# Finn Hill Road Shared Use Path

## Wetland Delineation Report and Buffer Enhancement Plan

**City of Poulsbo**
200 NE Moe Street
Poulsbo, WA 98370

***May 2019***

**Preparers Qualifications:**

Wetland delineation was completed in 2017 by James Guzman and Phil Struck of Sealaska Corporation. The Buffer Enhancement Plan was completed by Phil Struck in 2019. Mr. Guzman and Mr. Struck have received wetland training from the Department of Ecology. Mr. Guzman has 10 years of wetland delineation experience and has delineated over 20 wetland systems. Mr. Struck has over 30 years of wetland and stream delineation and mitigation design experience and has managed and conducted over 50 wetland and stream characterization projects, mitigation plans and mitigation design projects.

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| City | City of Poulsbo |
| Ecology | Washington State Department of Ecology |
| FAC | Facultative Wetland Indicator Rating |
| FACU | Facultative Upland Wetland Indicator Rating |
| FACW | Facultative Wetland Indicator Rating |
| ft, $ft^2$ | Feet, Square feet |
| NRCS | Natural Resources Conservation Service |
| NWI | National Wetlands Inventory |
| OBL | Obligate Wetland Plant Rating |
| Planning | City of Poulsbo Department of Planning and Economic Development |
| RCW | Revised Code of Washington |
| UPL | Upland Wetland Indicator Rating |
| USACE | United States Army Corps of Engineers |
| USDA | United States Department of Agriculture |
| WMVCS | Western Mountains, Valleys and Coast Supplement to the 1987 ACE Wetland Delineation Manual |

# 1 SUMMARY

This Wetland Delineation Report and Buffer Enhancement Plan describes wetlands and streams in the Finn Hill Road project area; evaluates potential impacts on wetlands, streams, and buffers from the proposed project; identifies avoidance and minimization measures included in the project design; and describes enhancements to existing degraded buffer areas.

The Finn Hill Road Shared Use Path (SUP) project will provide a non-motorized shared use path that links neighborhoods and schools and improves safety on Finn Hill Road. The project will provide approximately 4,800-ft of SUP adjacent to the Finn Hill Road between Olhava Way and Vinland Elementary School on Rhododendron Lane (see Figures 1-4).

One wetland (Wetland A) was delineated in the project area (see Figure 5). Wetland A overlaps multiple separate properties and was delineated within the right-of-way along the Finn Hill Road and Olhava Way frontage. Wetland A is rated a Category III wetland.

One stream was identified within the project area. The North Fork Johnson Creek is a Type F, fish-bearing stream crossed by Finn Hill Road at the intersection with Olhava Way. A culvert under SR3 creates a barrier to fish passage about 1,000-ft downstream of the project area. Wetland A is a headwater wetland to the North Fork Johnson Creek.

## 1.1 Potential Project Impacts

Construction of the SUP will affect 4,721 sq-ft of Wetland A buffer, which extends to the edge of Finn Hill Road. The buffer and edge of wetland area that is adjacent to the SUP is within an established above ground and underground utility corridor that is routinely mowed for maintenance (see Figure 5). There are no direct impacts to Wetland A. Wetland impacts are avoided by building a boardwalk along the edge of the wetland area. There will be no fill within the wetland area.

The SUP will be located within an interrupted buffer area where legally established utilities and roads are present. This legal but non-conforming use has resulted in significant existing buffer impacts. A buffer enhancement plan is proposed pursuant to PMC 16.20.230.A, 16.20.235.D and 16.20.740, and is intended to restore buffer functions in these degraded areas as an element of constructing the path within a designated buffer area.

The project location within the buffer is unavoidable due to the linear nature of the roadway adjacent to the wetland. There are no alternative locations for the SUP facility that could avoid wetland buffers. Impacts are minimized to the maximum extent feasible by reducing the width of the SUP adjacent to the wetland, using an elevated boardwalk adjacent to wetlands instead of using walls or fill slopes, and working within the portion of the maintained utility corridor right-of way.

Wetland buffer requirements are 150-ft for Category III wetland with a Habitat Score of 5-7 and High Impact Use per Poulsbo Municipal Code (PMC). Wetland buffer areas affected by the project are in a highly disturbed condition due to invasive vegetation, maintained landscaping and periodic mowing. Buffer impacts from the SUP are therefore not expected to be significant since all of the proposed SUP is within the maintained utility corridor that is periodically mowed for maintenance.

The North Fork Johnson Creek will be avoided and will not be affected as a result of the project. North Fork Johnson Creek is a Type F1 stream adjacent to the site, and buffer requirements are 200-ft each side of the stream pursuant to PMC. The North Fork Johnson Creek buffers overlap Wetland A buffers within the project footprint.

## 1.2 Proposed Buffer Enhancements

The project design was developed by proceeding in accordance with the mitigation sequencing requirements established by PMC. A high priority was placed on designing the project to include measures and features that avoid and minimize adverse effects on wetlands, streams and buffers. Impact avoidance and minimization measures, and the SUP location within the maintained utility corridor reduces wetland, stream or buffer impacts to a level not expected to be significant.

Although impacts are not expected to be significant, the City of Poulsbo will implement a buffer enhancement plan that will restore buffer areas degraded by existing utility corridor maintenance activities. Enhancement actions at the site will improve water quality and wildlife habitat and will be accomplished by a combination of planting native vegetation, controlling non-native or noxious weeds, and constructing stormwater quality treatment retrofits. These enhancements will result in a net improvement in wetland and buffer functions, and results in a net gain in functional wetland buffer area.

Enhancement plantings will improve habitat in 10,470 sq-ft of existing buffers and will restore areas degraded by prior utility maintenance activities. The buffer enhancement will provide significant ecological lift to the adjacent wetland and stream system by:

- Removal of existing underground utilities from the buffer area
- Removing invasive vegetation
- Treating stormwater prior to discharge to wetlands and North Fork Johnson Creek
- Improving soil conditions in the buffer so that they will support healthy native plant communities
- Improve biological diversity and wildlife habitat by establishing a variety of native plants
- Increase the production of organic matter in the buffer by establishing more complex plant communities and eliminating periodic mowing

- Improve water temperature by planting trees in degraded buffer areas immediately adjacent to the North Fork Johnson Creek

Enhancement will be provided at a ratio that exceeds 2:1 (buffer area affected by the SUP compared to buffer area enhanced). Given the highly degraded existing buffer condition, this ratio significantly exceeds all recommended local, state and federal guidelines.

The project will also reduce impervious areas and runoff to streams and wetlands. This reduction in impervious area means stormwater treatment is not technically required by City and state regulations. However, as part of the City's on-going stormwater retrofit program, the project will treat existing road surfaces adjacent to the wetland and stream buffer areas prior to discharge. These stormwater facilities therefore exceed current City and Department of Ecology (2014) stormwater management requirements. Other impact minimization will also be implemented including not increasing roadway lighting adjacent to the wetlands and maintaining surface water flows into the wetland consistent with existing conditions.

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# 2 INTRODUCTION

This report describes wetlands and stream conditions, project impacts and mitigation measures associated with a new shared use path (SUP) adjacent to NW Finn Hill Road and Rhododendron Lane NW in Poulsbo, Washington (Figure 1). The City of Poulsbo (City) proposes to construct this new SUP to improve safety of children walking and biking to school and to expand the City's non-motorized system. The SUP is an element of the Washington State Department of Transportation's (WSDOT's) Safe Routes to Schools program. Once complete, the project will improve public safety, as well as improve pedestrian and bicycle mobility.

The roadway improvements will affect approximately 4,800 linear feet of right-of-way within the City and unincorporated Kitsap County (County). Kitsap County is a partner with the City of Poulsbo on the SUP project. This report describes site conditions and wetland/stream buffer impacts and enhancement measures.

## 2.1 Report Updates

This final report provides updates to the February 2019 Wetland Delineation Report and Buffer Enhancement Plan to address City of Poulsbo Critical Area Review comments (Appendix A).

## 2.2 Site Location

The SUP is located adjacent to the north side of Finn Hill Road between Olhava Way and Rhododendron Lane, and the east side of Rhododendron Lane between Finn Hill Road and Vinland Elementary School (Figures 2, 3 and 4). The project site is located in portions of the NE and SE Quarters of Section 9 and SW Quarter of Section 10 of Township 26 North and Range 1 East of the Willamette Meridian. The site is within Water Resources Inventory Area 15 – Kitsap, partially within Hydrologic Unit Control (HUC) 17110018 – Hood Canal, and partially within HUC 17110019 – Puget Sound.

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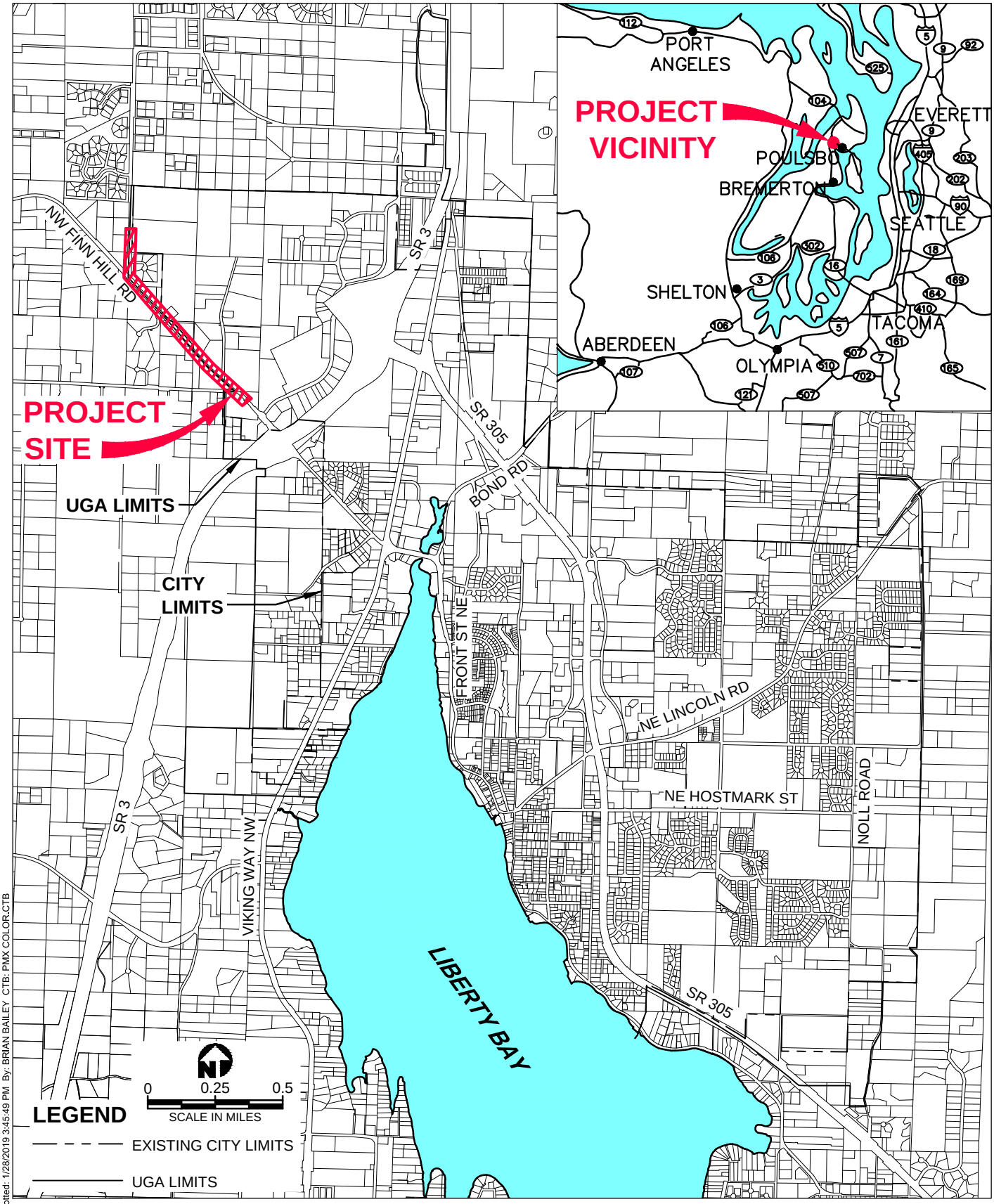


C:\USERS\BBAILEY\DROPBOX\FINN HILL\CADD\FINNHILL FIGURE 1 - VICINITY AND LOCATION MAP.DWG
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**Figure 1-1**
**Vicinity and Location Map**

Finn Hill Road
Shared Use Path
City of Poulsbo, WA

WETLAND "A"
(SEE FIGURE 5)

URDAHL RD NW

N. FORK JOHNSON CR

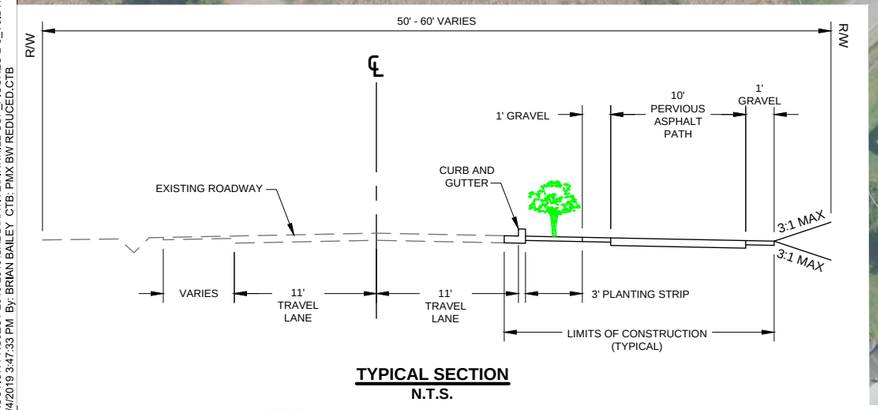
OLHAVA WAY NW

NW FINN HILL RD

NW RUDE RD

KASTER RD NW

WETLAND "B"




**TYPICAL SECTION**
**N.T.S.**

LEGEND

- PROPOSED SHARED USE PATH AT GRADE
- ELEVATED BOARDWALK
- WETLANDS (APPROXIMATE)
- CITY OF POULSBO CITY LIMIT
- UGA BOUNDARY
- RIGHT-OF-WAY
- PARCEL BOUNDARY

N

0 100

SCALE

# Figure 2
# Finn Hill Rd-Shared Use Path
# East Segment Plan

Finn Hill Road
Shared Use Path
City of Poulsbo, WA

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REGENT AVE NW

URDAHL RD NW

NW FINN HILL RD

NW PONDEROSA PL

N

0 100

SCALE

LEGEND

PROPOSED SHARED USE PATH AT GRADE

ELEVATED BOARDWALK

WETLANDS (APPROXIMATE)

CITY OF POULSBO CITY LIMIT

UGA BOUNDARY

RIGHT-OF-WAY

PARCEL BOUNDARY

CITY OF POULSBO VIKING CITY

**Figure 3**
**Finn Hill Rd - Shared Use Path**
**Middle Segement Plan**

Finn Hill Road
Shared Use Path
City of Poulsbo, WA

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VINLAND ELEMENTARY SCHOOL

RHODODENDRON LN NW

NW TRILBY CT

REGENT AVE NW

NW FINN HILL RD

NW FINN HILL RD

NW PONDEROSA PL

N

0 100

SCALE

LEGEND

PROPOSED SHARED USE PATH AT GRADE

ELEVATED BOARDWALK

WETLANDS (APPROXIMATE)

CITY OF POULSBO CITY LIMIT

UGA BOUNDARY

RIGHT-OF-WAY

PARCEL BOUNDARY

**Figure 4**
**Finn Hill Rd - Shared Use Path**
**West Segement Plan**

Finn Hill Road
Shared Use Path
City of Poulsbo, WA

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# 3 PROJECT DESCRIPTION

The project will provide a SUP connecting Olhava Way with Vinland Elementary School. The construction area extends along approximately 4,800 linear feet of right-of-way. Specific elements are described in more detail below and are shown in Figures 1-7 and the buffer enhancement design plans in Appendix B.

