MEMORANDUM

DATE: March 6, 2017

TO: Joe Brogan and Stephanie Weir, Foster Pepper, PLLC

FROM: Jon Houghton, Ph.D., Hart Crowser, Inc.

RE: **Potential Effects of Partial Removal of New Shoreline Protection on Runstad Property on Blakely Island**
17921-00

This technical memorandum was prepared by Jon Houghton, PhD, a professional marine biologist with more than 40 years of experience in the field of nearshore marine biology in the Pacific Northwest. In accordance with SJCC 18.35.130(G)(3)(f)(vii) the qualifications of Jon Houghton meet the San Juan County definition of a "qualified professional".

During the winter of 2010–2011, following a period of heavy rain and shoreline erosion, two sections of shoreline were stabilized (the Project) after multiple sloughing events along the Runstad property shoreline on Blakely Island, Washington. The landowner is currently seeking an after-the-fact exemption determination for a Shorelines Substantial Development Permit (SSDP), and, alternatively, a SSDP that would allow the Project to remain in place. Despite the fact that the Applicant believes bank conditions in Reach 6 warrant stabilization, he has voluntarily agreed to remove natural, rounded boulders placed along Reach 6.

At the request of San Juan County, this memo evaluates the potential short- and long-term, adverse effects on ecological resources of removal of a portion of the Project, specifically, removal of the natural rounded boulders on the western portion of the property (Photo 1). This reach was identified as Reach 6 by the Washington Department of Fish and Wildlife (WDFW) in their Biological Report from April 11, 2011 (sketch attached). Specifically, the objectives of this memo are to:

- Provide a complete narrative of the removal work;
- Address temporary impacts of the removal to Fish and Wildlife Habitat and Conservation Areas (FWCA);
- Address erosion control measures after removal is complete;
- Discuss where removed materials (rock and fill, etc.) will be placed;

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- Determine whether Hydraulic Project Approval (HPA) is required for removal; and
- Identify a project timeline.

Background and Existing Conditions

Background

To assess the potential effects of removing all or a portion of the Project, we must first describe the beach in this reach as it now exists, approximately 6 years after Project construction in the winter of 2010–2011. During construction, heavy equipment was operated on the beach in Reach 6 to place a number of rounded boulders on a relatively moderate slope and in front of a low scarp where wave action was eroding the toe of the slope. We assume that this erosion was similar to that which continues and is evident in Reaches 5 and 7 on either side (e.g., Photo 2). The Reach 6 boulders are mostly in contact with each other, with soil in the interstices in some places (Photos 3 through 6). Natural vegetation, dominated by grasses including dune grass, has colonized these interstices (Photos 3 and 6). It is unclear from existing photographs or site inspection whether the largest boulders along the toe of this slope (Photo 5) were in place before the 2011 work, or not. Some boulders appear to be eroding from the native bank material in the adjacent Reach 5 (Photo 7), so it is quite possible that some of these boulders along the ordinary high water (OHW) line in Reach 6 were present before the work occurred. The applicant reports that, indeed, some natural boulders existed along the toe of the slope in Reach 6 prior to Project actions. As of August 2016, the embankment in Reach 6 appears to be stable. Boulders seem for the most part to remain as placed, and no erosion of the underlying bank is evident.

Equipment operation in the intertidal zone in early 2011 likely caused considerable short-term disturbance of substrates and the limited epibiota and infauna that existed on the middle to upper beach at this location. At the time of our first low-tide site visit (January 2013), evidence of beach disturbance had largely disappeared. Wave and tidal action had resorted beach sediments into gradients that appeared natural for a beach of this slope and exposure. A few remaining quarry spalls noted on the western portion of the beach were removed shortly thereafter.

