



**COMMISSION
AGENDA MEMORANDUM**

Item No. 9a

BRIEFING ITEM

Date of Meeting June 12, 2018

DATE: June 5, 2018

TO: Stephen P. Metruck, Executive Director

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

SUBJECT: South Satellite (SSAT) Infrastructure Upgrades (CIP #C800798)

Amount of anticipated request: \$0

Total estimated project cost: \$52,232,000

EXECUTIVE SUMMARY

Construction of this project was authorized on August 8, 2017. At that time, the scope was limited due to plans to fully renovate the South Satellite in the next three to four years. Since then, the decision was made to delay the full renovation of the satellite 10 to 15 years. In February, a single irregular bid of 180 percent of the engineer's estimate was received for the project and the solicitation was cancelled. Staff has since identified additional scope for the project that better addresses the needs of the facility, improves constructability, and reduces risk to both the Port and Contractor which should make it more attractive to potential bidders. Staff will return to commission on June 26, 2018 for the authorization to proceed with design of the added scope.

The following are some issues identified by the project team that resulted in the irregular bid:

1. Removing, storing, and reinstalling the existing paraline ceiling was expensive and complicated for the contractor. The new approach, which directs the contractor to remove and dispose of the old ceiling and replace with new, improves constructability and reduces risk for the contractor while greatly improving the aesthetics of the SSAT.
2. Performing spot regulated materials management (RMM) abatement instead of full abatement required the contractor to use additional personnel to maintain the work area in a safe working condition at all times. The full RMM abatement will speed up the demolition and allow for easier maintenance in the future, saving the Port money in the long term.

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This project will improve the effectiveness and reliability of the Heating Ventilation and Air Conditioning (HVAC) system for the SSAT, a terminal that has seen dramatic passenger growth. Scope of work for the previous authorization included replacement and upgrade of the existing air handler and HVAC system, reinstallation of the existing ceiling, and partial RMM abatement.

The additional HVAC capacity will also accommodate the expansion of Airport Dining and Retail (ADR), providing needed customer amenities. Maintaining comfortable heating and cooling is a basic necessity for a satisfying customer experience. While the Port is interested in undertaking a major renovation of the SSAT within the next 10 to 15 years, the inadequacy of the HVAC system today and its risk of failure make this investment necessary.

The expanded scope of work for this project includes replacement and upgrade of the existing air handler and HVAC system (prior scope), replacement of the ceiling, lighting, sprinkler system, and signage on the concourse, Satellite Transit System (STS), and mezzanine levels, and above the escalators, replacement of the carpet on the concourse level, and full RMM abatement in areas where work will be performed. The additional scope increases the budget by \$38,307,000, for a total estimated project cost of \$52,232,000. Staff anticipates returning to Commission in October 2018 to request this funding after the 90 percent design is complete and request authorization to advertise the bid package for construction.

Equipment installed as part of this project may not be compatible for the future SSAT renovation project and the financial analysis for this project is based on this premise. Given what we know today about a likely SSAT renovation project schedule, the HVAC improvements would have a life of at least 10 to 15 years; consequently, the capital costs will be amortized over this period. This project is the first and most critical phase of the shorter-term SSAT program to address the immediate needs of the facility. Staff anticipates returning to Commission Q4, 2018 to brief Commission on additional project/s necessary to support the SSAT facility.

The SSAT was constructed in 1971 and the core mechanical and electrical utilities of the original concourse have remained largely unchanged since it was built. Demand on the mechanical systems has approximately doubled since 1971, primarily from additional cooling load caused by new electronic systems, increasing passenger traffic, and small facility additions. Portions of the HVAC Air Handler system failed recently due to age and condition, the outage during equipment repairs caused a complete loss of cooling capacity in the SSAT for approximately six weeks.

JUSTIFICATION

In coordination with the Aviation Division's original plan to completely re-construct the SSAT facility within the next few years, the scope of this project was minimized to just the essential infrastructure (concourse level HVAC) where failure was eminent. As a result of the irregular bid in the first quarter of 2018, and the decision to delay major renovation at the SSAT for the next 10 to 15 years, the team reevaluated the project scope to address shortcomings and

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constructability issues. The project team determined that in our effort to minimize project scope, we added substantial complexity, risk, and created difficult working conditions for the construction contractor. The additional scope, as proposed in this request, mitigates risk and constructability issues for the contractor while providing for the necessary operational integrity of the HVAC, Lighting, and Fire Sprinkler system at the SSAT.