## 3.1 Shared Use Path

The SUP will be constructed consistent with City standards and WSDOT guidelines. It will have a hard surface and be suitable for use by both pedestrians and bicyclists and will be compliant with the Americans with Disabilities Act (ADA). The SUP will consist of a 10-foot wide section of porous asphalt with 2-foot gravel shoulders on each side (see Typical Section on Figure 2). A 3-foot wide native plant landscape strip and concrete curb and gutter will separate the SUP from the motorized vehicle travel lanes. The SUP will be constructed at-grade in areas where slopes are minimal, such that permanent cut and fill areas are minimized. An approximate 200-ft portion of the SUP will be constructed on a boardwalk adjacent to a wetland.

Once constructed, the SUP will provide a continuous, non-motorized link between the Olhava regional commercial center, Olympic College and Western Washington University, and Vinland Elementary School.

## 3.2 Boardwalk SUP Segment

The boardwalk is located adjacent to the west limits of Wetland A as shown in Figure 5 and is located entirely within the limits of a mowed and maintained utility corridor (see Figures 6, 7 and 8). To minimize the construction footprint, the elevated portion of SUP will be an 8-foot wide upland boardwalk, typically between 2-feet and 4-feet off the ground. The 8-foot width is measured from inside rail to inside rail and is the minimum allowed SUP that can support both bicycle and pedestrian use. The boardwalk segment will be constructed using a wood frame on steel pin-pile or concrete pier piling and abutments.

The boardwalk extends over the edge of Wetland A by a maximum of 2-ft over an approximate 70-ft segment (see Figures 5 and 6). This extension is entirely within the mowed portion of the existing maintained utility corridor, which results in minimal and inconsequential impacts to the wetland and adjacent buffer from the new path. The proposed path will result in no loss of existing wetland acreage or reduction of existing wetland functions or habitat values.

The existing maintained utility corridor extends through the entire west buffer of Wetland A (Figure 7). Refer to section 7 for additional discussion of potential impacts and mitigation measures.

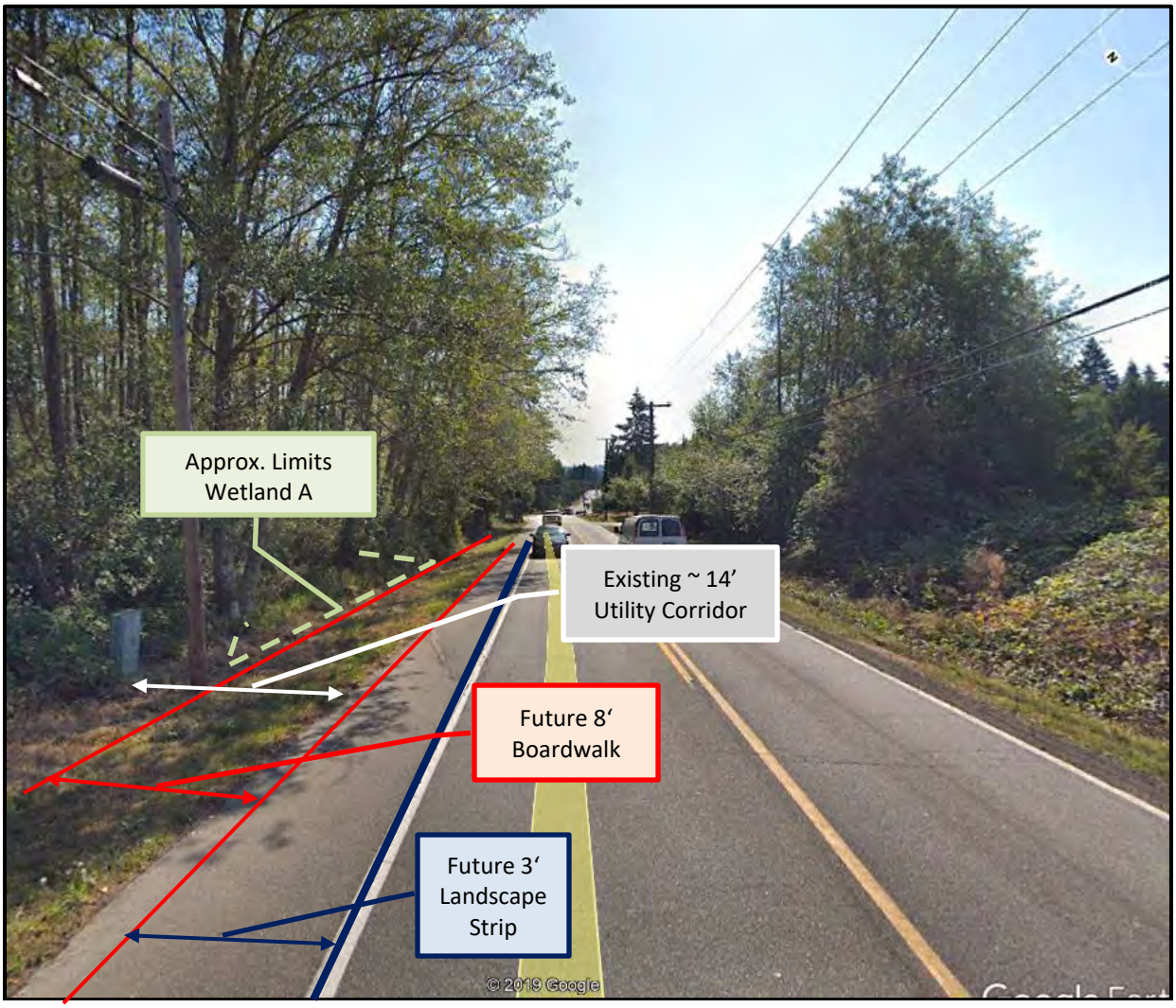


**Figure 5. Wetland A, Proposed Boardwalk and Existing Utility Corridor.**

## 3.3 On-Street Shoulder

An 8-foot wide paved shoulder will be added to a portion of northbound Rhododendron Lane to provide temporary parking for pick up and drop off at Vinland Elementary School. Existing shoulder area gravel will be replaced with pavement and concrete curb and gutter. The shoulder improvement area is outside of any wetland or stream buffer area.

## 3.4 Stormwater Improvements

The project will install new stormwater collection and conveyance pipes to replace existing ditches on the north side of Finn Hill Road and east side of Rhododendron Lane. Existing outfall locations will be maintained and will be retrofit with stormwater treatment vaults and cobble splash pads to disperse flows. No new stormwater outfalls are proposed. The new SUP will be

constructed of permeable asphalt so will not generate stormwater runoff.

The project will decrease pollutant generating impervious surfaces by approximately 1,880 sq-ft by replacing existing impervious roadway shoulders with the new permeable asphalt shared use path. Although it is not required, as part of the City's on-going stormwater retrofit program, the project will treat existing road surfaces adjacent to the wetland and stream buffer areas prior to discharge. Stormwater facilities for the project will exceed current City and Department of Ecology (2014) stormwater management requirements.

Runoff from the project flows into the North Fork Johnson Creek, Liberty Bay and Hood Canal. Approximately 95 percent of the project drains to the North Fork Johnson Creek and 5 percent to an unnamed tributary headwaters of Cattail Creek (Hood Canal basin).

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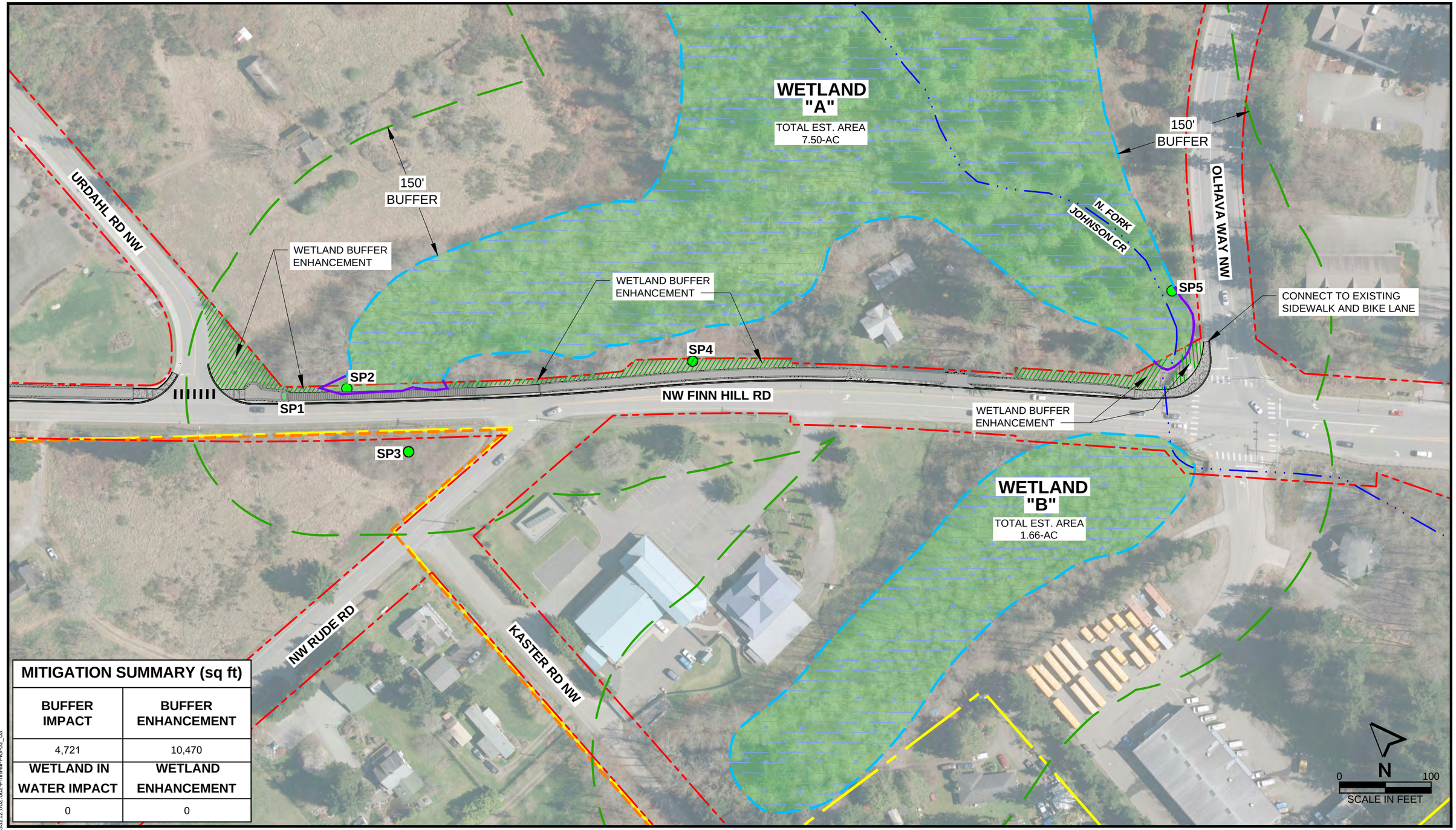


| MITIGATION SUMMARY (sq ft) | |
|---|---|
| **BUFFER IMPACT** | **BUFFER ENHANCEMENT** |
| 4,721 | 10,470 |
| **WETLAND IN WATER IMPACT** | **WETLAND ENHANCEMENT** |
| 0 | 0 |

**LEGEND**

- PROPOSED 10' SHARED USE PATH AND GRAVEL SHOULDER
- ELEVATED BOARDWALK
- CITY OF POULSBO
- UGA BOUNDARY
- ESTIMATED WETLAND LIMITS
- DELINEATED WETLANDS
- RIGHT-OF-WAY
- BUFFER ENHANCEMENT
- STREAM
- WETLAND SOIL DATA POINT

