

THE NORTHWEST SEAPORT ALLIANCE
MEMORANDUM

MANAGING MEMBERS

ACTION ITEM

Item No. 5B

Date of Meeting October 6, 2020

DATE: September 23, 2020

TO: Managing Members

FROM: John Wolfe, CEO

Sponsor: Tom Bellerud, Director, Business Development

Project Manager: Elly Bulega, Engineering Project Manager II

SUBJECT: Washington United Terminals (WUT) Fender System Replacement Construction Authorization

A. ACTION REQUESTED

As referenced in NWSA Resolution No. 2020-02, Exhibit A, Delegation of Authority Master Policy, Paragraph 8.c.iii., states project costs exceeding \$300,000 require approval from Managing Members.

Requesting project authorization in the amount of \$3,478,000 for a total authorized amount of \$3,678,000, for work associated with the Washington United Terminals (WUT) Fender System Replacement, Master Identification No. 201107.01.

B. SYNOPSIS

The objective of this project is asset preservation in accordance with the Northwest Seaport Alliance (NWSA) lease obligation to repair and/or replace the fender system at WUT.

The wharf at WUT was constructed in two sections. The original pier (northern 2,000 feet) was constructed in 1997, and the pier extension (southern 600 feet) was completed in 2010, for a total berth length of 2,600 feet. The original pier uses a fender-pile system with rubber arches for berthing vessels, which was suited to the original design vessels. The pier extension incorporates individual unit cone fenders with UHMW-PE (Ultra High Molecular Weight-Polyethylene) faced steel panels for dissipating berthing energy from large vessels. The unit fenders are appropriate for the wharf extension design vessels, and are best suited to vessels with large, and relatively constant, freeboard such as modern container vessels. The original pier fender-pile system is not performing well with modern large vessels. The existing fender-pile system energy capacity and stiffness are not high enough to handle modern vessels. The fenders need to be removed and replaced with a system that can handle and withstand the size of vessels calling at WUT.

C. BACKGROUND

WUT has been one of the busiest terminals at the Port of Tacoma, and now Northwest Seaport Alliance (NWSA). Increased and sustained container traffic has brought with it more vessel calls, progressively larger vessels and greater performance demands on the existing fender-pile system on the original pier. There are concerns about the energy capacity and stiffness of the old prestressed fender-pile system.

The existing fender system at the original pier consists of prestressed fender-pile assemblies typically spaced at 75-feet, but with variations in spacing of 70-feet and 80-feet in the heavy-lift zone. Each fender-pile assembly (shown in Figure-1) is comprised of four partially prestressed precast concrete piles, a welded steel waler and frame, and a pair of horizontally mounted arch fenders. The piles are 16-inch square, approximately 101-feet-long, spaced at 3 feet on center, and each is faced with protective UHMW-PE rub strips. Steel embeds in the pile tops connect the piles directly to the 14-foot-wide steel waler assembly. The waler assembly distributes pile reactions from berthing vessels, to the piles, and into the rubber arch fenders, which are mounted on the face of the concrete pier.