SSAT use and growth in passenger volume has increased dramatically since 1971 when first constructed such that the existing HVAC system is only capable of providing 70% of the building load. This growth has put a premium on having a smoothly operating and serviceable HVAC system at the SSAT. The major elements of the system are the air handler and air distribution boxes, which are now 47 years old - nearly twice their expected useful lives.

Failures of the cold deck supply fan in 2015 resulting in a six week total loss of cooling, highlight the need to upgrade key system components before catastrophic failure causes the SSAT to lose cooling and ventilation during the summer or heating and ventilation during the winter.

This project addresses the immediate operational needs at the SSAT and strives to minimize scope that could be rendered obsolete by any future all-encompassing renovation project at the SSAT.

DETAILS

Scope of Work

This project will replace key components of a portion of the SSAT HVAC system. The project will replace the constant volume air handler serving the Concourse level with a larger capacity and more energy efficient variable air volume system and replace the obsolete distribution boxes serving the concourse level.

This project will replace the hot and cold deck fans, coils, and controls with an energy efficient new air handler, coils, and controls. It will also install new ducting and diffusers to support additional ADR requirements along with replacing the ceiling, lights, fire sprinkler system, signage, and carpet.

Completion of this project will increase the heating and cooling energy efficiency approximately 15 to 20 percent on the SSAT concourse level system. Calculations estimate electric savings of 163,300 kilowatt hours per year on motor power and natural gas savings of 20,600 therms per year for heat for a total energy savings of 26,168 therms per year and reduced greenhouse gas emissions of 110 metric tons/year. This represents a savings of approximately 0.2% of the total airport energy consumption and 0.5% of the total airport greenhouse gas emissions. The new lighting will be more energy efficient, reducing energy consumption by over 50%. These efforts are in line with the Century Agenda Goals to be the greenest, and most energy efficient port in North America.

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The old paraline ceiling will be replaced with a new metallic ceiling that will greatly improve the aesthetics of the SSAT. The old ceiling is severely damaged and the particular style is no longer manufactured.

In addition to the replacement of the old paraline ceiling, the project will install new lighting that is energy code complaint and will improve the aesthetic look of the concourse for passengers.

As part of replacing the ceiling the signage of the South Satellite will also be updated. Currently, the signage is suspended from the paraline ceiling and this is an efficient time to replace the signage. The new signage will improve the appearance of the concourse and better direct passengers. To complement the new signage master plan that is being developed, electricity will be provided to all signs for LED lighting.

The project will perform full RMM abatement instead of spot abatement; this increases the Expense budget by \$3,033,000, for a total RMM expense of \$4,323,000. There are two reasons for conducting full RMM abatement in the plenum area of the concourse:

- It removes the requirement for and future cost of conducting RMM abatement in the future for this portion of the building. If only spot abatement was performed now and full abatement conducted in the future, e.g. for a full South Satellite renovation, substantial additional costs would be incurred to perform the abatement. Abatement costs are rising at about 10 percent per year.
- Currently, RMM abatement is required just to enter the paraline ceiling, regardless of the reason, this includes maintenance and inspections. Performing full abatement will remove this time consuming, intrusive and costly requirement allowing maintenance staff easier access to vital pieces of infrastructure equipment.

The current fire sprinkler system is almost 50 years old (installed in 1971). Per National Fire Protection Association (NFPA) 25, 10 percent of fire sprinkler heads are required to be tested after 50 years. If a sprinkler head fails the test, all sprinkler heads in the area sampled must be replaced. There is also a large portion of the fire sprinkler piping that is schedule 10 pipe, which is thinner than schedule 40, which would be used today. Schedule 10 pipe failures in this and other areas of the airport have highlighted the need to replace the thinner piping. Replacing the aging system as part of the project removes the requirement to test the sprinkler heads.

Carpet will also be replaced on the concourse as it is quite worn and in need of replacement. The cost of replacing the worn carpet is about the same that it would cost to protect it with plastic sheeting and plywood during construction.