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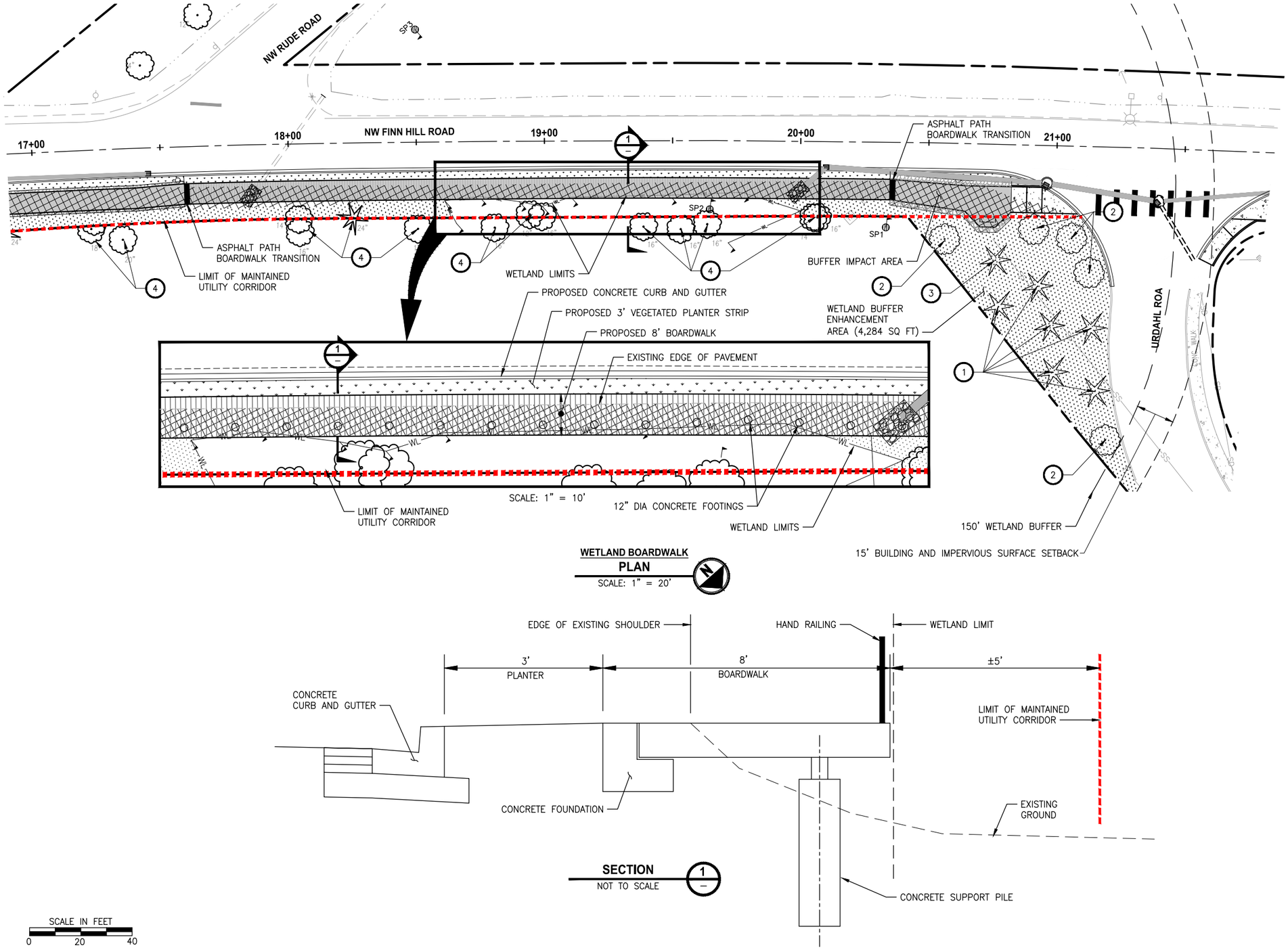
**Figure 6**
**Wetland and Stream Buffer Enhancement Plan**
**Finn Hill Road**
**City of Poulsbo**




**WETLAND BOARDWALK PLAN**
SCALE: 1" = 20'




**SECTION**
NOT TO SCALE

SCALE IN FEET
0 20 40

## LEGEND

- CONCRETE SIDEWALK
- SHARED USE PATH – POROUS HMA CLASS ½" PG 70-22 ER
- MAINTAINED LAWN AREA
- BUFFER IMPACT AREA
- WETLAND AND STREAM BUFFER ENHANCEMENT AREA, SEE NOTES SHEET LS3
- STREET PLANTING STRIP
- DELINIATED WETLAND
- SP1 SOIL PLOT

## PLANTING NOTES:

1. DOUGLAS FIR, SEE NOTES AND DETAILS SHEET LS3
2. WESTERN DOGWOOD, SEE NOTES AND DETAILS SHEET LS3
3. WESTERN RED CEDAR, SEE NOTES AND DETAILS SHEET LS3
4. PROTECT EXISTING TREES

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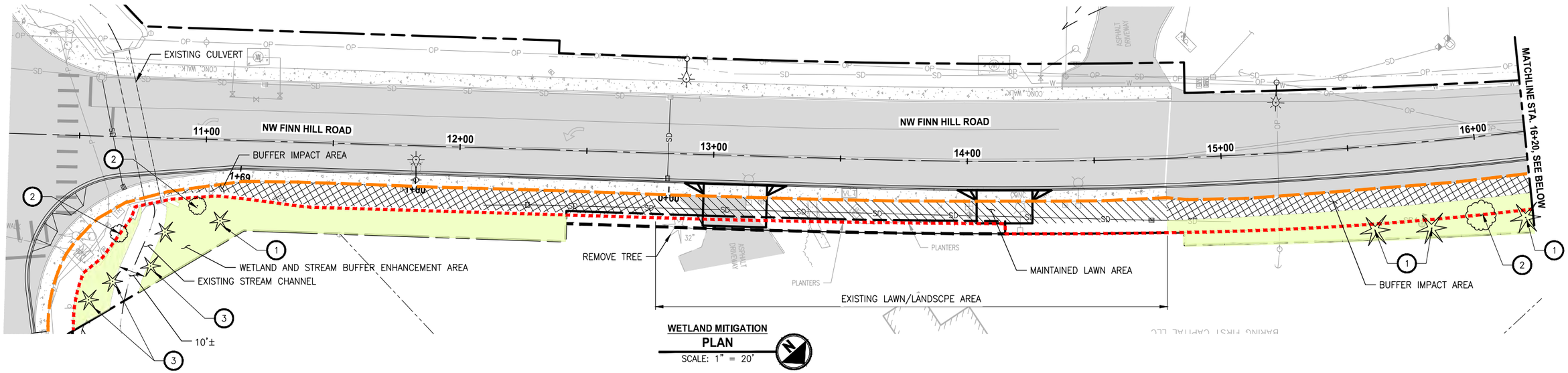
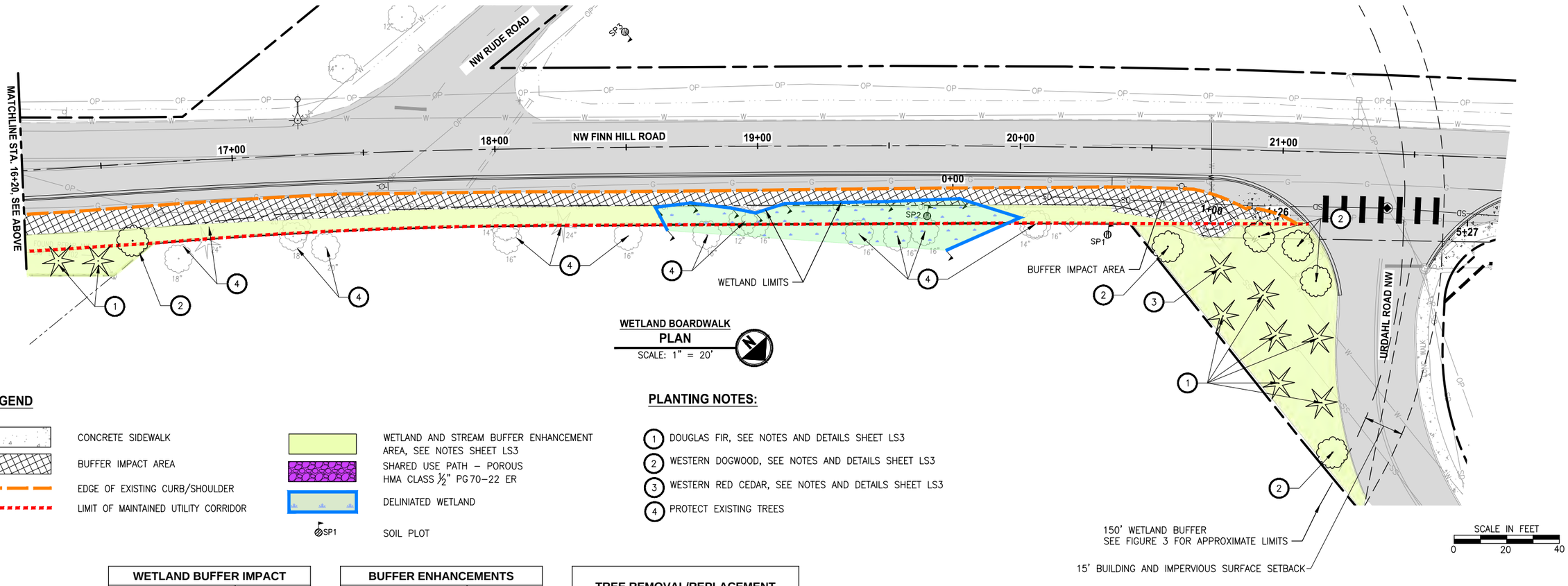
# Figure 7
# Finn Hill Rd-Shared Use Path Boardwalk Detail

Finn Hill Road
Shared Use Path
City of Poulsbo,
WA




## LEGEND

- CONCRETE SIDEWALK
- BUFFER IMPACT AREA
- EDGE OF EXISTING CURB/SHOULDER
- LIMIT OF MAINTAINED UTILITY CORRIDOR
- WETLAND AND STREAM BUFFER ENHANCEMENT AREA, SEE NOTES SHEET LS3
- SHARED USE PATH – POROUS HMA CLASS ½" PG 70–22 ER
- DELINIATED WETLAND
- SP1 SOIL PLOT

## PLANTING NOTES:

1. DOUGLAS FIR, SEE NOTES AND DETAILS SHEET LS3
2. WESTERN DOGWOOD, SEE NOTES AND DETAILS SHEET LS3
3. WESTERN RED CEDAR, SEE NOTES AND DETAILS SHEET LS3
4. PROTECT EXISTING TREES

| WETLAND BUFFER IMPACT | |
|---|---|
| WITHIN MAINTAINED UTILITY CORRIDOR | 4,636 SF |
| OUTSIDE MAINTAINED UTILITY CORRIDOR | 85 SF |
| TOTAL BUFFER IMPACT AREA | 4,721 SF |

| BUFFER ENHANCEMENTS | |
|---|---|
| WITHIN MAINTAINED UTILITY CORRIDOR | 2,785 SF |
| OUTSIDE MAINTAINED UTILITY CORRIDOR | 7,639 SF |
| TOTAL ENHANCEMENT AREA | 10,470 SF |

| TREE REMOVAL/REPLACEMENT | |
|---|---|
| TREES REMOVED | 1 - 32" DIA DOUBLAS FIR |
| TREES PLANTED | 10 - DOUGLAS FIR<br>7 - WESTERN DOGWOOD<br>4 - WESTER RED CEDAR |

# Figure 8
# Finn Hill Rd-Shared Use Path
# Limit of Maintained Roadway and Utility Corridor

Finn Hill Road
Shared Use Path
City of Poulsbo,
WA

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# 4 REGULATORY AUTHORITY

The purpose of a wetland delineation is to provide an assessment of the presence, location, and extent of wetlands and/or other critical aquatic habitat that are under the jurisdiction of the USACE, Ecology, and the City.

A wetland delineation is required whenever development or land disturbance activities occur in or near a wetland or wetland buffer area (Poulsbo Municipal Code 16.20; Revised Code of Washington [RCW] 90.48.030; 33 United States Code 1344; 40 CFR Parts 230 and Parts 232; and 33 CFR Parts 320-330).

## 4.1 Federal Regulations

In Section 404 of the Federal Water Pollution Control Act (Clean Water Act, P.L. 92-500, as amended), USACE and EPA share the authority to regulate the placement of fill materials in wetlands and other waters of the U.S. and requires permits for such activities. Additionally, Section 401 of the Clean Water Act regulates activities involving discharge into wetlands and requires that activities comply with water quality standards and are certified by Ecology or the appropriate tribal authority.

The project will not place any fill within wetlands or streams so no federal permits or approvals are required.

## 4.2 State Regulations

The state has jurisdiction over wetlands and other waters through Section 401 of the Clean Water Act, the State Growth Management Act, and the Shoreline Management Act (RCW 36.70A.175; RCW 90.58.380).

The project will not place any fill within wetlands or streams so no state permits or approvals are required.

## 4.3 City of Poulsbo Critical Areas Ordinance

The City of Poulsbo regulates all activities in and adjacent to wetlands, streams, and habitat conservation areas as outlined in the Poulsbo Municipal Code (PMC). This report meets the requirements of PMC for wetland delineation reports and buffer enhancement plans.

### 4.3.1 Consistency with Poulsbo Municipal Code

The project is consistent with the following standards of PMC Title 16 Critical Areas:

16.20.230 Wetland and buffer development standards:

**H. Impervious Surface Setbacks.** The impervious surface setback is shown on Figures 7 and 8 and an analysis has been conducted showing that the portion of the proposal constructed within the impervious surface setback area will not adversely impact the wetland (see section 7.5).

**J. Buffer Enhancement Plan**. This report meets the requirements for buffer enhancement plans. Refer to Section 8 for Buffer Enhancement Plan details. Table 1 summarizes the measures that are being used to minimize impacts.

