THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

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

6/14/2022 Board Meeting

7-5

Subject

Authorize three-year agreements with Power-Tech Engineers, Inc., HDR, Inc., Mangan, Inc., and Burns & McDonnell Engineering Company, Inc., each in a not-to-exceed amount of $2,250,000, for specialized technical services to enhance arc flash protection at Metropolitan facilities; the General Manager has determined that this proposed action is exempt or otherwise not subject to CEQA

Executive Summary

Metropolitan utilizes an extensive electrical power distribution system to safely direct and deliver electrical power to operate its water treatment, conveyance, and hydroelectric facilities. Safe operation of these facilities to protect staff from arc flash (a sudden, unanticipated release of electric energy) hazards is essential. Assessing the potential hazards and developing risk mitigation strategies for Metropolitan's electrical power systems is necessary to minimize the risk to personnel and equipment of arc flash events. Current regulations also require updates to these risk assessments every five years. This action authorizes four specialized on-call professional service agreements to assess and mitigate arc flash risks for Metropolitan's electrical power systems.

Details

Background

Metropolitan depends on high-energy electrical power distribution systems to operate its water treatment, conveyance, and hydroelectric facilities. As its operating facilities expanded, and their complexity increased over time, the supporting electrical distribution systems have also become more intricate. Metropolitan adheres to all pertinent standards issued by the National Fire Protection Association (NFPA), National Electrical Code, and Occupational Safety Hazard Administration for the design, operation, and recertification of these systems.

While designed and manufactured to stringent safety standards, the high-voltage electric distribution equipment at many of Metropolitan's facilities are inherently dangerous. A sudden, large release of unexpected electrical energy, commonly called an arc flash, may occur when electric current leaves its intended path and travels through the air between one conductor and another or to the ground. The likelihood of an electrical power arc flash occurring may be low, but the potential severity of such an incident is high. As a result, Metropolitan has adopted control measures to reduce both the hazard and the likelihood of such an event taking place. These mitigation measures include de-energizing equipment, when possible, during maintenance activities; utilizing appropriate personal protective equipment; training staff; and maintaining a safe distance from operating equipment.

To further reduce the potential arc flash hazards, recent NFPA code changes now require formal risk assessments of facilities at intervals not to exceed every five years. These assessments will be a comprehensive effort that requires coordination with electrical utilities and the collection of field data (i.e., horsepower ratings of motors, cable data, etc.) on the existing electrical systems. The subsequent computer modeling of this equipment further involves the use of detailed and accurate one-line electrical diagrams, protective device settings, voltages at each point in the system, and ratings of all electrical distribution equipment and transformers. After an accurate electrical system model is developed, an arc flash analysis will be performed to identify potential electrical hazards and create a list of risk reduction recommendations, ranging from providing updated safe work zones and appropriate personnel protective equipment to labeling equipment indicating the hazard.

While the initial development of the electrical system model involves significant efforts, subsequent analyses for future updates can utilize the previously created model and simply incorporate any changes that have occurred in the subject equipment over the intervening five-year period.

Staff recommends proceeding with arc flash analyses for all of Metropolitan's high-voltage electrical systems, including water treatment plants, aqueduct pumping plants, and hydroelectric plants. To complete this important task expeditiously, four specialized on-call engineering service agreements are recommended for authorization at this time. On-call agreements are multi-year with annual not-to-exceed amounts and provide a high degree of flexibility to respond to schedule or scope adjustments, allow quicker delivery times, and lower administrative costs for both Metropolitan and the consultants. For these types of agreements, consultants are assigned work only after specific tasks are identified by staff, up to the not-to-exceed amounts of the contracts.

In accordance with the April 2020 action on the biennial budget for fiscal years 2020/21 and 2021/22, the General Manager will authorize staff to proceed with the actions described herein, pending board-authorization of the design services agreement described below. Based on the current Capital Investment Plan (CIP) expenditure forecast, funds for the work to be performed pursuant to this action during the current biennium are available within the Capital Investment Plan Appropriation for Fiscal Years 2020/21 and 2021/22 (Appropriation No. 15517). Funds required for work to be performed pursuant to the subject contract after fiscal year 2021/22 are budgeted within the Capital Investment Plan Appropriation for Fiscal Years 2022/23 and 2023/24.

