



AGENDA MEMORANDUM

Item No.

6d

ACTION ITEM

Date of Meeting

December 10, 2019

DATE: December 2, 2019

TO: Stephen P. Metruck, Executive Director

FROM: Jeffrey Brown, Director Aviation Facilities and Capital Programs
Wayne Grotheer, Director, Aviation Project Management

SUBJECT: Fire Pump Replacement (CIP #C800794) – Project Approval

Amount of this request: \$4,840,000

Total estimated project cost: \$5,000,000

ACTION REQUESTED

Request Commission authorization for the Executive Director to (1) develop, advertise, and execute a Public Works Building Engineering Systems Contract and (2) authorize the use of port crews for preliminary work in support of the Fire Pump Replacement Project at Seattle-Tacoma International Airport. The amount of this request is \$4,840,000 for a total estimated project cost not to exceed \$5,000,000.

EXECUTIVE SUMMARY

This project will replace four, 50-year-old emergency fire pumps, which are beyond their useful life. In addition to replacement of the fire pumps and integral diesel engine units, this project will improve and streamline the ability to maintain and certify the system by installing isolation valves and an inline flow meter. Due to the age of these fire pumps, replacement parts are difficult to source making routine maintenance and annual performance certification increasingly problematic.

The current estimated cost of \$5,000,000 is significantly above the \$580,000 included in the 2020-2024 capital budget and plan of finance. The original status 2 estimate was a rough order of magnitude and only covered the cost of two pumps with a simple installation. The scope has since been modified to include additional pumps, isolation valves, and metering, requiring a more complex installation. The new estimate also includes necessary soft-costs and escalation since 2015.

JUSTIFICATION

In the event of a large fire in the terminal, hangars, or fuel farm, the emergency fire pump system will engage to supply the water needed to fight the fire. Currently, three of the four pumps to be replaced are having performance problems, in that they only narrowly pass the required annual test for flow rate per National Fire Protection Association (NFPA) standards.

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Based on the age of the pumps, the fourth pump will likely also begin to experience performance problems in the near term.

Installing new isolation valves at each pump will allow individual pumps to be isolated to facilitate and streamline required maintenance and testing. Using the current valve arrangement any maintenance on the pump requires four pumps to be isolated from the system.

Diversity in Contracting

The project staff, in coordination with the Diversity in Contracting department, have set a 4% woman and minority-owned business enterprise (WMBE) aspirational goal for this Building Engineering Systems contract. A significant portion of the project cost will be in the purchase of the fire pump system which limits the amount of subcontracting that is available.

DETAILS

The pump house, located on air cargo road, was built in the 1970s and houses two electric pumps to fill the reservoir, two electric pumps for baseline domestic/fire protection water, and six pumps that support the fire emergency need. The six fire pumps are split as four diesel and two electric pumps. As the airport grew the pump house was expanded in the early 2000s to include four additional diesel pumps, for a total of eight diesel and two electric pumps, to supply the peak need of 19,000 gallons per minute. The expansion added pump capacity but did not update any of the existing pumps. This project will replace existing pumps 5 through 8, and install additional isolation valves, so one pump can be taken off line while the others remain operational.

The NFPA requires that emergency fire pumps be tested annually to certify the pressure and flow rate. This project will install an inline flow meter on the fill line of the 2-million-gallon water reservoir. The pump house piping configuration was designed so that each individual emergency fire pump can feed the reservoir through a series of valve alignments. The inline meter with calibrated gauges can be used to certify the pumps while filling the reservoir and not waste any water for testing.

Scope of Work

- (1) Demolish and remove four fire pump systems (pump, engine, control panel, and associated connecting piping).
- (2) Install four new equivalent fire pump systems.
- (3) Provide wiring, testing, commissioning, and associated equipment for a fully functional fire pump system.
- (4) Install valves to isolate each of the new pumps for maintenance.
- (5) Install a bypass line that includes a direct measurement flow meter for annual flow testing. Provide the wiring, testing, commissioning, and associated equipment for a fully functional flow meter system.

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Schedule

Activity

Building Engineering System Advertise	2020 Quarter 1
Design start	2020 Quarter 2
Construction start	2020 Quarter 4
In-use date	2021 Quarter 3

Cost Breakdown

	This Request	Total Project
Planning and Design Phase	\$500,000	\$660,000
Construction and Closeout Phase	\$4,340,000	\$4,340,000
Total	\$4,840,000	\$5,000,000

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1 – Defer replacing the pumps until they are no longer operable.

Cost Implications: \$75,000 would need to be expensed.

Pros:

- (1) This defers the expense to a later date.

Cons:

- (1) This alternative may result in additional costs if the pumps need to be replaced on an emergency need.
- (2) This alternative removes the additional capacity if multiple pumps are out of service.
- (3) This alternative does not address the need for an inline measurement for annual flow testing.
- (4) This alternative does not resolve the isolation issue on the pumps if one in the bank of four needs service.
- (5) This alternative will result in an increased maintenance cost to keep obsolete and underperforming pumps in operation.

This is not the recommended alternative.

Alternative 2 – Replace four pumps only.

Cost Implications: \$4,500,000

Pros:

- (1) The replacement pumps will have a new service life.
- (2) The replacement pumps will be common equipment, reducing the parts inventory.
- (3) Reduced maintenance costs.

Cons:

- (1) This alternative does not allow for each pump to be isolated for maintenance.
- (2) This alternative will require an outside contractor to certify the pumps annually.

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This is not the recommended alternative.

Alternative 3 – Replace four fire pumps, install isolation valves, and install a flow metering system.

Cost Implications: \$5,000,000

Pros:

- (1) This alternative provides the most reliable means to fight a fire.
- (2) This alternative replaces four pumps in one request, reducing time, PM resources, and costs.
- (3) This alternative allows for each pump to be isolated individually for maintenance.
- (4) This will allow for annual in-house flow measurement certification of the pumps.

Cons:

- (1) This is the highest capital investment.

This is the recommended alternative.

FINANCIAL IMPLICATIONS

Cost Estimate/Authorization Summary

	Capital	Expense	Total
COST ESTIMATE			
Original estimate	\$580,000	\$0	\$580,000
Current change	\$4,320,000	\$100,000	\$4,420,000
Revised Estimate	\$4,900,000	\$100,000	\$5,000,000
AUTHORIZATION			
Previous authorizations	\$160,000	\$0	\$160,000
Current request for authorization	\$4,740,000	\$100,000	\$4,840,000
Total authorizations, including this request	\$4,900,000	\$100,000	\$5,000,000
Remaining amount to be authorized	\$0	\$0	\$0

The original estimate was developed in 2015 and only included the cost to replace two of the four pumps. Through discussions with the stakeholders and evaluation of the project, the scope was expanded to include the replacement of all four pumps, installation of isolation valves, and installation of a flow meter system.

Annual Budget Status and Source of Funds

This project, CIP C800794, was included in the 2020-2024 capital budget and plan of finance with a budget of \$580,000. A budget increase of \$4,320,000 was transferred from the Aeronautical Reserve CIP (C800753) resulting in zero net change to the Aviation capital budget. The funding source will be the Airport Development Fund and future revenue bonds.

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Financial Analysis and Summary

Project cost for analysis	\$5,000,000
Business Unit (BU)	Fire allocation to Airfield Movement and Terminal
Effect on business performance (NOI after depreciation)	NOI after depreciation will increase due to inclusion of capital (and operating) costs in airline rate base.
IRR/NPV (if relevant)	N/A
CPE Impact	\$0.02 in 2022

ATTACHMENTS TO THIS REQUEST

- (1) Presentation slides

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

None