



**COMMISSION
AGENDA MEMORANDUM**

Item No. 4d

ACTION ITEM

Date of Meeting May 23, 2017

DATE: April 12, 2017

TO: Dave Soike, Interim Chief Executive Officer

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

SUBJECT: Variable Frequency Drive Renewal and Replacement (CIP #C800801)

Amount of this request: \$1,975,000

Total estimated project cost: \$6,834,000

ACTION REQUESTED

Request Commission authorization for the Chief Executive Officer to (1) prepare design and construction bid documents for the Variable Frequency Drive Renewal and Replacement project at Seattle-Tacoma International Airport; and (2) utilize Port of Seattle crews and small works contracts for preliminary work if required. The amount of this request is \$1,975,000. The total estimated project cost is \$6,834,000.

EXECUTIVE SUMMARY

This capital project will replace 47 of the oldest Variable Frequency Drives (VFDs) installed at Seattle Tacoma International Airport. VFDs control critical Heating, Ventilation and Air-conditioning (HVAC) systems throughout the airport, including air handling supply fans in the Terminal Buildings and pumps in the Cooling Towers. The new VFDs are more energy efficient and will also result in reduced Greenhouse gas emissions.

JUSTIFICATION

The VFDs have an America Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) recommended useful life of ten (10) to fifteen (15) years and all 47 of these drives have been in operation for more than 15 years, several have been in operation for more than 21 years. The manufacturer no longer supports these older VFDs, and failures have occurred depleting repair parts from maintenance inventory. If this project is not completed additional failures of these 47 VFDs could result in extended outages of HVAC systems in the Terminal Buildings that would affect travelers and employee comfort.

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DETAILS

The 47 VFDs this project will replace are located throughout the airport terminal building. The new VFDs will be connected to the airport’s Direct Digital Control (DDC) system for energy consumption and performance monitoring. These new VFDs will reduce energy consumption by approximately 58,000 KWH/year and reduce Greenhouse gas emissions by 1.1 metric tons/year as compared to the older technology VFDs. Success for this project will be achieved when all 47 of these VFDs are replaced, fully commissioned and connected to the DDC system.

Scope of Work

The scope of work for this project includes:

- Replace 47 existing VFDs that have exceeded their useful life.
- Connect new VFDs to the existing DDC system.
- Provide wiring, testing, commissioning and associated equipment for a fully functional system.
- Salvage components from these 47 VFDs and add those components to the Ports spare parts inventory.

Small Business

To maximize small business participation, Port staff will be providing additional outreach efforts through the Port of Seattle’s Small Business Generator (PortGen) program. This small business program will not only provide information about the project scope of work, but will provide training about the Port’s procurement processes. Working with Economic Development Division Small business section, the Port will establish small business requirements set for this project.

Schedule

Design start	3 rd Quarter 2017
Commission construction authorization	2 nd Quarter 2017
Construction start	3 rd Quarter 2018
In-use date	2 nd Quarter 2020

Cost Breakdown

	This Request	Total Project
Design	\$2,025,000	\$2,025,000
Construction	\$0	\$4,809,000
Total	\$2,025,000	\$6,834,000

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ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1– Do not replace these VFDs.

Cost Estimate: \$0

Pros:

- (1) No capital investment required

Cons:

- (1) VFDs have an ASHRAE recommended useful life of ten (10) to fifteen (15) years. All 47 of these VFDs have between 15-21 years of use and are considered obsolete.
- (2) Increases likelihood of extended HVAC system outages affecting travelers and employee comfort due to these VFDs having exceeded their recommended useful life.
- (3) Manufacturers no longer provide repair parts for VFDs manufactured 15-20 years ago and the Port’s spare parts inventories have been depleted.
- (4) Does not provided energy and performance monitoring through connection to the DDC system.
- (5) Does not provide energy savings or reduction in related Greenhouse gas emissions.

This is not the recommended alternative

Alternative 2 – Replace 131 VFDs that have exceeded the ASHRAE recommended useful life.

Cost Estimate: \$13.8 million

Pros:

- (1) Reduces the likelihood of extended HVAC system outage due to these VFDs failing.
- (2) Provides energy and performance monitoring through connection to the DDC system.
- (3) Efficient VFDs will reduce energy usage and related Greenhouse gas emissions.

Cons:

- (1) Significant capital investment required.

This is not the recommended alternative

Alternative 3 – Replace the 47 oldest VFDs that have exceeded the ASHRAE recommended useful life.

Cost Estimate: \$6.8 million

Pros:

- (1) Reduces the likelihood of extended HVAC system outage due to these VFDs failing.
- (2) Provides energy and performance monitoring through connection to the DDC system.

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(3) Components from these 47 VFDs will be salvaged and added to the Port’s spare parts inventory in support of the remaining end of useful life obsolete VFDs.

(4) Efficient VFDs will reduce energy usage and related Greenhouse gas emissions.

Cons:

(1) Requires capital investment.

(2) Does not replace 84 remaining end-of-life VFDs.

This is the recommended alternative

FINANCIAL IMPLICATIONS

Project estimate has been updated based on project notebook development

<i>Cost Estimate/Authorization Summary</i>	Capital	Expense	Total
COST ESTIMATE			
Original estimate	\$5,000,000	\$0	\$5,000,000
Previous changes	\$1,834,000		\$1,834,000
Revised estimate	\$6,834,000	\$0	\$6,834,000
AUTHORIZATION			
Previous authorizations	\$50,000	\$0	\$50,000
Current request for authorization	\$1,975,000	\$0	\$1,975,000
Total authorizations, including this request	\$2,025,000	\$0	\$2,025,000
Remaining amount to be authorized	\$4,809,000	\$0	\$4,809,000

Annual Budget Status and Source of Funds

This project (CIP #C800801) was included in the 2017 – 2021 capital budget and plan of finance with a budget of \$5,000,000. The budget increase will be transferred from the Aeronautical Allowance CIP (C800753), resulting in no net change to the airport capital budget. The funding source for this project will be the Airport Development Fund (ADF) and future revenue bonds, to be issued in 2017.

Financial Analysis and Summary

Project cost for analysis	\$6,834,000
Business Unit (BU)	Terminal Building
Effect on business performance (NOI after depreciation)	NOI after depreciation will decrease
IRR/NPV (if relevant)	N/A
CPE Impact	\$0.02 in 2020

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Future Revenues and Expenses (Total cost of ownership)

This project replaces existing equipment that is old and dated. Replacement of the equipment will require a similar level of maintenance (or slightly less) & does not have a material impact on current Aviation Maintenance O&M costs.

ATTACHMENTS TO THIS REQUEST

- (1) Presentation slides

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

None