THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

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

4/12/2022 Board Meeting

7-4

Subject

Authorize an agreement with Stantec Consulting Services, Inc. for a not-to-exceed amount of $8.5 million to replace the control system at the Mills Water Treatment Plant and amend an existing agreement with CH2M Hill Engineers, Inc. for a not-to-exceed amount of $4.435 million; the General Manager has determined that this proposed action is exempt or otherwise not subject to CEQA

Executive Summary

Metropolitan's control system is used to operate, monitor, and collect critical information from Metropolitan facilities throughout Southern California. The existing system is nearing the end of its service life and needs to be upgraded to enhance the reliability and operating efficiency of Metropolitan's core facilities. A comprehensive upgrade of the entire control system is needed to maintain reliable water deliveries over the long term. Replacement of the control system at the Henry J. Mills Water Treatment Plant is the first step in a planned upgrade of Metropolitan's entire control system spanning the Colorado River Aqueduct, the five water treatment plants, and the entire conveyance and distribution system.

This action authorizes a professional services agreement for design, procurement of equipment, programming, and commissioning of a new control system at the Mills plant. This action also amends an existing professional services agreement to provide specialized technical support for this project.

Details

Background

Metropolitan's control system was commissioned in the mid-1990s and relies upon proprietary hardware and software to augment the local, manual controls that were installed when facilities were originally constructed. The control system is used by staff to monitor and operate treatment plants, chemical feed systems, flow control structures, hydroelectric power plants, pump stations, and associated facilities. In addition to its control, monitoring, and alarm functions, the system compiles operational data that is critical for regulatory compliance and for daily business processes.

The existing control system has operated reliably for over 25 years but is nearing the end of its service life. A condition assessment of the control system identified near-term cybersecurity risks with certain components, along with impending technological obsolescence of the system's hardware, software, control, and communication features. While upgrades over the past 25 years have extended the system's service, and it continues to operate reliably today, the existing system needs to be replaced to maintain future reliability and reduce cybersecurity risks. Without a reliable control system, a broad range of equipment that was designed to operate remotely would instead need to be operated locally with manual input. Operational data that is presently collected automatically and summarized for submission to regulatory agencies would instead need to be gathered and logged manually, while safety procedures that include automatic alarms would need to be assessed, modified, and staffed appropriately. Over the next ten years, major elements of the control system including hardware, software, and the communication network will need to be upgraded.

Staff has completed preliminary investigations to define business needs and the architecture of the replacement control system. As Metropolitan's control system is distributed over a large region and operates many facilities, a staged effort is recommended to upgrade Metropolitan's control system. Staff selected the Mills plant as the first

facility to be upgraded due to its modularity, smaller size, and relatively large finished water reservoir capacity. Staff recommends authorizing an agreement with the selected consultant to design, furnish equipment, and program the control system at the Mills plant at this time. Following successful completion of the upgrade at the Mills plant, the planned project approach is to roll out the same control system platform, using the same team (and the unit pricing structure submitted in the RFP proposal) across the remaining facilities in Metropolitan's system. This will result in a consistent, uniform, and comprehensive control system throughout Metropolitan's operating facilities.

Metropolitan staff plans to complete start-up and commissioning of the Mills plant prior to beginning design of the control system for the next treatment plant to capture any lessons learned from the Mills control system upgrade. Upon successful completion of the Mills project, staff will return to the Board to authorize additional actions to upgrade additional facilities. This phased approach allows for gradual implementation of the new control system across Metropolitan's treatment plants and conveyance and distribution systems. It is anticipated that the retrofit of all Metropolitan facilities will take approximately 10 years, with an estimated total cost of $165 million to $195 million. This implementation approach is part of the Capital Investment Plan (CIP) 10-year expenditure plan that will be included in the planned CIP Appropriation for Fiscal Years 2022/2023 and 2023/2024.

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 agreements described below. Based on the current CIP expenditure forecast, funds for the work to be performed pursuant to this action during the current biennium are available within the CIP Appropriation for Fiscal Years 2020/21 and 2021/22 (Appropriation No. 15517). Funds required for work to be performed pursuant to the subject agreement after fiscal year 2021/22 will be budgeted in the following fiscal years. This project has been reviewed in accordance with Metropolitan's CIP prioritization criteria and was approved by Metropolitan's CIP Evaluation Team to be included in the System Reliability Program.

Mills Plant Control System Upgrade – Design, Procurement and Implementation

The planned work includes the replacement of computer servers, distributed field computers, input/output devices, software, and communication equipment at the Mills plant and Metropolitan's chemical unloading facility. The control system upgrades will adopt industry-standard technology, programming, and modern architecture. Design activities will be conducted by a consultant as described below. Metropolitan staff will provide updated record drawings and process flow descriptions, consultant oversight, and overall project management.

Due to the critical nature of the Mills plant control systems and to minimize facility disruptions, Metropolitan staff will install the new control system equipment, as well as decommission and remove all obsolete control system equipment for this project. Staff will return to the Board at a later date to award public works contracts, as appropriate, for specific portions of the project that are too large or require special expertise. These areas include potential modifications and upgrades to the control rooms and fiber optical communication system cabling (currently estimated at $700,000).

