

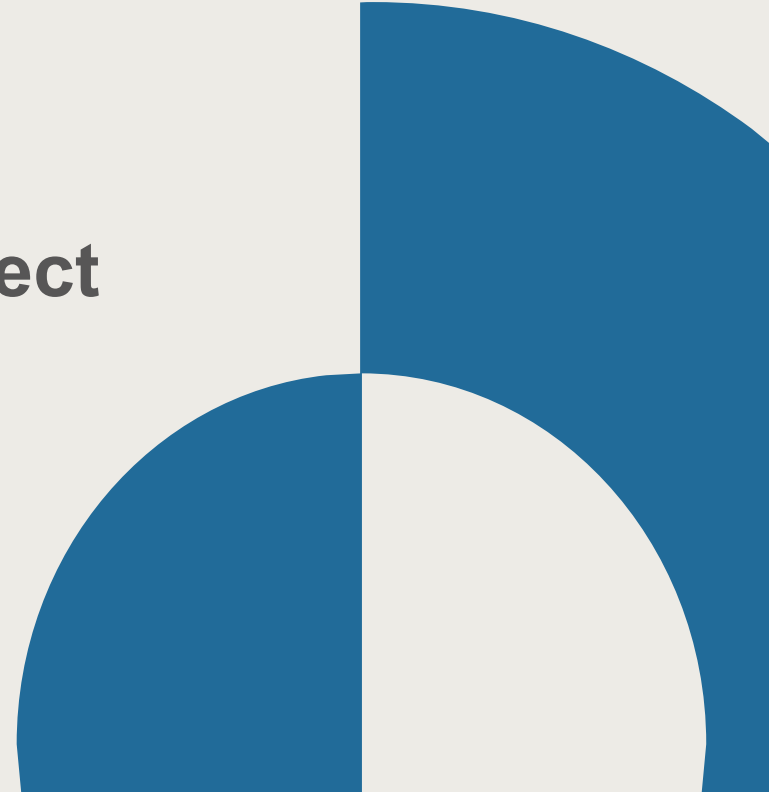


Point Hudson

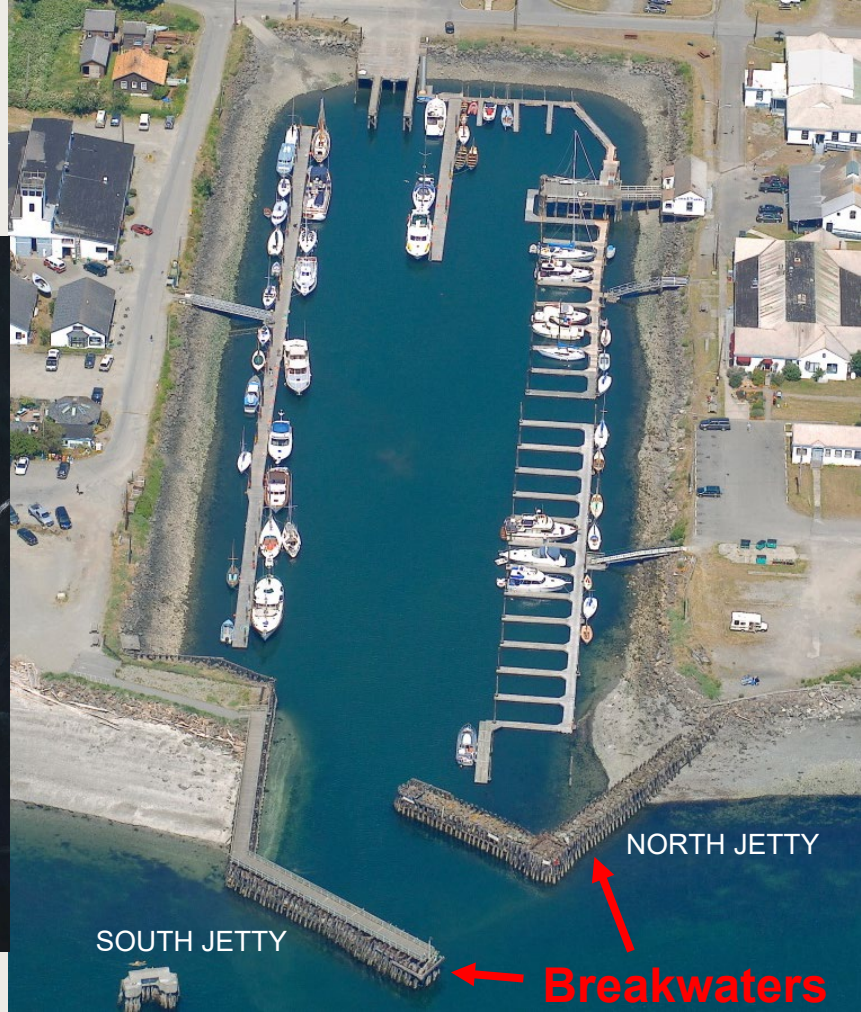
Breakwater Improvement Project