Arc Flash Assessment and Mitigation

The arc flash assessment and mitigation work will be conducted jointly by Metropolitan staff and the consultants. Metropolitan staff will compile existing record drawings, safely isolate equipment (when required) for data gathering, reactivate electrical systems upon completion of data gathering, perform overall project management, and provide consultant oversight. Consultants will collect appropriate data, develop computer models, conduct analyses, prepare recommendations, and other activities as described below.

A total of $12 million is required for this work. Allocated funds include an aggregated total of $9 million for arc flash assessments by four consultants under new on-call agreements, as described below. Allocated funds for Metropolitan staff activities includes $480,000 to isolate, shutdown, and reactivate electrical systems; $1,600,000 for record drawing compilation, technical oversight, and review of consultant's work; $320,000 for project management, project controls, and CIP office; and $600,000 for the remaining budget.

The total cost to mitigate risks of arc flash events at Metropolitan facilities will be evaluated during performance of the assessments. **Attachment 1** provides the allocation of required funds.

Engineering Support for Arc Flash Assessment and Mitigation (Power-Tech Engineers Inc., HDR, Inc., Mangan Inc., and Burns & McDonnell Engineering Company, Inc.) – New Agreements

Metropolitan issued Request for Qualifications (RFQ) 1301 to provide engineering services for arc flash model development and analysis and received a total of 14 Statements of Qualifications. Due to the large number of Metropolitan's facilities and systems that would require arc flash analyses, and to ensure that the work is completed in a timely manner, four firms are recommended to perform the work. The RFQ process provided a competitive process in which the expertise of the firms' staff, technical approach, proposed methodology, and capability for the planned work were evaluated.

Power-Tech Engineers, Inc., HDR, Inc., Mangan, Inc., and Burns & McDonnell Engineering Company, Inc. are recommended for the engineering services detailed below, based upon their extensive expertise in arc flash model development. In addition, their all-round experience will facilitate the assessment and analysis of Metropolitan’s complex electrical systems.

The planned scope of work for the selected consultants includes: (1) site investigations and data collection; (2) developing/verifying single-line electrical diagrams of Metropolitan facilities under study; (3) developing computerized electrical system models; (4) conducting arc flash assessment and analysis; (5) identifying recommendations for equipment safety or operational improvements; and (6) preparing arc flash warning/safety labels.

This action authorizes specialized on-call agreements with Power-Tech Engineers, Inc., HDR, Inc., Mangan, Inc., and Burns & McDonnell Engineering Company, Inc., each for a not-to-exceed total of $750,000 per contract year

for a duration up to three years, and each for a total not-to-exceed contract amount of $2,250,000, to assess and mitigate arc flash risks for Metropolitan facilities. On-call agreements are multi-year with annual not-to-exceed amounts and provide a high degree of flexibility to respond to schedule or scope adjustments, allow quicker delivery times, and lower administrative costs for both Metropolitan and the consultants. For these types of agreements, consultants are assigned work only after specific tasks are identified by staff, up to the not-to-exceed amounts of the contracts.

For these agreements, Metropolitan has established a Small Business Enterprise participation level of 25 percent. All four firms have committed to meet this level of participation.

Alternatives Considered

Several alternatives were considered to perform arc flash assessment and mitigation, including utilizing in-house Metropolitan staff to perform all work components. Metropolitan's staffing strategy for in-house Metropolitan staff has been: (1) to assess current work assignments for said staff and to determine the potential availability of staff to conduct this work; and (2) to use project-specific professional services agreements when resource needs exceed available in-house staffing or require specialized technical expertise in order to provide a concentrated engineering effort over an extended duration.

This strategy relies on the assumption that in-house engineering staff will handle the baseload of work on capital projects, while professional services agreements are selectively utilized to handle projects above this baseload or where specialized needs are required. This strategy allows Metropolitan's staff to be strategically utilized on projects to best maintain key engineering competencies and to address projects with special needs or issues.

After assessing the current workload for in-house staff, required expertise, and the relative priority of this project, staff has determined that insufficient electrical engineering staff is available to ensure completion of the work in a timely manner. Staff recommends utilizing a hybrid effort of consultant and Metropolitan staff for performance of this work. The consultants will perform the majority of arc flash assessment and mitigation work, and Metropolitan staff will provide needed site support and perform project reviews and oversight. This approach will allow for completion of not only this project, but also other budgeted capital projects within their current schedules and ensure that the work is conducted in the most efficient manner possible. Under these agreements, work assignments will be issued to consultants through task orders on a facility-by-facility basis.