A total of $19.945 million has been budgeted for this work. Allocated funds include $8.5 million for design, programming, and procurement activities by Stantec Consulting Services, Inc. and $1.95 million for owner support services by CH2M Hill Engineers, Inc. (CH2M); both agreements are described below. In addition to the amount of the agreements, other allocated funds for Metropolitan staff include $5,319,000 for installation of equipment and support; $1,681,000 for inspection, technical support during installation, and testing; $552,000 for specification development, process hazard analysis, and control panel design participation; $1,160,000 for contract administration, environmental monitoring, project controls, submittal reviews, and project management; and $783,000 for the remaining budget.

Agreement for Control System Programming and Equipment Furnishment (Stantec Consulting Services, Inc.) – New Agreement

Metropolitan issued Request for Qualifications (RFQ) 1226 for prequalification of control system suppliers. Metropolitan received a total of eight Statements of Qualifications, and six control system platforms were prequalified as meeting Metropolitan's control system requirements. Subsequently, Metropolitan issued Request

for Proposal (RFP) 1254 in search of an experienced engineering firm to develop, design, furnish, program, test, commission, train, and support a new control system. RFP 1254 required the engineering firms to base their proposal on a control system platform that had been prequalified under RFQ 1226.

Stantec Consulting Services, Inc. was selected through a competitive process via RFP 1254 to provide specialized control system hardware, software, and technical services. Stantec Consulting Services, Inc. is recommended to serve as the prime consultant for the services detailed below based upon its extensive expertise in control and communication technology, as well as its experience in upgrading large control networks similar to Metropolitan's system. (Stantec Consulting Services, Inc. proposed use of the Emerson Process Management Power & Water Solutions Inc. Ovation control system platform.)

The planned work activities include: (1) performing an initial pilot test of the control system upgrade; (2) providing subsequent technical services; and (3) furnishing equipment to replace the existing control system at the Mills plant. This scope of work includes the development and implementation of a complete design for the entire Mills control system upgrade and support facilities, furnishing control system components, performing programming and configuration work for the same, leading testing, commissioning, training, support, and warranty services for the new control system.

This action authorizes an agreement with Stantec Consulting Services, Inc. in an amount not-to-exceed $8.5 million. For this agreement, Metropolitan has established a Small Business Enterprise (SBE) participation level of 25 percent. The planned subconsultants under this agreement are listed in **Attachment 2**. Staff anticipates that once the Mills plant Supervisory Control and Data Acquisition (SCADA) work is successfully completed, staff will return to the Board to authorize an amendment to this agreement so that Stantec can proceed with the work on the next planned facility.

Agreement for Specialized Technical Services (CH2M) – Amend Existing Agreement

An amendment to an existing agreement with CH2M is recommended to provide specialized technical support services for design, equipment procurement, and the implementation of the control system upgrade at the Mills plant; CH2M is a wholly-owned company of Jacobs Engineering Group, Inc. CH2M was selected via RFQ 1153 to provide specialized control system, network, and communication system services in assessing, planning, and preparing Metropolitan for the control system upgrade. Subsequent to the assessment and planning phases, CH2M assisted Metropolitan in preparing RFQ and RFP documents for this project, utilizing its extensive expertise in control and communication technology and its experience in upgrading large control networks similar to Metropolitan's system. As part of the pilot and full plant implementation phases of the Mills Treatment Plant upgrade, CH2M will provide Metropolitan staff with support services to oversee the work.

Planned work activities include: (1) providing technical support during the pilot demonstration and full plant retrofit, (2) reviewing equipment and programming submittals, (3) providing advice to requests for information from the consultant; and (4) providing scheduling and document management support, cost and deliverable performance monitoring services. Additionally, CH2M will prepare a basis of design document for a new wide-area control system network communication system. The estimated cost for these services is $1.95 million.

This action authorizes an increase of $1.95 million to an existing agreement with CH2M, for a new not-to-exceed total of $4.435 million, to provide technical support during the pilot and implementation phases of the Mills control system upgrade. For this agreement, Metropolitan has established an SBE participation level of 25 percent. The planned subconsultants under this agreement are listed in **Attachment 2**. Staff anticipates that once the Mills plant SCADA work is successfully completed, staff will return to the Board to authorize an amendment to this agreement so that CH2M can provide specialized technical support on the next planned facility.

Alternatives Considered

Alternatives considered for upgrading Metropolitan's control system included using a traditional design-bid-build procurement strategy wherein prescriptive specifications for equipment and software would be developed for advertisement for competitive bidding. Due to the complexities and intricacies of this project, it was determined that this approach would introduce the potential for disputed issues between Metropolitan and the successful bidder. A key complexity identified by the project team was how to ensure that Metropolitan received the intended specified equipment, while ensuring that the system integrator remained responsible for resolving critical

hardware/software interface issues that would arise during software development, equipment procurement and field installation/start-up/testing. Unanticipated complications in any of these intermediate steps could potentially jeopardize both the timely completion of the project and the safe and reliable operation of Metropolitan's operational facilities.