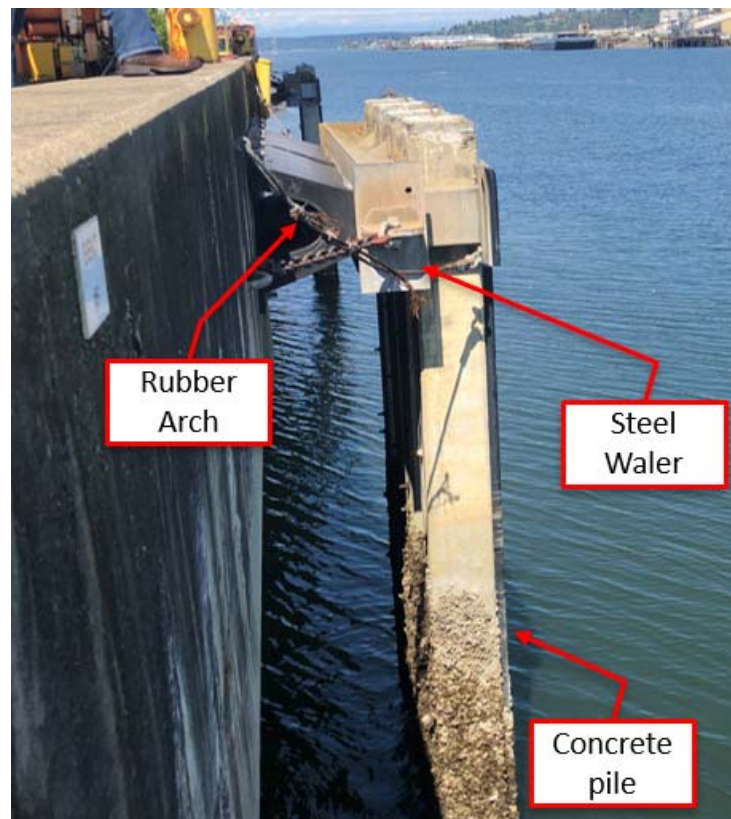


Figure-1: Existing Fender Pile System on Original Pier

All components of the fender system have damage to them. The prestressed precast concrete piles are spalling, and some have cracks in them. Some of the arch fenders are ripped, and the safety wire ropes are damaged or missing on most piles. Spalling and damage to the top corners of the fender piles indicate that the flat or vertical sides of large-freeboard container

vessels are not impacting the fender-pile rub strips. Port consultant reviewed the existing fender system, assessed the original vessel and fender system design criteria, and recommended replacing the fender system. The existing fenders are in poor condition, and the energy they absorb from berthing vessels exceeds what the fenders were designed for. The fenders need to be removed and replaced with fenders with performance characteristics similar to those at the Wharf extension, capable of handling 13,000 TEU container vessels. Below is a comparison of the original pier fender system and the new proposed fender system design criteria.

Characteristic	Unit	Original Northern Wharf Design Vessel	Wharf Extension Design Vessel	Upgraded Northern Wharf Design Vessel
TEU	N/A	5,500	13,000	13,000
Displacement	long tons	89,340	220,000	220,000
Overall Length, LOA	feet	902	1,300	1,300
Beam	feet	131	204	204
Maximum Draft	feet	40	48	48
Mean Perpendicular Velocity	foot per second	0.29	0.26	0.26
Berthing Approach Angle	degrees	10	6	6
Berthing Point	fore/LOA	Unknown	1/6	1/6
Max. Allowable Hull Pressure	ksf	Unknown	5	5

D. PROJECT DESCRIPTION AND DETAILS

Project Objectives

Remove the current existing concrete pile fender system and replace it with rubber fender elements with performance characteristics similar to fenders at the Wharf extension, suitable for today's large vessels calling at WUT.

Scope of Work

The WUT Fender System Replacement project will include the following work items:

- Demolition of the existing concrete-pile fender system including the precast concrete fender piles, steel walers, chains, cables, and arch fenders.
- Installation of a new cone fender system, UHMW-PE faced steel fender panels, chains, and anchorages.
- Anchorage of the new fender system to the existing bull rail may include:
 - Coring through the bull rail to allow anchorage to the inboard face, which would involve local removal and replacement of paving and fill.
 - Installing drilled and epoxied anchors into the outboard face of bull rail

- The existing fender stand-off distance or approximately 4'8" will be maintained.
- Where feasible, existing chains and anchorages will be reused from the original fender system.
- In areas where the fender spacing may need to be adjusted, steel fabrications may be installed to provide a reaction point and anchorage zone for the fender elements between pile caps.

Schedule

The design of the fenders is nearly complete. Construction is scheduled to commence Spring 2021. No permitting is anticipated on the project. Project schedule is as follows:

Complete Design	October 2020
Advertise Bid	October 2020
Bid Opening	December 2020
Contract Award	January 2021
Substantial Completion	November 2021

E. FINANCIAL IMPLICATIONS

Project Cost Details

	This Request	Total Project Cost	Cost to Date	Remaining Cost
Design	\$ -	\$ 200,000.00	\$ 112,219.00	\$ 87,781.00
Construction	\$ 3,478,000.00	\$ 3,478,000.00	\$ -	\$ 3,478,000.00
Total	\$ 3,478,000	\$ 3,678,000	\$ 112,219	\$ 3,565,781

Source of Funds

The current Capital Investment Plan (CIP) Budget allocates \$3,678,000 for this project.