**Table 1. Measures Used to Minimize Impacts to Wetlands (adapted from PMC Table 16.20.230.C).**

| Disturbance | Proposal Activities that Cause Disturbance | Measures Used to Minimize Impacts |
|---|---|---|
| Lights | Roadway lighting | No increase in the number of streetlights within the buffer area compared to existing conditions. One light being relocated to a point further from the wetland then its current location. |
| Noise | Roadway and pedestrian traffic | No change in roadway volumes due to the project. |
| | | Buffer enhancement will provide a denser vegetation screen which will reduce noise impacts to the wetland. |
| Stormwater Runoff | Runoff from the new shared use path and roadway | The path will be constructed of pervious materials which will treat run off and help maintain/support wetland and stream hydrology. |
| | | Portions of existing Finn Hill Road will be retrofit with stormwater quality treatment facilities. |
| Change in Water Regime | Runoff from the roadway and shared use path | Existing outfalls will be maintained and retrofit with new cobble dispersion pads. |
| | | The path will be constructed of pervious materials which will treat run off and help maintain/support wetland and stream hydrology |
| Pets and human disturbance | Activity on the shared use path | Buffer enhancement will provide a denser vegetation screen which will discourage access to the wetland. |
| Dust | Clearing and Grading during construction | BMPs for erosion control and dust management are defined in the Stormwater Pollution Prevention Plan and construction contract specifications. |

16.20.235 Additional development standards.

**D. Road/Street Repair and Construction**. The proposed public path is allowed in wetlands or wetland buffers and meets the following development standards:

1. There is no other reasonable or practicable alternative for locating the path, and it serves multiple properties;
2. The path is on publicly owned and maintained road right of way which provides for other purposes including utilities and stormwater treatment.
3. The road or street repair and construction are the minimum necessary to provide safe facilities that meet City and WSDOT design criteria;
4. Mitigation is being performed in accordance with this chapter of PMC and specific project mitigation plan requirements; and
5. Before beginning work in-water or within wetlands, the City will it shall be the responsibility of the agency to ensure that all other required state and federal approvals have been obtained. Because there is no in-water work, no other state or federal permits are required.

**G. Utilities in Wetlands or Wetland Buffers.** The proposal is located within an existing utility corridor as shown in Figure 5. Applicable development standards consist of the following:

6. Utility corridor maintenance shall include the following measures to protect the regulated wetland and buffer environment:
    a. Where feasible, painting of utility equipment such as power towers shall not be sprayed or sandblasted, nor should lead-based paints be used. No painting or sandblasting of utilities is proposed.
    b. No pesticides, herbicides or fertilizers may be used in wetland areas or their buffers except those approved by the EPA and the Department of Ecology. Where approved, herbicides must be applied by a licensed applicator in accordance with the safe application practices on the label. Any fertilizer and herbicide use in the buffer enhancement area will utilize only those approved by the EPA and the Department of Ecology and will be applied by a licensed applicator in accordance with the safe application practices on the label.

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# 5 WETLAND DELINEATION METHODS

Wetland delineation occurred in October 2016. The methods specified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) were used to delineate on-site wetlands. Additionally, the methods specified in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Corps 2010) were used.

Buffer requirements were determined based upon the category of the wetland areas as specified in PMC 16.20. Information related to wetland delineation and classification is found in Appendix C and D.

## 5.1 Preliminary Data Review

Public resource documents were used to provide initial site information on vegetation, soils, hydrology, and critical habitats. These resources included the following:

- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Soil Survey Natural Resources Conservation Service Hydric Soils List for Kitsap County, spatial data December 13, 2013 and tabular data September 14, 2015.
- Washington Natural Heritage Wetland Sites, Washington State Department of Natural Resources (DNR). July 24, 2015. http://www1.dnr.wa.gov/nhp/refdesk/datasearch
- U.S. Fish and Wildlife Service National Wetlands Inventory (NWI), 2016.
- City and County Critical Areas Maps.
- Washington State Department of Natural Resources, Forest Practice Application Review System (FPARS), ARCIMS mapping application, 2016. https://fortress.wa.gov/dnr/protectiongis/fpamt/index.html#
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) web mapper. http://apps.wdfw.wa.gov/phsontheweb/
- WDFW SalmonScape web mapper. http://apps.wdfw.wa.gov/salmonscape/map.html

## 5.2 Survey Protocols

Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. An area must have at least one positive indicator for hydrophytic vegetation, hydric soils, and wetland hydrology to be considered a wetland.

Delineated wetlands were instrument-surveyed by professional land surveyors. Wetland determination data forms from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Corps 2010) were recorded

for the wetland and are provided in Appendix C. In addition, numerous shovel probes and/or pits were dug throughout the study area to confirm the presence or absence of wetland characteristics, but these observations were not formally recorded.

### 5.2.1 **Vegetation**

Vegetative communities were assessed initially to estimate the boundary of the wetland. Once the wetland zone was established, soil test pits were excavated at the edge of the area to more accurately establish an actual boundary between the wetland and upland areas on the subject parcel. The soil test pits were used to evaluate soils for hydric indicators.

The dominant plants and their wetland indicator status were evaluated to determine whether the vegetation was hydrophytic. Hydrophytic vegetation is generally defined as vegetation adapted to prolonged saturated soil conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants must be Facultative (FAC), Facultative Wetland (FACW), or Obligate (OBL), based on the plant indicator status category assigned to each plant species by the U.S. Fish and Wildlife Service (USFWS) (Reed 1988, 1993). Table 1 lists the definitions of the indicator status categories.

Scientific and common plant names follow currently accepted nomenclature. Most names are consistent with the National Wetland Plant List (Lichvar 2013) and the PLANTS Database (USDA, NRCS 2013). During the field investigations, dominant plant species were observed and recorded on data forms for each sample plot.

**Table 2. Key to Plant Indicator Status.**

| Plant Indicator Status Category | Symbol | Definition |
|---|---|---|
| Obligate Wetland Plants | OBL | Plants that almost always (> 99% of the time) occur in wetlands, but which may rarely (< 1% of the time) occur in non-wetlands. |
| Facultative Wetland Plants | FACW | Plants that often (67% to 99% of the time) occur in wetlands, but sometimes (1% to 33% of the time) occur in non-wetlands. |
| Facultative Plants | FAC | Plants with a similar likelihood (33% to 66% of the time) of occurring in both wetlands and non-wetlands. |
| Facultative Upland Plants | FACU | Plants that sometimes (1% to 33% of the time) occur in wetlands, but occur more often (67% to 99% of the time) in non-wetlands. |
| Upland Plants | UPL | Plants that rarely (< 1% of the time) occur in wetlands, and almost always (> 99% of the time) occur in non-wetlands. |

Source: Environmental Laboratory (1987).

### 5.2.2 Soils

Generally, an area must have hydric soils to be a wetland. Hydric soil forms when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. Biological activities in saturated soil result in reduced oxygen concentrations that cause a preponderance of organisms using anaerobic processes for metabolism. Over time, anaerobic biological processes result in certain soil color patterns, which are used as indicators of hydric soil. Typically, low chroma colors are formed in the soil matrix. Brightly-colored redoximorphic features form within the matrix under a fluctuating water table.

Other important hydric soil indicators include organic matter accumulations in the surface horizon, reduced sulfur odors, and organic matter staining in the subsurface. The depths of the sample plots ranged between 18 and 20 inches deep with varying widths. Munsell color charts (Munsell Color 2010) were used to describe soil colors.

### 5.2.3 Hydrology

Wetland hydrology is present when indicators of seasonal or permanent local water inundation are observed. An area is considered to have wetland hydrology when soils are ponded or saturated consecutively for 12.5% of the growing season. In Kitsap County, the frost free growing season generally lasts from early April to early November. During this period, ponding must be present for approximately 30 consecutive days. Primary indicators of wetland hydrology include surface inundation and saturated soils. Secondary indicators include drainage patterns, watermarks and oxidized root channels.

The direction of surface and subsurface flow in wetlands, which inherently possess low-flow hydrologic regimes, is often difficult to determine and generally requires long-term hydrological monitoring via monitoring wells. In lieu of these more in-depth methods, cursory analyses were conducted to develop a general understanding of site hydrology. The direction of hydrologic flow surface water and sub-surface flow was determined by a qualitative field assessment and extrapolated to the extent possible from available topography.

## 5.3 Western Washington Wetland Rating System

Wetlands within the project area were assessed using the *Washington State Wetland Rating System for Western Washington* (Ecology 2004, Update 2014). Ecology's rating system was developed to characterize wetlands based on their attributes, ecological and environmental functions, rarity, sensitivity to disturbance, and ability to be replaced. Wetlands with high total functional scores are generally considered to be higher quality wetlands, provide higher ecological and/or environmental functions, rare, more sensitive to disturbance, and harder to replace.

The total functional value score is a combination of three groups of functions with about equal importance: improving water quality, hydrological functions, and wildlife habitat. Water quality, hydrologic functions, and habitat functions are worth 9 possible points each, with a total combined possibility of 27 points. The highest quality wetlands are Category I wetlands and have a total functional value greater than 23 based on a maximum possible score of 27 points. Category II wetlands are the next highest quality with total functional value scores from 20-22 points. Category III wetland have scores between 16-19, followed by Category IV, which is considered the poorest type of wetland, with scores between 9-15 (Ecology 2014).

Wetlands were rated according to PMC 16.20.210 using the latest approved version of the *Washington State Wetland Rating System for Western Washington – Revised* (Hruby 2014) (Appendix D). Table 2 summarizes the state and local jurisdiction wetland rating criteria for each wetland category. According to the requirements of PMC 16.20.230, the City assigns wetland buffer widths based upon wetland category, wetland rating system habitat score, and level of impact from adjacent land uses.

**Table 3. Criteria for Wetland Rating Categories.**

| | |
|---|---|
| **Category I** | Wetlands that: (a) represent a unique or rare wetland type; or (b) are more sensitive to disturbance than most wetlands; or (c) are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or (d) provide a high level of function. Category I wetlands include relatively undisturbed estuarine wetlands larger than 1 acre, wetlands with a high conservation value that are identified by scientists of the Washington Natural Heritage Program/Washington Department of Natural Resources (DNR), bogs, mature and old-growth forested wetlands larger than 1 acre, wetlands in coastal lagoons, interdunal wetlands that score eight or nine habitat points and are larger than 1 acre, and wetlands that perform many functions very well as demonstrated by a score of 23 to 27 total points. |
| **Category II** | Wetlands that are difficult, though not impossible, to replace, and provide a moderately high level of functions. Category II wetlands include estuarine wetlands smaller than 1 acre or disturbed and larger than 1 acre, interdunal wetlands greater than 1 acre or are a mosaic of interdunal wetlands that are 1 acre or larger, and wetlands that perform functions well as demonstrated by a score of 20 to 22. |
| **Category III** | Wetlands with a moderate level of function as demonstrated by a score of 16 to 19 points, and interdunal wetlands between one-tenth and 1 acre. |
| **Category IV** | Wetlands that have the lowest levels of functions as demonstrated by a score of 9 to 15 points and are often heavily disturbed. |

## 5.4 Wetland Functional Assessment

Functions of individual wetlands were assessed using Hruby (2014). This method evaluates three key functions that wetlands perform–water quality, hydrologic, and habitat functions. Each function is assessed in three contexts: whether the wetlands have the potential to perform a function, landscape factors that influence the functions in the wetland, and whether the wetland performs functions valuable to society.

The rating system uses a series of questions to score the various functions, resulting in a high, moderate, or low rating for each function. Thus, a total of nine scores is used to produce an overall rating for the wetlands. These function scores are useful to qualitatively compare functions across study area wetlands. These function scores also can be used as a basis for estimating wetland function impacts as well as the adequacy of proposed wetland mitigation (Hruby 2012).

## 5.5 Stream Identification

Stream identification was performed based on the definition provided by the City of Poulsbo Municipal Code. The City defines streams as "Those areas in the City of Poulsbo where the surface water flow is sufficient to produce a defined channel or bed. A defined channel or bed is an area which demonstrates clear evidence of the passage of water and includes but is not limited to bedrock channels, gravel beds, sand and silt beds and defined-channel swales. The channel or bed need not contain water year-round. This definition is not meant to include irrigation ditches, canals, storm or surface water runoff devices or other artificial watercourses unless they are used by salmon or used to convey streams naturally occurring prior to construction." (Poulsbo Municipal Code 16.20.155).

Project area streams were identified during field investigations, using the above definition. The locations of the ordinary high-water marks of streams were flagged and instrument-surveyed by professional land surveyors. Streams were classified according to the DNR water typing system (Washington Administrative Code [WAC] 222-16-030), as required by PMC. The classifications were applied to the stream reaches located within the project area.

## 5.6 Fish and Wildlife Habitat Areas

The City defines Fish and Wildlife Habitat as "Those areas identified as being of critical importance to the maintenance of fish, wildlife, and plant species, including: areas within which endangered, threatened, and sensitive species have a primary association; habitats and species of local importance; commercial and recreational shellfish areas; kelp and eelgrass beds, and forage fish spawning areas; naturally occurring ponds and their submerged aquatic beds that provide fish or wildlife habitat; waters of the State; lakes, ponds, streams or rivers planted with game fish by a government or tribal entity, or private organization; State natural area preserves and natural resources conservation areas."

The City defines "All streams which meet the criteria for Types F, Np and Ns waters as set forth in WAC 222-16-030 of the DNR Water Typing System" as Fish and Wildlife Habitat Conservation Areas (PMC 16.20.310 B). Primary association areas for critical species was done using data provided by the PHS database and species lists available from USFWS and National Marine Fisheries Service (NMFS). Species likely to inhabit the project area were also identified during the field investigations based on actual sightings; recognition of vocalizations; and presence of tracks,

scat, burrows, nesting structures, and other signs.

## 5.7 Impact Assessment

Impacts to wetlands, streams, and buffers were assessed by overlaying the proposed design onto project base maps showing wetland, stream, and buffer locations. Impact areas were determined as the area of intersection between the proposed design and the base maps. This assessment also considered loss of wetland and stream function (based on the amount of clearing, filling, and/or excavation as a result of the project) and other direct and indirect impacts to wetlands and wildlife habitat areas.

# 6 SITE INVESTIGATION RESULTS

## 6.1 General Site Description

The study area for the wetland investigation is generally defined as the area within approximately 100 feet of the right-of-way of Finn Hill Road and Rhododendron Lane from Olhava Way to Vinland Elementary School. Characteristics of the study area, including the watershed, land use, topography, soils, vegetation, fish and wildlife habitat, and wetlands, are described below.

