PORT OF BROOKINGS HARBOR
Special Commission Meeting
Thursday, October 24, 2019 • 10:00am
Port Conference Room Suite 202
16350 Lower Harbor Road, OR 97415

TENTATIVE AGENDA

Page

1. **CALL MEETING TO ORDER**
   - Pledge of Allegiance
   - Roll Call
   - Modifications, Additions, and Changes to the Agenda
   - Declaration of Potential Conflicts of Interest

2. **APPROVAL OF AGENDA**

3. **PUBLIC COMMENTS** (Limited to a maximum of three minutes per person. A "Public Comment Request", located near the entrance, must be completed and turned into the Chair prior to the beginning of the meeting.)

4. **ACTION ITEMS**

5. **INFORMATION ITEMS**
   A. None

6. **NEXT REGULAR MEETING DATE –** November 19, 2019, 6:00pm

7. **ADJOURNMENT**

ACTION ITEM – A

DATE:	October 24, 2019
RE:	Curry County Plan for Beachfront RV Park
TO:	Honorable Board President and Harbor District Board Members
ISSUED BY:	Gary Dehlinger, Port Manager

OVERVIEW

- Julie Schmelzer, Director of County Operations and Josh Hopkins, Park Director with Curry County will address the Board of Commissioners a plan for County maintenance and overseeing operation of facilities.

DOCUMENTS

- Beachfront RV Park Estimated Revenue Sharing, 1 page

COMMISSIONERS ACTION

- **Recommended Motion:**
  Motion to approve the Port Manager to begin negotiating for a proposed lease with Curry County Park Department for maintenance and overseeing operation of Beachfront RV Park facilities. Lease must be approved by Port of Brookings Harbor Board of Commissioners and Curry County Board of Commissioners.

- **Second Recommended Motion:**
  Motion to cancel Umpqua loan request and construction drawings for the new restroom building and five pull-thru sites.

Beachfront RV Park
Estimated Revenue Sharing

Fiscal Year	Profit	Expense	Net Income	Projected County Tax at 7%	Port 80%	County 20%
2009 - 2010	376,668	175,386	201,282		161,026	40,256
2010 - 2011	356,247	194,198	162,049		129,639	32,410
2011 - 2012	383,448	147,757	235,691		188,553	47,138
2012 - 2013	411,104	161,249	249,855		199,884	49,971
2013 - 2014	484,331	185,941	298,390		238,712	59,678
2014 - 2015	507,593	90,604	416,989		333,591	83,398
2015 - 2016	613,160	138,226	474,934		379,947	94,987
2016 - 2017	563,943	196,239	367,704		294,163	73,541
2017 - 2018	574,267	227,825	346,442		277,154	69,288
2018 - 2019	595,086	220,421	374,665		299,732	74,933
2019 - 2020 Budget	556,869	309,066	247,803	38,981	198,242	49,561

ACTION ITEM – B

DATE:	October 24, 2019
RE:	RV Park Conceptual Reconstruction Review
TO:	Honorable Board President and Harbor District Board Members
ISSUED BY:	Gary Dehlinger, Port Manager

OVERVIEW

- Mike Crow with Crow/Clay Associates will provide sample construction drawings of past projects of RV Park office, mini-mart and hotel room designs for review at the meeting.

- Mike Crow will provide a conceptual drawing of the RV Park for discussion and planning at the meeting.

DOCUMENTS

- None

COMMISSIONERS ACTION

- **Recommended Motion, if Board accepts Curry County Plan for the RV Park:** Motion to cancel the development of RV Park conceptual drawings for reconfiguration of the entrance and new RV Park office, laundromat, restroom, mini-mart and hotel type rooms.

ACTION ITEM – C

DATE: October 24, 2019

RE: Seawall Alternatives

TO: Honorable Board President and Harbor District Board Members

ISSUED BY: Gary Dehlinger, Port Manager

OVERVIEW

- Jack Akin with EMC Engineers/Scientists provided a report with alternative seawall designs for the Board to consider.

- Port staff believes the timber and H-pile design would be the better solution for protecting the RV Park from ocean debris during the winter. The timbers could be removed during the non-winter months to keep the view of the ocean. Height of the wall (H-pile) could be designed to be increased, if needed in the future.

