COMMISSION
AGENDA MEMORANDUM **Item No.** 6e

ACTION ITEM **Date of Meeting** January 28, 2020

DATE: November 27, 2019

TO: Stephen P. Metruck, Executive Director

FROM: Joanna Hingle, Senior Manager of Civil/Structural Design Services
Tina Soike, Director of Engineering Services

SUBJECT: Implementation Support for Building Information Modeling (BIM) Standards

Amount of this request: $150,000
Total estimated contract cost: $550,000

ACTION REQUESTED

Request Commission authorization for the Executive Director to execute amendment of an existing consultant service agreement for an additional amount not to exceed $150,000, providing support for the implementation of building information modeling (BIM) standards.

EXECUTIVE SUMMARY

Building Information Modeling is a tool that can be used in the planning, design, construction, operations and maintenance of a facility. BIM can aid in the visualization of vertical construction, proactively identify conflicts for space during design, and support collaboration during the design and construction process. Basic modeling data can be enriched with additional information appropriate for asset management including total cost of ownership. BIM is a critical tool for construction, especially in reconstruction of existing facilities.

Because the port is a long-term owner with a large and varied facility portfolio, it is important to have standardization of facility and project models to enable coordination, understanding, and consistent use. A contract was executed with CCI Engineering Services in January 2018 for the development of BIM standards. The standards developed under that contract will guide the format and use of design and construction models, to be provided to the port as project deliverables. These models will serve as record documents as well as a basis for a “live” model of selected port facilities. It is anticipated that, as more models are received, and as two-dimensional computer-assisted drawings become less common, an increasing number of projects and facilities will have information maintained in BIM.

Due to the emergent nature of this technology and application to asset management of port facilities, we do not currently have resources with the breadth nor depth of experience in applying BIM to large complex facilities. A BIM management position was approved for the

2020 budget. The in-house responsibilities will be those relevant to an owner's master model coordination as well as record file management.

This contract amendment will provide consultant expertise supporting the transition from completed design and construction BIM standards to BIM implementation, including tasks such as defining the skills and abilities required for the new BIM management position; recommending in-house team structure, roles, and responsibilities; training staff how to validate model compliance with standards; training staff on coordinating BIM implementation plans from multiple design consultants and contractors; and training staff on general use of BIM systems.

JUSTIFICATION

Recently, frequent requests have been made to Engineering for Building Information Modeling standards. Four projects for the Aviation Division (the International Arrivals Facility, NorthSTAR, Baggage Optimization, and Concourse D Annex) along with one Maritime Division project (Bell Street Cruise Terminal Improvements) are currently using and providing BIM for design and construction. The industry trend to move beyond 2D design into 3D modeling on vertical construction projects is continuing in the building design and construction environment. Designers and contractors are using various modeling tools to better visualize projects, sequence construction and resolve potential conflicts before construction. As this becomes the industry standard, the port is increasingly spending money for consultants to convert BIM models back to two-dimensional CAD deliverables so that the port may view, manage, and extract information with our existing systems. This requires significant additional effort and results in a loss of substantial data built into the three-dimensional model.

Advancements in the design and construction of facilities continue to apply technology as a way to optimize the delivery process. Using increasingly sophisticated tools, such as BIM, substantial facility data can be developed that has potential application beyond design and construction extending into the operation, maintenance, and long-term asset management of a facility. However, this contract's scope is limited to only design and construction implementation. While there is an intent to allow for future asset management work, it is not accomplished with this contract. The original contract included review of current industry practices, assessment of opportunities for application of project data for maintenance and asset management activities, evaluation of the cost/benefit to the port, recommendation of methodology for moving forward, and finally development of BIM standards. To realize the value of that work and advance the use of BIM at the port, additional support is needed for implementation of the BIM standards. The following are some key points considered:

(1) Technology advancements will continue to influence design, construction, operation and maintenance, and asset management of facilities.
(2) Collaboration between owners, designers and contractors can benefit from implementation of integrated 3D modeling tools.

(3) Design and construction efficiencies can be realized by using appropriate modeling tools.
(4) Development of Port BIM processes and procedures are a long-term investment that will yield dividends for future capital project development.
(5) Applying the One Port philosophy for development of processes and standards will guide the use of this tool across all divisions to optimize cost versus benefit.
(6) Implementation of BIM technology is still in the emergent phase but has been expanding rapidly, especially for operations, maintenance and asset management applications; public owners need to establish processes and standards appropriate for use at their facilities and to assess long term financial and staff commitments needed to support those efforts.

The work funded by this contact amendment will support the successful implementation of BIM for Port facilities.

Diversity in Contracting

This amendment is to an existing contract with CCI Engineering Services, which is a certified Women's Business Enterprise as well as a small business.

DETAILS

Scope of Work

The contract amendment will be per port policies and procedures in accordance with the General Delegation of Authority and procurement policy CPO-1. The contract is structured with a specific not-to-exceed amount and identifies tasks and services required.

