

Item 4.0 of “Adapting Woodstock” Charrette “Site Planning Topics & Reference Items”

Working With Water—Wetlands, the Creek, Bay Dynamics

Notes and Map by Tim Wahl, July 2008

NONIRIPARIAN WETLANDS, SEE FOLLOWING MAP

These are roughly portrayed in the City GIS database and are informally shown on the map below (probably more accurately) made by Tm Wahl in 2008. The emphasis here is not on regulatory implications or standard classifications but rather on quickly summarizing potentially emergent repairs and issues involving specific future site improvements.

W1 Kopperdahl Wetland; Trail Renovation Issue

The switch-backing trail here is a former cat road constructed hurriedly by aspiring developer. Trail renovation requires a drainage system that essentially incorporates the hillside wetland flows moving down the draw. Like other narrow, forested wetlands this feature adds considerable biological diversity to the Woodstock site. This wetland should be protected and must be “worked with” creatively to dry-out the trail. While a few species could be added to enhance diversity, based on appropriate reference sites, the understory and herbaceous components are in good shape and fairly diverse.

W2 Orchard Spring & Cook’s House Wetlands; Driveway and Other Structural Issues

Water collects in the mowed basin opposite and E of the Cook’s House and is apparently discharged in a (probably partly collapsed) tile to the Cooks House wetland. The basin above the driveway has been historically grazed and altered (probably drained with tile) since the 1910s; as modified it comprises an important part of the historic character of the maintained orchard and grounds. Creation of a vernal pool could be explored. Water can be heard flowing from inside the Cook’s House basement. A portion of the peak discharge, probably resulting from tile failure, now flows along the upper edge of the driveway to and inlet at the sports court parking area, where it enters the creek culvert, one assumes. This flow along the driveway is likely charging the subgrade of the driveway, an undesirable state of affairs that should be corrected soon.

W3 Lower Bluff Seeps; Poorly Drained Areas around Gates-Lee House

Replacement of G-L House perimeter drains could eliminate a wet lawn problem at front door (W3.1, unusable during wet periods) and to relieve potential long term issues involving the house foundation... *Iris missouriensis* planted 2008 in pasture pockets W of “Chicken House lawn.” These seeps might be developed into wet meadow pockets and vernal pools as part of a designed landscape, for floral and biological interest. This system has been historically grazed and altered since the 1910s and, as modified, comprises an important part of the historic character of the Farm’s cultural landscape. Grass tennis court (W3.2) needs perimeter drainage for sustained use; it may have had such a system when constructed. Wet meadow pockets are visible outside regularly maintained areas cueing to *Juncus*. Preservation and enhancement of vernal pools and management of groundwater flows moving toward the extremely dry

West Point may be very desirable as part of a Garry Oak/Pacific Madrone meadow mosaic establishment project there.

W4 Boathouse Ravine Wetland

A relatively high quality forested wetland. Himalayan blackberries being removed from drier edges. *Viburnum trilobum* was added to buffer area. Former Gates' access road to the 1920s floating boathouse ran down this draw. Prehistoric wet-site artifacts of great interest but none found along OHWM. *Salicornia* and *Juncus* marsh at OHWM. 2006 inspection and dye tests with WCH Dept. indicate no septic discharges to this draw.

WOODSTOCK CREEK, SEE MAP

WC Open creek channel (WC), dammed pool (WC.1), seasonal waterfall (WC.2), lower culverted creek segment (WC.3), 1953 highway-standard creek culvert, WC.4

The Creek runs 6-9 months a year, and is valued as a source of gentle white noise and as a wildlife habitat feature. The potential for salmonid habitat is probably not significant; even with dam removal channel gradient is relatively steep, flows are low and fluctuating and a fish-impassible waterfall lies about 175' above the marine shoreline. The creek was culverted under Chuckanut Drive in 1953 or 1954 when a timber highway bridge was replaced with today's fill. A 36" culvert under the highway now connects with a 12" culvert running along the NE side of the sports court parking area to discharge into the open creek channel at the edge of the driveway. The discharge area below the driveway was seriously eroded during a creek overflow incident during the 1970s or 80s (?) when an object passing under Chuckanut blocked the 12" culvert in the junction box just above the sports court parking area. The eroded slopes at the 12" culvert discharge, while requiring stabilization, have remained remarkably stable after the overflow incident. Denis Bailey speculates there may be more than one culvert under segment WC4, although only one discharge is known. It is possible that an earlier Gates culvert under the original kitchen garden failed and was replaced by a second line by the Lees at the time of the 1953 highway construction. Apparent subsidence around the monkey-puzzle tree suggests underground instability due to ground water movement. Bailey has also wondered about a possible connection between the S barn wall and slab failures and old creek flows or flooding incidents.