New, replacement equipment includes the following:

1. HVAC Air Handler
2. Cooling and Heating Coils and heating water piping
3. Controls and Variable Frequency Drives

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4. Terminal Distribution Boxes
5. Diffusers
6. Motor Control Center
7. Light Fixtures
8. Electrical infrastructure for lights and signage
9. Fire Sprinkler System
10. Signage
11. Ceiling
12. Carpet

This project will:

1. Improve HVAC reliability.
2. Provide additional HVAC capacity for concourse level areas and new tenant spaces.
3. Improve energy efficiency.
4. Facilitate maintenance.
5. Replace obsolete equipment and infrastructure.
6. Improve lighting throughout the SSAT.
7. Improve signage from the STS level to the concourse and gates, which improves passenger experience.
8. Replace the aging and vulnerable fire sprinkler piping.

Small Business

Aviation Project Management has been partnering with the Port’s small business group to ensure proper outreach via PortGen to small businesses and those owned by women and minorities (WMBE firms). These activities range from email outreach and presentations, to those businesses that may be interested in the opportunities this project presents.

Schedule

Updated schedule only applies to the new scope added and not previous authorizations.

Activity

Design start	2018 Quarter 2
Commission construction authorization	2018 Quarter 4
Construction start	2019 Quarter 1
In-use date	2021 Quarter 3

Cost Breakdown

	This Request	Total Project
Design	\$1,142,000	\$3,029,000
Construction	\$37,165,000	\$49,203,000
Total	\$38,307,000	\$52,232,000

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ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1 – Cancel the project and continue to utilize the failed system.

Cost Implications: \$1,050,000 (expense design, capital investment for communications equipment relocation)

Pros:

- (1) Reduced capital expenditure

Cons:

- (1) This alternative does not provide a dependable indoor environment to facilitate airline operations.
- (2) This alternative would significantly degrade the quality of passenger experience at Sea-Tac.
- (3) This alternative would potentially lead to airlines insisting on processing departing passengers in severely congested hold rooms on other concourses already being used for other flights.
- (4) This alternative does not provide reliable HVAC capacity (currently 30 percent under capacity) for the increasing number of flights and additional tenant spaces.
- (5) This alternative does not provide capacity for any additional tenant space development.
- (6) No capacity for the addition of new airport dining and retail space, resulting in reduced customer experience and Port revenues.

This is not the recommended alternative.

Alternative 2 – Replace and upgrade the existing air handler and HVAC system (penthouse and concourse level), replace the ceiling, lighting, fire sprinkler system, signage, carpet, and perform full RMM abatement (concourse level only).

Cost Implications: \$42,000,000

Pros:

- (1) This alternative provides dependable indoor environmental quality in all seasons for the foreseeable future.
- (2) This alternative improves overall appearance of the SSAT concourse, which is consistent with the Century Agenda goals for making Sea-Tac the West Coast “Gateway of Choice” for international travel.
- (3) Smaller capital investment than also upgrading the ceiling and lighting in the STS and mezzanine levels.
- (4) This alternative will provide the capacity for existing (being remodeled) and new tenant spaces.
- (5) New signage will help passengers find where they are going easier.
- (6) Shorter construction timeline than also updating the STS and mezzanine levels.

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- (7) Added HVAC capacity for the addition of new airport dining and retail space and retail space providing for a better customer experience and increased revenues.
- (8) This alternative will improve energy efficiency in the HVAC system and result in a 50% reduction in energy use for the lights. This alternative supports the Century Agenda goal to, “Be the greenest, most energy efficient Port in North America.”

Cons:

- (1) Depending on when full renovation of the SSAT occurs, the upgrades from this project could only be used for 10 to 15 years.
- (2) This alternative will only update the concourse level, leaving the STS, mezzanine, and escalator ceilings, lighting, and sprinkler system in poor condition and at end of the useful life.

This is not the recommended alternative.

Alternative 3 – Replace and upgrade the existing air handler and HVAC system (penthouse and concourse level), replace the ceiling, lighting, sprinkler system, and signage on the concourse, STS, and mezzanine levels, and above the escalators (not in the Federal Inspections Services or International Corridor). Replace the carpeting on the concourse level and conduct full RMM abatement wherever work is being performed.