Summary

This action authorizes agreements with Power-Tech Engineers, Inc. HDR, Inc., Mangan, Inc., and Burns & McDonnell Engineering Company, Inc. to assess and mitigate arc flash risks for Metropolitan facilities. See **Attachment 1** for the Allocation of Funds, **Attachment 2** for the listing of Subconsultants, and **Attachment 3** for the Location Map.

Project Milestone

December 2025 – Completion of arc flash assessment and mitigation for Metropolitan’s high-voltage power distribution systems.

Policy

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

Metropolitan Water District Administrative Code Section 11104: Delegation of Responsibilities

By Minute Item 51963, dated April 14, 2020, the Board appropriated a total of $500 million for projects identified in the Capital Investment Plan for Fiscal Years 2020/21 and 2021/22.

By Minute Item 52778, dated April 12, 2022, the Board appropriated a total of $600 million for projects identified in the Capital Investment Plan for Fiscal Years 2022/23 and 2023/24.

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The overall action involves the funding, assessment, development, and design, of existing public or private structures, facilities involving negligible or no expansion of use, and no possibility of significantly impacting the physical environment. Additionally, the proposed action consists of basic data collection, research, experimental management, and resource evaluation activities, which do not result in a serious or major disturbance to an environmental resource. These 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 under Class 1 and Class 6 (Sections 15301 and 15306 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

Board Options

Option #1

Authorize agreements with Power-Tech Engineers, Inc., HDR, Inc., Mangan, Inc., and Burns & McDonnell Engineering Company, Inc., in an amount not-to-exceed total of $750,000 each per year for a period of three years, to assess and mitigate arc flash risks for Metropolitan's facilities.

Fiscal Impact: Expenditure of $12 million in capital funds. Approximately $10,000 will be incurred in the current biennium and has been previously authorized. The remaining funds from this action are accounted for in the next biennial budget and were authorized in April 2022.
Business Analysis: This option will enhance the operational safety of Metropolitan's high-voltage power distribution systems with the appropriate level of expertise and within a reasonable timeframe.

Option #2

Do not proceed with these agreements at this time.
Fiscal Impact: None
Business Analysis: This option may forego or delay the opportunity to enhance the operational safety of Metropolitan's power distribution systems.

