Bayan Trails Site

Olympia, Washington

Wetland and Soils Report and Mitigation Proposal
February 2015

SCJ ALLIANCE
CONSULTING SERVICES

Bayan Trails
Wetland and Soils Report and Mitigation Proposal

Project Information

Project:	**Bayan Trails Wetland and Soils Report and Buffer Mitigation Proposal**
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Reviewing Agency

Jurisdiction:	City of Olympia

Project Representative

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Project Reference:	SCJ # 1541.01

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF APPENDICES

1. INTRODUCTION

1.1 Project Overview

The project site includes two parcels (approx. 20 acres total) located at 607 and 709 Sleater Kinney Road NE, Olympia, WA (S17, T18N, R1W), Tax Parcel Numbers 11817210100, 11817210200 (Figure 1). For the wetland report, SCJ Alliance wetland scientists (SCJ) working with Mtn2Coast (project surveyor) were to delineate the onsite wetland boundary and to assess onsite soil conditions at six locations across the site. SCJ also provides a wetland rating score and related standard buffer width for purposes of design layout. In addition, SCJ carried out a soil survey, excavating 6 soils pits to determine soil depth and potential for stormwater infiltration.

SCJ wetland scientist (Lisa M. Palazzi, CPSS, PWS) delineated onsite wetlands on May 7, 2014 and excavated and described soil pits on June 2, 2014. The wetland edge was surveyed by project surveyors, and that survey map was adapted to create Figures for this report.

The 2013-2014 winter had below average rainfall through early February. However, rainfall events from mid-February through May 2014 were above average. The wetland hydrology in these systems was fully developed at the time of field work. Both deciduous and herbaceous wetland vegetation were rapidly developing and actively growing.

Figure 1. Project area map

The wetland located at the western end of the project site is classified as a Depressional system (Hydrogeomorphic [HGM] Classification System), and as a Palustrine Emergent (PEM)/ Palustrine Scrub-Shrub (PSS), Palustrine Forested (PFO), Palustrine Aquatic Bed (PAB) system (Cowardin Classification System). Under the 2004 Western Washington Wetland Rating System (WWWRS) and current City of Olympia Critical Area regulations, the wetland is a Category II wetland and is assigned a standard 120' buffer.

2. METHODS

2.1 Wetland Delineation Regulations (federal and state)

Under the Washington Administrative Code (WAC) section 173-22-035, the Washington State Department of Ecology (Ecology) requires wetland identification and delineation be completed following the approved federal wetland delineation manual and applicable regional supplements, including but not limited to the 1987 Corps of Engineers Wetland Delineation Manual and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (U.S. Army Corps of Engineers 2010).

2.2 Wetland Rating, Classification, and Buffers

City of Olympia Municipal Code defines Wetland Protection Standards in Chapter 18.32.500, which includes requirements for rating the wetland and making buffer width determinations based on rating score results.

As required by current City of Olympia code, wetlands were rated according to the *Washington State Wetland Rating System for Western Washington* (Ecology Publication #04-06-025, Hruby 2004). This system scores wetlands based on the functions of water quality, hydrology, and habitat. This system also reviews the wetland's sensitivity to disturbance and rare or non-replaceable wetland characteristics. This wetland rating system was updated as of January 1, 2015, but the project is vested in the 2004 Rating Manual. Thus the 2004 buffer determination protocols defined in the City of Olympia Critical Areas Ordinance apply to this project.

Wetlands identified as part of this project were classified according to the USFWS Cowardin classification system (Cowardin et al. 1979) and the USACE Hydrogeomorphic (HGM) classification system (Brinson 1993).

2.3 Background Materials

To help determine the site conditions that might affect delineation and rating results, SCJ Alliance staff reviewed the following information to provide site information:

- Thurston County GeoData mapping system (Thurston County 2014)
- US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) map (USFWS 2014)
- US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic database online Web Soil Service. (WEBS Soil Survey 2014)
- Precipitation data (US Climate Data 2014)
- Washington State Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) Database (WDFW PHS 2014)
- Washington State Department of Natural Resources (DNR) FPARS stream mapping system (DNR 2014).
- Google Earth historic timeline aerial photos of the project area

2.4 Assessing Wetlands and Soils Onsite

SCJ Alliance staff, Lisa Palazzi, CPSS, PWS, carried out the onsite wetlands delineation on May 7, 2014, and assessed soil pits onsite on June 2, 2014. The wetland boundary was marked using pink flagging, labeled "WETLAND DELINEATION" and numbered sequentially. Paired sample plots were dug within the existing wetlands and within adjacent upland areas, on either side of a specific numbered flag. Hydric soils were evaluated using the Munsell Soil Chart (Munsell 2009). A map of the flagging was provided to Mtn2Coast Survey, and the wetland flag locations were professionally surveyed.

Soil profile characteristics in 6 soils pits dug to as deep as 11 feet were documented per Natural Resource Conservation Services (NRCS) standards. They were evaluated specifically to determine soil texture at various depths and depth to the seasonal groundwater table, and as might impact design decisions for stormwater infiltration facilities.