### 6.1.1 Watershed Location

The project site is in portions of the NE and SE Quarters of Section 9 and SW Quarter of Section 10 of Township 26 North and Range 1 East of the Willamette Meridian. It is within Water Resources Inventory Area 1 – Kitsap, partially within Hydrologic Unit Control (HUC) 17110018 – Hood Canal, and partially within HUC 17110019 – Puget Sound.

The project area is located within two watershed; the North Fork Johnson Creek basin which drains to Liberty Bay, and Cattail Creek, which is a contributing sub-basin to the Hood Canal watershed. All wetlands and streams potentially affected by the project are located in the North Fork Johnson Creek basin. Basin delineation and flow paths developed for the project Stormwater Drainage Report are provided in Appendix E.

### 6.1.2 Land Use

The project area generally consists of improved right-of-way roadway shoulders and adjacent maintained vegetation. Existing shoulder slopes vary between flat (0–5%), moderate (5–15%), and steep (>15%) largely depending on historic cuts and fills generated during construction of the existing roadway and development of adjacent properties. Non-vegetated portions of the project area consist of existing asphalt and gravel shoulders. Representative photographs of the site are provided in Appendix F.

The project area is typically moderately to highly disturbed due to historical development of the existing road and adjacent properties. Vegetation in developed areas ranges from non-existent in paved areas, to a mix of grasses, shrubs, and trees. Small stands of mature conifers, interspersed with deciduous trees are also present.

## 6.2 Habitat In Project Vicinity

Habitat in the project vicinity generally consists of shrub and forested wetlands surrounded by fragmented upland forest, commercial and residential development. Forested areas of Wetland A consists mostly of red alder forest, with adjacent buffer areas consisting primarily of Douglas fir. Wetland A and adjacent Wetland B form the headwaters of North Fork Johnson Creek, which

becomes channelized prior to entering a culvert under Finn Hill Road. North Fork Johnson Creek is considered a fish-bearing stream by state and local agencies, and eventually drains into Liberty Bay. Fish presence above Finn Hill Road is unlikely due to a barrier culvert located downstream at SR3, and a high gradient de-watered channel segment above Finn Hill Road.

## 6.3 Review of Existing Data

Multiple databases were consulted to review site characteristics and background information prior to data collection in the field. Information obtained during the document review supported the following interpretations:

- The NWI and City Wetlands Critical Areas maps indicated that a relatively large wetland is present in the site vicinity (see Figure 3).
- The City Fish and Wildlife Habitat Conservation Areas map and WDFW web data indicated that there is a fish-bearing stream (North Fork Johnson Creek) that crosses the easternmost section of the project area.
- The project area is not within a section and township that contains a Washington Wetland Natural Heritage Site, as classified by DNR (2015).
- The WDFW Priority Habitat and Species database shows wetlands in the project area but no other priority habitat or species in the immediate project vicinity.

## 6.4 Previous Studies

No previous wetland studies were evaluated in association with this report.

## 6.5 Field Work Summary

Field investigation consisted of a survey of the project area for indicators of wetland vegetation, soil types, and/or hydrology. Potential indicators were evaluated using that USACE WMVCS Wetland Determination Data Form. Soil pits were dug throughout the subject area to identify and delineate wetland areas; soil pit data sheets can be found in Appendix C.

### 6.5.1 Vegetation

Vegetation within the wetland and wetland buffer includes reed canarygrass (*Phalaris arundinacea*), common velvet grass (*Holcus lanatus*), other mowed grasses and forbs, salmonberry (*Rubus spectabilis*), snowberry (*Symphoricarpos albus*), Himalayan blackberry (*Rubus armeniacus*), and western swordfern (*Polystichum munitum*). Trees adjacent to the maintained right of way include red alder (*Alnus rubra*), Douglas-fir (*Pseudotsuga menziesii*),

western redcedar (*Thuja plicata*), and big-leaf maple (*Acer macrophyllum*) and Pacific willow (*Salix lucida*).

### 6.5.2 **Soils**

The Natural Resource Conservation Service (NRCS) Soil Survey for Kitsap County Area (see Appendix G) primarily categorizes soils as Poulsbo gravelly sandy loam, 6 to 15 percent slopes, in the northwest portions of the right-of-way, Poulsbo gravelly sandy loam, 0 to 6 percent slopes, in the central portion of the right-of-way, and McKenna gravelly loam in the extreme southeast portion of right-of-way.

Poulsbo gravelly sandy loam is described as moderately deep, moderately well drained soils that formed in glacial till. Permeability of this soil is moderate to rapid above a hardpan layer at approximately 20 to 40-inch depth, and slow through the pan. Runoff from this complex is slow and the hazard of water erosion is slight. Depth to water table for these soils is estimated to be from 12 to 30 inches.

McKenna gravelly loam is described as moderately deep, poorly drained soils that formed in glacial till. Permeability of this soil is slow down to the underlying till. Runoff from this complex is ponded during winter months and water erosion is not a hazard. Table 3 summarizes soil types.

The soils indicated by NRCS to be within or near the subject parcel are considered hydric or have hydric soils within the soil units, and hydric soils were identified in wetland test pits. Detailed descriptions of soils found during the field visit are provided in the wetland data sheets (Appendix C). Soil pit locations are shown on Figures 6, 7 and 8 and the plans in Appendix B.

**Table 4. NRCS Soil Types Within and Adjacent to Subject Parcel.**

| NRCS Soil Types | Proportion of Hydric Soil (%) |
|---|---|
| McKenna gravelly loam | 85 |
| Poulsbo gravelly sandy loam, 0 to 6 percent slopes | 5 |
| Poulsbo gravelly sandy loam, 6 to 15 percent slopes | 5 |

### 6.5.3 **Hydrology**

Field efforts were conducted in October 2016. Wetland hydrology indicators present during the field study included oxidized rhizospheres along living roots, surface water, high water table, and saturation.

Site topography and other indicators indicate that surface and subsurface waters generally flow east and then enter North Fork Johnson Creek, which flows south through a culvert under Finn

Hill Road. Wetland hydroperiods, as defined by Washington State Wetland Rating System for Western Washington (Ecology, 2008), were determined using aerial imagery, LiDAR digital elevation models (DEM), and field observations.

## 6.6 Wetlands in the Study Area

General wetland characteristics are discussed below. Detailed information is presented in the appendices: wetland delineation and buffer enhancement plans (Appendix B), wetland determination forms (Appendix C), wetland rating forms (Appendix D), drainage basin maps (Appendix E), photographs (Appendix F), and NRCS Soils Report (Appendix G).

### 6.6.1 Wetland A

Summary
Estimated Size: 7.5 acres
City and Ecology Rating: Category III
Standard Buffer: 150 feet
USFWS Classification: Palustrine Forested
HGM Classification: Depressional
Sample Plots: SP-2, SP-5

Wetland A occurs adjacent to Finn Hill Road and Olhava Way (Figure 6) and is a headwater wetland to North Fork Johnson Creek. It is a palustrine forested wetland that generally extends uphill to the north. The North Fork Johnson Creek channel forms in the low gradient portion of the wetland near the intersection of Olhava Way and Finn Hill Road. Adjacent upland area consisting of a patchwork of development, lawn and forest slope upward to the north and west, respectively.

Wetland A adjacent to the project site is dominated by patches of reed canarygrass and soft rush (*Juncus effusus*). Common velvet grass is also present. Shrubs are dominated by salmonberry (*Rubus spectabilis*), Scouler's willow (*Salix scouleriana*) and Himalayan blackberry (*Rubus armeniacus*). Trees are primarily red alder (*Alnus rubra*).

The soils in Wetland A are dark brown, gravelly sandy loam to 18 inches (7.5 YR 3/1, 7.5 YR/2.5/1) with depleted matrix. No surface water was present at the time of field delineation; however, soil was saturated and a water table was encountered at depths of 6 inches (SP-5) and 16 inches (SP2).

Wetland A is a palustrine forested wetland under the Cowardin (1979) system and is a depressional wetland under the HGM system (Brinson 1993).

### 6.6.2 **Wetland B**

Summary

Estimated Size: 1.66 acres
City and Ecology Rating: Not Rated

Wetland B occurs adjacent to the south side of Finn Hill Road (Figure 6) and is a headwater wetland to North Fork Johnson Creek. Wetland B was not delineated or rated since it is not affected by the project. Wetland B appears to be a palustrine forested wetland that generally extends uphill to the west. The North Fork Johnson Creek channel forms in the low gradient portion of the wetland near the intersection of Olhava Way and Finn Hill Road. Adjacent upland area consisting of a patchwork of development, lawn and forest slope upward to the north and west, respectively.

### 6.6.3 **Wetland Rating and Function Assessment**

Wetland A was assessed using Ecology's 2014 wetland rating system for the category evaluation, and Ecology's comparison guidance table, to determine the buffer requirements for Poulsbo Municipal Code 16.20.230. National Wetlands Inventory maps, aerial photos, vegetation structure (Cowardin classes), and hydroperiods were used to evaluate subject wetlands at a landscape-scale.

Wetland A scored 19 points using the Ecology (Hruby 2014) method (7 points for water quality functions, 5 points for hydrologic functions, and 7 points for habitat functions), thereby qualifying as a Category III wetland. The PMC requires a standard buffer of 150 feet for Category III wetlands. Ecology wetland rating scores are summarized in Table 4 below. Rating forms and supporting documentation is provided in Appendix D.

**Table 5. Functional Scores and Category of Delineated Wetland A.**

| Wetland Name | Water Quality Score | Hydrology Score | Habitat Score | Total Score | Wetland Category |
|---|---|---|---|---|---|
| A | 7 | 5 | 7 | 19 | III |

Wetland A buffer functions are summarized as follows:

- Water Quality: The wetland buffer provides moderate water quality benefit due to stormwater discharges from the adjacent roadway, and the wetland contributes to 303(d) listed waters (Liberty Bay).

- Hydrology: Hydrology functions are moderate due to development in the area. Surface flooding has not been reported as a problem in the basin.

- Habitat: Habitat value is moderate due to special habitat features (large wood and snags, thin stemmed persistent plants and invasive vegetation coverage). Priority habitats are present. Habitat value of buffer area affected by the project is very low due to periodic mowing.

- Buffer Integrity: The project is located within an interrupted buffer area where legally established utilities and roads are present. These non-conforming use have resulted in significant buffer impacts. The buffer enhancement plan is intended to restore buffer functions in this area where feasible pursuant to the provisions of PMC 16.20.230.A and PMC 16.20.740.

# 7 PROTENTIAL PROJECT IMPACT EVALUATION

This section describes the extent and type of potential temporary and permanent (direct and indirect) impacts on wetlands, streams and buffers that may occur as a result of constructing the proposed project. Measures to avoid and minimize impacts are also described.

## 7.1 Avoidance and Minimization Measures

The project design was developed by proceeding in accordance with the mitigation sequencing requirements established by PMC. A high priority was placed on designing the project to include measures and features that avoid and minimize adverse effects on wetlands, streams and buffers. Project impacts are significantly minimized by locating the proposed path within the interrupted buffer created by the roadway and utility corridor. The linear nature of the roadway adjacent to the wetland results in no alternative locations for the SUP facility that could avoid wetland and stream buffers.

Wetlands, streams and buffers in the project area have been avoided to the greatest extent feasible while still achieving the project's purpose and need. Avoidance and minimization of impacts to wetlands and streams was achieved through the following measures:

- The SUP alignment was developed to avoid direct impacts to Wetland A and North Fork Johnson Creek.
- The path will be constructed as a boardwalk adjacent to wetlands to avoid having to place fill material that would encroach into the wetland.
- The SUP alignment is kept within the footprint of existing public roads and utility corridor access areas to avoid disturbing in-tact buffers and wetlands.
- The SUP width was reduced to the minimum allowed under City Road and WSDOT standards in areas adjacent to Wetland A.
- Near wetlands and streams, earthwork will be done in the dry season to reduce the potential for sediment runoff.
- Best management practices (BMPs) to control erosion will be implemented to reduce direct and indirect impacts on aquatic resources during construction.
- All construction activities will comply with water quality standards set forth in the 1998 Water Quality Implementing Agreement between the Washington State Department of Transportation (WSDOT) and Ecology, as well as compliance with the State of Washington Surface Water Quality Standards (WAC 173-201A).
- A Spill Prevention, Control, and Countermeasures (SPCC) plan will be prepared prior to start of construction. The SPCC plan will identify the appropriate spill containment materials and will be available at the project site at all times.

## 7.2 Temporary or Permanent Impacts on Wetlands

Project construction will have no permanent or temporary impact on Wetland A.

A boardwalk is proposed adjacent to Wetland A to avoid construction of embankments or walls that could extend into wetlands and buffer areas. The boardwalk will be constructed by connecting pre-fabricated wood or composite decks on steel or concrete piling supported abutments that are located outside of the wetland limits. The boardwalk will be between 2-feet and 4-feet off the ground and will have an 8-foot width as measured from inside rail to inside rail, which is the minimum that can support both bicycle and pedestrian use.

The proposed boardwalk adjacent to the west limits of Wetland A (shown in Figure 5, 6 and 7) is located entirely within the limits of a mowed and maintained utility corridor. The boardwalk extends over the edge of Wetland A by a maximum of 2-ft over an approximate 70-ft segment (see Figure 7). This extension is entirely within the mowed portion of the existing maintained utility corridor, which results in minimal and inconsequential impacts to the wetland and adjacent buffer from the new path. The proposed path will result in no loss of existing wetland acreage or reduction of existing wetland functions or habitat values.

## 7.3 Permanent or Temporary Impacts to Wetland Buffers

Project construction will result in the disturbance of existing vegetation within 4,721 sq-ft of Wetland A buffer (Table 5). This impact results from removal of vegetation to install 970-ft of proposed path within the existing 150-ft Wetland A buffer. The SUP is located adjacent to Finn Hill, which results in unavoidable buffer impacts. There is no other location available for the SUP facility except adjacent to the existing roadway.

**Table 6. Wetland, Stream and Buffer Impacts.**

| | | | Wetland/Stream | Buffer |
|---|---|---|---|---|
| **Wetland/Stream** | **USFWS Classification** | **City of Poulsbo Rating [a]** | Permanent Impacts (sq-ft) | Permanent Impacts (sq-ft) |
| Wetland A | PFO | III | 0.0 | 4,721 |
| North Fork Johnson Creek [b] | N/A | Type F1 | 0.0 | Included as part of Wetland A buffer |

[a] Wetland rating according to PMC 16.20.210; Hruby (2014).