Staff Recommendation

Option #1

5/20/2022

John V. Bednarski *Date*
Manager/Chief Engineer
Engineering Services

5/23/2022

Adel Hagekhalil *Date*
General Manager

Attachment 1 – Allocation of Funds

Attachment 2 – List of Subconsultants

Attachment 3 – Location Map

Ref# es12680296

Allocation of Funds for Arc Flash Assessments

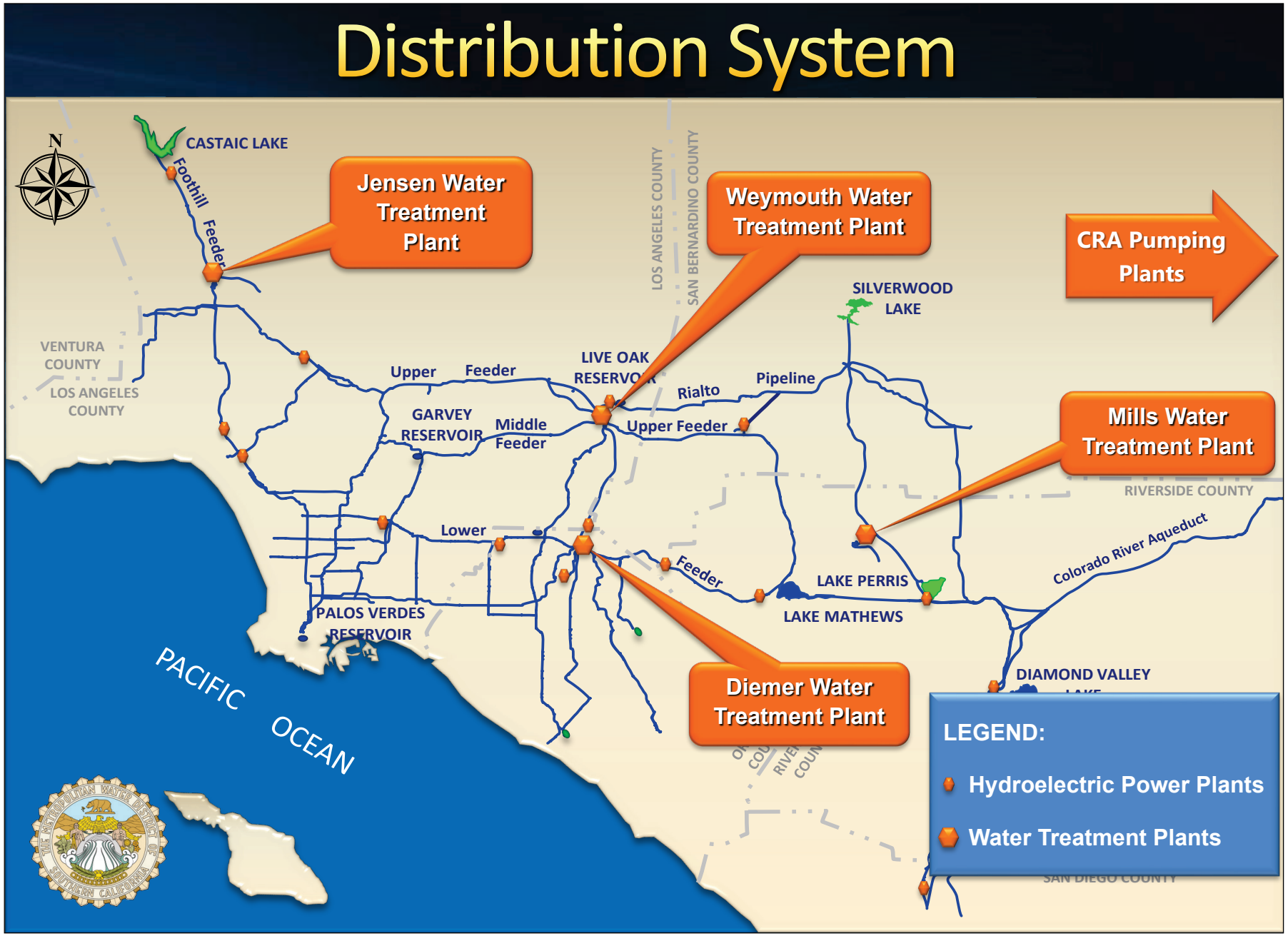
	Current Board Action (June 2022)
Labor	
Studies & Investigations	$ 480,000
Final Design	-
Owner Costs (Program mgmt., envir. monitoring)	320,000
Submittals Review & Record Drwgs.	1,550,000
Construction Inspection & Support	-
Metropolitan Force Construction	-
Materials & Supplies	45,000
Incidental Expenses	5,000
Professional/Technical Services	
Power-Tech Engineers, Inc.	2,250,000
HDR, Inc.	2,250,000
Mangan, Inc.	2,250,000
Burns & McDonnell Engineering Company, Inc.	2,250,000
Equipment Use	-
Contracts	-
Remaining Budget	600,000
Total	**$ 12,000,000**

1. The total amount expended to date on the Arc Flash Assessment is approximately $0.19 million. The total estimated cost to complete the model for Metropolitan high voltage facilities including the amount appropriated to date, and current funds requested, is approximately $12.2 million.

The Metropolitan Water District of Southern California

Subconsultants for Agreement with HDR , Inc.

Subconsultant and Location
TJC & Associates, Inc. (TJCAA) Sacramento, CA
ProjectLine Technical Services (ProjectLine) Costa Mesa, CA


Distribution System
N
CASTAIC LAKE
Foothill Feeder
Jensen Water Treatment Plant
Weymouth Water Treatment Plant
CRA Pumping Plants
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
SILVERWOOD LAKE
VENTURA COUNTY
LOS ANGELES COUNTY
Upper Feeder
LIVE OAK RESERVOIR
Rialto Pipeline
GARVEY RESERVOIR
Middle Feeder
Upper Feeder
Mills Water Treatment Plant
RIVERSIDE COUNTY
Lower Feeder
Colorado River Aqueduct
LAKE PERRIS
LAKE MATHEWS
PALOS VERDES RESERVOIR
PACIFIC OCEAN
Diemer Water Treatment Plant
DIAMOND VALLEY
LEGEND:
Hydroelectric Power Plants
Water Treatment Plants
SAN DIEGO COUNTY