



**COMMISSION
AGENDA MEMORANDUM**

Item No. 6h

ACTION ITEM

Date of Meeting July 14, 2020

DATE: July 8, 2020
TO: Stephen P. Metruck, Executive Director
FROM: Melinda Miller, Director, Real Estate and Asset Management
James Truhan, Sr. Real Estate Manager
Amira Chowyuk, Sr. Environmental Management Specialist
Rod Jackson, Capital Project Manager

SUBJECT: WTCW HVAC Replacement (CIP # C800199) Design and Construction

Amount of this request: \$3,276,000
Previously Authorized: \$250,000
Total estimated project cost: \$3,526,000

ACTION REQUESTED

Request Commission authorization for the Executive Director to direct staff to develop, advertise, and execute a Public Works Building Engineering Systems Contract to replace the World Trade Center West (WTCW) building heating, ventilation, and air conditioning (HVAC) system. This high efficiency HVAC system Replacement project has an estimated total project cost of \$3,526,000. The amount requested under this authorization is \$3,276,000 (the remaining \$250,000 was previously authorized by the Economic Development Division).

EXECUTIVE SUMMARY

This request for a replacement HVAC system at WTCW provides an energy efficient and sustainable alternative to replace the building's end-of-life mechanical systems. The WTCW's existing central HVAC system—a 200-ton (T) rooftop unit (RTU)—was installed in 1998 and is nearing failure and in need of immediate replacement. The current R-22 refrigerant used by the RTU will be discontinued in 2020 and will be replaced with an new energy efficient R410A refrigerant that will be used in the new RTU system. In addition to replacing the WTCW's RTU, this project proposes a holistic and sustainable approach that gains additional efficiencies by bundling related HVAC system upgrades. By doing so, the Port can increase overall energy efficiency, reduce greenhouse gas (GHG) emissions and costs, and minimize tenant disruption.

The existing HVAC system relies on a single RTU with 96 variable air volume (VAV) boxes that use electric resistance reheat coils to heat, cool, and ventilate each of the building's four floors. This zonal VAV box system, in combination with the aging RTU and antiquated system controls,

Meeting Date: July 14, 2020

provides minimal energy efficiency and significant opportunity for improvement. The existing VAV boxes are nearing the end of their life and replacement during this project will introduce higher-efficiency replacements and minimize future tenant disruptions. New HVAC system controls will integrate systems throughout the WTCW and ensure peak performance. Additionally, replacement of the WTCW's kitchen HVAC system on the 4th floor provides a significant energy saving opportunity. The kitchen HVAC system is currently served by a constant volume exhaust fan, which operates 24 hours per day and relies on a natural gas-fired make-up air unit for heating. Proposed replacement of this HVAC component will eliminate natural gas for heating in the building and introduce a significantly more energy efficient system, which will improve tenant comfort, reduce GHG emissions, and lower utility costs.

In preparation for equipment replacement and an early pilot of Sustainable Evaluation Framework (SEF) principles, staff hired consultants to complete energy audits, conduct building assessments, and identify potential components to form the basis of the HVAC system replacement alternatives. Port of Seattle project staff met in January and February of 2020 to evaluate consultant audit findings and recommendations, prioritize goals, and identify and compare alternatives based on the project's sustainability criteria.

JUSTIFICATION

This HVAC replacement project supports all four of the Port's Century Agenda objectives under the following strategies:

- (1) Position the Puget Sound region as a premier international logistics hub
- (2) Advance this region as a leading tourism destination and business gateway
- (3) Be the greenest, and most energy-efficient port in North America.

The WTCW provides vibrant workspaces for tenants, a conference center, and two restaurants, among other valuable amenities to the central waterfront. Replacement of the central HVAC system—original to building—will not only replace the essential system but also modernize its systems to improve occupant comfort and reduce the building's environmental impact. The proposed project will reduce energy use by approximately 104,000 kilowatt-hours (kWh) and 3,130 therms. As a result, this project will reduce GHG emissions by nearly 20 metric tons (Mt) of CO₂ per year and 376 Mt CO₂ over the assets' useful life of 20 years. The building's energy use intensity (EUI)—a measure of energy use per square foot—score is expected to be reduced by approximately 14%. By phasing out use of fossil natural gas for heating and investing in energy efficiency, this project represents a critical step towards the 2050 Century Agenda GHG target of being carbon neutral or negative.

DIVERSITY IN CONTRACTING

Project staff along with the Diversity in Contracting Department have set a woman and minority business enterprise (WMBE) aspirational goal of 6% for this project.