3. FINDINGS

3.1 General Project and Site Description

The Bayan Trails project site consists of two adjacent 10 acre parcels, each with one current homesite. The project is designed to meet requirements of RM-18 zoning, thus includes transitional townhouses in the southern portion and a retirement apartment complex in the northern portion of the project. A wetland system covers the western portion of both parcels, backing up to the Chehalis Western trail at the far western end of the project site. Forested uplands cover the eastern portion of the project site. Existing trail systems in the wetland buffer will be maintained and improved to ensure safe access for users, and certain portions of the buffer will be improved by removal of weedy, non-native vegetation and replanting with a native vegetation plant community. All residential development is concentrated in the eastern uplands, with no direct impacts to wetland areas.

SCJ Alliance was to delineate wetlands onsite and provide a wetland rating score for onsite systems. In addition, SCJ was to provide information about soil conditions as would affect site hydrology and related stormwater system design. SCJ reviewed soil maps, aerial photo timelines, survey maps, geology maps, hydrology maps, and fish and wildlife maps to be fully informed about know site conditions prior to any onsite work.

During extreme high winter rainfall events, the onsite wetland overflows naturally across the 4.4 acre parcel lying directly north of the project site, then through a piped system to the NE through the Oriental Drive and Balsam Avenue neighborhood, eventually draining to piped stormwater systems at Sleater Kinney that drain to the Woodland Creek basin. Personal communications from City of Olympia staff indicated that the wetland might also overflow to the south, draining to stormwater systems at Martin Way. However, a site visit with City staff to the southern end of the wetland (offsite) indicated that there is no overflow to the south. The City stormwater pipes in that area drained overflow from the San Mar neighborhood, but did not directly connect to the Bayan Trails wetland system.

3.2 SCJ Wetland Delineation Results

The wetland that covers the western portion of the two study site parcels (Wetland A below) is a semi-isolated system, in that it only appears to overflow during rare, extreme weather events (25+ year events) to the northeast. Otherwise, the wetland has no outlet. It is bounded along its western edge by the toeslope of the Chehalis Western Trail fill pad, indicating that it may have been partially excavated to provide fill for the railroad bed. Offsite wetland areas to the south are surrounded by a dense

neighborhood with no buffer (San Mar subdivision), aside from landscaped yards between the wetland edge and existing homes. Offsite wetland areas to the northwest cover part of the far western portion of a 4.4 acre single-family parcel, and extend to the edge of another densely developed neighborhood (south end of Coulter Street NE). As described previously, piped overflow during extreme winter rainfall events is directed through the neighborhood to the north, and then to piped City of Olympia systems along Sleater Kinney Road.

Wetland A (Figure 2) is classified as a Palustrine Emergent (PEM)/ Palustrine Scrub-Shrub (PSS), Palustrine Forested (PFO), Palustrine Aquatic Bed (PAB) system (Cowardin Classification System). For purposes of rating (described further below), it is classified as a Depressional wetland system (Hydrogeomorphic [HGM] Classification System).

The source of ***Hydrology*** for Wetland A is groundwater and surface water flows accumulating from seasonal rainfall in the immediately surrounding basin, and from direct winter precipitation.

Figure 2. Wetland Boundary, 120' Buffer and Cowardin Wetland Vegetation Class areas.

The ***Vegetation*** community in Wetland A was complex. There were four distinct vegetation class areas:

- An Aquatic Bed area in the southern portion of the wetland that becomes almost completely covered with lily pads during summer months;
- Several Emergent vegetation areas covered with Reed canarygrass, pasture grasses, cattails, native sedges and rushes – dependent on historic disturbance;
- A Scrub-Shrub area, dominated with young willows and spiraea;
- Several Forested areas, with concentrations of Oregon ash, red alder, black cottonwood, western redcedar and minor quaking aspen inclusions in various areas.

The upland plant community beside the wetland was mostly forested with a typical Douglas-fir, salal, and Oregon grape vegetation community, but was dominated in some areas by English ivy and Himalayan blackberry in the understory.

The ***Soils*** in the wetland at the edge of Aquatic Bed areas in the southern portion of the onsite wetland were typically a thin layer of organic muck overlying sandy loam substrates. In Scrub-Shrub and Forested wetland areas, the soils were deeper and sandier with dark-colored, surface soils with high organic matter content overlying depleted (i.e., meeting the Hydric Soil definition of "depleted matrix") loamy sand substrates.

3.3 SCJ Rating and Buffer Results

As described in the 2004 Western Washington Wetland Rating System, the entire wetland is rated as one system (Wetland Rating Unit), due to a common hydrology being shared across all wetland classes. The wetland is a Depressional system, and scores moderate to high for Water Quality (20 out of 32 possible) and Hydrologic (flood control, 24 out of 32 possible points) functions. However, because the system is isolated and lacks connections to other habitats, and because the buffers around most of the perimeter are minimal, and/or densely developed, the habitat score was relatively low – only 22 points (out of a possible 36 points). According to the Buffer Table X in Section 18.32.535 in the OMC, the standard buffer for a wetland with Water Quality Improvement Score of 24-32 points and a Habitat score of 22 points is assigned a standard buffer of 120 feet.

3.3 Proposed Mitigation

Proposed Mitigation must meet the standard three tiered approach[1] requirements of Section 18.32.135 – language provided below. In addition to meeting requirements of subsections A and B, double stars ** indicate those measures used in subsection C:

Mitigation 18.32.135 General Provisions - Mitigation Priorities

A. Mitigation shall be undertaken in the following order of preference:

1. Avoiding the impact altogether by not taking a certain action or parts of an action;

2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;

3. Rectifying the impact by repairing, rehabilitating or restoring the affected environment;

[1] First ***Avoid*** the impact if possible; if avoidance is not possible, then ***Minimize*** the impact and ***Mitigate*** (or rectify) for the impact

4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

5. Compensating for the impact by replacing, enhancing or providing substitute resources or environments;

6. Monitoring the impact and taking appropriate corrective measures.

Mitigation for individual actions may include a combination of the above measures.