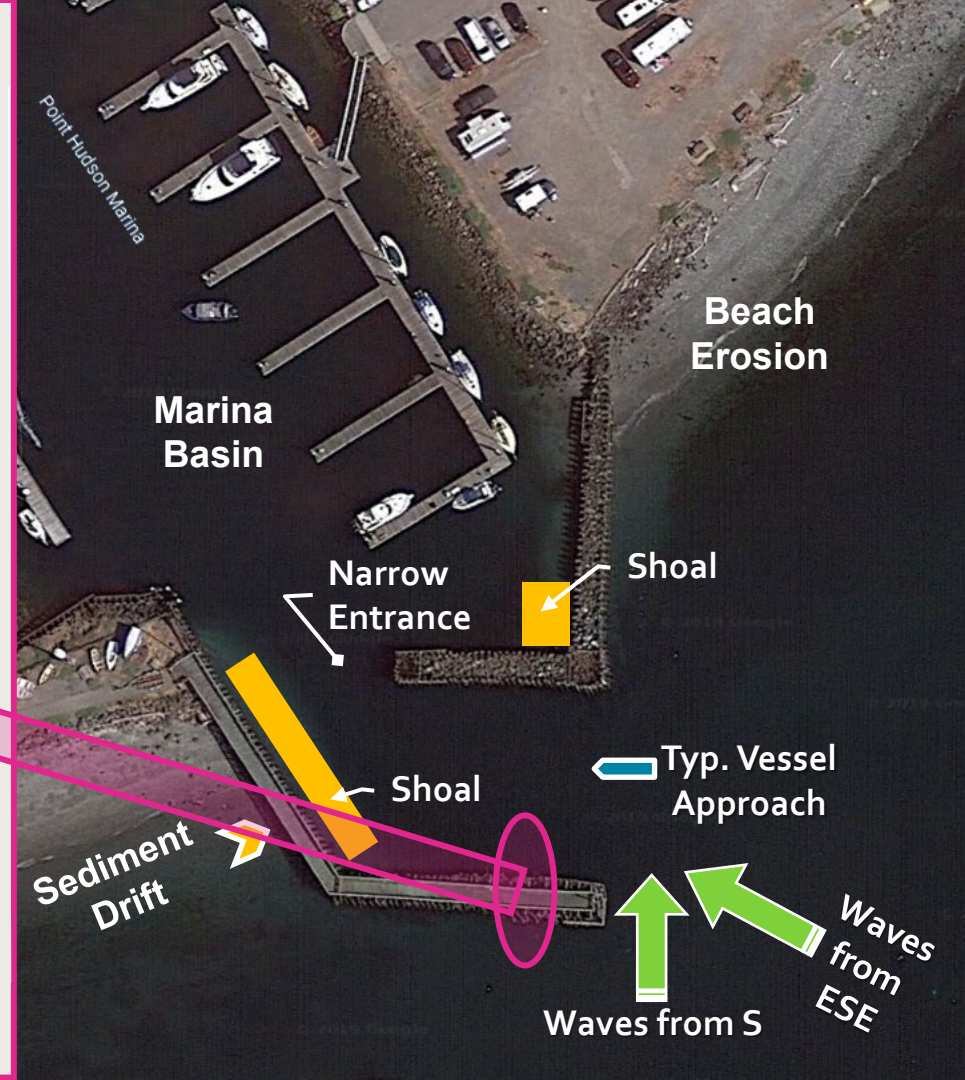
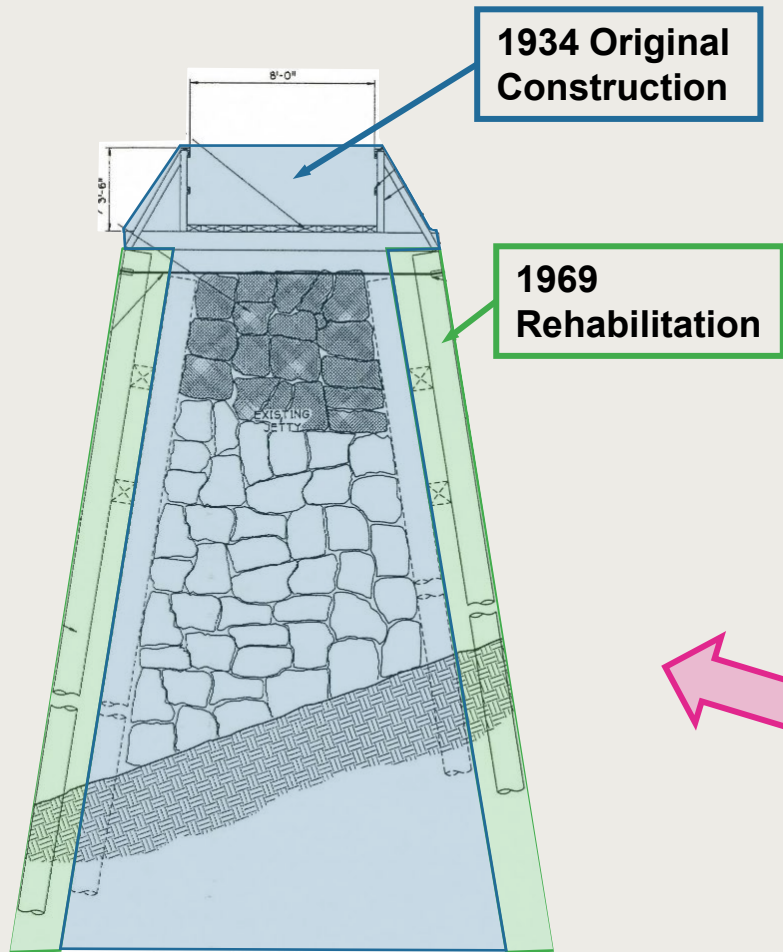
Marine Resource Committee Meeting
March 2021