Meeting Date: July 14, 2020

DETAILS

The proposed HVAC system replacement is critical to avoid system failure and will be competitively procured as a building engineering systems contract. In accordance with RCW 39.04.290, the Port may award contracts of any value for the design, fabrication, and installation of building engineering systems, by using a competitive bidding process or request for proposals process where bidders are required to provide final specifications and a bid price for the design, fabrication, and installation of building engineering systems, with final specifications being approved by the Port. This procurement strategy was chosen because a simplified and self-contained turn-key solution is available, and equipment represents a large percentage of the project cost. Further, this provides opportunities for quality, efficiency, and risk reduction for the Port. Port staff will provide project administration and oversight.

Additionally, the recommended approach brings the WTCW in-line with local and state building energy code requirements and presents a new opportunity for the Port to capture utility incentives.

Scope of Work

The scope of work for this project includes, but is not limited to, the building system improvements at WTCW:

- (1) Replacing the central HVAC system, HVAC controls, and all VAV boxes
- (2) Replacing the 4th floor kitchen HVAC system to phase out natural gas
- (3) Testing and commissioning all systems
- (4) Salvaging components for the Port’s spare parts inventory

Schedule

Elements within the scope of work may provide small business opportunities. The project team is coordinating with the small business team in the Office of Economic Development to help identify and outreach to those small businesses that may be interested in this project.

Activity

Commission Design & Construction authorization	July 2020
Advertisement and Award	Q3 2020 thru Q4 2020
Design start	Q1 2021
Construction Start	Q3 2021
In-use date	Q4 2021

Cost Breakdown

	This Request	Total Project
Design and Construction	\$2,746,000	\$2,859,000
POS Oversight	\$530,000	\$667,000
Total	\$3,276,000	\$3,526,000

Meeting Date: July 14, 2020

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1: In-kind system – Replace RTU with like-for-like system, continue use of existing VAV system until failure, no change to 4th floor kitchen HVAC or building system controls.

Capital Cost: \$1.8

Pros:

- (1) Shortest construction timeline since only the main RTU is impacted.
- (2) Minimal impact to tenants.
- (3) Lowest capital cost option: half the cost of the recommended alternative.

Cons:

- (1) Does not advance the CA’s environmental goals.
- (2) Lowest environmental benefit: Expected to reduce 10 Mt CO₂ over 20-year lifecycle and reduce the building’s EUI by 2%.
- (3) Has the longest lifecycle payback (in years).
- (4) Continues fossil natural gas use for heating and has the highest building EUI of all alternatives.
- (5) Does not address 24/7 operation of the kitchen HVAC system.
- (6) Does not address replacement of end-of-life VAV boxes.
- (7) Minimal opportunity for contractor innovation and input during design.
- (8) Minimal opportunity for utility incentives or grants.
- (9) Minimal control of occupant comfort.

This is not the recommended alternative.

Alternative 2: State-of-the-art system – Replace RTU with high-efficiency state-of-the-art dedicated outdoor air system (DOAS), upgrade controls, replace VAV boxes with de-coupled variable refrigerant flow (VRF) air-source heat pumps for space conditioning, replace 4th floor kitchen HVAC system with DOAS to eliminate natural gas heating.

Capital Cost: \$6.7M

Pros:

- (1) Advances the CA’s environmental goals the furthest.
- (2) Greatest environmental benefit: Expected to reduce 519 Mt CO₂ over 20-year lifecycle and reduce the building’s EUI by 38%.
- (3) Exemplifies the latest HVAC technology and allows the Port to pilot high-efficiency mechanical systems.
- (4) Projected energy savings are the highest of all alternatives.
- (5) Improves occupant comfort efficiency through independent zonal control.
- (6) Eliminates fossil natural gas for heating within the building to reduce GHG emissions.

Meeting Date: July 14, 2020

- (7) Replaces the end-of-life VAV boxes at the same time as the RTU system to minimize tenant impact and construction costs.
- (8) Use of high-efficiency systems provides greatest opportunity for incentives or grants.

Cons:

- (1) Highest capital cost with minimal incremental GHG savings compared to the recommended alternative.
- (2) Retrofit is invasive and requires phased work in all tenant spaces.
- (3) Construction period is several months, the longest of all alternatives.

This is not the recommended alternative

Alternative 3: Hybrid approach – Replace RTU with like-for-like system plus upgrade system controls, replace all existing VAV boxes, replace 4th floor kitchen HVAC system with DOAS to eliminate natural gas heating.