DOCUMENTS

- EMC Recommended RV Park Protective Wall Alternatives, 15 pages
- Port Staff Recommended Location of H-Pile Log Seawall, 1 page

COMMISSIONERS ACTION

- **Recommended Motion, if Board accepts Curry County Plan for the RV Park:** Motion to stop developing a seawall design or pursuing a Pre-Disaster Grant until further notice.

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8/18/19

MEMO-8182019-01

To: Gary Dehlinger
Manager, Port of Brookings Harbor
Travis Webster
Harbormaster, Port of Brookings Harbor

From: Jack Akin
EMC-Engineers/Scientists, LLC

RE: RV Protective Wall Alternatives

Introduction

On 11/10/2017, at about 9AM, an incident was reported, which occurred at the Beachfront RV Park, 16035 Boat Basin Road. The report stated "Some waves breached the top of the road in some areas along the RV Park. None of the debris made it across the road into the sites or the restroom. Unplugged catch basin inlet at dry camp". Such incidents have not been uncommon during past storm seasons, presenting a nuisance. However, during 2018 and 2019 winter storm surges damage has occurred, debris (rocks, logs, sand) has washed across the road, into the restroom, into some sites, and has been strewn on the access roads and parking areas. Photos to the right were taken on January 18th, 2018.

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Causes

The RV Park surfaces (parking, structures and sites) tend to grade to lower elevations northward. Hence the west-adjacent sidewalk and existing rock wall also grade to lower elevations northward. Though, due to incoming tidal fluctuations and winds during storm surges, there has been from time to time ocean waves overtopping at southward locations along the rock wall, the greatest and most frequent overtopping occurrences have occurred along the northward, lower sections of the wall.

Constraints

When considering construction and/or repair alternatives, Port Management has noted customer concerns regarding the obstruction of ocean and beach views, as well as access to the beach areas from the Park.

Summary of Alternatives Considered

The alternatives provided in this analysis include sheet pile, H pile/concrete lag, embankment rock, Echo Block, Ultra block and H pile/treated wood beam construction.

In this narrative prices given in TABLE A below, for uniformity, are per lineal foot on a 10-foot height basis. Total estimated costs for actual design specifications are presented in TABLE B.

Sheet piling comes in several configurations but PS28 can be estimated for comparison purposes as shown in TABLE A per lineal foot. Sheet pile (cantilevered, no tie-backs) is the most expensive alternative presented in this report.

The second most expensive is the H pile/concrete lag wall. These two alternative provide the advantage of a vertical construction (narrow footprint).

Ultra-block and eco-block constructions are also vertical, but can be shifted and might need repair as damaged by energetic storms. Perhaps the construction that is most compatible with the existing would be the rap-rap alternative. Installation of sheet piling would likely require the removal of the existing sidewalk east adjacent to the existing wall, in order to make room for the installation. Thus a new sidewalk would have to be constructed. The same would be the case for any Ultra or Eco-block constructions. Public protection against sharp edges from sheet pile construction would need to be provided. Some marked advantages to utilizing rock are apparent. The existing wall is a rock construction. A design flaw in the existing rock construction is the undersizing of many of the rocks, not matching the energy put forth by severe winter storms. However, if smaller store rocks were removed and used for gradation fitting, and larger stones placed, a new rock construction could be integrated with the existing. Finally, construction of timbers, supported by H pile, is an interesting approach. It is likely this construction approach would not require the removal of the sidewalk to make room for the construction along the east edge of the existing rock wall.

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TABLE A

Wall Construction	Estimated Cost ($)/foot, 10 ft. Height Basis	Comments
Sheet Pile	2600	Armored by existing rock wall (cantilevered, no tie-backs). Soils are not cohesive. It is estimated that sheet pile would be driven to a depth more than double that of exposed length. Construction might be accomplished without the removal of the sidewalk. Continuous construction necessary for entire length of repair.
H-Pile/Concrete Lag	975	Armored by existing rock wall. H-piles to be driven to a depth at least double that of exposed length. Construction might be accomplished without the removal of the sidewalk. Construction might be accomplished without the removal of the sidewalk. Continuous construction necessary for entire length of repair.
Ultra Block	450	Armored by existing rock wall. Rock must be excavated and footing/key placed. Construction cannot be accomplished without the removal of the sidewalk. Construction can be partial.
H-Pile/Timber	425	Armored by existing rock wall. Construction can be partial.
Rock	350	Integrate with existing rock wall. Construction can be partial.
EcoBlock	200	Armored by existing rock wall. Construction can be partial. Rock must be excavated and footing/key placed. Construction cannot be accomplished without the removal of the sidewalk.
Sidewalk	260	Per linear ft., not on a 10 ft. height basis. Construction can be partial.