Existing Conditions

During multiple low-tide visits to the site in 2013–2016, the beach continued to exhibit natural features and seasonal changes similar to those expected on undisturbed beaches. In late summer 2013, we conducted a delineation of the OHW line on the site that showed the lower exposed rock of the newly constructed Project to be above OHW. This delineation and accompanying photographs are provided as Attachment 1 to this memorandum. The WDFW Area Habitat Biologist has agreed with this OHW determination. No substantive changes in

these conditions were observed during a recent (August 15, 2016) site visit. Since construction, the accumulation of sediment, drift logs, and growth of vegetation on the limited backshore in front of the Project (Reaches 3, 4, and 6 in attached sketch) indicate that the Project is having no ongoing adverse impact on the nature of the beach sediment and coastal processes of the beach.

Fish and Wildlife Habitat and Conservation Areas (FWHCA) on Site

The Runstad shoreline has the following types of FWHCAs (SJCC 18.35.115):

A. **Areas with which endangered, threatened or sensitive species have primary association.** Marine waters adjacent to the site support several species of salmonids and rockfish listed as endangered or threatened under the federal Endangered Species Act (ESA). Additional sensitive species that may occasionally feed in (or over) waters inshore of Armitage Island ("Armitage Bay") and along the project site include Peregrine Falcon, Common Loon, and Marbled Murrelet. It is unlikely that southern resident orcas or other whales would enter these confined waters, but Steller's sea lion could occasionally do so.

B. **Shellfish areas.** Various shellfish species (cockles, butter clams, littleneck clams, purple varnish clams, and horse clams) are present in low densities at mid- to lower-intertidal elevations and subtidally along the shoreline downslope from Reach 6. There is no commercial harvest of these species on the site but limited harvest by local residents may occur from time to time. Dungeness crab and pandalid shrimp likely also move into tidal areas below Reach 6 during higher tides.

C. **Kelp and eelgrass beds.** Kelp (mostly *Saccharina latissima*) and eelgrass (*Zostera marina*) are present on the lower intertidal beach below about 0 feet mean lower low water (MLLW). Kelp is typically attached to a hard substrate such as cobble or rock, while the eelgrass is found in areas with loose sand or mixed silt, sand, and shell habitat.

D. **Forage fish spawning habitat.** Forage fish spawning surveys were conducted in suitable habitat for spawning by surf smelt, Pacific sand lance, and Pacific herring along the entire Runstad shoreline. Surveys were conducted monthly from January through April 2013, October through December 2014, and twice monthly in August and September 2016. Surveys were conducted in accordance with the extant WDFW protocols by a biologist trained in those protocols. No evidence of actual spawning was found, but habitats sampled generally included substrates appropriate for surf smelt spawning.

E. **Habitats of local importance/critical salt water habitats.** This category essentially encompasses all nearshore marine waters of the county since ESA-listed salmonids utilize (have a primary association with) all such waters.

F. **Areas with which select species (see SJCC 18.35.115 (I)) have a primary association.** Of the species listed, Great Blue Heron occasionally forage along the shorelines during lower tides and Pigeon Guillemot may forage in open water areas north of Armitage Island. No nesting sites for either species are known within the area around Armitage Island.

Short-term (Temporary) Effects of Boulder Removal

Removing boulders from the shoreline and bank in Reach 6 would be accomplished by an excavator with a thumb on the bucket, working from the upland (lawn) in front of the existing house. Boulders to be removed would be pre-marked in the field by a team made up of the WDFW area Habitat Biologist, and the Applicant's biologist and coastal engineer. This team will ensure that the work accomplishes the habitat goals of boulder removal without unduly destabilizing the shoreline. Each boulder would be picked from the shoreline or lower slope and placed in a waiting truck or in a stockpile area for removal to an upland area on the property. Some excavation by hand or machine may be needed to allow the thumb to gain a hold on some boulders. Where boulder removal leaves a cavity on the lower bank or shoreline, the cavity would be filled with a habitat mix of sandy gravel into which dune grass or other appropriate vegetation would be planted.