Financial Impact

Project costs will be capitalized and depreciated over an estimated 15-year life, resulting in annual depreciation expense of \$245,000. There will be no depreciation for 2020 based on a completion date of November 2021.

Washington United Terminals (WUT) provides approximately \$13 million in revenue to the NWSA annually.

The estimated remaining net book value to be written off is \$1,154,000. This will impact the Port of Tacoma, as these were existing assets at the time of the NWSA formation.

F. ALTERNATIVES CONSIDERED AND THEIR IMPLICATIONS

Alternative 1: Do nothing. The result of no action is that vessels will continue berthing using undersized fenders risking damage to the pier and/or the vessels themselves. The presence of severely damaged fenders would prevent vessels from berthing putting the NWSA in violation of its lease obligation.

Alternative 2: Remove the current existing concrete pile fender system and replace them with rubber fender elements with performance characteristics similar to the fenders at the wharf extension, capable of handling 13,000 TEU container vessels. It is the NWSA's lease obligation to provide a fender system suitable for the size of vessels calling at WUT.

Alternative 2 is the recommended course.

G. ENVIRONMENTAL IMPACTS/REVIEW

Permitting:

No new permitting is required on the project. The Port has an existing programmatic permit that covers fender replacement.

Remediation:

Not applicable.

Water:

No water quality impacts are anticipated. Best Management Practices (BMPs) will be implemented to protect water during construction activities.

Air Quality:

Not applicable.

H. ATTACHMENTS TO THIS REQUEST

- Computer slide presentation.

I. PREVIOUS ACTIONS OR BRIEFINGS

<u>Date</u>	<u>Action</u>	<u>Amount</u>
April 1, 2020	Executive Authorization	\$200,000
TOTAL		\$ 200,000