B. Unavoidable impacts to critical areas often can and should be minimized by sensitive site design and deliberate actions during construction and implementation.

C. In addition to meeting the standards of the underlying zone, the Department may require the use of more restrictive mitigation techniques described as follows:

1. Limitation of building and development coverage;

*2. Setbacks or buffers; ***

3. Size of lots and development sites;

4. Height limits;

5. Density limits;

6. Time limits;

*7. Restoration of ground cover and vegetation;***

*8. Creation of critical area tracts; ***

*9. Innovative design or construction methods; ***

*10. Signing, fencing, and limitation of access; ***

*11. Notice of conditions placed on the title of the property; ***

*12. Provisions for access or rights-of-way; ***

*13. Financial surety; and/or ***

*14. Other measures for environmental protection. ***

This project entirely avoids direct impacts to wetland areas, but some buffer impacts will occur. The original proposal included more impacts to buffers. Most of those impacts are avoided in this final site plan layout. Those design changes are listed below to document that the project layout was revised to avoid impacts whenever possible. Some of this avoidance was made possible by a recent agreement with the property owner to the north who agreed to share the 6th Avenue Street easement, thus allowing buildings, roadways and associated parking areas to shift away from the wetland and buffers.

The current proposed buffer impacts are limited to four areas:

- A section of sidewalk and grassed area adjacent to the farthest southwest townhouse in addition to a required sewer and waterline stub out to the San Mar neighborhood (including a required 10 ft wide gravel surface maintenance access pathway) encroaches on the buffer (2,209 sqft, maximum width, 28 ft). We had proposed to stub out the sewer and water pipes outside of the buffer until such time as they were needed, but City staff indicated that was not an option. Thus the pipes as well as the 10 ft wide maintenance access road are required.

However, the seldom used maintenance road will be adapted to provide access to the Bayan Trails pathways for San Mar residents. The native vegetation community in the adjacent buffer area is in poor condition – being dominated by English ivy -- and will be replanted to taller, denser native shrub and tree species to minimize noise and light impacts from the townhouses (partially mitigating for impacts, more discussion on mitigation to follow).

- An Overlook Platform is proposed just north of midsite (1,602 sqft, maximum width, 30 feet). The semi-circular platform is located in an area that is currently a vegetable garden, and thus results in no impacts to native vegetation (minimizing impacts). It is designed and intended as a place where site residents can gather to view the wetlands and buffer areas, and where educational signage will be located explaining the wetland and upland habitat features. The goal of this central public structure is to provide a safe and controlled gathering place for the community adjacent to the onsite natural areas, and also to locate educational signage to educate the residents about wetland and buffer area functions and values onsite. This will help residents to personally invest in and understand wetland and buffer protection requirements, while providing for a safe and controlled access to the existing trail system in the wetland buffer.

  The platform footprint design was changed to keep all impacts within the outer 25% of the standard buffer (minimizing impacts), including replacing a sloped fill pad with a vertical retaining wall. The platform is located west of the site roads, to provide access to the onsite trails, thus cannot be located across the road outside of the buffer without creating a safety hazard. Existing weedy vegetation near this area (Himalayan blackberry stands) will be removed and replaced with a native vegetation community, improving buffer habitat and reducing noise and light impacts from upland areas (partially mitigating for impacts; more mitigation discussion below).

- There are two stormwater level spreader devices in the buffer area – gravel-filled trenches, dimensions 2ft deep x 2ft wide x 200 ft long -- designed to release treated stormwater to the buffer in such a way as to eliminate erosion and concentrated flow pathways. They are located at elevations driven by the depth of the stormwater capture/treatment facilities around the upslope buildings, and thus are unavoidably within 20-40 feet of the wetland edge in some places. Locations farther upslope will not allow for gravity driven water release to the wetlands. The stormwater overflow will be released at a controlled rate (mimicking pre-development release rates) across a level spreader (no erosion), and water quality will be treated to levels required by Olympia Stormwater Management regulations. Thus this system will not negatively impact water quality in the wetland, but will ensure that stormwater from the site will continue to provide hydrology to the wetland system at rates and volumes equivalent to historic conditions (minimizing impacts to hydrology and water quality). Areas with temporary impacts from pipe and trench installation will be restored and replanted with native vegetation, and the construction area will be surrounded by silt fences and other appropriate erosion control devices until all surfaces are stabilized and restored to a native plant community (partially mitigating for impacts; more discussion below).

The total buffer area impact from these four areas sums to 4,611 sqft. To compensate for this loss of wetland buffer area, it is proposed to ***Buffer Average*** by adding two areas measuring 4,896 sqft, one along the northern property boundary, just west of the maintenance/ recycling facility and the other along the southern property line near the San Mar entry. Adding these areas to the buffer will preserve

the existing native forest vegetation in the northern area and allows for native revegetation in the southern area. The northern addition also serves to protect the current natural emergency overflow pathway to the northeast (described earlier).

