



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

1/9/2024 Board Meeting

7-1

Subject

Authorize an agreement with the Center for Smart Infrastructure in an amount not to exceed \$2 million to fund the organization's startup costs and focused water innovation research; the General Manager has determined that the proposed action is exempt or otherwise not subject to CEQA

Executive Summary

Metropolitan staff have participated in startup planning for the Center for Smart Infrastructure (CSI) at the University of California at Berkeley since its inception in 2020. The CSI mission focuses on developing and testing emerging technologies in the water industry. While innovative water infrastructure research is currently underway, CSI requires startup funding primarily to make capital improvements to the facility, improvements which will enhance the capabilities of the center. Several other water sector public agencies, including the Los Angeles Department of Water and Power and East Bay Municipal Utility District (EBMUD), are also funding these startup activities. Metropolitan is not currently providing direct funding to the CSI beyond initial startup planning support.

This action authorizes an agreement with CSI to provide \$1 million to support the startup of the facility and an additional \$1 million to fund Metropolitan-focused research projects to be conducted at CSI over the next four years. This funding earns Metropolitan "Founding Partner" status, which allows staff to work directly with CSI to focus on research in areas of particular interest to Metropolitan.

Proposed Action(s)/Recommendation(s) and Options

Staff Recommendation: Option #1

Option #1

Authorize an agreement with the Center for Smart Infrastructure in an amount not to exceed \$2 million for startup costs and focused research.

Fiscal Impact: \$1 million in operating funds plus up to \$1 million in budgeted operating funds or capital funds under projects included in the Capital Investment Plan. \$250,000 in O&M funds will be incurred this fiscal year. The remaining funds will be accounted for in future biennial budgets.

Business Analysis: This option allows Metropolitan to help develop CSI as a sustainable water infrastructure research resource and allows Metropolitan and member agencies to use CSI as an opportunity for infrastructure innovation and water-related research.

Option #2

Authorize an agreement with the Center for Smart Infrastructure in an amount not to exceed \$1 million for focused research only.

Fiscal Impact: Up to \$1 million in budgeted operating funds or capital funds under projects included in the CIP. These funds will be expended and accounted for in future biennial budgets.

Business Analysis: Allows Metropolitan and member agencies to use CSI as an opportunity for infrastructure innovation and water-related research, but will not provide enhanced protection against the risk of CSI becoming unsustainable over the long term.

Option #3

Do not proceed with funding CSI at this time.

Fiscal Impact: None

Business Analysis: Under this option, Metropolitan would not have the ability to work with CSI on innovation initiatives or research opportunities, either foregoing areas of interest or finding other research opportunities in support of the General Manager's business plan goal of applying innovation and technology across project lifecycles.

Alternatives Considered

Staff considered an alternative to fund research by task only and not provide \$1 million in startup funding. CSI's relationships with some agencies follow this funding model. However, this option may limit the type of tests that can be performed by CSI due to limited research infrastructure, and delay the development and delivery of higher-quality products. The selected alternative provides startup funding that will be used to make enhancements at the CSI test facility. This alternative affords Metropolitan the opportunity to invest in a facility that is able to test a wide variety of equipment, provides focused engineering research, and exposes students to the water industry.

Applicable 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

Related Board Action(s)/Future Action(s)

Informational item presented to the Engineering, Operations, and Technology Committee on August 14, 2023

Summary of Outreach Completed

Informational item presented to member agency engineering managers on June 1, 2023

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

The proposed action is exempt from CEQA because the action consists of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of existing or former use and no possibility of significantly impacting the physical environment. In addition, the proposed action consists of basic data collection, research, experimental management, and resource evaluation activities that do not result in a serious or major disturbance to an environmental resource. (State CEQA Guidelines Sections 15301 and 15304).

CEQA determination for Option #2:

The proposed action is exempt from CEQA because the action consists of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of existing or former use and no possibility of significantly impacting the physical environment. In addition, the proposed action consists of basic data collection, research, experimental management, and resource evaluation activities that do not result in a serious or major disturbance to an environmental resource. (State CEQA Guidelines Sections 15301 and 15304).

CEQA determination for Option #3:

None required

Details and Background

Background

Metropolitan has a long history of participating in and supporting research and innovation in the water industry. From the development of new pump designs for the Colorado River Aqueduct (CRA) at the California Institute of Technology in the 1930s to inventing new pressure control valves at the Yorba Test Facility in the 1970s, Metropolitan continues to be a leader in the development of innovative water infrastructure technology.

In recent years, Metropolitan staff have cooperated with other agencies and academia to test the use of earthquake-resistant ductile iron pipe, flexible pipes that move with the ground during earthquakes, or in landslide areas. This innovative pipeline technology was recently installed on the Casa Loma Siphon and is the largest application of this pipe in the United States. Much of the seismic pipeline research for the Casa Loma project was done at Cornell University in New York, where they developed specialized test equipment to support this research. That laboratory was recently closed due in part to staff retirements.