Presenter: Mike Love, Port of Port Townsend



Location





POINT HUDSON
NORTH
BREAKWATER



POINT HUDSON SOUTH BREAKWATER



Existing Condition

Timber piles, walers, cable tiebacks, and armor rock are at or beyond useful life. Stability of the overall structural system is compromised.



Stone Weathering



Water Deterioration



Cable Corrosion



Existing Condition Pile Deterioration



A Challenging Marine Environment

- A 2018 storm damaged the breakwaters, breaking pile tops, severing cable ties and further eroding the armor rock core



Photo taken by Ron Moller

A December 2018 storm sweeps over the jetties and into the Point Hudson Marina.

Design Objectives

- **Engineering.** Protect existing marina and Port operations for 30 years from wind and vessel waves and **sea level rise**.
- **Aesthetics.** Similar in appearance to existing breakwater (rocks and piles) using environmentally acceptable materials.
- **Environmental Considerations.** Remove creosote, reduce breakwater footprint, and protect existing eelgrass outside of marina.
- **Constructability.** Minimize risks from potential cost overruns, delays, errors, and obstacles during construction.

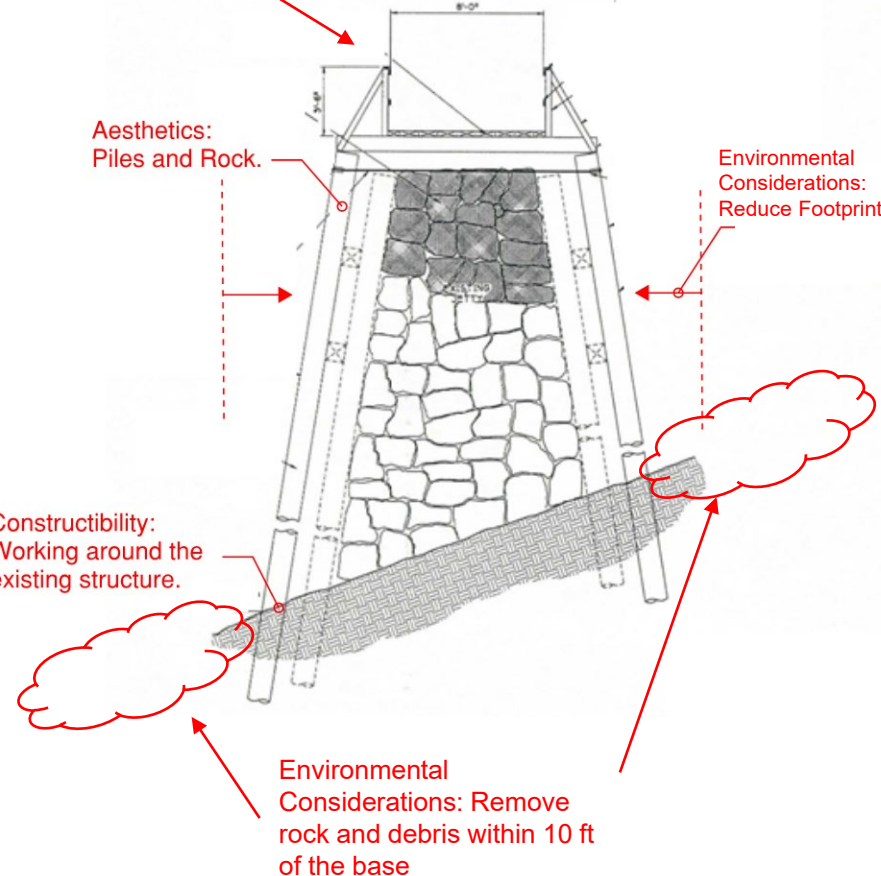
Replacement breakwater height must include sea level rise resistance

Aesthetics:
Piles and Rock.