Andy Law of Wilson Engineering has developed a conceptual plan for daylighting creek segment WC4. See Charrette Topic/Reference Item 4.1. A new creek channel here could compliment relandscaping of the "flag pole hill" slope (possibly established as an open Chuckanut ledge/meadow community planting based on nearby reference sites), creating a pleasant sound experience for site users during creek flow months and accenting a visual edge of the planting. It has been observed that such a creek channel might be more of a sculptural hardscape feature bordering the new planting, rather than being forcefully and improbably modeled after a wildland stream. Gates had a hydropower generating station somewhere on the Farm. It is possible that a demonstration, seasonally activated hydropower station might be incorporated into a visually interesting, exposed creek channel feature as part of an artistically inspired sustainability demonstration effort. Replacing the driveway culvert part of WC4 and addressing the slope erosion at the WC4 culvert discharge should be part of an overall plan involving WC4. (This could avoid the use of imported but commonly used bank stabilization materials like quarried limestone and visible, engineered products without undermining the integrity of civilization, say as part of an overall historic

register type management approach for the Farm. While attractive, integrated actions are desirable for all of WC4 it must be emphasized that the driveway culvert portion itself is at some risk of failure, along with the effects of surface water flowing along the driveway from the upper part of W2, the Orchard Spring...an artistic timeframe may be unwise at the driveway.

A Washington Clean Water grant is being used to refence the upper parts of the creek ravine to keep sheep and visitors off of the ravine slopes. An old road grade passes along the north bank of the creek and can serve as a trail connecting the Cook's House area with the bay shore and the boathouse. Reestablishment of the old farm fence in conjunction with reopening this grade will be desirable to keep people off of the steeper ravine slopes and away from the easily damaged creek shoreline.

Several people have suggested a suspension bridge between the garage/barn area and the old road grade on the N bank, as an accessible amenity for visitors using the core of the site in conjunction with the buildings. Such an unique (and costly) structure would provide an engaging tree canopy experience for visitors, and a pleasant way to experience the creek during higher flows.

WCD Lee-era creek dam installed for fish rearing and aesthetics. Reservoir is now severely filled with fine sediment. Impoundment pool and waterfall are nice aesthetic features during high water. Dam removal assistance grant funds are not suitable due to lack of fishery. Giant salamander (nearby occurrence) habitat value of created pool should be examined. Dam is probably in best location for improved footbridge, a function it now serves. Pros and cons of removal, replacement, maintenance etc. all need study.

IT Interurban Trail Fill above Woodstock.

Integrity of the Interurban rail grade fill and the condition of the culvert there (both owned by Puget Sound Energy) have been identified as a concern in the event a seismic incident combined with rainfall. There appears to be no functioning culvert under the old rail grade fill, which impounds water during wet weather and where an upstream wetland has formed over successive years of inundation. Of note is an event like the "Fire Hall Flood" father south on the Interurban grade, which threatened flood and debris torrent damage to Chuckanut Drive and several residences.

WET SOIL CREEP AND SLAB FAILURES, SEE FOLLOWING MAP

SF Monkey-Puzzle Lawn Settling (SF1), Barn Slab Failure (SF2), Cowman's Cottage Area Bank Movements (SF4)

The concrete slab in front of the barn is failing and the S foundation wall of the barn basement is leaning to the N. Two structural engineers have looked at the situation and suggested monitoring. One felt action was needed immediately. Crack monitors are now in place on the barn wall, and indicate no movement over the past 18 months. (No failure trends or actual incidents are known.) Hydrostatic pressure is most certainly the cause of the barn wall movement, something which needs to be mitigated with sealing of the adjoining slab ASAP. Denis Bailey has speculated that there may be subsurface water movements from the old creek channel below the sports court parking area toward the barn slab/wall failure area. He also made note of the fact that the slab failure seemed to come after the plugged culvert incident described under WC, above. (Parks crews are implementing temporary water infiltration prevention actions this summer.) Taken with subsidence observed around the monkey-puzzle tree just N of the Gates-Lee House

and slumpage and soil heaving below the barn it is advisable to consider connected groundwater movements that may be influencing the entire S creek bank from the monkey-puzzle tree to the Cowman's Cottage. Below and N of the barn the old Gates dump (SF3, paved with a slab for parking by Ray Lee) is visibly slumping, the Cottage walkway slabs are heaving and an old shed at above the Cottage is breaking apart. Groundwater movements in this corridor are essential to understand with respect to the present septic fields in the area, as well what they mean for development of a new sewage treatment system elements for publicly-adapted Farm buildings.

