Project Narrative

Introduction and Purpose

The Northwest Maritime Center is exposed to high wave energy in Puget Sound terms and has been impacted by several high-water storm in events in the recent years. Without action, the site will continue to experience erosion with additional impacts to existing infrastructure, likely within next 3 years. The proposed project design or preferred alternative provides a strategy to repair damage from erosion and prevent damage from future erosion.

The waterfront site is currently developed with a multi-purpose building and a hardscape staging area surfaced with pavers. A concrete stairway descends from the staging area to the beach. We understand that wave action during heavy storms has caused erosion around the plaza stairway, and the base and sides of the structure are exposed and unsupported in some areas. Soil was also eroded from beneath the pavers in one area along the top of the plaza stairway and from under the smaller (western) concrete pad.

The main observations and relevant information are summarized as follows:

- Upper beach erosion and toe scour with exposure and loss of foundation base rocks was observed at the northeast end of the concrete pathway to the beach, which provides wheelchair beach access.
- Toe line scour and base exposure were also observed along the toe of the concrete stairway leading to the beach. Similar toe line scour was seen at the beach leading to the paved concrete boat ramp.
- Decorative landscaping boulders that had previously been integrated into the concrete structure were undermined and displaced due to toe scour beneath the boulders.
- At least one large log (we understand other anchored logs were broken loose in storms and were removed prior to 2018) that had been originally installed and anchored at the upper beach had been displaced. One approximately 40 FT-long log was found partially stuck under the porch deck. Evidence of impact and abrasion between the log and the metal truss (deck supporting member) was evident. Other large and small logs and wood pieces were scattered on the upper beach/backshore.
- The electric box and wire conduit (HDPE pipes) at the base of the pier on the beach side were broken and deformed, apparently damaged by debris impact during the recent storms.

The absence of regular, naturally derived sediment supply from the surrounding shores to this site makes this site less resilient to erosive forces. The historical drift cell that ran for miles from the SW to NE to this site was interrupted by numerous, large overwater structures in the downtown Port Townsend waterfront, virtually eliminating all natural, littoral sediment supply. Unprotected beaches under current conditions at this site will likely continue to erode.

As all previously installed protection logs were detached during storms and the beach has lowered, leaving the two-story decks, and building more exposed to storm wave attack. The upper beach elevation could be further lowered in a future storm which would allow more wave energy to reach the structures. Considering the limited under-deck clearance, future extreme high-water storms would put the deck at the risk of under-deck wave impact (as occurs at the Cannery Building several blocks to the southwest).

Project Description

The preferred design alternative project is to repair the exposed foundation of the concrete pathway and beach stairs at the plaza and to protect the first and second floor deck supports after chronic beach erosion during major storms in the last 5 years. The repair will involve excavating upper beach sand and gravel at the undermined concrete step foundations and placing deeply buried, small, angular rock (quarry spall) and pouring a new concrete footing (all below grade) to fill the voids and deepen the foundation to avoid re-exposure of the foundation.

To prevent future toe scour and damage, existing upper beach sediment will be excavated, and cobble-gravel beach nourishment will be imported at the upper beach near the structure area to protect the structure against potential future toe scour. The cobble will extend as far waterward at elevation 7.7 FT MLLW, just above the MHHW line and be keyed below existing grade. Cobble will be placed starting 24 FT southwest of the existing per and 9- FT northeast of the pier, for a total length of 128 FT. Most of the excavated sediment will be placed on top the imported cobble in a 0.5 FT or slightly thicker surface layer.

Large boulders will be placed strategically as debris barriers to reduce wave and debris impact to deck and pier supports on the uppermost beach. A total of 8 3-man, 14 4-man, and 5 5-man builders will be used. Boulders will be placed on buried quarry spall rock placed at least 1.0 FT below existing grade.

The displaced boulders and eroded upper beach have resulted in undermining the north bank adjacent to the concrete stairway shall be repaired by the excavation of existing beach sediment at the existing structure's toe and the placement of quarry spall 9-21" below grade. Large boulders shall be placed scattered and in groups on beach grade.

Project Actions

The following lists the proposed project actions that are shown on the project design sheets (see design sheets):

1. ***Concrete Foundation Repair***
    a. Excavate toe sand at the concrete foundation.
    b. Form a new concrete step/footing at the base of the existing footing.
    c. Deepen and widen the foundation toe line and fill the voids under the exposed parts of the concrete foundation with quarry spalls to avoid re-exposure of the foundation.
2. ***Scour Control along Structure Toe Line on North Beach***
    a. Excavate existing beach approximately 1.75 ft below the existing grade.
    b. Introduce 1.5 ft minimum cobble-gravel beach nourishment at the upper beach near the structure. to raise the beach elevation and to protect the structure against toe line scour.
    c. Place 0.5 ft excavated beach sediment atop newly placed cobble.
    d. Place large boulders strategically as debris barriers to reduce wave and debris impact to structures.
3. ***Revetment Repair at North Bank Adjacent to the Concrete Stairway***
    a. Place quarry spall 9-21" below grade.

b. Place large boulders scattered and in groups on beach grade.

4. Protection of Porch Deck at South Beach and Pier Deck at its Connection to Shore

a. Protect Utility (water) pipes and supporting structural members beneath the porch deck, as well as the electric wire conduits beneath the pier.
b. Place quarry spall 9-21" below grade.
c. Place large boulders scattered and in groups on beach grade.

5. South Stairs Repair

a. Remove existing scattered boulders from the beach surface.
b. Excavate sand at and the edge of the concrete.
c. Add concrete footing below existing paving.

6. Mitigation and Rehabilitation

a. Remove rock boulders from the upper beach just northeast of the northeast end of the concrete stairway near the plaza—move to the eroded low bank immediately adjacent above elevation 11 FT MLLW.
b. Remove a portion of the armor rock on the intertidal surrounding the stormwater culvert along the southwest end of the site.
c. Install small (approximately 356 SF) planting area in uppermost beach/ backshore (see design sheets). This would involve planting American dunegrass (Leymus mollis) on the north side of the existing pier, in front of the paved terrace.