In addition to meeting buffer averaging area requirements (i.e., adding an area equal to or greater than the reduced buffer area), it is proposed to mitigate further by restoring native vegetation in all temporary impact areas (as described above), and also in other areas identified throughout the current buffer where non-native weedy vegetation dominates. Specifically, invasive Himalayan blackberry patches will be removed near the central platform and along the existing buffer trail to the northeast; and a large patch of non-native, invasive English ivy will be removed from the southern buffer, adjacent to the San Mar neighborhood. These areas will be replanted with native species, shrubs and trees, creating a dense, and, over time, taller wetland buffer community, to reduce noise and light impacts from the adjacent buildings.

All planting restoration areas will be monitored over a 5-year period following completion of vegetation community planting to ensure that the native plant community survives. Survival rates of 80% or development of >60% canopy coverage of native plant communities at the end of 5 years, and less than 15% cover from the targeted non-native species [Himalayan blackberry and English ivy]) will be required for the mitigation planting to be considered successful.

The wetland and wetland buffer impact avoidance decisions and site plan changes are listed below to document that the project followed the Reduce, Minimize, Mitigate strategies defined in Section 18.32.135 (provided above).

1. The maintenance/ recycling center facility located the far northwest corner of the developable area was redesigned to eliminate fill pad impacts to the wetland buffer in that area.
2. The central site Overlook Platform was redesigned with a retaining wall along its western side to ensure that impacts occur only in the outer 25% of the standard buffer (i.e., at least 90 feet away from the wetland edge).
3. Signage on the Platform will serve to educate the local community about wetland and buffer functions and values.
4. Signs will be placed every 50 feet along the buffer boundary describing the area behind the sign as a natural area to remain in an undisturbed native vegetation condition.
5. Previously proposed buffer impact area at certain site design stages was as much as 8,000 sqft, and included avoidable impacts within 50 feet of the wetland edge. The current proposal greatly reduced the total area of buffer impact to less than 3000 sqft and allowed only the level spreader stormwater release devices (location defined by elevation of the upslope stormwater treatment systems, thus is unavoidable) to be within the inner 75% of the buffer. Other impacts are all minimized and are located in the outer 25% of the buffer.
6. Code requires that roads connect to the San Mar neighborhood to the south. This would result in a significant impact to the wetland buffer in the southwestern portion of the project site. The road connection is not desired by neighbors to the south (San Mar neighborhood), and road impacts would result in a loss of approximately two acres of buffer area. There is not enough area onsite to compensate for this buffer loss through averaging without losing several buildings, and even then, the only areas available for buffer mitigation (due to road location) would be on the east side of the road – i.e., isolated from the wetland system. This would be a non-functional buffer. For these reasons, the road connection is not included in the site design as it is impossible to meet City code requirements for buffer mitigation.

7. Sewer and water lines were also to be provided along the roadway extension (described above) in the event that San Mar neighborhood might someday hook up. Because there is no current proposal to hook up, it was initially proposed that the sewer pipe and water pipe stub-outs would stop outside of the buffer, in order to avoid current impacts. However, City staff indicated that the pipes must be extended and a 10 ft wide gravel maintenance access pathway is required. Thus the impact cannot be avoided now to minimize impacts due to City requriements.
8. Both sewer and stormwater pipes serving western areas in the Bayan Trails project were originally designed to run through some portions of the wetland buffer. To reduce buffer impacts, those pipes were realigned and moved out of the buffer to the east along the roadway, thus avoiding pipe installation impacts as well as a need to provide for surface maintenance access in a vegetated wetland buffer area.
9. Existing trails in the buffer will be improved by adding a wood chip or crushed rock base between 4-6 feet wide (details defined in City code). This will serve two purposes:
    1. To keep residents using the trails on designated trail systems; and
    2. To provide for safer access with fewer "tripping" opportunities than occur under present conditions.

6. Trash and garbage from existing and past homeless encampments will be gathered and removed for safe disposal. Camp areas will be revegetated with dense thorny native shrubs intended to discourage future encampments.