Item No: 5B_supp
Date of Meeting: October 6, 2020

Project Authorization For WUT Fender System Replacement

Presenter: Elly Bulega
Title: Engineering Project Manager II

Action Requested

WUT Fender System Replacement

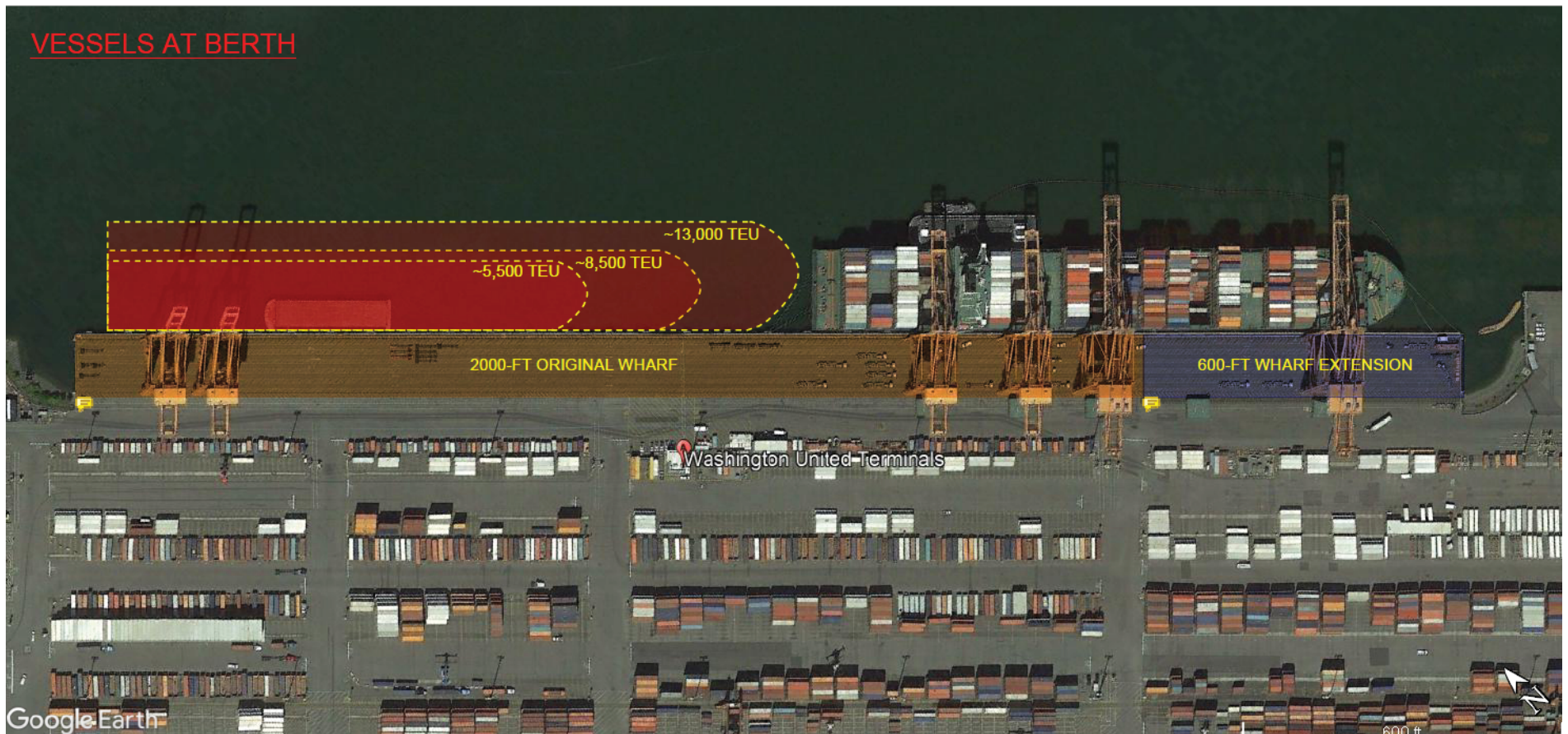
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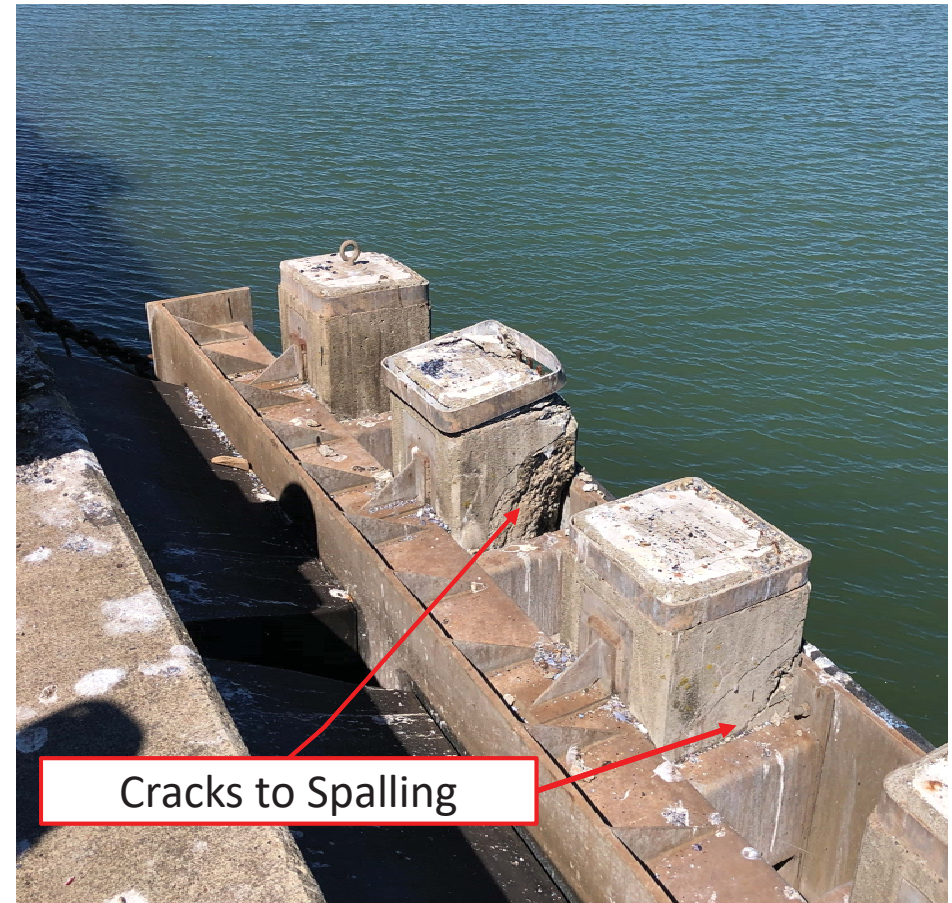
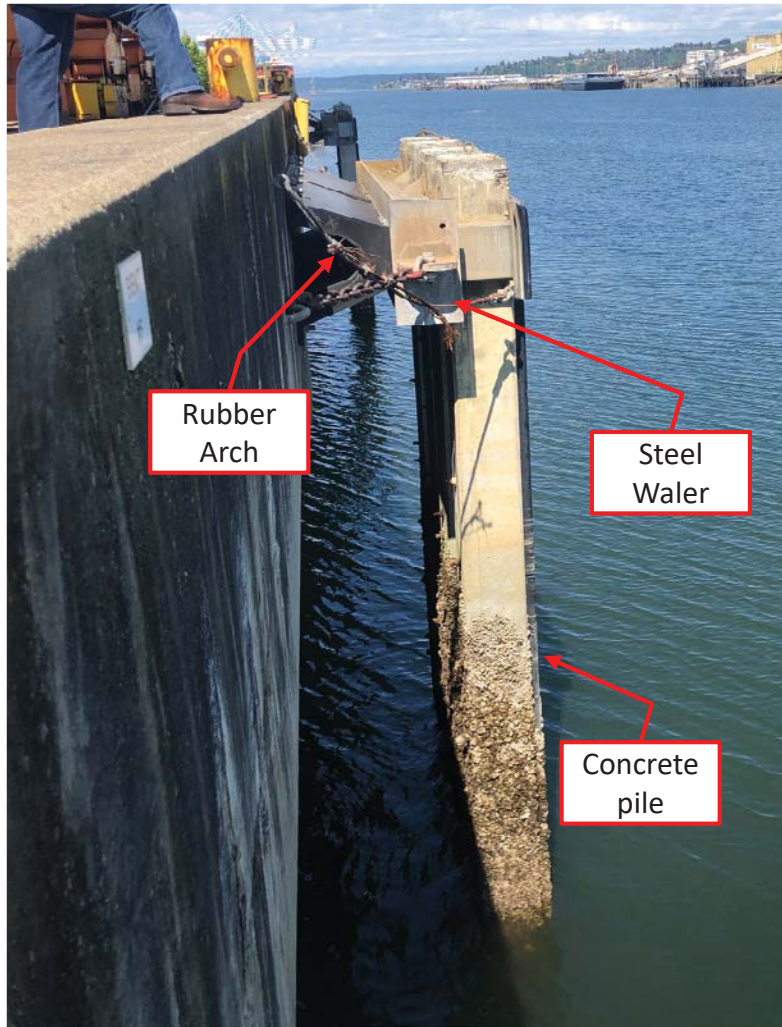