Depending on the reach of the excavator, and the stability of the upland upon which the excavator must work, removal of the lower-most boulders might not be possible from the uplands. As noted above, it is unclear whether these boulders, the largest of which likely have their invert elevations below the existing OHW, were present before the other boulders were placed on the slope above OHW. In any case, removal of these boulders might require work from the beach and would destabilize the shoreline at and below the OHW line. To remove the larger boulders at OHW, it likely would be necessary to operate tracked equipment on the beach. Beach access might be accomplished either from a landing craft-type barge, or by re-opening the historically used ramp at the west side of Reach 6 (Photo 8). As shown in Photo 8, this area has been revegetated with a dense stand of dune grass since its last use in 2011. Disturbance of the beach would likely be comparable to that of the initial project construction and considerable in local short-term severity. Removing all of the boulders from the shoreline and bank in Reach 6 would require an HPA from WDFW because of the possible need to operate heavy equipment on the beach. Because of these complications, and because of the limited, if any, potential ecological gains to be derived, Hart Crowser does not recommend removal of

larger boulders from the lower slope and shoreline that cannot be accomplished working from the uplands.

Removal of boulders from steeper bank areas above OHW would require implementation of other measures to control erosion from surface runoff. These measures could include placement of a soil/gravel mix in cavities from which boulders are removed, placement of jute mats or coir logs, hydroseeding, and regrading to divert surface water away from destabilized areas. Where slope allows, plantings of riparian grasses and shrubs would provide longer-term slope stability and reductions in runoff. Removal of all the boulders around the base of two large Douglas firs at the shoreline (Photos 4 and 9) would place these key riparian trees in immediate jeopardy of falling and is not recommended.

As described above, there is a significant potential that removal of all boulders and the associated need for operating heavy equipment on the beach would have a number of short-term (temporary) adverse effects on the physical and ecological functions of the shoreline and riparian zone in Reach 6:

- Disturbance of the existing riparian zone and vegetation, likely requiring aggressive erosion-control measures;
- Disturbance of the shoreline at OHW, leading to development of an eroding scarp along and beyond the present OHW;
- Potential loss of two large Douglas Fir trees that dominate the riparian vegetation of the reach;
- Disturbance of the upper beach surface (associated with need to remove large boulders at OHW) including areas of potential forage fish spawning habitat;
- Kelp and eelgrass could be affected by maneuvering of barges needed to bring heavy equipment to the beach to handle large boulders.

Clearly this work would have some level of temporary effect on most of the listed FHWCA. Care would be taken during boulder removal to minimize disturbance of existing riparian vegetation (e.g., above the eastern portion of Segment 6; Photo 3), as this area has regrown well in recent years. Based on beach recovery following the 2011 work on the beach, it is expected that a similar trajectory of beach recovery would occur following boulder removal. Nonetheless, Hart Crowser recommends a partial removal of these boulders as described above, with WDFW participation in selection of boulders to be removed.

As noted above, removed boulders would be placed elsewhere on the Runstad property, above OHW. Some might be suitable for use in landscaping on the property including the immediate

bank and lawn above the site. Since complete boulder removal would likely require equipment operation on the beach during low tide, some of the removed boulders, a portion of which were originally in the intertidal zone, could be returned to the beach, if desired by the resource agencies. Details of how and where these boulders should be placed would be worked out with WDFW biologists.

Long-term Effects

In the long-term it is expected that, if all of the boulders were removed from OHW and up the embankment in Reach 6, there would be substantially higher rates of shoreline erosion at the site. The exact nature and rates of this erosion would depend in part on any measures enacted to stabilize the shoreline and the bank in the absence of the boulders. Eroding scarps in the natural soils east and west of Reach 6 (Photos 2 and 7), strongly suggest that the toe of the embankment in front of the new house would be eroded by storm waves and log battering. The two large Douglas firs at the water line would certainly fall (Photo 4). There would be increased sediment delivery to the beach; it is probable that these inputs would include episodic releases of large amounts of sediment as slope failures occurred and the scarp along the toe of the slope increased in height. At some point, it is likely that measures to slow this erosion would be required to protect the house on the property.