The scope of work for the original contract includes five work elements as listed below:

(1) Develop Port BIM Needs Assessment
(2) Define Options for One Port use of BIM
(3) Develop Internal BIM Processes and Procedures
(4) Develop BIM Standards and Library
(5) Develop Port Guidelines and Standards Documentation

The proposed contract amendment adds three new work elements:

(6) BIM Implementation and Transition
(7) BIM Staff Development Support
(8) Center of Expertise Development Support

Schedule

The work within this contract amendment is to be completed within one year of contract amendment execution, expected to span from Q1 2020 to Q1 2021.

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1 – Do not amend CCI Engineering Services contract to add BIM implementation support.

Cost Implications: Save $150,000 in Engineering operating expense

Pros:

(1) Port saves operating costs for consultant services.
(2) Port saves staff costs needed to support consultant scope of services.

Cons:

(1) BIM standards are rolled out without expert technical support.
(2) Additional challenges in hiring new BIM-related staff due to lack of in-house expertise in unique elements of the field
(3) Staff will not be trained to utilize new data and models being received, limiting their usefulness. Alternatively, the training cost would be spent on training with a different company not familiar with the recently-developed BIM standards.

This is not the recommended alternative.

Alternative 2 – Execute a new BIM implementation support contract with a separate company.

Cost Implications: Engineering Operating expense of $175,000 for consultant services in addition to staff resources required to support the consultant.

Pros:

(1) Implementation of Port BIM standards will allow for requirements to be applied consistently across projects.
(2) Projects wishing to utilize BIM will no longer need to develop their own unique set of modelling, data, and deliverable requirements.
(3) Staff will be trained such that use of BIM models can occur within the organization.
(4) Port will provide the option for many types of projects to be completed in BIM, better aligning with developing industry norms and reducing the need for expensive conversion of BIM back to 2D CAD deliverables.

Cons:

(1) New consultants must familiarize themselves with BIM standards developed by CCI and learn about the needs of the many departments that have contributed to the effort.
(2) Port must undertake a separate procurement process, requiring additional time and staff effort.
(3) Port spends up front operating expense for future benefit that may not be fully utilized, depending upon future model uses.
(4) Limited staff availability may require reprioritization of tasks.
(5) Training and implementation will require staff time across the organization for those who will be interfacing with BIM.

This is not the recommended alternative.

Alternative 3 – Execute amendment to CCI Engineering Services contract, adding BIM implementation support.

Cost Implications: Estimated Engineering Operating expense of $150,000 for consultant services in addition to staff resources required to support the consultant.

Pros:

(1) Implementation of Port BIM standards will allow for requirements to be applied consistently across projects.
(2) Projects utilizing BIM will no longer need to develop their own unique set of modelling, data, and deliverable requirements.
(3) Staff will be trained such that use of BIM models can occur within the organization.
(4) Port will provide the option for many types of projects to be completed in BIM, better aligning with developing industry norms and reducing the need for expensive conversion of BIM back to 2D CAD deliverables.

Cons:

(1) Port spends up front operating expense for future benefit that may not be fully utilized, depending upon future model uses.
(2) Limited staff availability may require reprioritization of tasks.
(3) Training and implementation will require staff time across the organization for those who will be interfacing with BIM.

This is the recommended alternative.

FINANCIAL IMPLICATIONS

Funding for this consultant service agreement will be through approved Engineering operating expense. All Port staff support costs required to complete the scope of services will also be funded through approved operating expense budgets.

Cost Estimate/Authorization Summary	Capital	Expense	Total
COST ESTIMATE			
Original estimate	$0	$400,000	$400,000
Current change	$0	$150,000	$150,000
Revised estimate	$0	$550,000	$550,000
AUTHORIZATION			
Previous authorizations	$0	$400,000	$400,000
Current request for authorization	$0	$150,000	$150,000
Total authorizations, including this request	$0	$550,000	$550,000
Remaining amount to be authorized	$0	$0	$0

Annual Budget Status and Source of Funds

This cost will be included as a one-time expense in the Engineering Operating Budget, divided out across the contract's duration

Financial Analysis and Summary

Project cost for analysis	$150,000 addition, $550,000 total
Business Unit (BU)	Engineering, supports all facilities/BU's
Effect on business performance (NOI after depreciation)	N/A
IRR/NPV (if relevant)	N/A
CPE Impact	N/A

Future Revenues and Expenses (Total cost of ownership)

No revenues are directly gained by implementation of BIM standards. Future expenses currently include one full-time employee, already included in the department budget. Expenses also include ICT support of model storage and additional BIM software licenses. Expense offsets include potential for reduction of some consulting costs by elimination of BIM-to-CAD conversion.

ATTACHMENTS TO THIS REQUEST

None

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

May 9, 2017 – The Commission authorized $400,000 for the execution of a service agreement for development of BIM standards.