Capital Cost: \$3.5M

Pros:

- (1) Advances the CA's environmental goals.
- (2) High environmental benefit: Expected to reduce 376 Mt CO₂ over 20-year lifecycle and reduce the building's EUI by 14%.
- (3) Eliminates fossil natural gas for heating within the building to reduce GHG emissions.
- (4) Use of DOAS allows the Port to demonstrate advanced HVAC technology.
- (5) Replaces the end-of-life VAV boxes at the same time as the RTU system to minimize tenant impact and construction costs.
- (6) Better tenant comfort control than Alternative 1.

Cons:

- (1) VAV box replacement and control upgrades are invasive and requires phased work in all tenant spaces.
- (2) Construction period is several months long, but shorter than Alternative 2.
- (3) Capital costs are double Alternative 1.

This is the recommended alternative

Meeting Date: July 14, 2020

FINANCIAL IMPLICATIONS

Cost Estimate/Authorization Summary

	Capital	Expense	Total
COST ESTIMATE			
Original estimate	\$3,054,000	\$0	\$3,054,000
AUTHORIZATION			
Previous authorizations	\$250,000	0	\$250,000
Current request for authorization	\$3,276,000	0	\$3,276,000
Total authorizations, including this request	\$3,526,000	0	\$3,526,000
Remaining amount to be authorized	\$0	\$0	\$0

Annual Budget Status and Source of Funds

This project was included in the 2020 Plan of Finance under CIP # C800199 for WTCW HVAC Replacement at an estimated total project cost of \$3,947,000. The updated current total project estimate is \$3,526,000.

This project will be funded by the General Fund.

Financial Analysis and Summary

Project cost for analysis	\$3,526,000
Business Unit (BU)	Portfolio Management
Effect on business performance (NOI after depreciation)	The project will maintain annual gross revenue of \$1.5 million from WTCW. Depreciation will increase by \$352,600 per year, thereby reducing the NOI by the same amount.
IRR/NPV (if relevant)	No incremental revenue. The NPV is the present value of the project cost.
CPE Impact	N/A

SUSTAINABLE EVALUATION FRAMEWORK

The WTCW HVAC System Replacement project was identified as a priority project for the Sustainable Evaluation Framework. Staff hired consultants to provide alternatives to replace end-of-life HVAC equipment. An internal interdisciplinary team was formed to evaluate alternatives to balance costs occupant comfort, overall system and building energy efficiency, and advance the Century Agenda greenhouse gas (GHG) goals. Meetings were held in late 2018 and 2019 to complete energy audits, conduct building assessments, and identify potential components to form the basis of the HVAC system replacement alternatives. Port of Seattle project staff met in January 2020 to evaluate consultant audit findings and recommendations

Meeting Date: July 14, 2020

and solidify goals. The identified goals include cost effectiveness, greenhouse gas emission reduction, energy efficiency, and impacts to tenants.

Project goals were used to evaluate three design alternatives. A cost-benefit analysis was assembled for each alternative and recommendations were presented to the project sponsors in February of 2020. Additional details are provided in the WTCW HVAC Replacement Sustainable Design Approach (SDA) & Sustainable Design Strategy (SDS) document. Findings were then presented to the Energy & Sustainability (E&S) Committee on June 16th. The SDA & SDS document was updated based upon comments during the meeting and organized to align with this memo. The E&S Committee confirmed the recommended alternative (Alternative 3).

Alternative Analysis Summary

Alt	Life-cycle Cost (\$M)	20-Yr Increment NPV (\$M)	Maritime/ EDD Building Energy Emissions Reduction (2018 Emissions)	Capital Carbon Cost (\$/MT CO ₂ avoided)	EUI (reduction from 2017 Baseline)	Annual energy savings (kBTUs)	Lifetime CO ₂ avoided (MT)	Tenant Impact	Tenant Comfort
1	\$3.3	\$0 (base)	0.0%	\$172,000	68 (2%)	84,000	10	Low	Low
2	\$7.7	-\$4.4	1.2%	\$13,000	43 (38%)	1,832,000	519	High	High
3	\$4.9	-\$1.6	0.9%	\$9,500	60 (14%)	668,000	376	Med	Med

ATTACHMENTS TO THIS REQUEST

- (1) Presentation slides
- (2) Sustainable Design Approach & Sustainable Design Strategy WTCW HVAC Replacement

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

None