Recommended Course of Action

Because of the short- and long-term effects of boulder removal in Reach 6, Hart Crowser recommends a removal alternative, with participation by WDFW in determining precise boulders to be removed. Under this course of action, the majority of the boulders placed in Reach 6 would be removed. The larger boulders at OHW, some of which may have been present before 2011, may be left in place where they would continue to stabilize the toe of the embankment. The majority of boulders around the bases of the two large fir trees should also remain to protect those trees, although the upper boulders around those tree bases (e.g., Photo 9) would be removed. Where appropriate, i.e., where reasonably sustainable, spaces created between remaining boulders would be filled with soil and planted with riparian grasses or shrubs. The lower portion of the slopes would be planted primarily with dune grass (*Leymus mollis*) and tufted hair grass (*Deschampsia cespitosa*). At higher elevations, these species would be mixed with appropriate shrubs such as red current (*Ribes sanguinolenta*), Salal (*Gaultheria shallon*), Oregon grape (*Mahonia* spp.) or native rose (*Rosa* spp.).

The short- and long-term impacts of this alternative would be substantially reduced from those resulting from full boulder removal. Erosion of the upper bank would be largely eliminated by the riparian plantings among remaining and newly placed boulders farther up the slope. No heavy equipment would be operated on the beach. The two large firs would be expected to

remain standing. The riparian zone would be enhanced. It is also expected that coastal erosion into the embankment in front of the house would be curtailed.

It is anticipated that this work would be completed in late summer to early fall 2017, with riparian plantings completed by March 2018. Depending on this final statement of work, an HPA may not be required (i.e., if all work is above OHW and approved by WDFW).

Attachment

Attachment 1 – OHW Memorandum (11/08/13)
Attachment 2 – WDFW Shoreline Reach Map

Photographs

Photo 1 - Beach house on Runstad property, Reach 6 boulders left side of the image; 8/15/16.

Photo 2 - Eroding scarp in Reach 7, note 5.5-inch pen for scale; 8/15/16.

Photo 3 - Reach 6 east end, looking west; 8/15/16.

Photo 4 - Reach 6, eastern and central portion showing fir trees at risk; 8/15/16.

Photo 5 - Reach 6 to east showing large boulders above OHW; 8/15/16.

Photo 6 - Reach 6 to east; 8/15/16.

Photo 7 - Boulder from eroding scarp in undisturbed Reach 5; 8/15/16.

Photo 8 - East toward Reach 6; Former beach access was in area of dense dune grass, center; 8/15/16.

Photo 9 - Reach 6 Boulders protecting fir tree base: 8/15/16.

MEMORANDUM

DATE: November 8, 2013

TO: Joe Brogan, Foster Pepper, PLLC

FROM: Jon Houghton, Diane Hennessey, Hart Crowser, Inc.

RE: **Ordinary High Water at Runstad Property on Blakely Island**
17921-00

This memo describes the results of a site visit to the Runstad property on Blakely Island, Washington on September 10, 2013. The purpose of this visit was to examine the upper shoreline on the property and to use the guidance of the Washington Department of Ecology (Olson and Stockdale 2010) to determine if the toe of a newly constructed reach of bulkhead is above or below the ordinary high water (OHW) line. The visit was conducted between 1200 and 1330 when the predicted tide (based on Thatcher Pass) ranged between +5.2 and +4.3 relative to mean lower low water (MLLW). The preceding lower high tide had been +6.6 feet MLLW at 0940 am, and the preceding higher high tide had been +7.6 MLLW at 1953 on September 9.

Primary factors used in our OHW determination were:

- Presence and stability of drift wood below the wall;
- Wrack lines; and
- Nature of vegetation below the wall.

Definition of OHW

Per Olson and Stockdale (2010) the OHW mark, as used for administering the Shoreline Management Act: (SMA), taken from the SMA (RCW 90.58.030(2)(b) and WAC 173-22-030(11)) is as follows:

"**Ordinary high water mark** on all lakes, streams, and tidal water is that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1,

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1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department: PROVIDED, that in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water."