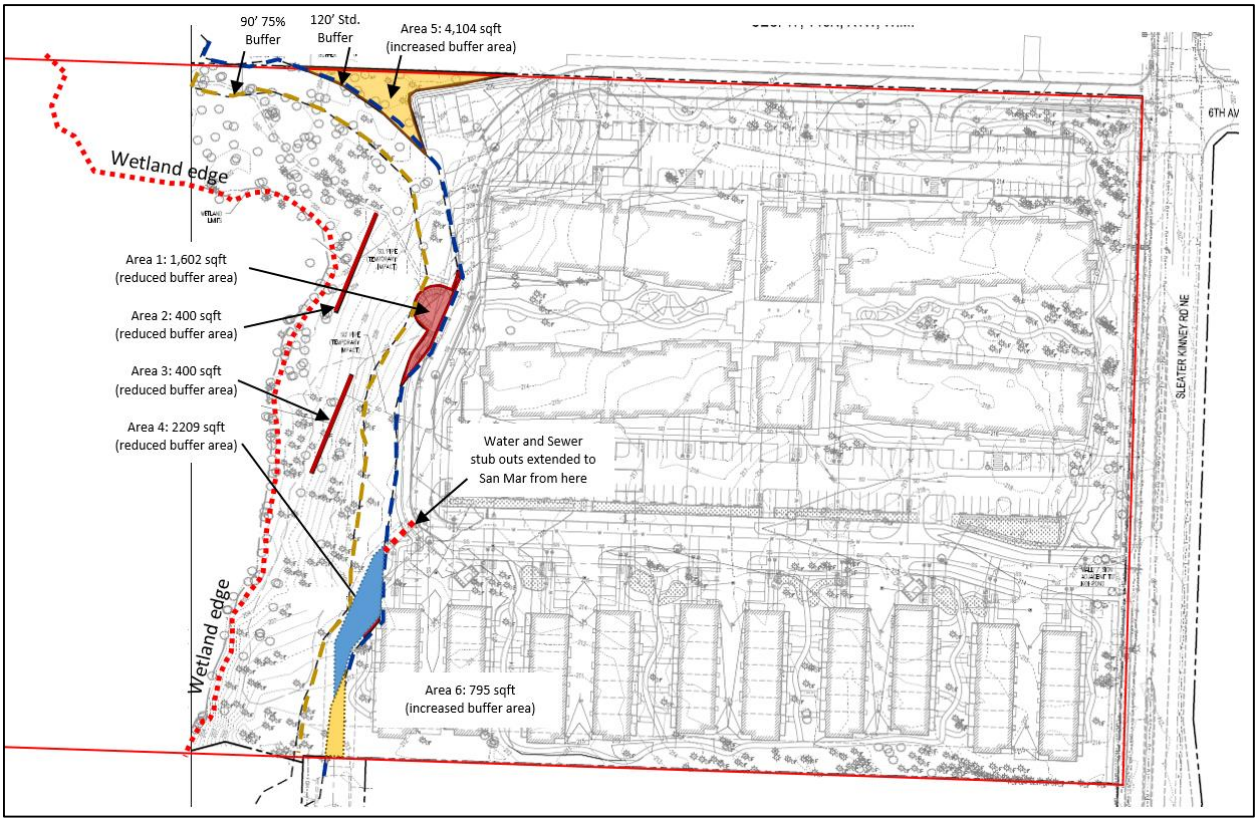

Figure 3. Showing buffer impact area (Areas 1, 2, 3 and 4 red polygons) and buffer averaging area (yellow polygon, Area 5).

Section 18.32.525(F) buffer averaging rules require the following:

1. The reduced buffer is located next to a less-sensitive portion of the wetland, and the increased buffer is located adjacent to the more sensitive portion of the wetland;
2. The total buffer area after averaging is equal to or greater than the standard buffer area;
3. The narrowest point is at least 75% of the standard buffer width.

The proposed site design meets the first two requirements for buffer averaging, but not the third. The level spreader stormwater trenches are located within the buffer, but their location is defined by elevation of upland facilities. However, the water released will be treated, to ensure that there are no water quality impacts, and the volumes released will be controlled to mimic pre-development rates. Thus there will be no long-term negative impacts from these trenches. Following installation, the surface around the trenches as well as the buried pipeline pathway will be revegetated with native species, and at some point, the trenches will become effectively invisible in the landscape.

If these minimum standards cannot be met, the Hearing Examiner may allow more than 25% reduction of the standard buffer width on a case by case basis:

> *…when it can be demonstrated that:*
> *a. The provisions of OMC 18.32.535(G) have been evaluated by a Wetland Mitigation Report described in OMC 18.32.590, and*
> *b. The proposed wetland buffer width will protect the wetlands' functions and values based upon the Wetland Mitigation Report and the best available science.*

Following the proposed mitigation plan approach outlined above will result in improved wetland and buffer functions and values, and will compensate for unavoidable impacts to the buffer at the locations described above and displayed in Figure 3.

In addition to this mitigation plan, the project proponent has plans to develop a long-term research and stewardship program, centered on the wetland and buffer system. North Thurston High School science department staff as well as the Olympia Stream Team staff have already been contacted with ideas as to how the area might be incorporated into long-term water quality or wetland habitat studies. Stream Team may also provide an avenue for long-term studies and wetland habitat enhancement prospects.

3.4 Baseline Soil Conditions

Baseline soil depth and texture conditions were evaluated at 6 locations across the upland areas outside of wetlands and buffers for purposes of stormwater facility design (Figure 4). The onsite soils are mapped as the Alderwood soil series, which are expected to have gravelly sandy loam surface soils overlying cemented and impermeable glacial till at 3-4 feet depth. Stormwater infiltration facility design is difficult in Alderwood soil types due to limited soil depth, and shallow seasonal groundwater tables perching on top of the glacial till at 3-4 feet depth.

However, results of onsite soils investigations show that that the soils in the northern portion of the site are instead deep gravelly loamy sands down to as deep as 15 feet (Soil Pits 1, 2 and 3, Figures 4 and 5). Soil Pit 1, located within about 100 feet of the northeast site corner had a surface elevation of 213-214'. The soils were extremely gravelly loamy sands down to over 12 feet depth, but a water table was encountered at about 11 feet depth (i.e., ~202' elevation). This water table elevation is similar to the

water surface elevation expressed in the wetland area (according to Mtn2Coast survey results); however, it is considered likely to be reflecting a different hydrology source. We note that the Soil Survey maps (which were drawn in the 1970s) show a McKenna Hydric Soil map unit to the northeast – indicating that a shallow wetland depression in that area was possibly drained or filled in order to build the subdivision to the north.