[b] Area within ordinary high-water mark as surveyed.

Wetland buffer impacts are minimized by constructing the minimum SUP width allowed by City and State road standards, including a 200-ft long segment of 8-foot wide upland boardwalk adjacent to the wetland.

All of the 4,721 sq-ft of wetland buffer affected by the project is highly disturbed from utility

corridor and right of way maintenance (mowing), invasive vegetation and historical development activity. Although impacts of constructing the project within this interrupted buffer area are minimal, the City will enhance 10,470 sq-ft of degraded wetland and stream buffer by removing invasive vegetation, importing topsoil and planting native vegetation. Refer to section 8 for additional detail on enhancement measures.

No temporary wetland impacts are anticipated as part of the project construction.

### 7.3.1 Tree Removal

Within the wetland and stream buffer area, one mature Douglas Fir tree will be removed due to safety and site distance obstructions. A total of 28 trees will be planted within the enhanced buffer area.

### 7.3.2 Indirect Impacts on Wetland Buffers

Indirect wetland impacts from a linear transportation project are typically disturbances that reduce or eliminate wetland functions without directly filling or excavating wetland soils. These include changes in drainage patterns and water quality, or changes in lighting.

Hydrology and Water Quality

Existing wetland hydrology will not be modified by the project and no indirect impacts are anticipated. The following BMPs summarize measures that will be used to prevent and reduce impacts from surface water modifications:

- Reduction of total pollutant generating impervious surfaces in the project area by 1,880 sq-ft by removal of existing asphalt shoulders and replacement with permeable asphalt with infiltration.
- Installation of stormwater treatment vaults to treat roadway runoff prior to discharge to wetlands and the North Fork Johnson Creek.
- Maintenance of existing flows and outfall locations at Wetland A to ensure no change in wetland hydrology.
- Retrofit of existing outfalls with cobble splash pads to disperse flows and reduce potential erosion. No new outfalls are proposed.
- Prepare and implement a construction Stormwater Pollution Prevention Plan (SWPPP) and Spill Prevention, Control and Countermeasures (SPCC) Plan.
- All equipment used for construction activities will be cleaned and inspected prior to arriving at the project site to ensure no potentially hazardous materials are exposed, no leaks are present, and the equipment is functioning properly.
- All construction-related debris will be cleaned up on a daily basis.
- Disturbance will be limited to those areas necessary for construction, which will be

identified in the field prior to construction.

- There will be no work below Ordinary High Water Mark (OHWM) in streams or wetlands.

Lighting

No new streetlights will be added within the segment of the project that is within the wetland buffer area. There are currently 10 streetlights in the segment of City roadway that is within the Wetland A and North Fork Johnson Creek buffer. There are six streetlights in the 1,150-ft long segment of Finn Hill Road between Olhava Way and Urdahl Road that will be affected by the project. This segment generally coincides with the limits of the Wetland A buffer. All existing streetlights are shielded to reduce light scatter.

The lights at the intersections of Olhava Way and Urdahl Road will remain at their current locations to meet intersection lighting standards. Four lights along Finn Hill Road between Olhava Way and Urdahl Road will be relocated. Three of these are dedicated streetlights that will be relocated from the north side of Finn Hill Road to directly across the road to the south side of Finn Hill Road in order to utilize existing utility poles as luminaire locations. One light will be relocated from within the wetland buffer on the north side of Finn Hill Road to the other side of Finn Hill Road further from the wetland. All new lights will be shielded and directed downward to reduce scatter. Overall, lighting within the wetland and buffer area will not increase compared to existing conditions. Street lighting changes are expected to reduce potential light impacts due to the relocation of one light to a point that is further from the Wetland A buffer.

## 7.4 Streams

### 7.4.1 Permanent Impacts on Streams

The project will construct improvements within the developed portion of the Finn Hill right-of-way adjacent to North Fork Johnson Creek. No work over or within North Fork Johnson Creek will occur. No impacts to North Fork Johnson Creek are expected.

### 7.4.2 Permanent Impacts to Stream Buffers

Within the project footprint, the North Fork Johnson Creek buffers coincide with Wetland A buffers, so Wetland A buffer impacts of 4,721 sq-ft include all buffer areas to the North Fork Johnson Creek.

Near the North Fork Johnson Creek, the SUP footprint is kept within the existing pavement (road and sidewalk) prism to minimize impacts. At the intersection of Olhava Way and Finn Hill Road, the path is constructed within the existing roadway and sidewalk to avoid modifications to the existing culvert and stream crossing.

### 7.4.3 Temporary Impacts on Stream Buffers

Buffer areas along North Fork Johnson Creek that would be affected by project construction are low growing small shrubs and grass. No trees will be removed within the stream buffer. One Douglas Fir tree located immediately adjacent to the road approximately 300-ft west of the stream is proposed to be removed due to safety issues. Vegetation removal would therefore not contribute to increased water temperatures by reducing shade or reduce potential delivery of large woody debris. Buffer enhancement along North Fork Johnson Creek will include removal of invasive vegetation, and plantings of shrubs and trees that will provide significant habitat improvement compared to existing conditions.

### 7.4.4 Indirect Impacts on Streams

Changes in impervious surfaces in the project area have the potential to affect flow regimes or water quality in streams. This project is not expected to result in any such effects, however, because the new SUP will be constructed of pervious materials and will remove the north paved shoulder of Finn Hill Road. Overall, the project will reduce impervious surfaces within the contributing basin. Stormwater quantity control will be provided via infiltration facilities located beneath the SUP within the road right-of-way. The roadway stormwater treatment retrofit will improve stream water quality compared to existing conditions.

Ground-disturbing activities within and adjacent to stream channels have potential to cause short-term increases in sediment input. The risk of adverse effects due to such increases will be avoided or minimized through the preparation of the project SWPPP and implementation of BMPs to control erosion during construction.

## 7.5 Building or Impervious Surface Setback

PMC requires building and impervious surface buffer setbacks for 15-ft for wetlands and 25-ft for streams. These setbacks are shown on Figure 7 and 8 and on the plans in Appendix B. The project is not adding any buildings and the SUP will be constructed of permeable asphalt or wood boardwalk so no new imperious surfaces are being added within the buffer setback area. The portion of the proposal constructed within the impervious surface and building setback is relatively small and is adjacent to an existing City Road (Urdahl Road). The portion of the proposal within the impervious surface setback will therefore not adversely affect the wetland.

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# 8 BUFFER ENHANCEMENT PLAN

This buffer enhancement plan describes how the project will improve buffer function and enhance the values of the buffer and adjacent wetland and stream. Enhancement actions at the site are intended to improve water quality and wildlife habitat and will be accomplished by a combination of planting vegetation, controlling nonnative or noxious weeds, and constructing stormwater quality retrofits. These enhancements will result in a net improvement in wetland and buffer functions, and results in a net gain in wetland buffer area.

The project is located within an interrupted buffer area where legally established utilities and roads are present. These non-conforming use have resulted in significant buffer impacts and habitat degradation. This buffer enhancement plan is proposed pursuant to PMC 16.20.230.A, 16.20.235.D and PMC 16.20.740, and is intended to restore buffer functions in these degraded areas as an element of constructing the path within a designated buffer area. Refer to section 4.3 for analysis of PMC criteria.

## 8.1 Buffer Enhancement Site Location

The buffer enhancement site adjacent to Wetland A was selected because it is on-site and in proximity to the impacts. Due to City ownership and past utility corridor maintenance activities, the site has a high potential to successfully enhance adjacent wetland and buffer functions. The site is also controlled by the City through right of way ownership in order that long-term protection and management can be ensured.

## 8.2 Buffer Enhancement Plan Goals

The objective of the buffer enhancement plan is to manipulate the physical and biological characteristic of the site to improve habitat functions and to change the growth stage and composition of the vegetation present. Changing the growth stage and composition of the buffer will be done by removing invasive vegetation, improving soil conditions, and supplementing the existing native plants with a wider variety of plant species (trees and shrubs). This will result in improved native plant growth, reproduction and seed dissemination, as well as more diverse plant communities and age classes that will result in greater diversity of plants and development of multiple plant cover type classes (shrub and forested) that improve buffer habitat functions.

Specific enhancement actions and buffer function improvements are as follows:

- Remove existing underground utilities from the buffer area
- Remove invasive vegetation
- Treat stormwater prior to discharge to wetlands and North Fork Johnson Creek
- Improve soil conditions in the buffer so that they will support healthy native plant communities

- Improve biological diversity and wildlife habitat by establishing a variety of native plants
- Increase the production of organic matter in the buffer by establishing more complex plant communities and eliminating periodic mowing
- Improve water temperature by planting trees in degraded buffer areas immediately adjacent to the North Fork Johnson Creek

These goals will be achieved by planting 10,470 sq-ft of highly disturbed and degraded weed-infested buffers with diverse native plant species. Stormwater treatment vaults will be installed on the existing Finn Hill Road to provide run off water quality treatment where none currently exists. Underground utilities within the buffer area will also be removed to eliminate the need for future mowing.

Wetland and stream buffer enhancement is provided at a greater than 2:1 ratio. Specific buffer impact-mitigation ratios are not included in PMC or in Ecology wetland buffer regulatory guidance (Ecology 2014). In general, best available science for buffer mitigation reflects that buffer impact mitigation should be sufficient to protect adjacent wetlands from the impacts of the adjacent land use. Depending on the condition of the buffer, this mitigation may include increased area to compensate for the risk that mitigation may fail and for the time lag that occurs between the buffer impact and achieving a fully functioning mitigation site (Ecology 2014).

The proposed plan enhances buffer function in highly degraded buffer areas that have been impacted by prior development and utilities. The enhancement plan will help improve wetland habitat and water quality functions by removing invasive vegetation, increasing plant native density and diversity, and improving vegetative plant cover. This is expected to provide a net increase in buffer function compared to existing conditions. The buffer enhancement plan is consistent with wetland buffer width regulatory guidance for sites that are sparsely vegetated and/or vegetated with invasive species which states that generally improving buffer vegetation is more effective than widening the buffer (Ecology 2014).

The 2:1 mitigation ratio provides the increase area to compensate for risks that some buffer mitigation will fail and the temporal loss of functions that may occur. The City's peer review consultant Grette Associates has concurred with this mitigation ratio (see Appendix A), and the mitigation ratio proposed is consistent with other buffer mitigation projects in the City of Poulsbo including:

- Noll Road extension, 2019 (proposed 1.8:1 ratio); (Parametrix, 2019)
- Nelson Park Connector Trail, 2013 (proposed 1.8:1 ratio); (Parametrix, 2013)
- Lincoln Road Improvements, 2011 (1:1 approved buffer mitigation); (Parametrix, 2011)

Other impact minimization will also be implemented including retrofitting existing lights with appropriate shields, adding no additional road lighting adjacent to the wetland area and

maintaining stormwater flows into the wetland consistent with historical conditions.

## 8.3 Buffer Function Assessment

The existing buffer area effected by the project consists of mowed grass and small shrubs associated with the maintained utility corridor. Functions provided by this buffer area are generally low due to physical disturbance, lack of woody plant species, low plant coverage and shade, and reduced organic matter output. Low to moderate level of water quality function is provided via biofiltration and infiltration during dry periods. Overall, the existing buffer area within the project footprint provides minimal habitat, flood control, groundwater recharge and erosion protection.

The project will significantly improve habitat and water quality functions by removing the underground utilities from the buffer (and eliminating future mowing requirements), restoring native woody plants and trees, and installing stormwater treatment for the existing roadway. These measure will improve habitat complexity and diversity, help detain and disperse stormwater, and enhance surface water retention and groundwater recharge. Stormwater treatment retrofits of the existing roadway will reduce toxics and bacteria loading to Wetland A, the North Fork Johnson Creek, Liberty Bay and Puget Sound thereby improving fish and wildlife habitat in those areas.

## 8.4 Performance Standards

Buffer enhancement is intended to provide a variety of ecological functions, including potential fish and aquatic habitat, and wildlife habitat support for passerine birds, small mammals, and amphibians.

To achieve these intended ecosystem functions, the enhancement plan is designed to meet specific objectives. To ensure that these objectives are achieved, a series of performance (success) standards must be met within the monitoring period. These objectives and performance standards are combined and described below.

### 8.4.1 Mitigation Objectives

***Objective 1: Plant 10,470 sq-ft of Wetland and Stream Buffer to Provide Diverse Vegetation Community***

*Performance Standards:*
Year 0 (As-Built Conditions)

- Plant 10,470 sq-ft acres of upland buffer.
- Remove all invasive species.
- Plant buffer with a diversity of native trees and shrubs.

Year 1

- Achieve 100 percent survival of planted woody species at the end of the plant establishment period for Year 1. If all dead woody species plantings are replaced, the Year 1 success standard will be met. The replanting may not be completed and documented until after the Year 1 monitoring report is submitted.
- Remove temporary erosion and sedimentation features.
- Invasive species coverage will be less than 10%.

Year 2

- Achieve at least 30 percent cover of native woody species in the planted buffer areas.
- Invasive species coverage will be less than 10%.

Year 3

- Achieve at least 50 percent cover of native woody species in the planted buffer areas.
- Invasive species coverage will be less than 10%.

Year 5

- Achieve at least 70 percent cover of native woody species in the planted buffer areas. This is considered a realistic performance standard given the extent of existing wood species in the buffer enhancement area and the density of planting proposed.
- Invasive species coverage will be less than 10%.
- Ensure critical area fences and signage are intact. Critical area fences are provided adjacent to the boardwalk as shown in the project design plans (see sheet S4 in Appendix B). Sign details are provided in Appendix B.

## 8.5 Construction Plan

### 8.5.1 Proposed Schedule

The enhancement plan is assumed to be constructed in one phase. Site preparation activities will begin in the summer following permit issuance. Planting will occur during the fall or winter of the same year.