Olson and Stockdale note further that "the OHW [mark] on any particular site is not a static line or level, such as a surveyed mean tide elevation or mean high water elevation, but rather is the dynamic edge of the waterbody under legal jurisdiction of the [SMA]. As such, the OHW [mark] may change over time due to natural events or as a result of permitted actions."

Field Results

Our field determination reflects the OHW line on the Runstad property as evidenced on the day of our visit and does not necessarily coincide with the spatial location of the line prior to construction of the new wall that is the subject of the present permitting action. Our field survey does, however, provide some evidence regarding the probable location of that pre-construction OHW line. Construction of the "new" wall was completed in early 2011providing three growing seasons for vegetation to become established below the wall.

A perspective of the beach in question is provided in Photographs 1 and 2, taken from near the top and bottom, respectively, of a pathway that leads to the beach east of the new wall area. In the foreground is a sandy patch of beach below previously existing "old" riprap. From the base of the path (lower two steps in the lower right corner of Photograph 2), a number of drift logs are evident at the base of the old wall, with several patches of dune grass (*Leymus mollis*) visible both among and in front of the logs. Based on the vegetation indicator species in Appendix B of Olson and Stockdale (2010), this species is expected to be found at or above OHW. Other species in this area include common velvetgrass (*Holcus lanatus*), Siberian wheatgrass (*Agropyron fragile*), and reed canarygrass (*Phalaris arundinacea*). This vegetation distribution, coupled with the highest wrack line visible, clearly indicate the location of the OHW line at this point on the beach.

The new wall section in question begins just beyond (west) of the patch of cobble upper beach that is evident in both Photographs 1 and 2. That transition area is shown in Photograph 3 (just in front of first clump of alders [*Alnus rubra*] above the wall). Closer views of the eastern most section of the new wall (Photographs 4 and 5) show multiple lines of drift logs and herbaceous vegetation that has grown since the wall was installed. Plants that were interspersed within the logs at the base of the new wall include dune grass, bedstraw (*Gallium sp.*), European searocket (*Cakile maritima*), trailing blackberry (*Rubus ursinus*), common velvetgrass (*Holcus lanatus*), Siberian wheatgrass, and reed canarygrass (*Phalaris arundinacea*). While a few of these plants (e.g., European searocket) may

also be found below OHW, the assemblage is dominated by species found at or above OHW. A complete list of species found on the upper beach below the new wall section is provided in Table 1, along with their respective distributions with relation to OHW, as reported by Olson and Stockdale (2010). The highest line of old wrack is also coincident with the outer most drift wood pieces. Again, this indicates that the OHW line is well below the toe of the new wall in this area.

Photograph 5 illustrates that there is a near-continuous line of drift logs along the base of the new section of the wall stretching to the west. Although the line of logs is narrower in the central part of the new wall (Photographs 6 through 8), dune grass, trailing blackberry, and Siberian wheatgrass continue to be found on the beach below the wall. Photographs 7 and 9 show the blackberry vines descending down the wall and trailing along the upper sand at the base of the wall in this area. Photograph 9A is a closeup showing green leaves on the vine at beach level; in other places, the tips of this species were blackened where they had extended down the beach to OHW. Photograph 8 shows a reach of beach (approximately 20 linear feet) that lacked embedded logs at the time of the survey, however, the highest line of old wrack is shown to lie out from the toe of the wall. We therefore conclude that the OHW line is this area, while closer to the toe of the wall than it is in the adjacent areas, remains below the toe of the wall.

In the area immediately east (Photograph 10) and west (Photograph 11) of the bedrock outcrop the toe of the new wall is approximately 1 foot above OHW as indicated by the multiple lines of embedded drift logs and the variety of vegetation species found among those logs. Vegetation observed in this area included most species listed above, plus salt grass (*Distichlis spicata*), lance-leaved plantain (*Plantago lanceolata*), maritime plantain (*Plantago maritima*), hawkweed (*Hieraceum sp.*), curley dock (*Rumex crispus*), and field horsetail (*Equisetum arvense*).