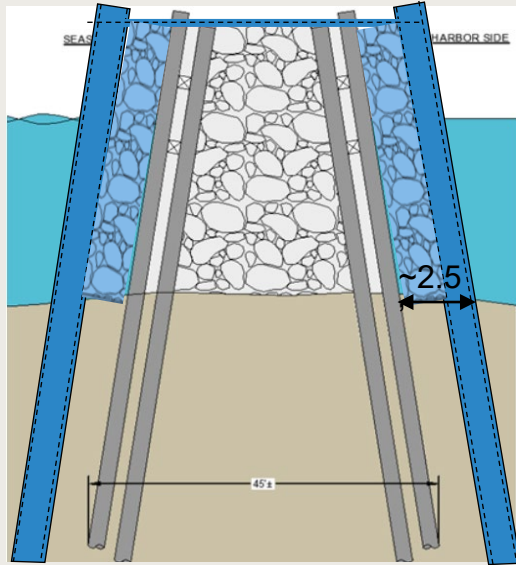
Environmental
Considerations:
Reduce Footprint

Constructability:
Working around the
existing structure.

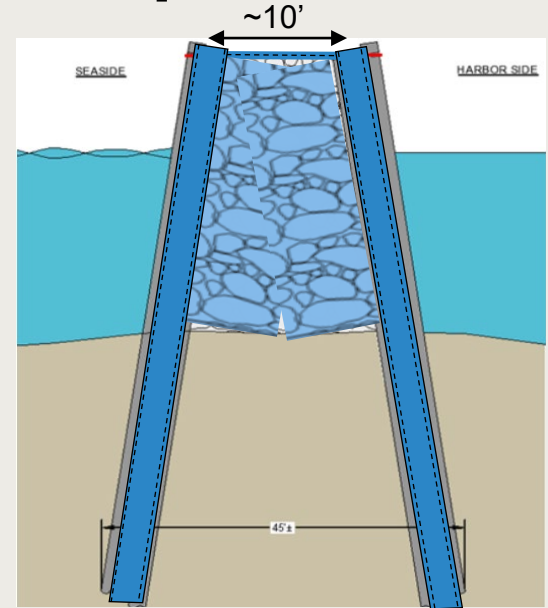
Environmental
Considerations: Remove
rock and debris within 10 ft
of the base



Alt. Evaluation: Encapsulation vs. Replacement



- Existing structure remains except for a few select creosote timber piles removed for permitting.
- Piles driven in a batter outside of existing structure, expand footprint by 2.5 ft each side with mesh lagging.
- Reduces demo costs but increases offsite mitigation costs.

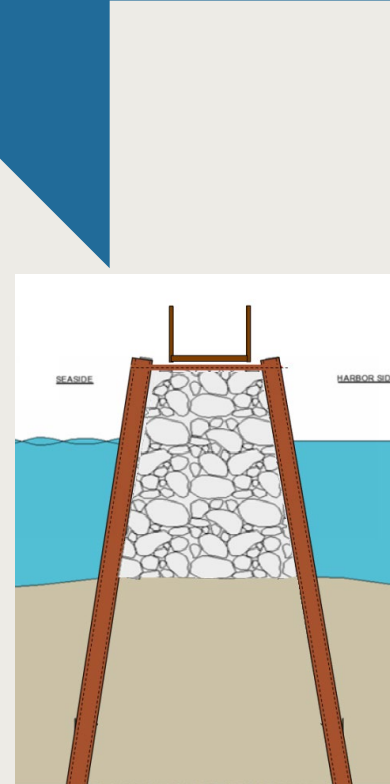


- Existing structure is completely removed including piles and rock.
- Piles driven batter with new rock installed between the rows of piling.
- Seeks to be self mitigating because of the reduction in footprint and creosote removal.

Breakwater Design

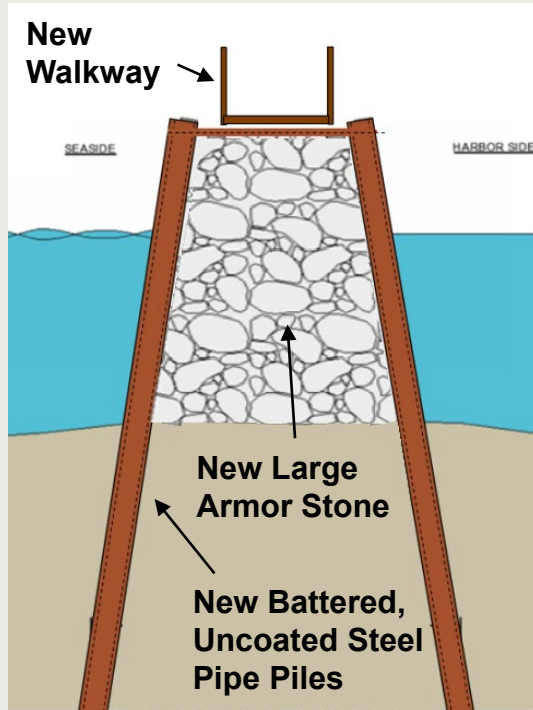
After review of the different alternatives, Replacement was selected as the preferred alternative with some additional input.