NE CHUCKANUT BAY SHORELINE ISSUES

BN Burlington Northern & Santa Fe Railway Causeway Issues

Also see separate item 4.2.

Today's BNSFRW causeway was built predominantly as open trestle between 1902 and 1904. During the 1920s it was replaced with rock causeway, with the exception of the small boat opening now in place. The structure was built on public land, in a street right-of-way controlled by the City. No leases and permits were secured and the structure has contributed to the shoaling and of NE Chucknaut Bay, the movement of the Chuckanut Creek channel away from the Woodstock shore (traditionally a canoe beach associated with the ancient processing and some-time dwelling site) and perhaps salinity changes landward of the causeway. Several major property owners indemnified the railroad for loss of riparian rights and navigation convenience, but not all of them and not the City's predecessors in interest at Woodstock or COB's other upland shore properties. See Charrette Topic/Reference Item 4.2 for a brief description of how the railroad changed the area's shoreline processes, primarily by eliminating a powerful storm eddy and sediment transport mechanism that apparently kept accumulated sediment and the creek channel stacked against the Woodstock shoreline. Fine sediments associated with urban and road system development, notably I-5 in the Chuckanut Creek watershed, have accumulated in the quieted "Mud Bay" basin NE of the railroad causeway. Eelgrass observed during the lifetime of the writer has now been extirpated in the inner bay and its historic plant and animal communities have been greatly changed with accumulation of fine sediments and colonization by exotic and indigenous species favoring muddy substrates. The ongoing change in the inner bay habitat has benefited many species and reduced or eliminated others. The present ecological functions of the bay's mudflats have not been systematically compared with those of the basin's original, sandier and gravellier state. Human use of the intertidal zone is greatly reduced by the spread of the mudflats, resulting in a quieter and more passive public environment.