Cost Implications: \$52,232,000

Pros:

- (1) This alternative provides dependable indoor environmental quality in all seasons for the foreseeable future.
- (2) This alternative improves the overall appearance of the SSAT, from the STS level to the concourse, which is in line with the Century Agenda goal for making Sea-Tac the West Coast “Gateway of Choice” for international travel.
- (3) This alternative will provide the capacity for the existing (being remodeled) and new tenant spaces.
- (4) New signage will help passengers find where they are going easier.
- (5) This alternative will improve energy efficiency in the HVAC system and will result in a 50 percent reduction in energy use for the lights. This alternative supports the Century Agenda goal to “Be the greenest, most energy efficient Port in North America.”

Cons:

- (1) This alternative has the highest capital investment
- (2) This alternative has the longest construction timeline
- (3) This alternative has the largest impact to operations with work being performed while airline operations continue.
- (4) Depending on when the full renovation of the SSAT occurs, the upgrades from this project may only be used for 10 to 15 years.

This is the recommended alternative.

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FINANCIAL IMPLICATIONS

Cost Estimate/Authorization Summary

	Capital	Expense	Total
COST ESTIMATE			
Original estimate	\$6,000,000	\$150,000	\$6,150,000
Previous changes – net	\$6,635,000	\$1,140,000	\$13,925,000
Current change	\$35,274,000	\$3,033,000	\$38,307,000
Revised estimate	\$47,909,000	\$4,323,000	\$52,232,000
AUTHORIZATION			
Previous authorizations	\$12,635,000	\$1,290,000	\$13,925,000
Current request for authorization	\$0	\$0	\$0
Total authorizations, including this request	\$12,635,000	\$1,290,000	\$13,925,000
Remaining amount to be authorized	\$35,274,000	\$3,033,000	\$38,307,000

Annual Budget Status and Source of Funds

The SSAT HVAC project (CIP #C800798) was included in the 2018-202 capital budget and plan of finance as a business plan prospective project with a total capital budget of \$11,210,000. The total cost increase of \$35,274,000 was transferred from the Aeronautical Allowance (CIP #C800753), resulting in no net change to the capital budget. The environmental remediation will be funded through the annual operating budget process. The capital portion of this project will be funded with the Airport Development Fund and short-term revenue bonds. This project, with a budget of \$10.3 million, was approved by the airlines through a Majority-in-Interest (MII) vote on February 2017. The cost increase will require an additional MII vote.

Financial Analysis and Summary

Project cost for analysis	\$47,909,000
Business Unit (BU)	Terminal Building
Effect on business performance (NOI after depreciation)	NOI after depreciation will increase
IRR/NPV (if relevant)	N/A
CPE Impact	\$0.24 CPE in 2022

Future Revenues and Expenses (Total cost of ownership)

This project replaces existing equipment that is old and dated. Regulated Materials Abatement performed as part of this project will allow appropriate preventive maintenance to be performed on the equipment. This will increase O&M costs somewhat for this system. Aviation Maintenance expects to be able to absorb this increase within current budget. The new system will provide improved customer service and reliability.

No future revenues are anticipated as a result of the completion of this project.

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ATTACHMENTS TO THIS REQUEST

- (1) Presentation slides

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

November 28, 2017 – The Commission authorized \$1,425,000 additional, for a total project cost of \$13,925,000.

August 8, 2017 – The Commission authorized \$11,200,000 for the advertisement, bid, and award the construction contract for the South Satellite HVAC Upgrade project. Month D, November 8, 2016 – The Commission authorized \$3,450,000 for the preparation of design and construction bid documents, the advertising and execution of a major works construction contract, and the utilization Port crews for the South Satellite Structural Improvements (CIP C800818).

July 24, 2012 – The Commission authorized \$6,500,000 for the redesign the SSAT HVAC systems to meet current and future requirements. The design included adding an additional penthouse system, replacing three existing systems, reconfiguring the ductwork, and replacing all the distribution boxes. The 2012 estimated costs of these improvements were about \$37 million. The design effort was suspended in 2013 and canceled in 2014 after staff determined that:

- (1) The SSAT would require a seismic upgrade to facilitate any new systems.
- (2) IAF and SAMP may change the use of SSAT.

May 3, 2011 – The Commission authorized the negotiation and execution of a professional services contract for design services. No funding was associated with this authorization.

September 22, 2009 – The Commission was briefing on the condition of the HVAC systems of the North and South Satellites.