### 8.5.2 Pre-Construction Meeting

Prior to any site work, a pre-construction meeting will be held with the general contractors, landscape contractors, and biologists to explain the enhancement goals and overall design; review the construction plan set; determine lines of communications; and review all

environmental permit conditions.

### 8.5.3 Temporary Erosion and Sediment Control

Standard sedimentation fences will be placed along the edges of construction areas to prevent soil erosion and sedimentation of adjacent wetland and buffer areas. High visibility construction fencing will be placed at the edge of work areas to ensure that activities do not extend beyond the approved work area. A clear access work area will be established in the field by the contractor prior to beginning any earthwork.

### 8.5.4 Habitat Features

On-site trees will be salvaged from upland clearing activities outside of the buffer and will be used for habitat features. These features will be located by the City's biologist at the time of construction.

### 8.5.5 Invasive Species Management

Prior to installing new plant material, noxious weeds will be removed from the buffer area. The existing wetlands have a variety of weed species that could spread and limit the success of the mitigation plan.

In the buffer enhancement area, the top 12 inches of root mass will be excavated and disposed off site at an approved facility. Topsoil will be imported in select locations where subsoils are not suitable for soil amendments. These areas will then be mulched with at least 3 inches of wood chip mulch to prevent weed re-infestation.

In the buffer enhancement areas, blackberry (*Rubus* spp.), English ivy (*Hedera helix*), and Scot's broom (*Cytisus scoparius*) are present. These species, as well as other noxious weeds on the Kitsap County, Washington, list of noxious weeds, will be controlled using herbicide applications or hand removal measures. In buffer planting areas, these species will be completely removed prior to planting.

### 8.5.6 Planting Plan

Following site preparation activities, the enhancement area will be planted with native woody vegetation as shown in the plan set in Appendix B. Detailed planting notes, details, and spacing are shown on the design plans in Appendix B.

### 8.5.7 Signage and Fencing

Permanent signs will be posted to identify the boundary of buffer to wetlands and streams as critical areas. Sign details are provided in Appendix B. Fencing will be provided on the boardwalk adjacent to Wetland A (see Appendix A).

### 8.5.8 Irrigation

Irrigation for newly planted vegetation will be provided via a temporary irrigation system for a minimum of the first year including the growing season. The irrigation system design will be provided by the contractor under performance specifications provisions of the construction contract.

### 8.5.9 Construction Observation

A wetland biologist will review the site periodically during construction. The purpose of construction observation is to provide assistance to the contractor and City for the interpretation and proper implementation of the enhancement plan. The responsibilities of the biologist may include, but are not limited to, providing explanations of unique construction planting techniques; reviewing construction materials and nursery stock; reviewing plant locations; and assessing temporary erosion and sediment control measures. Depth of excavation areas and slope profiles will be verified by a civil engineer and/or surveyor. The biologist will also attend the pre- and post-construction meetings.

## 8.6 Monitoring Plan

The enhancement site will be monitored for a minimum of 5 years. Monitoring will be conducted as required under PMC 16.20.745 on the following schedule:

A. At the end of construction (as-built);
B. Early in the growing season of the first year;
C. Late in the growing season of the first year;
D. Annually thereafter during mid-late growing season.

Monitoring reports will be submitted for review on the following schedule:

- Sixty days after completing construction of the project (Year 0; submittal of as-built report)
- End of the first growing season after construction (Year 1)
- December 1 of the calendar year annually for Years 2, 3, 4, and 5

Successful enhancement will be measured by attainment of the performance standards described above. Quantitative monitoring will occur in Years 1, 2, 3, and 5. Qualitative monitoring will occur in all years. Permanent photopoints will be established and monitored for the entire monitoring period. Specific monitoring will include, but not be limited to, observations of wildlife usage of the site, vegetation establishment, hydrology, weed populations, and site disturbances.

Total percent areal vegetative cover and survival by species will be measured using the line intercept method. The percent cover of individual woody plant species will be totaled to estimate

the total percent woody cover. The percent cover of non-native plant species will also be estimated. Total percent survival of woody species in Year 1 will be estimated in representative sampling plots.

## 8.7 Contingency Plan

It is anticipated that the enhancement goal will be achieved with the construction and installation of the design as shown on the plan set. However, contingency actions may be needed to correct unforeseen problems. Failure to meet the proposed vegetation performance standards could result in some or all of the following contingency actions:

- Planting additional vegetation—Additional vegetation planting may be needed to meet cover or plant survival standards. Plant species will be evaluated in relation to site conditions to determine if plant substitutions are necessary.
- Weed control—Control of competitive weed species, particularly reed canarygrass, may be required if weed cover is limiting attainment of plant survival or cover standards. Methods of weed control could include hand or mechanical weeding, herbicide application, or mulching.
- Irrigation—Plantings in the buffers may require supplemental irrigation beyond the Year 1 plant warranty period, especially in summer. Irrigation could occur by using water trucks on adjacent Finn Hill Road.

## 8.8 Adaptive Management Plan

Following construction, oversight will be required to ensure the long-term success of the project. The goal of the proposed enhancement is to create a functional, self-sustaining buffer that requires little or no long-term maintenance. Buffer sites are dynamic systems that can evolve rapidly as site conditions change. Projects that require modification to soils, plant communities, topography, and/or hydrology do not always respond as predicted; therefore, the principles of adaptive management will be used to guide post-construction management activities.

Adaptive management is driven by the monitoring objectives that describe the desired condition of a site. If the monitoring objectives are not met, adaptive management activities will be planned to achieve the desired condition. Management activities may include implementation of contingency actions described above, or other activities as appropriate.

## 8.9 Maintenance Plan

During the monitoring period, regularly scheduled maintenance activities such as removing noxious weeds, repairing vandalism, and collecting trash will occur on a semi-annual basis for the first 3 years. Depending upon the success of the plant establishment, maintenance activities may be needed annually in Years 4 and 5.

Access to the site for maintenance activities shall occur from the City right-of-way.

## 8.10 Financial Assurance

This project will be sponsored and permitted by the City of Poulsbo. The City will implement a suitable mechanism to ensure that the project is implemented successfully and monitored for a minimum of 5 years, or until the project enhancement is deemed a success by achieving its performance standards.

## 8.11 Site Protection and Long-Term Preservation

The buffer enhancement area is part of City right of way. A supplemental plan sheet will be prepared as part of the project's final Right of Way plan that depicts the enhancement area limits. This plan will depict the area and note that the area is committed to be permanently used for buffer enhancement in perpetuity. This plan will be prepared by a PLS and will become part of the permanent project record. In addition, permanent fencing and signs indicating that the area is a natural or critical area to be protected from disturbance will be posted along the boundaries of each mitigation area.

## 8.12 Long-Term Management Plan

After attainment of performance standards, the City will implement a long-term management plan for the site as part of normal road and stormwater system maintenance. This will include trash removal, weed control, signage repair, and other elements that may be necessary for the long-term viability of the site.

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# *Appendix A: City of Poulsbo Critical Area Review*

# City of Poulsbo

*Planning & Economic Development*

March 19, 2019

City of Poulsbo c/o Andrzej Kasiniak, P.E. Director of Engineering
200 NE Moe Street
Poulsbo, WA 98370
Email: akasiniak@cityofpoulsbo.com

Subject: Finn Hill SUP Critical Area Review
Planning File No. P-01-14-19-01
Notice of Technically Complete Application with Optional SEPA and Request for Revisions

Dear Mr. Kasiniak:

This letter is to notify you that the Planning and Economic Development Department (PED) has determined that the above referenced application is **Technically Complete** as of March 19, 2019 under the provisions of Poulsbo Municipal Code Title 19 (permit processing procedures). The application will now move forward to the next phase in the review process.

A Notice of Application (NOA) will include a single integrated comment period for SEPA review through the optional DNS process. The NOA with optional DNS will be published in the North Kitsap Herald and sent to interested agencies, persons, and property owners within 300 feet of the subject site. PED staff anticipates the NOA will be circulated March 22, 2019. Comment period will end on April 5, 2019.

The PED Director and the city's peer review comments from Grette Associates have been provided with this letter. Comments may be received from interested agencies and the public during the integrated public comment period. The compilation of staff, peer review, interested agency, and public comments will result in additional information and corrections, if necessary, may be required for your proposal. After these corrections are requested and corrections are received, they will be reviewed to ensure no items remain outstanding. Then a staff report will be developed. The staff report will be circulated for the required 5-day review and comment period for all Type II permit applications prior to staff report circulation to you and any interested agencies, persons, and property owners within 300 feet of the subject site who request review.

The PED Department comments are minor and editorial in nature. It is anticipated that incorporating these corrections will not alter the site plans. Comments and revision are as follows:

1) Edits: Replace all "non-confirming" with "non-conforming",
Replace all "exiting" with "existing",
Replace "Butter" with "Buffer" in Figure 8 table for Wetland Buffer Impacts,
Replace Water Resources Inventory Area "1" with "15",

2) For Section 4.3.1 Pg. 4-2 under wetland and buffer development standards the following are requested:
    a. Revise H. Impervious Surface Setbacks section to include a statement that the setback is shown on Figure 7 and Figure 8 and that an analysis has been conducted and the result is that the portion of the proposal constructed within the impervious setback area will not adversely impact wetland as further described in Section 7.5. Add this analysis description to Section 7.5.
    b. Add to J. Buffer Enhancement Plan. It is recommended that this section refers to Section 8 for Buffer Enhancement Plan details.
    c. Add Table 16.20.230.C Examples of Measures to Minimize Impacts to Wetlands from Different Types of Activities. List all measures being used to minimize impacts. The proposal can address each item for minimization measures.

3) For Section 4.3.1 Pg. 4-2 under Additional development standards the following are requested:
    a. Section D. Road/Street Repair and Construction. Add all standards numbered 1-5. As proposed only numbers 1-3 are discussed.
    b. Delete Section F. Trails and Trail-Related Facilities. The proposal describes this use as a shared use path and has a distinct and different definition than a trail.
    c. Revise Section G. As shown in Figure 5, this is an existing utility corridor. Refer to section G.6 and respond to utility corridor maintenance criteria.

4) Revise Section 5.6 Fish and Wildlife Habitat Conservation Critical Area as follows:
    a. The City defines Fish and Wildlife Habitat ~~Conservation Critical Areas~~ as "Those…
    b. If the definition for Fish and Wildlife Habitat Conservation Area has a separate and distinct definition. If this is to be included, please add this definition separately.

5) Clarify Section 7.3.2 Indirect Impacts on Wetland Buffers. The lighting section is confusing. It is hard to tell if new lighting will be included, if lighting shields will be added to existing lighting, or if separate and less obtrusive lighting will be included within the boardwalk or within the landscape strip or if something different is proposed.

6) Section 7.5 should be revised as described above under item 2.a.

7) Clarify Section 8.2. The Buffer Enhancement Plan goal is proposed, "…to improve habitat functions and to change the growth stage and composition of the vegetation present." What is the change in growth stage and composition of the vegetation present intended to do? This goal must be clear so that the following Performance Standards and Mitigation Objectives can be clearly identified.

8) Under Section 8.2, and where necessary, please identify, clarify, or describe the common practice of wetland buffer impact ratios to be established as 1:1. A best management practice or best available science directive will ensure staff can appropriately state a specific standard criterion as being met.

9) Add utility corridor maintenance, as necessary, to Section 8.3.

10) Comments, questions, and revisions for Section 8.4.1 are as follows:
    a. Year 0 should include removal of all invasive species.

b. Year 1-Year 5 should state invasive species will be less than 10% coverage.
c. Is achievement of 70% cover of native woody species achievable in Year 5 with the size of plantings proposed?
d. Year 5 and other places in the report talk about a fence and sign. Please provide a detail of what the fence and sign: include design, material, size, etc.

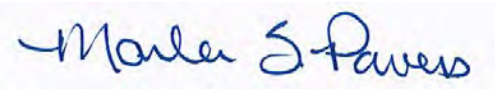
11) Proposed monitoring plan in Section 8.6 is different the requirements under PMC 16.20.745. Please revise as needed.

12) The City's peer review consultant, Grette Associates, Technical Memorandum is included. Ensure all comments are addressed in revised materials.

We look forward to seeing this proposal implemented and the enhanced habitat and critical area function these improvements will stimulate. If you have any questions, please let us know.

If you have questions, please call or email me.

Sincerely,



Marla Powers
Associate Planner

Enclosure: NOA w/ Optional DNS

# TECHNICAL MEMORANDUM

Prepared for: Marla Powers
Associate Planner
City of Poulsbo
200 NE Moe Street
Poulsbo, WA 98370

March 12, 2019

Prepared by: Grette Associates[LLC]
2102 North 30th Street, Ste A
Tacoma, WA 98403

File No.: 208.021

Re: Finn Hill Rd. Shared Use Path: Third-Party Review

## 1 INTRODUCTION

Grette Associates is under contract with the City of Poulsbo (City) to assist in the review of a revised Wetland Delineation Report and Buffer Enhancement Plan (February 2019) that was prepared by the Sealaska Corporation in support of the Finn Hill Rd. Shared Use Path project.

## 2 METHODS

### 2.1 Site Visit

A Grette Associates biologist completed a site visit on March 6, 2019 to assess the area in the vicinity of the proposed project for consistency with the information contained in the submitted document. All accessible areas near the proposed project were evaluated.

### 2.2 Document Review

Grette Associates conducted a thorough review of the submitted document. The review focused on verifying the accuracy of the descriptions within the document and compliance with the current version of Chapter 16.20 of the Poulsbo Municipal Code. (PMC).

## 3 RESULTS

### 3.1 Site Visit Review

Grette Associates traversed the project area to identify any potential critical areas as defined in Chapter 16.20 of the PMC. The submitted document accurately describes the existing conditions within the project area. Grette Associates identified two wetlands (Wetland A and B) and two streams (North Fork Johnson Creek and a small unnamed tributary). No additional critical areas (i.e., wetlands and/or streams) were identified.

