PORT OF SEATTLE
MEMORANDUM

COMMISSION AGENDA
ACTION ITEM

Item No. 4b

Date of Meeting December 9, 2014

DATE: December 1, 2014

TO: Ted Fick, Chief Executive Officer

FROM: David Soike, Director, Aviation Facilities and Capital Programs
Wayne Grotheer, Director, Aviation Project Management Group

SUBJECT: Airport-wide Mechanical Controls Upgrade (CIP # C800497)

Amount of This Request:	$3,226,000	**Source of Funds:**	Airport Development Fund and Future Revenue Bonds
Est. Total Project Cost:	$3,500,000		
Est. State and Local Taxes:	$218,000		

ACTION REQUESTED

Request Commission authorization for the Chief Executive Officer to advertise, award, and execute a major public works contract for the construction of the Airport-wide Mechanical Controls Upgrade project. The total amount of this request is $3,226,000. Previous authorizations for design totaled $274,000 for a total projected project cost of $3,500,000.

SYNOPSIS

Commission authorization is requested to proceed with construction of the Airport-wide Mechanical Controls Upgrade. The existing system controls and/or monitors:

- The extensive mechanical system that serves the airport terminal campus;
- The building heating and cooling, water pumping and distribution, ventilation, cooling towers and central mechanical plant operations;
- Smoke control, natural gas and water metering; and
- Waste pumping demands of the Airport.

The existing controls system suffers significant performance issues due to obsolescence, the mix of network types and the overall number of aging devices on the serial communications network. The existing network will be upgraded to a modern Ethernet-based communications system that can provide sufficient bandwidth and speed to enable operations and maintenance personnel to manage the airport-wide systems without delays or loss of data. This project was included in the 2015 – 2019 capital budget and plan of finance.

BACKGROUND

The existing airport-wide mechanical system control network has been evolving over the years and has been modified as larger mechanical system projects have been executed. As technology has progressed, many of the control components have become obsolete. The current network consists of a mix of serial and Ethernet communications that connect the servers to the mechanical systems' field controllers. In addition, the current system is overloaded with control devices on the serial communications network.

The existing system currently runs on a local area network which limits the flexibility in adding stand-alone systems to the airport wide network. The system will be upgraded to an Ethernet-based wide area network (WAN). The WAN allows the airport to add separate stand-alone systems such as the South Logistic Center (SLC) control system or future systems that may be required.

In addition to the mix of systems, there are two components of the mechanical control network that slow down processing of important data.

- The first component is the existing system copper "backbone" in Concourse A. This existing copper "backbone" transmits data slowly, creating a bottleneck. The new Ethernet system will replace the copper system with a fiber optics "backbone" that can transmit data 17,000 times faster than copper.
- The second component is the network hardware and switches. These also need to be replaced to increase data transmission speed and reliability.

During the design phase of this project it was discovered that thirty-one (31) additional control panels that drive the smoke control system on A Concourse need to be replaced as they would be obsolete and no longer supported with repair parts beginning in 2015. The risk to the Airport would be that a panel failure could cause a smoke control system failure of several weeks for procurement of needed parts.

The current server and a large portion of the network hardware have exceeded their useful/supportable life (5-7 years). Technical support is no longer available for the existing system hardware and software. The server and hardware must be replaced.

The existing serial network cannot incorporate the addition of a stand-alone system such as the one controlling the SLC. The new system will add a wireless connection to enable addition of existing facilities such as the SLC, and it will allow the addition of other stand-alone systems with separate servers.

The existing system components and software are a Siemens proprietary system. An existing competition waiver is in place that covers the Siemens system. The project specifications include the proprietary system as well as the publicly bid portions of the work and will be included in the bid package.

A good faith survey for asbestos has been completed. At this point we do not anticipate the need for regulated materials abatement.

PROJECT JUSTIFICATION AND DETAILS

The project will replace the existing Airport-wide Mechanical Control System with an up-to-date data delivery system that includes a new Ethernet fiber optics "backbone," up to date hardware, new server, and updated software. The new system will provide the needed speed and flexibility for current and future needs as well as facilitating the addition of stand-alone systems such as the existing facilities in the SLC.

The stand-alone system will also limit the risk of security breaches. The system is completely stand-alone with three exceptions where wireless signal transmission occurs by line of sight and all within the security fence. Security provisions include: operator password required for access, access level clearance for specified levels of control, password personnel reports, stand-alone system not connected to internet. Servers and work stations are all located in controlled areas.

Project Objectives

- Maintain a high level of security.
- Increase the speed and reliability of the existing mechanical systems communications network and control system.
- Provide Aviation Maintenance the ability to:
  - Control and monitor cooling tower chemical feed pumps. Monitor to two existing parking garage stair tower pressurization fans.
  - Control and monitor the SLC, Bus Maintenance facility and Distribution Center mechanical systems.
- Minimize system downtime and associated operational disruption to tenants.
- Complete project on time and within budget.

Scope of Work

- Coordinate with ICT to make sure that the existing mechanical controls system is completely separated from other airport communications systems in order to provide a secure network.