To mitigate these risks, it was determined that Metropolitan should utilize the RFQ/RFP procurement strategy outlined in this letter to (1) prequalify equipment providers, and (2) to select, through a best-value RFP process, a control system team that would deliver a fully integrated product (equipment and software) which utilized the prequalified equipment vendors. With this approach, Metropolitan will rely on the consultant as an overall system integrator to furnish the necessary new control system hardware and perform software programming and pre-testing prior to Metropolitan staff's installation activities. This method of using a system integrator and prequalified equipment suppliers is expected to reduce potential errors and disagreements between the project team which includes the system designer, equipment furnishers, and system programmers. To further streamline the process, staff recommends that Metropolitan's in-house staff install the control system equipment. Currently, Metropolitan staff maintains the core competencies and technical capabilities to perform the necessary installation work as well as knowledge and awareness of the importance of its operational facilities. This overall approach is expected to minimize the potential for project delays and disputes, especially during installation and commissioning at Metropolitan's operational facilities.

Summary

This action authorizes: (1) a new agreement with Stantec Consulting Services, Inc. for a not-to-exceed amount of $8.5 million for design and equipment procurement to upgrade the control system at the Mills plant; and (2) an amendment to an existing agreement with CH2M for a new not-to-exceed amount of $4.435 million to provide specialized technical services for the upgrade. See **Attachment 1** for the Allocation of Funds; **Attachment 2** for the List of Subconsultants; and **Attachment 3** for the Location Map.

Project Milestones

January 2023 – Completion of pilot testing at the Mills plant

January 2026 – Completion of Mills control system upgrade

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 Minutes Item 50792, dated April 2017, the Board authorized preliminary investigations for a system-wide upgrade of Metropolitan's control system.

By Minutes Item 50851, dated June 2017, the Board authorized conceptual design for a system-wide upgrade of Metropolitan's control system.

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.

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 activities involve the funding, design, minor alterations and replacement of existing public facilities with negligible or no expansion of use and no possibility of significantly impacting the physical environment. Accordingly, the proposed action qualifies under Class 1 and Class 2 Categorical Exemptions (Sections 15301 and 15302 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

Board Options

Option #1

a. Authorize an agreement with Stantec Consulting Services, Inc. for a not-to-exceed amount of $8.5 million for design and equipment procurement to upgrade the control system at the Mills plant.
b. Authorize an increase of $1.95 million to an agreement with CH2M Hill Engineers, Inc for a new not-to-exceed amount of $4.435 million to provide specialized technical support for the upgrade.

Fiscal Impact: Expenditure of $19,945,000 in capital funds. Approximately $250,000 will be incurred in the current biennium and has been previously authorized. The remaining capital expenditures will be funded from future CIP budgets following board approval of those budgets.
Business Analysis: This option will enhance the reliability and operating efficiency of Mills plant's control system.

Option #2

Do not proceed with the project at this time.
Fiscal Impact: None
Business Analysis: This option would forego an opportunity to enhance the operational reliability and operating efficiency while increasing the risk of unplanned outages at the Mills plant.

Staff Recommendation

Option #1

3/24/2022
John V. Bednarski *Date*
Manager/Chief Engineer
Engineering Services

3/31/2022
Adel Hagekhalil *Date*
General Manager

Attachment 1 – Allocation of Funds

Attachment 2 – List of Subconsultants

Attachment 3 – Location Map

Ref #es12680523

Allocation of Funds for Mills Control System Upgrade

	Current Board Action (Apr. 2022)
Labor	
Studies & Investigations	$ -
Final Design	552,000
Owner Costs (Program mgmt., envir. monitoring, & contract admin.)	1,035,000
Submittals Review & Record Drwgs.	125,000
Inspection & Testing	1,681,000
Metropolitan Force Construction	5,118,000
Materials & Supplies	200,000
Incidental Expenses	1,000
Professional/Technical Services	
Stantec Consulting Services, Inc.	8,500,000
CH2M Hill Engineers, Inc.	1,950,000
Right-of-Way	-
Equipment Use	-
Contracts	-
Remaining Budget	783,000
Total	**$ 19,945,000**

The total amount expended to date on the Mills Control System Upgrade is approximately $4.846 million. The total estimated cost to complete the replacement, including the amount appropriated to date, current funds requested and future work, is approximately $25.491 million.

The Metropolitan Water District of Southern California

Subconsultants for Agreement with Stantec Consulting Services, Inc.

Subconsultant and Location
Emerson Process Management Power & Water Solutions, Inc. Riverside, CA
O2 Optimizing Organization La Jolla, CA
Modular Building Concepts Poway, CA
DRP Engineering, Inc. Alhambra, CA
Glenmount Global Solutions Vacaville, CA
Ramya & Rashmi LLC San Diego, CA
IEM San Pedro, CA

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Subconsultants for Agreement with CH2M Hill Engineers, Inc.

Subconsultant and Location
PMCS Group, Inc. Long Beach, CA

Distribution System