Soil Pit 2 was dug east of Pit 1, near the north-central site boundary. This pit also had a surface elevation of about 214 feet, and was dug to about 12 feet depth. No water table was observed in Soil Pit 2, but is expected at about the same elevation as the pit base (around 202 feet elevation). These soils were deep, non-gravelly loamy sands in the upper 6 feet, but became more gravelly with depth – having about 35% gravel content from 6-12 feet depth.

Figure 4. Thurston County Soil Survey map: whole site is mapped as the Alderwood gravelly sandy loam soil, 0-3% slopes.

Soil Pit 3 was dug south of Pit 2, about mid-site, with a surface elevation of around 214 feet. The soil texture to 10 feet depth was non-gravelly, loamy sand. From 10-12 feet depth, the soils were massive

silt loams, expected to perch seasonal groundwater. No water table was observed in this soil pit, but during winter months, groundwater would be expected to pond directly above the silt loam layer (at 10 feet depth), or to persist at the same elevation as the wetland water surface -- about 202 feet elevation (12 feet depth).

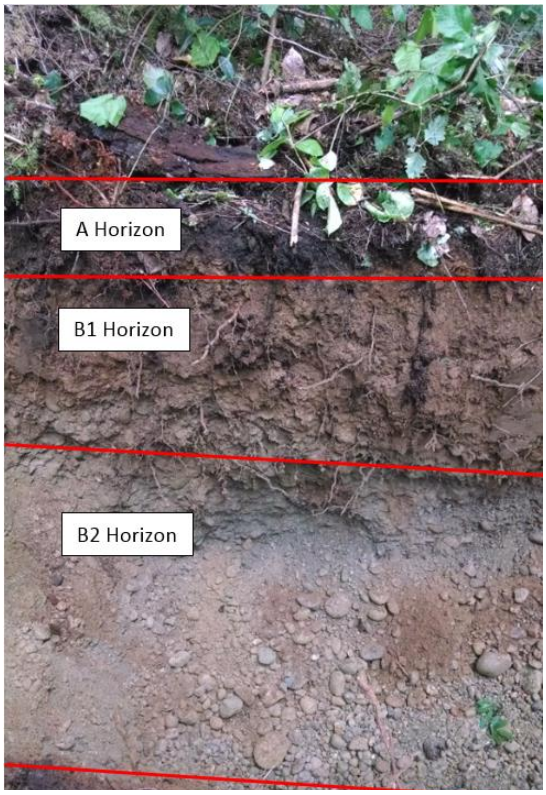

Figure 6. Alderwood soil pits example, representing Pits 4, 5 and 6,

Soil Pits 4, 5 and 6 (Figures 4 and 6) had shallow glacial till substrate, as would be expected in the Alderwood Map Unit. Soil Pit 4 was dug south of Pit 3, near the southern property line with a surface elevation of around 211 feet. Pit 4 was distinctly different from Pits 1-3 – having impermeable, densic glacial till at about 5 feet depth, with evidence of seasonal perched water table fluctuations above the till to as high as 3 feet depth in the soil. This perched groundwater surface develops from infiltration of winter rainfall, which ponds at the till, then drains horizontally across the till surface, presumably to the west, draining into the wetland. The soil texture above the glacial till surface is very gravelly loamy sand and sandy loam. Therefore, seasonal stormwater can be infiltrated in this area, but infiltration systems must be shallower, and if possible, more linear, as that will provide the greatest infiltration potential for areas with limited soil depth.

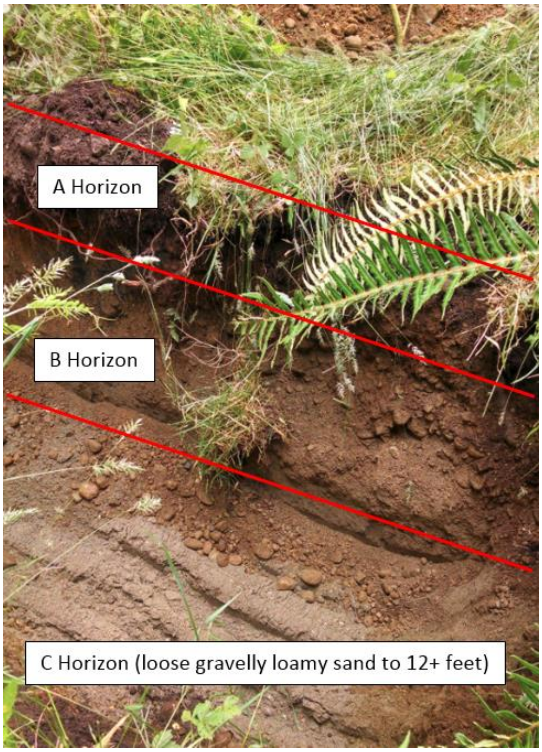

Figure 5. Indianola/Everett soil pits example (representing Pits 1, 2 and 3)

Soil Pit 5 was dug east of Pit 4, near the southeast site corner with a surface elevation of around 214-215 feet. This pit also had densic glacial till at about 4.5 feet depth with overlying gravelly sandy loam and loamy sand. There was evidence of a seasonal water table perching above the till with periodic fluctuations to as high as about 3 feet from the soil surface. This soil profile is typical of the Alderwood soil series

Soil Pit 6 was dug about midsite between Pits 1 and 5, north of the asphalt pavement area. The surface elevation at the pit was around 216-217 feet. This pit also had densic glacial till at about 5 feet depth with evidence of a seasonally perched water table above the till fluctuating to as shallow as 3 feet below the surface. Surface soils above the till were non-gravelly loamy sands, thus would have good infiltration potential despite being somewhat shallow.

