144), Owner Costs ($73,500), Construction Inspection & Support ($20,000), Metropolitan Force Construction ($30,500) and Materials & Supplies ($45,856) for the Emergency Broadcast System Rehabilitation project, as a result of acoustic engineering recommendations to address site-specific audio conditions.


Robert B. Diemer Water Treatment Plant
CASTAIC LAKE
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
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SILVERWOOD LAKE
VENTURA COUNTY
LOS ANGELES COUNTY
Upper Feeder
LIVE OAK RESERVOIR
Rialto Pipeline
Feeder
Upper Feeder
Middle
GARVEY RESERVOIR
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
Lower
Feeder
LAKE PERRIS
Aqueduct
Colorado
River
LAKE MATHEWS
Robert B. Diemer
Water Treatment Plant
PACIFIC
OCEAN
DIAMOND VALLEY LAKE
LAKE SKINNER
RIVERSIDE COUNTY
ORANGE COUNTY
SAN DIEGO COUNTY