- Increase the speed and reliability of the existing mechanical systems communications network and control system:
  - Expand the Ethernet network to include Concourse A mechanical systems and major communications links over fiber optic cables for the systems.
  - Replace the existing network switches with 1 gigabit/sec network switches.
  - Replace the existing copper "backbone" with fiber optics.
  - Upgrade existing, obsolete, mechanical systems field panels in Concourse A, from serial to Ethernet.

- Upgrade the hardware and network cables for fifty six (56) existing system panels in Concourse A. Replace the existing server and associated software in the Central Mechanical Plant control room.
- Provide new racks for new system.
- Provide new communications hardware for mechanical controls system.
- Update or create mechanical system documentation to reflect system changes including network record drawings.
- Update system graphical visualization, data collection, and aging software to the latest version and update respective support agreements as required.

- Control and Monitor the Cooling Tower chemical feed pumps:
  - Extend the new fiber optics backbone to the existing actuators in the Cooling Tower.
  - Add actuators to existing Cooling Tower control valves.
  - Integrate actuators into the new controls software.

- Monitor to two existing parking garage stair tower pressurization fans:
  - Add controls to two existing pressurization fans in the parking garage stair wells.
  - Extend the new fiber optics backbone to the existing actuators in the Cooling Tower.
  - Integrate fans into the new controls software.

- Control and Monitor the SLC, Bus Maintenance facility and Distribution Center mechanical systems:
  - Create a new network connection to the SLC, Bus Maintenance facility and Distribution Center by adding a wireless connection to the new fiber optics backbone.
  - Incorporate the buildings' mechanical equipment into the new control and monitoring software.

Schedule

- MII Authorization — November 2014
- Commission Construction Authorization — December 2014
- Issue Notice to Proceed — May 2015
- Construction Substantial Completion — May 2016

FINANCIAL IMPLICATIONS

Budget/Authorization Summary	Capital	Total Project
Original Budget	$1,800,000	$1,800,000
Previous Budget Increases	$1,700,000	$1,700,000
Revised Budget	$3,500,000	$3,500,000

Previous Authorizations	$274,000	$274,000
Current request for authorization	$3,226,000	$3,226,000
Total Authorizations, including this request	$3,500,000	$3,500,000
Remaining budget to be authorized	$0	$0
Total Estimated Project Cost	$3,500,000	$3,500,000

Project Cost Breakdown

	This Request	Total Project
Design Phase	$0	$274,000
Construction Phase	$3,008,000	$3,008,000
Sales Tax	$218,000	$218,000
Total	$3,226,000	$3,500,000

Budget Status and Source of Funds

This project, CIP #C800497, was included in the 2015 – 2019 capital budget and plan of finance with a budget of $3,500,000. The source of funds is the Airport Development Fund and future revenue bonds. The Port anticipates issuing revenue bonds in 2015 to fund a number of projects.

Financial Analysis and Summary

CIP Category	Renewal/Enhancement
Project Type	Airport Infrastructure
Risk adjusted discount rate	N/A
Key risk factors	N/A
Project cost for analysis	$3,500,000
Business Unit (BU)	Terminal
Effect on business performance	NOI after depreciation will increase
IRR/NPV	N/A
CPE Impact	$0.01 increase in 2017

Lifecycle Cost and Savings

The project replaces existing mechanical systems communication infrastructure. By itself, this project does not provide energy efficiency; rather the project provides better control and monitoring data in real time, which allows the maintenance staff to diagnose operational problems more quickly and to remedy them quicker, which could result in savings. Tracking and trending of the data is utilized for energy conservation project analysis. Operational costs will remain the same and are factored into existing Aviation Maintenance budgets.

STRATEGIES AND OBJECTIVES

This project will support our Century Agenda Strategic Objective to meet the region's air transportation needs at the Airport by ensuring that the infrastructure is operationally reliable and well controlled.

TRIPLE BOTTOM LINE

Economic Development

The project will benefit Airport customers by improving response time to mechanical problems which might otherwise impact travelers' safety and comfort (smoke control, air temperature, water temperature, etc.). Operational efficiency can be improved with better control and monitoring data from the various mechanical systems at the Airport.

Environmental Responsibility

The project will enhance the environment by recycling a portion of the materials to be removed and by installing new more efficient Mechanical Control System equipment.

Community Benefits

The project will benefit the community by ensuring that the Airport is effective and efficient and therefore can remain a financially healthy neighbor and good steward of energy.

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1) – Leave the equipment in place and live with the slow response time and lack of real time data. This alternative represents growing risk to the Port. If an aging component of the system fails, then the remote monitoring and controlling function fails. HVAC Mechanical systems would still operate at the local thermostats and controllers using either the manufacturers' or latest equipment operating parameters (set points). Equipment malfunctions would not be visible to maintenance staff until customers call in with problems such as being too hot or cold or that the waste pumps have failed and are overflowing. This is not the recommended Alternative.

Alternative 2) – Replace the existing Mechanical Control System with an up to date data delivery system that includes a new fiber optics "backbone," up-to-date hardware, new server, and updated software. The new system will provide the needed speed and flexibility for current and future needs as well as facilitate the addition of stand-alone systems such as the facilities in the SLC. **This is the recommended alternative.**

ATTACHMENTS TO THIS REQUEST

- None.

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

- February 5, 2013 – Authorization to proceed with design documents.