Figure 7. Onsite soil and hydrology conditions from baseline wetland and soil pits studies.

4. CONCLUSIONS

4.1 Wetland Conditions Onsite

The onsite wetland includes areas with standing water and lily pads (southern portion of the wetland), as well as soil-based wetlands with emergent vegetation, shrubby vegetation and forest (northern portion of the system). Therefore, this is variable, relatively high quality wetland, but shows signs of eutrophication – likely from impacts of nutrient-laden runoff from adjacent subdivisions and development.

The lack of surface connections to other wetland and upland habitats as well as minimal buffers around more than half of the wetland perimeter reduces its habitat functions, resulting in a moderately low habitat score. The overall rating score of 66 points reflects the quality of the wetland interior, as well as the value of its functions for water quality treatment and flood storage. But the relatively low habitat

score of 22 points results in a standard buffer of 120 feet under the 2004 Wetland Rating system and City of Olympia Critical Area Ordinance buffering rules.

Unavoidable impacts to the 120' wetland buffer can be effectively compensated for through a combination of buffer averaging, buffer vegetation planting and a properly designed and maintained trail system.

4.2 Soil Conditions

Onsite soils were mapped in the Thurston County Soil Survey (mapping carried out in the mid to late 1970s) as being Alderwood gravelly sandy loams. But that mapping is only correct in the southeast quarter of the site. The western portion of the site is covered with wetlands – with some of the wetland area having year-round surface water and some having seasonal water tables at 0-2 feet depth. The northwestern portion of the upland area east of the wetlands was found to have deep, gravelly to non-gravelly loamy sand soils to at least 12 feet depth. The southeastern portion of the upland area was found to be correctly mapped as Alderwood soils, having densic glacial till at about 5 feet depth, and evidence of a seasonal perched water table on top of the till. This seasonal water table will drain horizontally across the till, and is expected to eventually drain to the wetland in the western portions of the project site.

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APPENDIX A
WETLAND PHOTOGRAPHS

Figure 9. View of Aquatic Bed wetland area from the east

Figure 8. View of early winter hydrology conditions in forested wetland adjacent to Chehalis Western Trail.

Figure 11. Abandoned homeless encampment along northern forested wetland edge

Figure 10. Existing trail in the northern wetland buffer.

APPENDIX B
WETLAND RATING FORMS

Wetland name or number Bayan Trails Wetland

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Bayan Trails Wetland Date of site visit: 5/7/2014_

Rated by Lisa Palazzi Trained by Ecology? Yes ☑ No ☐ Date of training ~2005

SEC: 17 TWNSHP: 18 RNGE: 1W Is S/T/R in Appendix D? Yes___ No XX

Map of wetland unit: Figure ____ Estimated size ~10ac

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II XX III___ IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	20
Score for Hydrologic Functions	24
Score for Habitat Functions	22
TOTAL score for Functions	66

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply XX

Final Category (choose the "highest" category from above) II

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		**Depressional**	XX
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		XX
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		XX
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		XX
SP4. *Does the wetland unit have a local significance in addition to its functions*? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		XX

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?

☑ NO – go to 2 ☐ **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☑ NO – go to 3 ☐ **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?

___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

___At least 30% of the open water area is deeper than 6.6 ft (2 m)?

☑ NO – go to 4 ☐ **YES –** The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?

____The wetland is on a slope (*slope can be very gradual*),

____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

____The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*

☑ NO - go to 5 ☐ **YES –** The wetland class is **Slope**

5. Does the entire wetland unit **meet all** of the following criteria?

____ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

____ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

☑ NO - go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO – go to 7 ☑ **YES –** The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number Bayan Trails Wetland

D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the potential to improve water quality?**	***(see p.38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	**Figure** 2 3 (The wetland does overflow to the NE, but only during extreme events; not 5/10 yrs)
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	0 (the edge soils are dominated by sil or sl)
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	**Figure** 2 3
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0 Map of Hydroperiods	**Figure** 2 4
D	**Total for D 1** *Add the points in the boxes above*	10
D	**D 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☑ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☑ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☑ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	***(see p. 44)*** multiplier X2
D	**TOTAL - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	20

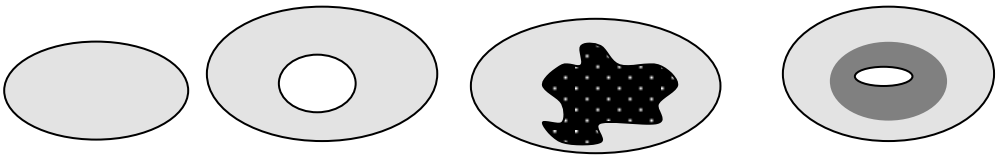
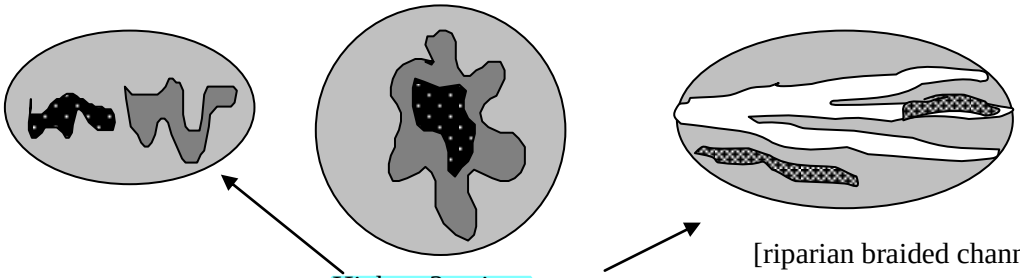
Wetland name or number Bayan Trails Wetland