TABLE B

Wall Construction	Estimated Cost ($)	Estimated Dimensions of Construction
Sheet Pile	1,300,000	Estimate 520 ft. wide, 9 ft. long sheet piles, three feet above Park grade, $2500/ linear ft. (includes mobe/demobe). Assuming that construction can be accomplished without the removal of the sidewalk. Some moving and placement of existing rock necessary.
H-Pile/Concrete Lag	481,000	Estimate 520 ft. wide, 9 ft. long H-piles, three feet above Park grade, $925/ linear ft. (includes mobe/demobe). Assuming that construction can be accomplished without the removal of the sidewalk. Some moving and placement of existing rock necessary.
Ultra Block	461,500	Estimate 650 ft. wide, 9 – 12 $ft.^2$ faces per block, specify 24" thickness, built to one-to-three feet above Park grade, average $450/linear ft. (includes excavation of existing rock and footing/key). Construction cannot be accomplished without the removal of the sidewalk. Add $260/linear ft. for sidewalk removal and reconstruction.
H-Pile/Timber	234,000	Estimate 520 ft. wide, 9 ft. long H-piles, three feet above Park grade, $450/linear ft. (includes mobe/demobe). Assuming that construction can be accomplished without the removal of the sidewalk. Some moving and placement of existing rock necessary. Construction can be partial.
Rock	200,000	Integrate with existing rock wall. Construction can be partial. Estimate 450' length of rock placement. Estimate 650 cy to be placed. Assume 2000 – 5000 pound rock, utilizing existing rock for gradation. Some moving and placing of existing rock as necessary.
EcoBlock	299,000	Estimate 650 ft. wide, specify 18" thickness, built to one-to-three feet above Park grade, average $200/linear ft. (includes excavation of existing rock and footing/key). Construction cannot be accomplished without the removal of the sidewalk. Add $260/linear ft. for sidewalk removal and reconstruction.

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Recommendations

It is our opinion that, though there are advantages and disadvantages to each alternative presented, maximum utility, ease of construction and minimization of site preparation seems to be made available by the selection of a rock repair. Selection and leveling can be accomplished, integrating rock placement to provide required wall elevations. Beach access can be easily provided via stepped rock placement where desired. An added benefit is that the rock construction can be added to or re-oriented as desired, based on observations made in during subsequent storm seasons, without damaging previous work.

We would rank as the second choice the H-pile/Timber construction. H-piles can be placed intermittently, and timbers, if damaged, could be fairly easily replaced. Damage to wood beams don't result in large and growing stress cracks to any extent that can occur in concrete lags.