Apparent Wall Construction Approach

Nothing in our field results reported above or in our general observations of the riparian condition behind the new wall section suggests that the wall was constructed below the pre-project OHW line. The slope of the present riparian zone extending from the top of the wall, if extended at a similar angle, as it might have existed before construction, would intersect the present beach line, several feet in front of the present wall location; this is illustrated in Photograph 5 and other photographs. This would tend to suggest that the wall was constructed by cutting into the existing bank slope so that the toe rocks could be placed behind the then extant OHW.

Additional Observations

We have compared photographs provided in the WDFW Case # WA-11-001018 (identified as being provided by the contractor Needham) with those taken on January 15 and September 10,

2013. In several reaches of the central portion of the constructed wall, we can identify specific boulders incorporated into the wall in both photograph sets (compare Photograph 12 with Needham Photograph 2). In all such cases, the recent line of beach sediments is higher on the boulders in the more recent photographs. This again suggests that the wall was constructed behind the then extant OHW line and that ongoing natural processes have rebuilt the beach face and storm berm up to re-establish the OHW line in front of the wall.

Reference

Olson, P. and E. Stockdale, 2010. Determining the Ordinary High Water Mark on Streams in Washington State. Second Review Draft. Washington State Department of Ecology, Shorelands & Environmental Assistance Program, Lacey, WA. Ecology Publication # 08-06-001.

Attachments:
Table 1
Photographs 1 through 12

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Table 1 – Vegetation Species Observed on the Beach Below the New Wall and Typical Distribution As It Relates to the Ordinary High Water Mark

Plant Species – Common Name	Scientific Name	Below OHWM[1]	At/Straddle OHWM[1]	Above OHWM[1]
Bedstraw[2]	*Gallium sp.*			
Bull thistle	*Cirsium vulgare*			X
Colonial bentgrass	*Agrostis capillaries*		X	X
Common velvetgrass	*Holcus lanatus*		X	X
Curley dock	*Rumex crispus*		X	X
Dune grass	*Elymus mollis*		X	X
European searocket[2]	*Cakile maritime*			
Field horsetail	*Equisetum arvense*	X	X	X
Hawkweed[2]	*Hieraceum sp.*			
Lance-leaved plantain	*Plantago lanceolata*		X	X
Maritime plantain	*Plantago maritima*	X	X	
Reed canarygrass	*Phalaris arundinacea*	X	X	X
Saltgrass	*Distichlis spicata*	X	X	
Siberian wheatgrass[2]	*Agropyron fragile*			
Trailing blackberry	*Rubus ursinus*			X

[1]Based on the vegetation indicator species in Olson and Stockdale (2010) *Determining the Ordinary High Water Mark on Streams in Washington State*, Appendix B.
[2]Not on the Olson and Stockdale (2010) report Appendix B list.

Photograph 1 – Runstad Beach overview

Photograph 2 – Runstad Beach shoreline

Photograph 3 – Transition from old to new wall (at base of alders)

Photograph 4 – New wall east end (1)

Photograph 5 – New wall east end (2)