Background

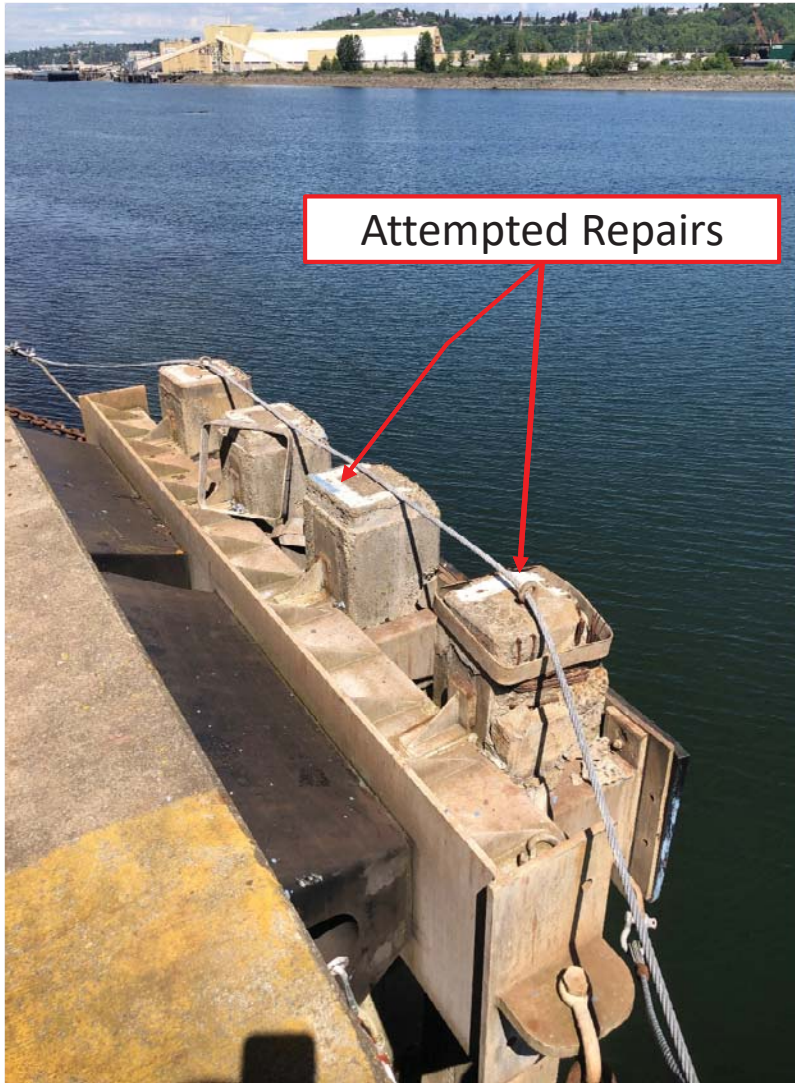
WUT Fender System Replacement



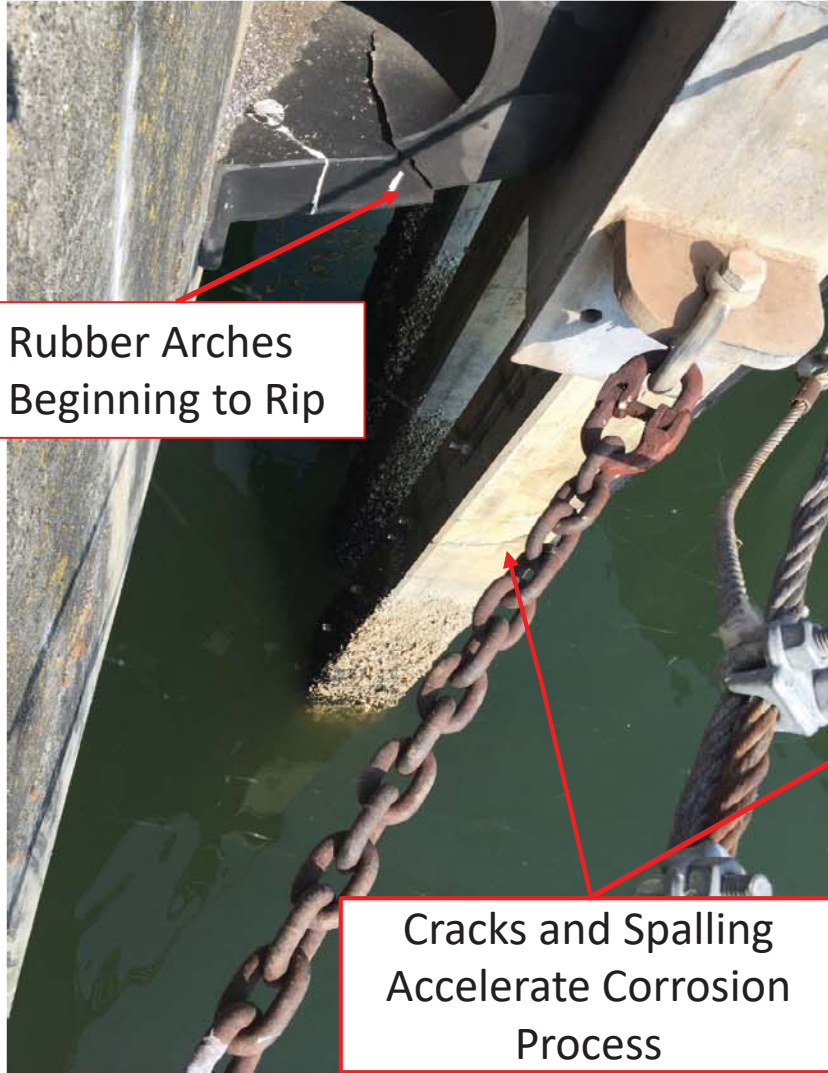
Existing Concrete-Pile Fenders



Existing Concrete-Pile Fenders



Existing Concrete-Pile Fenders



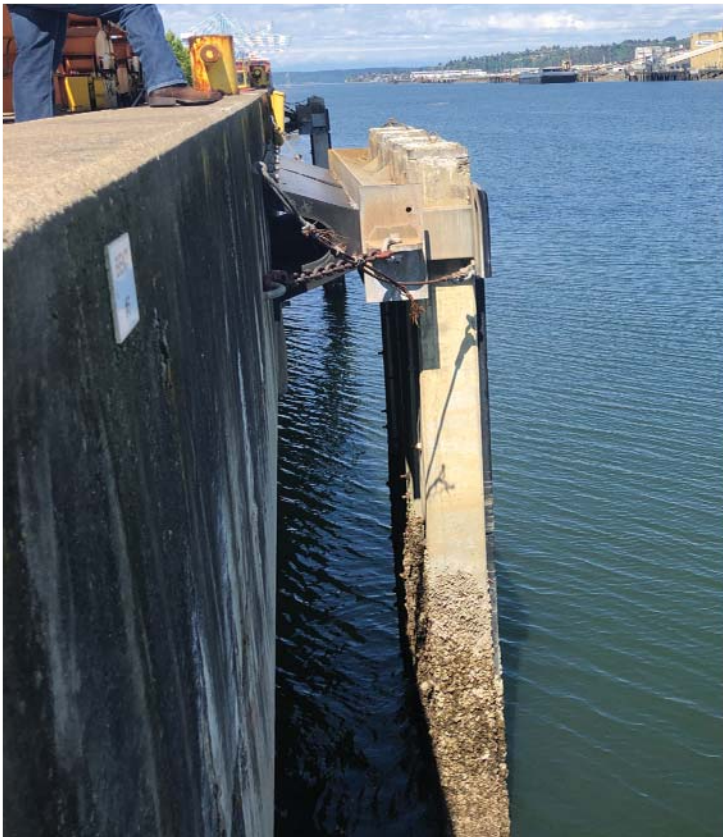
Rubber Arches
Beginning to Rip

Cracks and Spalling
Accelerate Corrosion
Process



Project Description and Details

WUT Fender System Replacement



Existing Fender-Pile System with Rubber Arches



Cone Fender System

Project Schedule

WUT Fender System Replacement

Activity	Timeframe
Advertise Bids	October 2020
Bid Opening	December 2020
Contract Award	January 2021
Contract Completion	November 2021

Financial Implications

WUT Fender System Replacement

- The estimated cost of Construction for this project is \$3,478,000.
- The estimated budget for this project is \$3,678,000.
- The current Capital Investment Plan (CIP) allocates \$3,678,000 for this project.
- WUT provides approximately \$13 million in revenue to the NWSA annually.
- The estimated remaining net book value to be written off is \$1,154,000. This non-cash transaction will impact the Port of Tacoma, as these were existing assets at the time of the NWSA formation.

Financial Summary

WUT Fender System Replacement

Item	Budget Estimate	Cost to Date	Remaining Cost
DESIGN	\$200,000	\$112,219	\$87,781
CONSTRUCTION	\$3,478,000	\$0	\$3,478,000
PROJECT TOTAL	\$3,678,000	\$112,219	\$3,565,781

Environmental Impacts/Review

WUT Fender System Replacement

Permitting:

There is a programmatic permit in place already. No additional permitting is required on the project.

Water:

No water quality impacts are anticipated. Best Management Practices (BMPs) will be implemented to protect water during construction activities.

Air Quality:

Not applicable

Conclusion

WUT Fender System Replacement

Request project authorization in the amount of \$3,478,000, for a total authorized amount of \$3,678,000, for the Washington United Terminals (WUT) Fender System Replacement, Master Identification No. 201107.01.