Rock Wall Construction - Patchwork

Approximate Plan View of Above Rock Wall Repair Elevation

Vertical Repair Construction - Continuous

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TECHNICAL SPECIFICATIONS

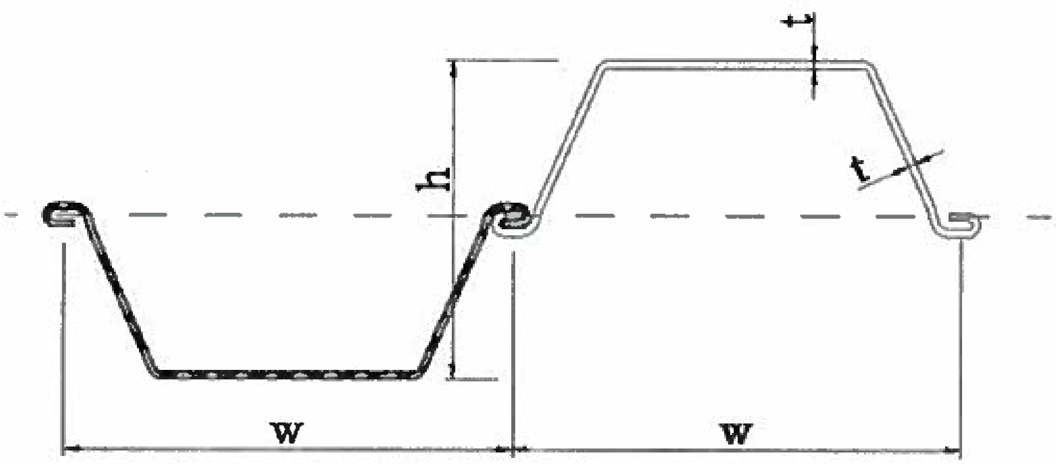
Cantilever Sheet Pile

Description

Cantilever sheet piles are piles that are installed without anchoring, driven in sequence to design depth along the seawall alignment. The interlocked sheet piles form a wall for permanent or temporary lateral earth support with reduced groundwater inflow.

Steel sheet pile is a rolled steel section consisting of a plate called the web with integral interlocks on each edge. The interlocks consist of a groove, one of whose legs has been suitably flattened. This flattening forms the tongue which fits into the groove of the second sheet. Commonly used steel sheet piles types are:

1. Larssen shapes



2. Z-type shapes
3. Straight web section

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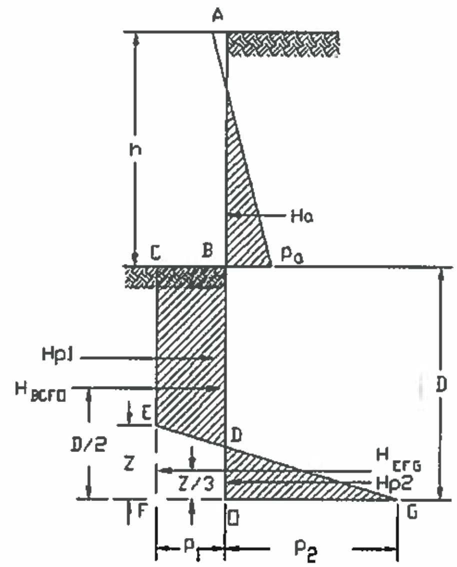
<u>Specifying Sheet Pile Profile and Total Length</u>

For cohesive soil, friction angle, f = 0, the sheet pile is supported by soil cohesion, C. Because cohesion, the soil can stands by itself at certain height without sheet pile. Since f= 0, lateral earth pressure distributes uniformly below excavation.



Referring to the diagram to the right, the maximum shear occurs at point B, at the bottom of excavation and/or at point D. The maximum moment occurs at a distance y below the bottom of excavation where shear equal to zero. The sheet pile section can be selected based on maximum moment and shear. The design routine calculates pile free standing height, lateral and active earth pressures, design depth, design pile length, maximum moment, modulus and thence sheet pile section.

If, for example, you assume a depth of excavation (D), of 10 ft., a unit weight of soil of 115 lb/ft^3 and a soil cohesion of 500 psf, a vertical pile, and 32 ksi allowable design stress for the sheet pile, you can calculate the free standing height, the lateral pressure at bottom of the pile, the total active force, assume a test depth, if calculated difference is close to zero, then calculate the length of the sheet pile, find the depth where the maximum moment, find the required section modulus and select the sheet pile section from, say, tables out of the USS Steel Pile Design Manual, which would be, in this case, a simple PS28 (S = 1.9 in^3/ft.) profile.

H-Pile (Soldier)/Concrete or Timber Lag Construction

Soldier Piles are steel H piles that are vertically driven or drilled into the earth at regular intervals prior to excavation. For excavation projects, as excavation progresses in stages, horizontal lagging in the form of timber or precast concrete is added behind the flanges to create the wall. The lagging transfers the pressures of the retained strata to the piles. The wall can be additionally reinforced by adding walers, or steel supports, between the soldier piles.

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Data Required for Soldier Pile Wall Design

As in the design of a sheet steel wall, data needed includes the nature of the soil, friction angle of the soil, density of the soil, passive and active allowable pressures, arching factors to use, and other recommendations which specifically related to the site. Finally, we need to choose cost effective beams. As recommended in this case, wood beams bring advantages.