Photograph 6 – New wall center to east

Photograph 7 – New wall center to west

Photograph 8 – New wall center; farther west

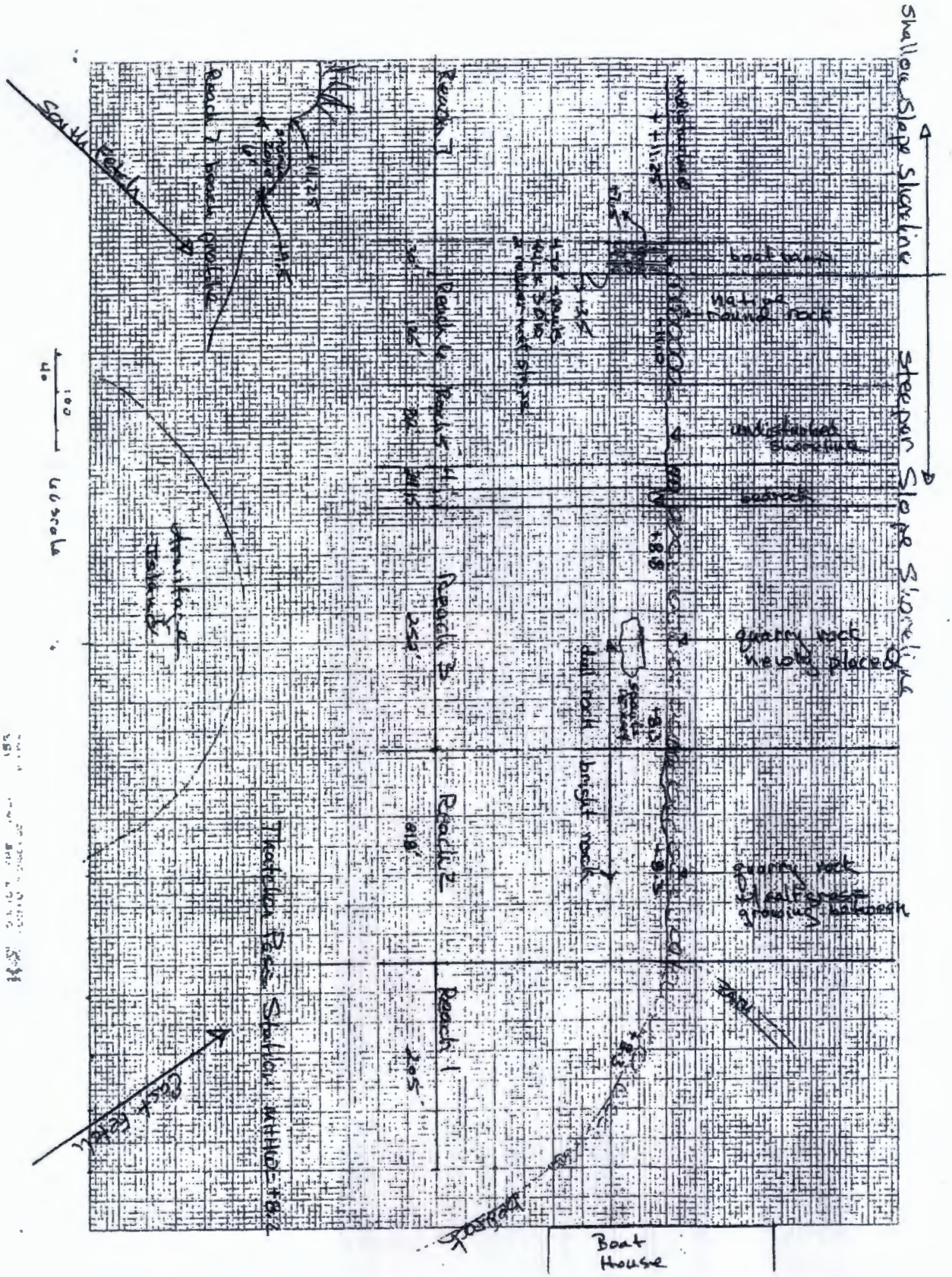
Photograph 9 – New wall blackberry shoot

Photograph 9A – Blackberry shoot closeup

Photograph 10 – Toward west end bedrock

Photograph 11 – From bedrock to west

Photograph 12 – Center of new wall


Shallow Slope Shoreline
Steeper Slope Shoreline
boat ramp
native found rock
undisturbed shoreline
bedrock
quarry rock newly placed
quarry rock
dull dark bright rock
Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
Reach 6
Reach 7
Section Less Shallow
Section Steeper
Section 1
Section 2
South Point
East Point
Boat House
Upson
100