Rather than dispose of that equipment, scientists, engineers, and faculty at the University of California at Berkeley moved these apparatuses to an empty warehouse at a campus facility. The collective gathering of this research equipment in Berkeley became the inception of the Center for Smart Infrastructure (CSI), a partnership between infrastructure owners, academia, industry, and regulators. The main focus of the center is to address the water industry's most pressing challenges, such as aging infrastructure, climate change, water supply, natural resources, and emergency and community preparedness.

The Center for Smart Infrastructure – Startup and Research Funding

CSI is unique in its capabilities. Its charter is to use a holistic approach to develop resilient systems through state-of-the-art laboratory and field-testing equipment, smart sensors and robotics, big data and machine learning, and multi-scale computer modeling and simulation tools. CSI has already established itself as the only pipe-testing facility on the West Coast and one of only two such facilities of this scale in the United States. CSI represents a rare opportunity to test innovative technologies and perform research on infrastructure problems.

CSI receives no funding from the University of California system and relies entirely upon funding from outside entities to operate. EBMUD provided CSI \$1.5 million in startup funding at its inception. Los Angeles Department of Water and Power intends to provide CSI \$1.5 million in startup funding. San Francisco Public Utilities Commission is considering providing significant funding for the same purpose. Other large organizations that have funded research at CSI include the State of California Energy Commission, the United States Army Corps of Engineers, the United States Department of Transportation, Caltrans, and the United States Department of Energy.

Since its inception in 2020, Metropolitan has engaged with other water agencies to help guide the direction of CSI since much of CSI's work focuses on water systems. The facility at UC Berkeley has performed tests and research in the below-listed areas. The results of these examples could prove helpful to Metropolitan and its member agencies:

- *Distributed sensors and networks using satellites, fiber optics, and wireless sensor networks - providing sensors everywhere.* This work could result in systems to continuously monitor the condition of Metropolitan's and its member agencies' pipelines and possibly link hydraulic models between Metropolitan and member agencies.
- *In-field autonomy using drones and robotics – for inspection, maintenance, and security activities.* This research could aid Metropolitan in continuous dam levee condition monitoring and autonomous security patrols.
- *High-performance cloud computational simulations using Big Data.* This area could potentially help Metropolitan by creating climate models specific to California's water supply or by modeling service area-wide post-seismic event damage assessment.

Planning is in place to perform Metropolitan-focused studies, including testing how Metropolitan's standard prestressed concrete cylinder pipe steel slip-lining design performs under seismic strain; and also modeling and

testing how the CRA's cut-and-cover unreinforced concrete "horseshoe" configuration performs under heavy above-ground loading. Additionally, Metropolitan staff are currently engaged with the Water Research Foundation to identify opportunities to perform joint studies at the CSI facility.

In cooperation with EBMUD, CSI has created a new class at UC Berkeley titled "CE 112 – Water and Wastewater Operations and Design". This class teaches water supply, water system design, and infrastructure resilience and sustainability from the perspective of a government water agency to create a pipeline of future workers in the water industry. There may be future opportunities for Metropolitan to participate in or expand upon this class and tap into this engineering resource.

In June 2023, CSI presented its vision to representatives from member agencies at the Member Agency Engineering Manager Forum held at Inland Empire Utilities Agency's headquarters. The response from member agency participants was positive, and staff intends to share both opportunities to participate in innovation activities and results from relevant research with Metropolitan member agencies.

At the September 2023 Engineering, Operations, and Technology Committee meeting, staff solicited feedback from directors on the CSI investment opportunity. Proceeding with an agreement with CSI at this time is based on the positive support for the initiative expressed by the directors at that meeting.

Innovation and Research Services (Center for Smart Infrastructure) – New Agreement

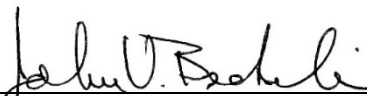
CSI is recommended to perform research and testing services in support of Metropolitan's innovation program and Capital Investment Plan. Startup funding for CSI will primarily be used to make capital improvements to the center's facilities in Berkeley and include procurement and installation of a new overhead crane, pipe bending equipment, a reinforced floor capable of supporting heavy equipment, and other facility upgrades. By making this contribution, Metropolitan will be recognized as a "Founding Partner" of CSI and will have Metropolitan's seal and name prominently displayed on the front of the building.

Planned activities for CSI include (1) capital improvements to the center's facility and staff funding; and (2) sponsor-focused research in support of Metropolitan O&M and capital projects.

This action authorizes a four-year agreement with CSI for a not-to-exceed amount of \$2 million. This funding amount consists of two components. The first component of funding provides \$250,000 per year for four years to fund the startup of CSI, which includes enhancements to the center's testing infrastructure. The startup funding would come from Metropolitan's operating budget. The second component of funding provides an additional amount of discretionary spending capacity of up to \$250,000 per year for focused innovation research studies that would be negotiated by Metropolitan staff on a per-task basis. Funds for this focused research would come from operating or capital funds based on the nature of the work.

Project Milestone

End of 2024 – complete first Metropolitan research study with CSI


John V. Bednarski
Manager/Chief Engineer
Engineering Services

12/18/2023
Date


Adel Hagekhalil
General Manager

12/19/2023
Date