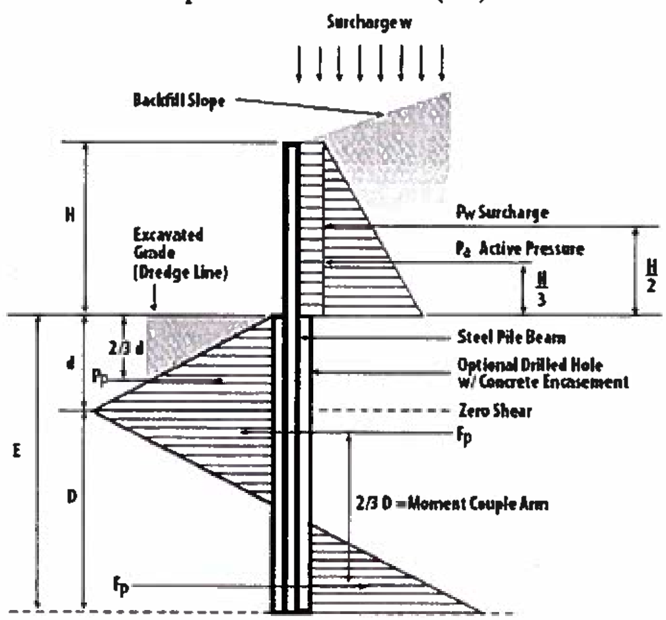
Soldier Pile Wall Design Procedures

In the design methodology, presented below, certain assumptions are made. First, it is assumed that the soil is non-cohesive or. Second, as in the above-described case using sheet steel piles, this procedure is applicable for cantilevered soldier pile walls, therefore using tiebacks is not accounted for in this methodology. So, the routine is:

1. Compute forces which are exerted by construction surcharges and pressure of active soil tributary to each soldier pile, Rankine formula could be used for calculation of active pressure coefficient (Ka).

2. Spacing of the piles is determined depend on beam size, embedment depth, and choosing of lagging. Several design calculations may be necessary to use to determine the best spacing option.

3. Determine embedment depth after both surcharge (Pw) and active pressure (Pa) is calculated. Figure to the right shows different forces which cantilevered soldier pile wall subjected to in a sandy soil.



The embedment depth (d) of the pile is computed using equation-1 and it is the function of passive pressure and arching factor which is denoted as (f) and taken as 0.08 but should not surpass 2.5.

Embedment Depth of Soldier Pile

Where: d is the effective depth at zero shears; Pp is the force which opposes and equal to (Pw+ Pa); SF is the Safety factor used for allowable passive pressure; *P* is the Allowable passive pressure; *D* is the hole diameter, or flange width, whichever is utilized. *A*: arching factor multiplier taken as (0.80).

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Various Forces Acting on Cantilevered Soldier Pile on Non-Cohesive Soil

4. Calculate maximum beam moment by taking moment summation above zero shear point. The following equation can be used straight away.

$$M_{max} = P_a(0.33H + 0.67d) + P_w(0.50H + 0.67d) \rightarrow \text{Equation-2}$$

5. The maximum moment is opposed by passive pressure couple consisting of $0.67D{*}F_p$, so the required depth is calculated as:

$$D = \sqrt{\frac{Maximum\ momnet{*}SF}{(P{*}D{*}A{*}D{*}0.25)0.67}} \rightarrow \text{Equation-3}$$

and required embedment depth which is denoted as (E) in figure on Page 8, is combined of (D+d), and as rule of thumb it can be taken between 1.3H to 1.5H.

6. Load resistance factor design (LRFD), which is achieved by maximum moment times load factor of 1.6, is used to select various beam options from AISC 13-edition, LRED, steel design handbook after choosing most economical and available beam.

7. Choose lagging which must be treated wood and conservative fiber stress is 6.2 MPa. Lateral earth pressure Soldier Pile Retaining Wall Design Calculations is decreased over the wall height from the base to the top. Therefore, different lagging thickness can be used at various depths. Due to soil arch action between beams, 80% of the simple moment of each lag can be used in addition to providing 25 cm space between lags for allowing water drainage.