Category	Input
Pile	<ul style="list-style-type: none">• Piles should be closely spaced, similar to the existing• Piles should be uncoated steel pipe piles with sacrificial corrosion thickness, no composite piles• Piles should be battered to match existing aesthetics• Piles should be supported with tie rod cross-ties and potential walers
Breakwater Core	<ul style="list-style-type: none">• Large high quality riprap (granite)• No mesh for rock containment
Walkway	<ul style="list-style-type: none">• Design and system should allow for installation of walkway on top of the south breakwater• End of walkway waterside should incorporate a wider turnaround and look out area
Permitting	<ul style="list-style-type: none">• North and south breakwaters should be designed and permitted together

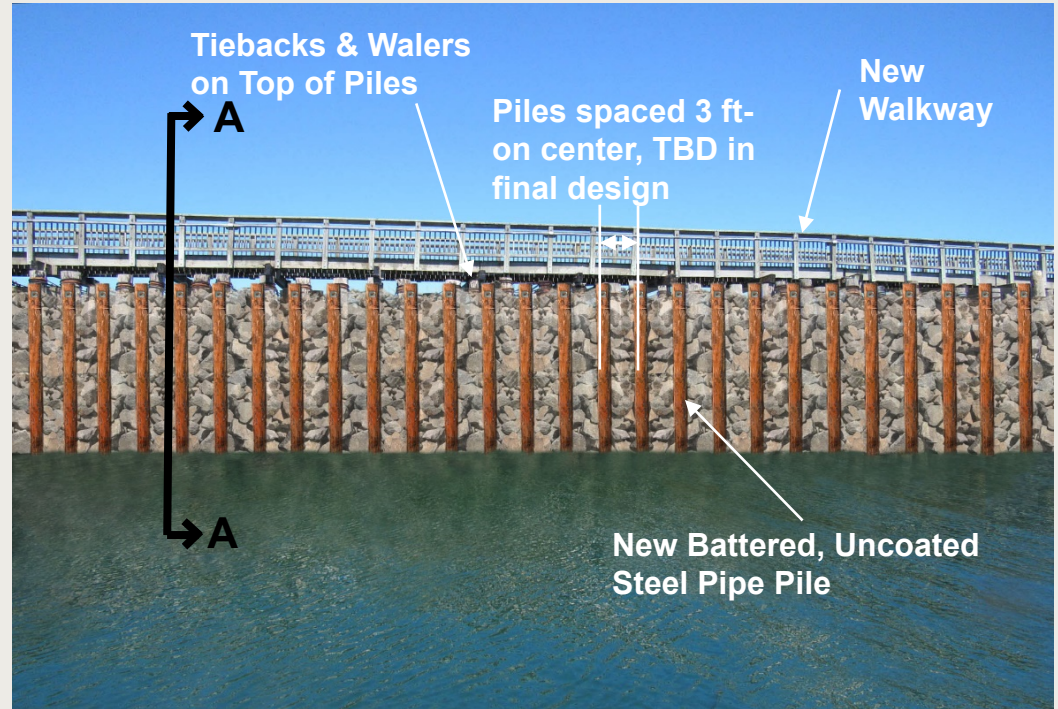


Selected Breakwater Design - Replacement

Selected Cross-Section and Elevation

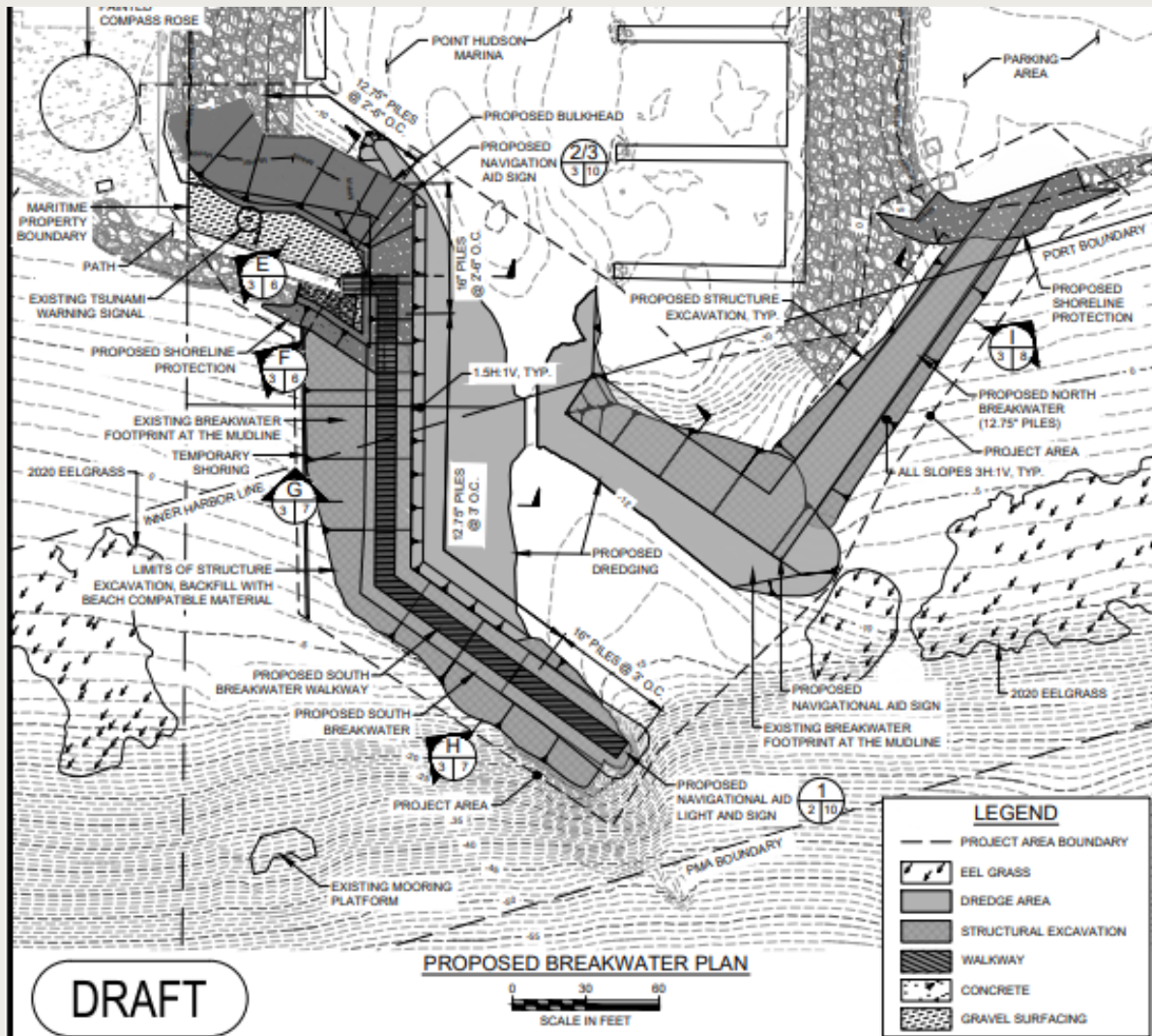


Section A - A

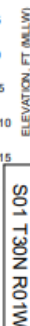


Elevation View

PERMIT DRAWING



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Potential Permitting Scenarios/Schedules

	Scenario 1 (Best Case)	Scenario 2	Scenario 3