BHM Boathouse Midden Shore Erosion

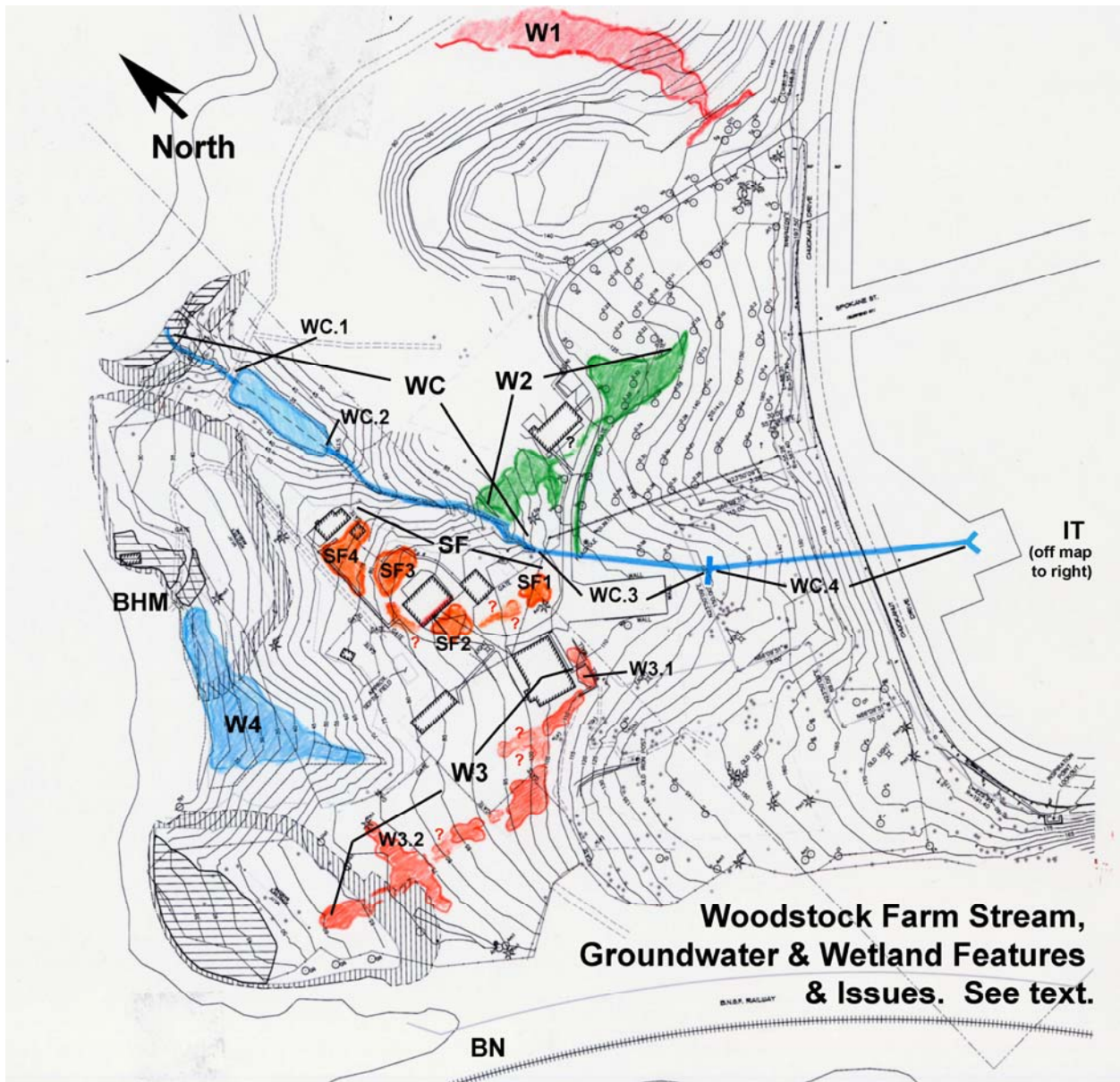
Also see separate item under Charrette Topic/Reference Item 9.

The loss of reflected wave energy from the N Bay shore, whether as an eddy or as direct counter waves, is apparently the main reason the midden bluff at the Lee boathouse is eroding. Historic photographs show a more gradually sloping, vegetated bluff at the boathouse and eyewitnesses over the past 40-50 years report a significant increase in undercutting and sloughing of the culturally deposited bank material. Perhaps a shoaling of the adjacent basin due to sediment accumulation has also changed the way wave energy affects the shell midden deposit. The exposure of ancient cultural material affects how the

boathouse beach is managed. The area is presently closed to the public because cultural materials are exposed to theft and disturbance.

SUMMARY OF IMPLICATIONS FOR SITE MAINTENANCE AND ADAPTATION

Surface and groundwater greatly reduce the usability of the Kopperdahl Trail, an important element of a recreational loop trail for Farm users. Reconstruction of the old road grade as a well-drained trail is essential in places where it crosses and conveys water flowing through the forested wetland there. Wetlands contribute to species diversity and enhance wildlife utilization, if these themes and values are important in the public's use and enjoyment of the site preserving and enhancing wetlands is also important, even for small wetlands retained or enhanced in their culturally modified condition. Problems with groundwater and poorly managed surface water visibly and audibly suggest impending structural problems involving the Cook's House, Barn and Cowman's Cottage and the Woodstock Creek culvert under the driveway. Perimeter drainage around the Gates-Lee House is desirable, but no problems are evident other than a periodically unusable front yard/gathering area. The Woodstock Creek dam is well-located as a pedestrian bridge crossing and creates a reflecting pool for visitors; its effect on fish and wildlife is unassessed and may not be significant and its structural integrity is unassessed. NE Chuckanut Bay is filling in due to changes following construction of the mainline railroad causeway. Rowing and boating access are restricted due to this shoaling and small boat trips must be carefully planned. Shoreline stabilization and covering of the exposed midden face is needed at the Boathouse Beach to permit regular public access and protect the cultural feature. Understanding ground water movements is likely critical to engineered sewage system development. Puget Sound Energy should be energized to manage potential risks associated with the Interurban Trail (rail grade) fill placed across the Woodstock Creek ravine.



**Woodstock Farm Stream,
 Groundwater & Wetland Features
 & Issues. See text.**