D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the potential to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0	4
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	5 (ponding above the winter water level is <3 ft)
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire unit is in the FLATS class points = 5	3/5 (WL is about 10% of the basin, but could be more than 10%)
D	**Total for D 3** *Add the points in the boxes above*	12/14
D	**D 4. Does the wetland unit have the opportunity to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☑ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☑ Other protects surrounding neighborhoods fr **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 49)* multiplier X2
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	24/26

Wetland name or number Bayan Trails Wetland

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)***	**Figure** 2
Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres. xx Aquatic bed xx Emergent plants xx Scrub/shrub (areas where shrubs have >30% cover) xx Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* xx The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more points = 4 3 structures points = 2 2 structures points = 1 1 structure points = 0 Map of Cowardin vegetation classes	4
H 1.2. <u>Hydroperiods</u> ***(see p. 73)***	**Figure** 2
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods) xx Permanently flooded or inundated — 4 or more types present points = 3 xx Seasonally flooded or inundated — 3 types present points = 2 xx Occasionally flooded or inundated — 2 types present point = 1 xx Saturated only — 1 type present points = 0 ____ Permanently flowing stream or river in, or adjacent to, the wetland ____ Seasonally flowing stream in, or adjacent to, the wetland ____ ***Lake-fringe wetland* = 2 points** ____ ***Freshwater tidal wetland* = 2 points** Map of hydroperiods	3
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species points = 2 *List species below if you want to:* 5 - 19 species points = 1 < 5 species points = 0	2

Total for page 9

H 1.4. Interspersion of habitats ***(see p. 76)*** Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points  High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	**Figure ___** 3
H 1.5. Special Habitat Features: ***(see p. 77)*** *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* XX Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). XX Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* XX At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)* ____ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	3
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	15

Comments

H 2. Does the wetland unit have the opportunity to provide habitat for many species?

H 2.1 Buffers ***(see p. 80)***

Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."

- ☐ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer**.** (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5**
- ☐ 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4**
- ☐ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4**
- ☐ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3**
- ☐ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3**

If buffer does not meet any of the criteria above

- ☐ No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2**
- ☐ No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2**
- ☐ Heavy grazing in buffer. **Points = 1**
- ☐ Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**.
- ☑ Buffer does not meet any of the criteria above. **Points = 1**

Aerial photo showing buffers

Figure 2

1 Undisturbed buffer for 170-330 ft less than 15% perimeter; no paved areas or buildings within 50 meters around 36% of perimeter;

H 2.2 Corridors and Connections ***(see p. 81)***

H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*).

☐ YES = **4 points** (*go to H 2.3*) ☑ NO = go to H 2.2.2

H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above?

☐ YES = **2 points** (*go to H 2.3*) ☑ NO = H 2.2.3

H 2.2.3 Is the wetland:

within 5 mi (8km) of a brackish or salt water estuary OR
within 3 mi of a large field or pasture (>40 acres) OR
within 1 mi of a lake greater than 20 acres?

☑ YES = **1 point** ☐ NO = **0 points**

1 No unbroken connections ; Not a lake-fringe wetland as "lake" is too small

Total for page 2

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)***

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.*

- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- ☑ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*).
- ☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).*
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☑ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **3 or more** priority habitats **= 4 points**
If wetland has **2** priority habitats **= 3 points**
If wetland has **1** priority habitat **= 1 point** No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

3

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits*) ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	2
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	7
TOTAL for H 1 from page 14	15
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	22

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands *(see p. 86)* Does the wetland unit meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 ☐ NO ☑	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I ☐ NO go to SC 1.2 ☐	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? ☐ YES = Category I NO = Category II ☐ ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

SC 2.0 Natural Heritage Wetlands ***(see p. 87)*** **Cat. I**

Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.

SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)*

S/T/R information from Appendix D ☐ or accessed from WNHP/DNR web site ☐

YES ☐ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ☑

SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?

YES = Category I ☐ NO ☐ not a Heritage Wetland

SC 3.0 Bogs ***(see p. 87)***

Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.***

1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 ☐ No - go to Q. 2 ☑
2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond?
   ☑ Yes - go to Q. 3 ☐ No - Is not a bog for purpose of rating
3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)?
   ☐ Yes – Is a bog for purpose of rating ☑ No - go to Q. 4
   NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.

1. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?*

2. YES = Category I ☐ No ☑ Is not a bog for purpose of rating **Cat. I**

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* ☐ **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ☐ **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ YES = Category I NO ☑ not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* ☐ YES = Go to SC 5.1 NO ☑ not a wetland in a coastal lagoon SC 5.1 Does the wetland meets all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland is larger than 1/10 acre (4350 square feet) ☐ YES = Category I ☐ NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands ***(see p. 93)*** Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ☐ YES - go to SC 6.1 NO ☑ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? ☐ YES = Category II ☐ NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? ☐ YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	