Description	<ul style="list-style-type: none">Existing permit is modified for current design	<ul style="list-style-type: none">Existing permit is modified but NMFS is re-engaged	<ul style="list-style-type: none">Modification is rejected and a new permit application is required.
Permitting Length	<ul style="list-style-type: none">6 months	<ul style="list-style-type: none">12 months	<ul style="list-style-type: none">18 + months
Permit Submittal	<ul style="list-style-type: none">July 2020	<ul style="list-style-type: none">July 2020	<ul style="list-style-type: none">July 2020
Permit Received	<ul style="list-style-type: none">Jan 2021	<ul style="list-style-type: none">July 2021 (+6 months)	<ul style="list-style-type: none">Jan 2022 (+12 months)
Bid Advertisement	<ul style="list-style-type: none">Spring 2021	<ul style="list-style-type: none">Spring 2021	<ul style="list-style-type: none">Spring 2022 (+12 months)
Construction Start	<ul style="list-style-type: none">Fall 2021	<ul style="list-style-type: none">Fall 2021	<ul style="list-style-type: none">Fall 2022 (+1 year)
Construction End*	<ul style="list-style-type: none">Spring/Fall 2022	<ul style="list-style-type: none">Spring/Fall 2022	<ul style="list-style-type: none">Spring/Fall 2023 (+1 year)

- *Would seek to replace breakwater in one construction season however, depending on fish work window requirements, replacement may need to occur over two in water work windows.