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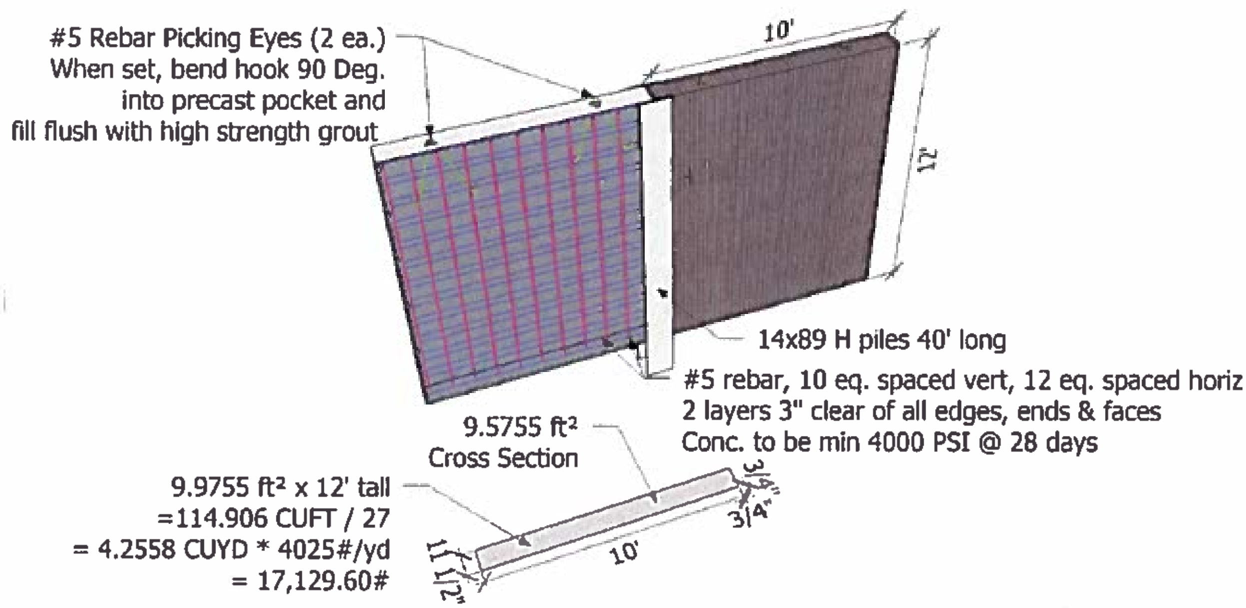
Illustration of H beam/Concrete Wall Section – Note H-beam and lagging type (concrete, timber) and dimensions are calculated per the retaining needs.



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Ultrablock and EcoBlock Walls

Ultrablock units are an interesting replacement for small block walls as an installer is able to place 12 square feet of face at a time.

Note that the integration of stout, industrial or commercial fencing into alternatives should be considered.

Installing Ultrablock construction is not difficult, but should be accomplished using good engineering practice. The foundation trench is first excavated to the dimensions indicated on the construction drawings. A qualified engineer should inspect and approve the reinforced zone and leveling pad foundation soil subgrade in order to ensure adequate bearing capacity. Foundation subgrade soils and any backfill materials are compacted to a minimum of 95 percent Standard Proctor Dry Density in accordance with ASTM D698-98 before placing the leveling pad.

The leveling pad should consist of 6 inches thick layer of ¾-inch minus well-graded aggregates compacted to 95% of ASTM D 1996 modified proctor density, unless specified otherwise by the design engineer.

Installation should always be in accordance with manufacturer guidelines. A detailed installation guide can be found online (www.ultrablock.com). A track-mounted excavator is the ideal equipment for block installation. A wire rigging with swivel hooks, OSHA approved and rated for weight of the blocks, can be attached to the excavator and used for lifting, moving, and placing the blocks. The contractor should very carefully place the first course of Ultrablock units.

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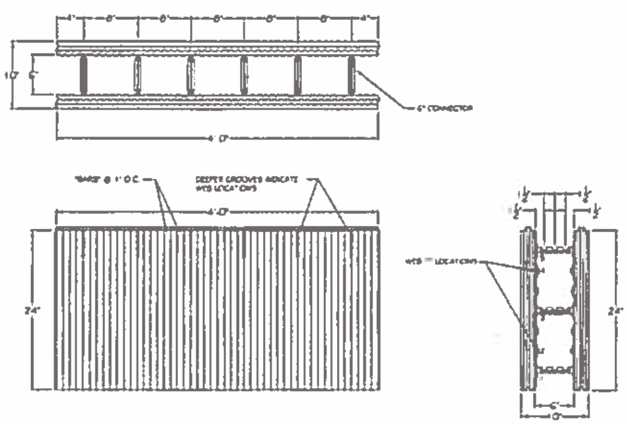
Block placement should start at the lowest elevation. At the start of the wall, make a line perpendicular to the face of the wall so the first block can be placed square to the wall face. Set blocks at the back of the wall first, i.e. if the width of the wall base is larger than the block width, then the first block shall be place at the back followed by the front block.