Environmental Considerations

1. CREOSOTE REMOVAL 827 piles
2. SMALLER FOOTPRINT
3. ROCK AND DEBRIS REMOVAL
4. INWATER WORK SEASON JULY TO FEBRUARY
5. VIBRATORY PILE DRIVER
6. BUBBLE CURTAIN
7. FLOATING DEBRIS BOOM
8. SILT CONTAINMENT CURTAIN
9. HOURS OF WORK
10. EEL GRASS AVOIDANCE
11. MARINA OPERATION

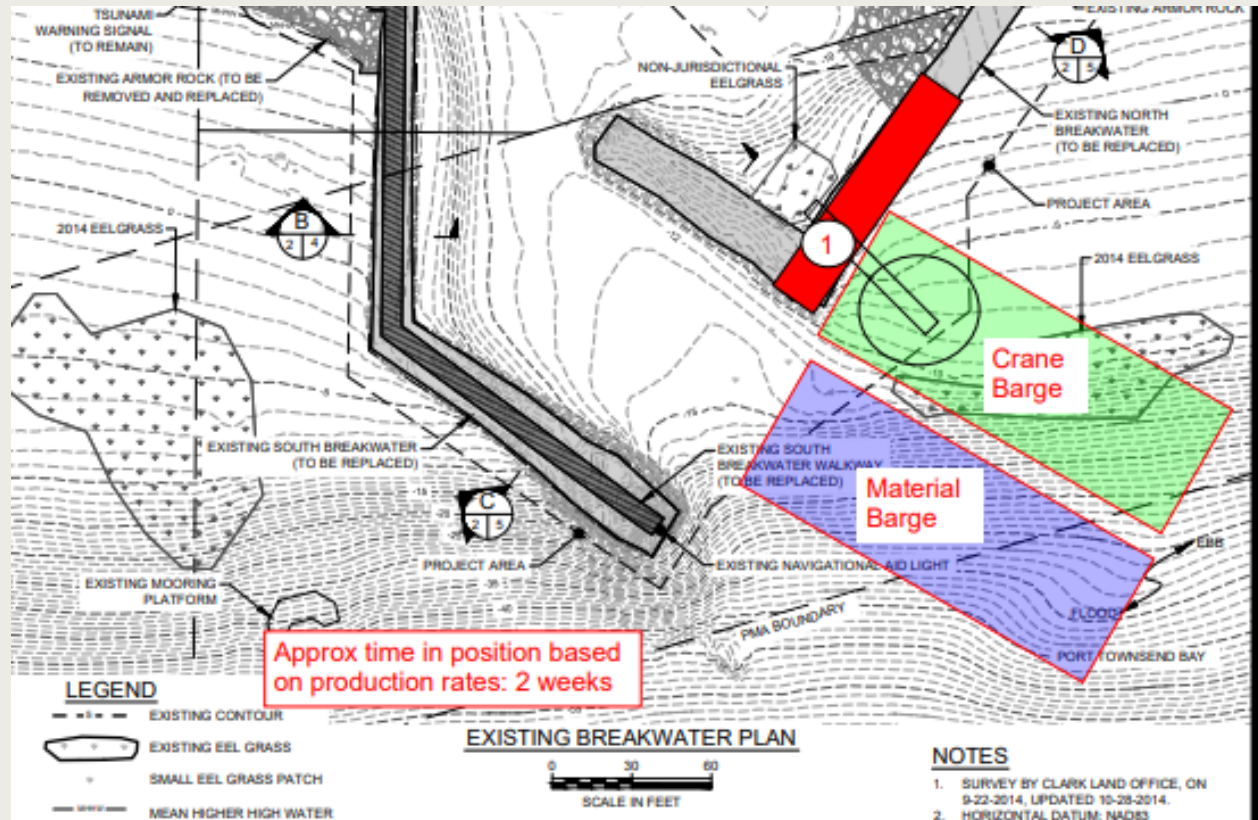


Construction Timeline of North Breakwater (Water access typical crane and barge)