The drainage backfill needs should be assessed. Retained backfill material should be placed in maximum lifts of 10 inches and compacted to a minimum 95 percent Standard Proctor Dry Density in accordance with ASTM D698-98.

EcoBlock Construction

The major constituents of the Eco-Block are recycled glass and recycled aggregate from construction and demolition waste. Apart from that, a small quantity of photocatalyst is used on the surface layer of the eco-block. A mechanized molding method is used for producing the Eco-Block. The materials are mixed with water and fly ash in a fixed proportion. Then the mixed materials will be molded under a combined vibrating and compacting action. Before put into use, the eco-block needs to be cured under suitable condition.

On the surface layer there is a special coating made from titanium oxide (TiO2). When activated by the sunlight, the titanium oxide can catalyze the decomposition of nitrous oxides into oxygen, water, sulphur, nitrates and other non-toxic solid compounds which can be washed away by water.



Ecology Blocks is a term also often used for large concrete blocks, which are manufactured from left-over or unused concrete. Concrete, that in years gone-by would have been dumped and wasted or hauled to a land fill site, is saved and turned into a useful construction product. The blocks are cast into either a half block or a full block and use nearly a half or a full yard of concrete respectively. The dimensions for these blocks are 2' X 2' X 3' for a half block and 2' X 2' X 6' for a full block (see some examples below).

Each block is cast with a 3" radius tongue and groove, for interlocking stability, in stacking applications. The full blocks weigh approximately 3850 lbs and the half blocks are 1900 lbs. There is a picking eye of #5 rebar located in the spacing between the tongues in the top of each block. This picking eye is suitable for loading, unloading and for placing the blocks with a crane or backhoe capable of lifting and moving 4000 lbs, in the case of a full block.

Rock Wall

The rock that would be recommended for this project, if the rock wall alternative were selected, would be specified to follow test requirements found within AASHTO 85 (Apparent specific gravity, percent absorption); ODOT TM 208A (degradation);and ASHTO T 104 (soundness). All rock specified in this project must be angular in shape, and the thickness of any single rock shall not be less than one third of its length. Round rock will not be accepted unless authorized by the engineer of record.

The rock must meet the gradation requirements for the class specified, be free from overburden, spoiled, shale and organic material. Non-durable rock, shale or rock with shale seams is not acceptable. Class 2000 Rock is, for example, comprised of rocks that are 20% by weight of 1400 pounds to 2000 pounds, 30% by weight of 700 to 1400 pounds, 40% by weight 40 to 700 pounds and 0 to 10% 0 to 40 pounds.

Either a filter blanket of 16 inch layer of class 50, or specified filter fabric will be laid beneath the rock. A clamshell, orange peel bucket, skip or similar approved device will be used which will contain the rock material to its final destination.

The longitudinal extent of this repair should be continuous for a distance greater than the length that is impacted. The vertical extent of protection required for this revetment includes design height and foundation or toe depth. The design height of the rock installation is to be equal to the design high water elevation (King tide plus storm surge) with adequate freeboard to accommodate wave action, super elevation from the channel bend, hydraulic jump, and flow irregularities, plus erratic phenomena such as unforeseen embankment settlement, accumulation of trash and debris from the ocean.

All work is to be accomplished "dry", meaning that work will be scheduled to be done above tidal waters at all time.

Sincerely

Jack (John) Akin, MS, PE, IC, HMS, CAI
EMC-Engineers/Scientists, LLC

REGISTERED PROFESSIONAL ENGINEER
42850PE
OREGON
JOHN (JACK) A. AKIN
RENEWAL: 12/31/19


H-Pile with Logs placed approx. 3-feet from existing sidewalk.
Remove rocks and install concrete sidewalk in space.


H-Pile with Logs placed approx. 3-feet from existing sidewalk.
Remove rocks and install concrete sidewalk in space.