Demo - 5 weeks
356 wood piles
5,428 cy

Rebuild - 12.5 to 14 wk
5,035 cy of Fill
197 new piles

Five Months of in-water
Work without delay



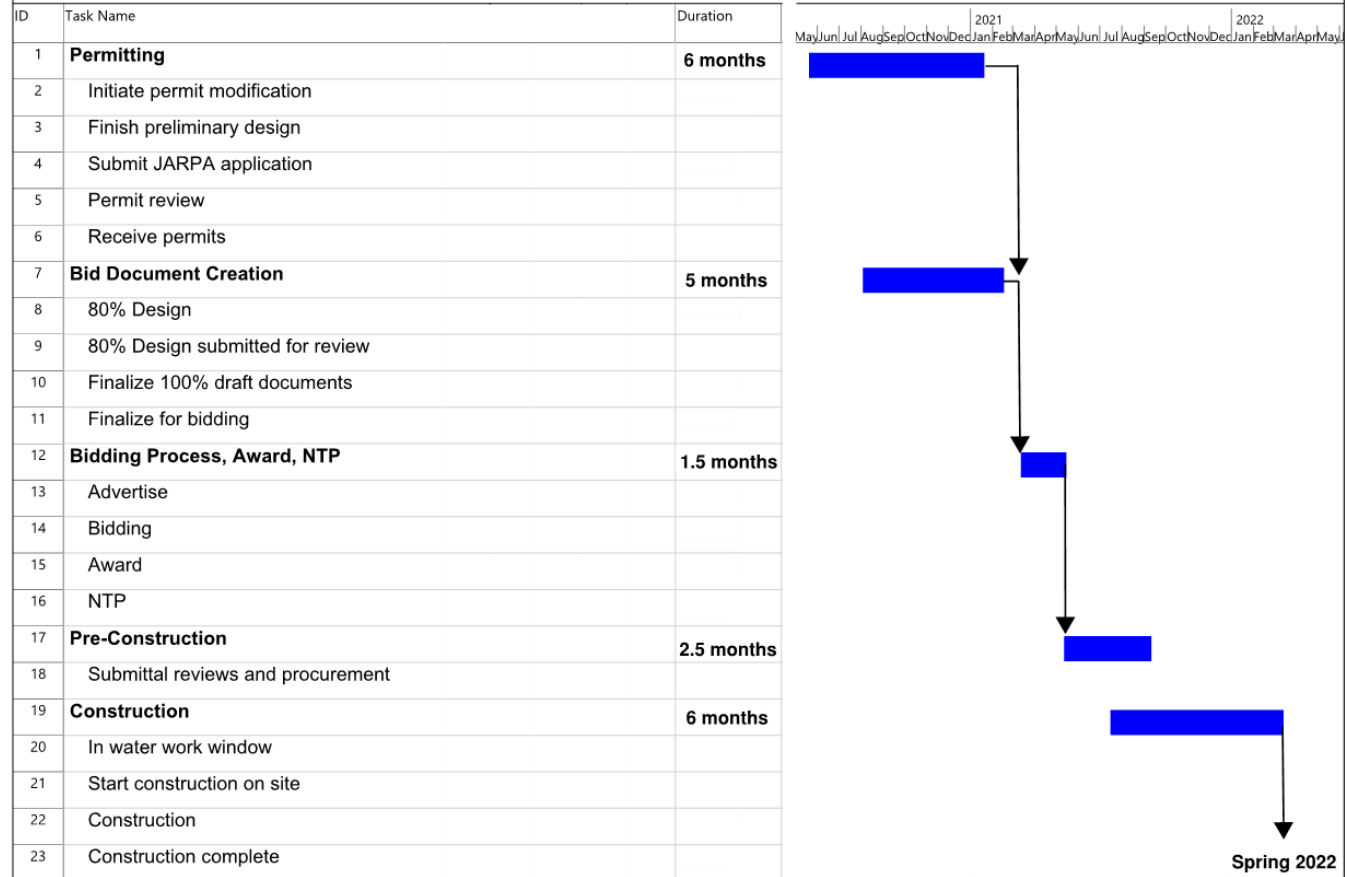
- North Jetty Construction Schedule

Pt Hudson Breakwater Replacement Project - Best Case Scenario

Estimated Permitting and Construction Schedule

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M
MOTT
MACDONALD



Note: Permit schedule assumes that a modification to the existing Corps permit is obtained, requiring an estimated 6-months. In the event a modification to the existing permit is not obtained, a new individual Corps permit would be necessary, adding an estimated 12 months to the permitting/construction schedule.

Project Costs

Total Project Costs (South and North)

- Construction Cost - **\$13.6 Million** (2020 dollars)
- Engineering, Permitting, Bid Docs - **\$400k**
- Construction Administration (South) - **\$250k**
- Construction Administration (North) - **\$250k**
- **Grand Total = \$14.5 Million** (2020 dollars)

Current Funding Sources (South and North)

- RCO - **\$880k (may be ineligible)**
- EDA Grant - **\$7.1M**
- Port Funding - **\$6.5 to \$7.4M**
- Grand **Total = \$14.5 Million**

Variables

- Costs assume two separate construction seasons which is most likely scenario due to funding and potential fish window restrictions
- Permitting to be a permit amendment or modification to existing permits.

Summary

Replacement Alternative

- Breakwater replacement alternative similar in style as existing breakwater with modern materials and walkway on south breakwater.

Permitting

- Permitting will include replacement of both breakwaters.

Final Design

- Final design will be for replacement of both breakwaters.
- We may break project into Two Phases. Constructing the North Phase first.

Schedule

- Earliest Start Date August 2021 with completion of the north breakwater March 2022.

Questions?