In addition, the submitted document accurately describes the conditions within the wetland and stream buffers and upland areas that are situated in the project area. These areas are highly degraded due to the existing land use. More specifically, the wetland and stream buffers that are

within the project area are situated in an existing public right-of-way that is regularly maintained (mowed). Existing substantial improvements (paved road and sidewalk) are also situated within portions of the project area. Furthermore, Grette Associates identified two small culverts (~12-16 inches in diameter) that collect and convey stormwater from roadside ditches along Finn Hill Rd. and NW Rude Rd. The culverts discharge stormwater into Wetland A in the general area where the proposed pedestrian boardwalk will be installed. Stormwater discharge sheet-flows across the landscape and is not confined to a ditch.

## 3.2 Document Review

### *3.2.1 Wetlands*

Per PMC 16.20.210, Wetland A was rated using Ecology's current wetland rating system (Hruby 2014). In summary, Grette Associates concurs with Wetland A's rating (Category III). According to the report, Wetland B was not rated due to its location across Finn Hill Rd. Per PMC 16.20.120(K), Finn Hill Rd. functions as an interrupted buffer; therefore the buffer associated with Wetland B does not extend north of Finn Hill Rd. Based on this information, Grette Associates agrees that it was not necessary to delineate or rate Wetland B for this project. Per PMC 16.20.230, Category III wetlands with moderate habitat value and high land use are subject to a 150-foot buffer and a 15-foot building setback.

In summary, the report meets the minimum reporting requirements defined in PMC 16.20.730.

### *3.2.2 Fish and Wildlife Habitat Conservation Areas*

Per PMC 16.20.310 all Type F, Np and Ns streams, as defined in WAC 222-16-030, are designated as Fish and Wildlife Habitat Conservation Areas (FWHCA). As summarized above, Grette Associates identifies two streams within the vicinity of the project area. North Fork Johnson Creek is situated within Wetland A, while an unnamed tributary to North Fork Johnson Creek is situated within Wetland B. The unnamed tributary identified within Wetland B is outside of the project area and inconsequential to this review (see Section 3.2.1 above regarding buffer interruptions).

While the report identifies North Fork Johnson Creek as a Type F1 stream, no rationale is given in the report for this stream rating. Both WDNR and WDFW document fish use within North Fork Johnson Creek (WDFW 2019; WDNR 2019). However, WDFW and the WA State Department of Transportation document the presence of a total fish passage barrier at SR-3 (sloped culvert). According to WAC 222-16-030, *fish habitat is habitat used by fish at any life stage at any time of year, including potential habitat likely to be used by fish which could be recovered by restoration*. Therefore, the upper reach of North Fork Johnson Creek is classified as a Type F stream (PMC 16.20.310).

While anadromous salmonid species do not currently utilize the reach of North Fork Johnson Creek on the project site due to the total fish passage barrier at SR-3, the WSDOT-owned culvert is likely to be replaced at some point in the future with a fish-passable culvert. Therefore, it is appropriate to consider the reach of North Fork Johnson Creek above the culvert as containing salmonids for the purposes of this project. As such, Grette Associates recommends that the City regulate the section of North Fork Johnson Creek at the project site as a Type F1 stream, consistent with the rating used in the Sealaska report. Per PMC 16.20.315, Type F1 streams are subject to a 200-foot buffer and a 25-foot building setback.

### *3.2.3 Wetland Buffer Enhancement Plan and Habitat Management Plan*

*Mitigation Sequencing and Impact Analysis*

Per PMC 16.20.240, all regulated development activities proposed within a wetland and/or buffer shall demonstrate mitigation sequencing. Chapter 7 of the February 2019 document adequately demonstrate mitigation sequencing. The proposed project avoids direct impacts to Wetland A (through the use of a boardwalk), implements minimization measures (minimum footprint and positioning the walkway as close to the road as possible), and proposes buffer enhancement to compensate for those buffer areas that cannot be restored.

The submitted report states that there will be approximately 4,721 square feet of impacts to highly degraded wetland and stream buffer. The report also states that the project will enhance approximately 10,470 square feet of degraded buffer associated with Wetland A. This represents a 2.2:1 ratio. Given this information, sufficient enhancement would occur to offset the impacts proposed.

In Grette Associates' professional opinion, the submitted report has adequately demonstrated mitigation sequencing and is proposing sufficient buffer enhancement to compensate for the impacts proposed.

*Habitat Management Plan*

Per PMC 16.20.755, a habitat management plan shall contain applicable project information, an impact analysis, proposed mitigation, and measures to evaluate the proposed mitigation. In addition, a detailed map of the FWHCAs identified within 300 feet and applicable project and survey information is a required component of an HMP.

The submitted report describes the impacts proposed to buffers on the site, measures to avoid and minimize those impacts, and actions proposed to compensate for unavoidable impacts to the wetland and stream buffers. As discussed above, an unnamed tributary to North Fork Johnson Creek was observed by Grette Associates within Wetland B, but was not discussed or mapped in the report. However, as discussed above in Section 3.2.1, the buffer of this stream would not cross Finn Hill Road and would therefore have no effect on the project. Likewise, the project would have no impact on the buffer of this stream. Therefore, the report meets the requirements of PMC 16.20.755.

*Buffer Enhancement Plan*

Per PMC 16.20.740 and PMC 16.20.755, a plan shall be prepared to demonstrate how an applicant proposes to mitigate for any adverse impacts to a critical area (wetland and/or streams) or their associated buffer. The submitted documents are proposing buffer enhancement adjacent to the proposed project to ensure no adverse impact will occur to buffer functions.

Per PMC 16.20.740, a buffer enhancement plan shall provide a detailed map specifying the buffer areas proposed for enhancement as well as a detailed planting plan that uses native plant species indigenous to the region. A buffer enhancement plan also shall include provisions for monitoring and maintenance over the monitoring period as required under PMC 16.20.745. Per PMC 16.20.745, a monitoring program shall be for a minimum of five years and should include monitoring at the end of implementing the enhancement actions (as-built); early in the first growing season of the first year; late in the growing season of the first year; and once each following year during the growing season until the approved monitoring period is complete.

Chapter 8 of the report details the proposed enhancement actions within the wetland/stream buffer. More specifically, the report provides clear goals and objectives to demonstrate how the proposed enhancement will improve existing buffer functions as well as provides appropriate performance standards, a planting plan that contains an assortment of native shrubs and trees, a monitoring plan, and a contingency plan. However, the proposed monitoring schedule does not include two monitoring assessments in the first year as required per PMC 16.20.745. The remaining monitoring schedule meets the standards defined in PMC 16.20.745.

## 4 SUMMARY

Upon thorough review, the submitted report substantively complies with the provisions of Chapter 16.20 of the PMC. The summary below identifies those issues that are addressed herein or must be resolved and/or clarified to comply with the PMC.

- Per PMC 16.20.725, all wetlands within 300 feet of a proposed project shall be identified. The report identifies all wetlands (Wetlands A and B) within 300 feet of the proposed project. According to the report, Wetland B was not rated due to its location across Finn Hill Rd. Per PMC 16.20.120(K), Finn Hill Rd. functions as an interrupted buffer; therefore the buffer associated with Wetland B does not extend north of Finn Hill Rd. Based on this information, Grette Associates agrees that it is not necessary to delineate or rate Wetland B for this project. Grette Associates concurs with the classification of Wetland A as a Category III wetland.
- Per PMC 16.20.310, all streams shall be shall be classified according to WAC 222-16-030 and rated according to Table 16.20.315. The submitted report identifies North Fork Johnson Creek as a Type F1 stream, however the report does not provide any analysis to support the classification. Based on the analysis provided above in Section 3.2.2, Grette Associates recommends that the stream classification stated in the report (Type F1) be used. Per PMC 16.20.315, Type F1 streams are subject to a 200-foot buffer and a 25-foot building setback.
- The submitted report states that there will be approximately 4,721 square feet of wetland/stream buffer impact. The report also states that the project will enhance approximately 10,470 square feet of degraded buffer associated with Wetland A. This represents a 2.2:1 ratio. Given this information, sufficient enhancement would occur to offset the proposed buffer impacts.
- Per PMC 16.20.235(F) and PMC 16.20.320(F), pedestrian trails shall be located in the outer 25 percent of a wetland/FWHCA buffer. Given the location of the proposed project in relation to the wetland location and Finn Hill Road (a buffer interruption), the proposed project is located as far from the wetland boundary as is possible. As the buffer ends at Finn Hill Road, the majority of the project is located within the outer 25 percent of the buffer.
- The proposed monitoring schedule does not include two monitoring assessments within the first year as required per PMC 16.20.745. Grette Associates recommends that the monitoring schedule be revised to comply with PMC 16.20.745.

If you have any questions from this review, please contact me at (253) 573-9300, or by email at chadw@gretteassociates.com.

Regards,

Chad Wallin
Biologist

**References:**


Washington Department of Fish and Wildlife (WDFW). 2019. SalmonScape [map online]. All SalmonScape Species. Queried March 6, 2019. URL: http://wdfw.wa.gov/mapping/phs/.

Washington Department of Natural Resources (WDNR). 2019. Forest Practices Application Mapping Tool [map online]. Streams and Water Type Breaks. Queried March 6, 2019. URL: https://fortress.wa.gov/dnr/protectiongis/fpamt/index.html

Washington State Department of Transportation (WSDOT). 2019. WSDOT Fish Passage Inventory. Queried March 6, 2019. URL: https://www.wsdot.wa.gov/Projects/FishPassage/default.htm

# NOTICE OF APPLICATION and Optional DNS

Planning and Economic Development Department
200 NE Moe Street | Poulsbo, Washington 98370
(360) 394-9748 | fax (360) 697-8269
www.cityofpoulsbo.com | plan&econ@cityofpoulsbo.com

**Finn Hill Shared Use Path (SUP), Type II Critical Area Permit**

The City of Poulsbo has received a permit application for the following project that may be of interest to you. The public has the right to review contents of the official file for the proposal, provide written comments, participate in any public hearings, and request a copy of the final decision.

| | | | |
|---|---|---|---|
| **File No.:** | P-01-14-19-01 | **Zoning:**<br>**CAO:** | Residential Low (RL)<br>Wetlands &<br>Fish and Wildlife Habitat |
| **Counter Complete:** | January 15, 2019 | **Technical Completion** | March 19, 2019 |
| **Notice of Application:** | March 22, 2019 | **Comments Due:** | April 5, 2019 |
| **Site Location:** | Finn Hill from Olhava Way to Urdahl Rd | **Tax Parcel:** | City Right-of-Way |
| **Property Owner:** | City of Poulsbo, 200 NE Moe Street, Poulsbo, WA 98370 | | |
| **Applicant/Agent:** | Andrzej Kasiniak, P.E., Director of Engineering 200 NE Moe Street, Poulsbo, WA 98370 | | |
| **Project Description:** | The Finn Hill road Shared Use Path (SUP) project will provide a paved non-motorized shared use path that links neighborhoods and schools and improves safety on Fin Hill Road. The project will provide a SUP adjacent to Finn Hill Road and Rhododendron Lane between Olhava Way and Vinland Elementary School.<br><br>The path will extend along approximately 4,800 linear feet of City and Kitsap County right-of-way adjacent to Finn Hill Rd. The SUP will be constructed consistent with both pedestrians and bicyclists and will meet Americans with Disabilities Act (ADA) requirements. The SUP will consist of a 10-foot wide section of permeable asphalt with 2-foot gravel shoulders on each side. A 3-foot wide landscape strip and concrete curb and gutter will separate the SUP from the motorized vehicle travel lanes.<br><br>The proposal will encroach into required wetland, wetland buffer, and stream buffer areas.<br><br>Project construction is anticipated in summer and fall 2019. Overall, the project is expected to result in improved wetland buffer and stream buffer function for the North Fork Johnson Creek. | | |
| **Permits Included in Application:** | Critical Area Permit & SEPA determination | | |
| **Permits NOT Included in Application:** | Grading Permit, Building Permit, other construction permits as determined through this permit process. | | |
| **Environmental Review:** | The City of Poulsbo has reviewed the proposed project for probable adverse environmental impacts and expects to issue a determination of nonsignificance (DNS) for this project. The Optional DNS process in WAC 197-11-355 is being used. **This may be the only opportunity to comment on the environmental impacts of the proposed project.** The proposal may include mitigation measures under applicable codes, and the project review process may | | |

| | |
|---|---|
| | incorporate or require mitigation measures regardless of whether an EIS is prepared. A copy of the subsequent threshold determination for the proposal may be obtained upon request.<br><br>Agencies, tribes, and the public are encouraged to review and comment on the proposed project and its probable environmental impacts. **Comments must be submitted by April 5, 2019.** |
| **Existing Environmental Docs:** | SEPA Environmental Checklist, Finn Hill Road shared Use Path National Environmental Policy Act (NEPA) Documented Categorical Exclusion, 2018, Fin Hill road Cultural Resource Assessment Report, 2018, Drainage Report, January 2019, Geotechnical Report, 2017, Engineering Plans, December 2018, and Wetland Report and Buffer Enhancement Plan, February 2019. |
| **Requested Studies:** | None |
| **Public Comment Period:** | The minimum public comment period shall be 14 calendar days. The public may comment on the application and the comment period will remain open until **April 5, 2019**. The public may request a copy of the decision once made. Public comments may be mailed, emailed, personally delivered or faxed to the City. |
| **Public Hearing Date:** | N/A |
| **Staff Report:** | The staff report will be available for review at no cost at least five calendar days before the PED Director's decision and a copy will be provided at a reasonable cost. |
| **Examination of File:** | The complete application file may be examined at the PED Department, Poulsbo City Hall, 200 NE Moe Street, from 8:30 a.m. to 4:30 p.m. Monday through Friday. |
| **Review Authority:** | The PED Director is the review authority for this Type II application. |
| **Staff Contact:** | Marla Powers, Associate Planner; mpowers@cityofpoulsbo.com; (360) 394 -9737 |
| **Site Map:** | See attached. |

# *Appendix B: Buffer Enhancement Design Plans*

| IMPACTS AND MITIGATION SUMMARY | SQ FT |
|---|---|
| WETLAND IN-WATER IMPACT | 0 |
| IN-STREAM IMPACT | 0 |
| WETLAND/STREAM BUFFER IMPACT | 6,194 |
| WETLAND/STREAM BUFFER ENHANCEMENT | 10,815 |

## GENERAL NOTES:

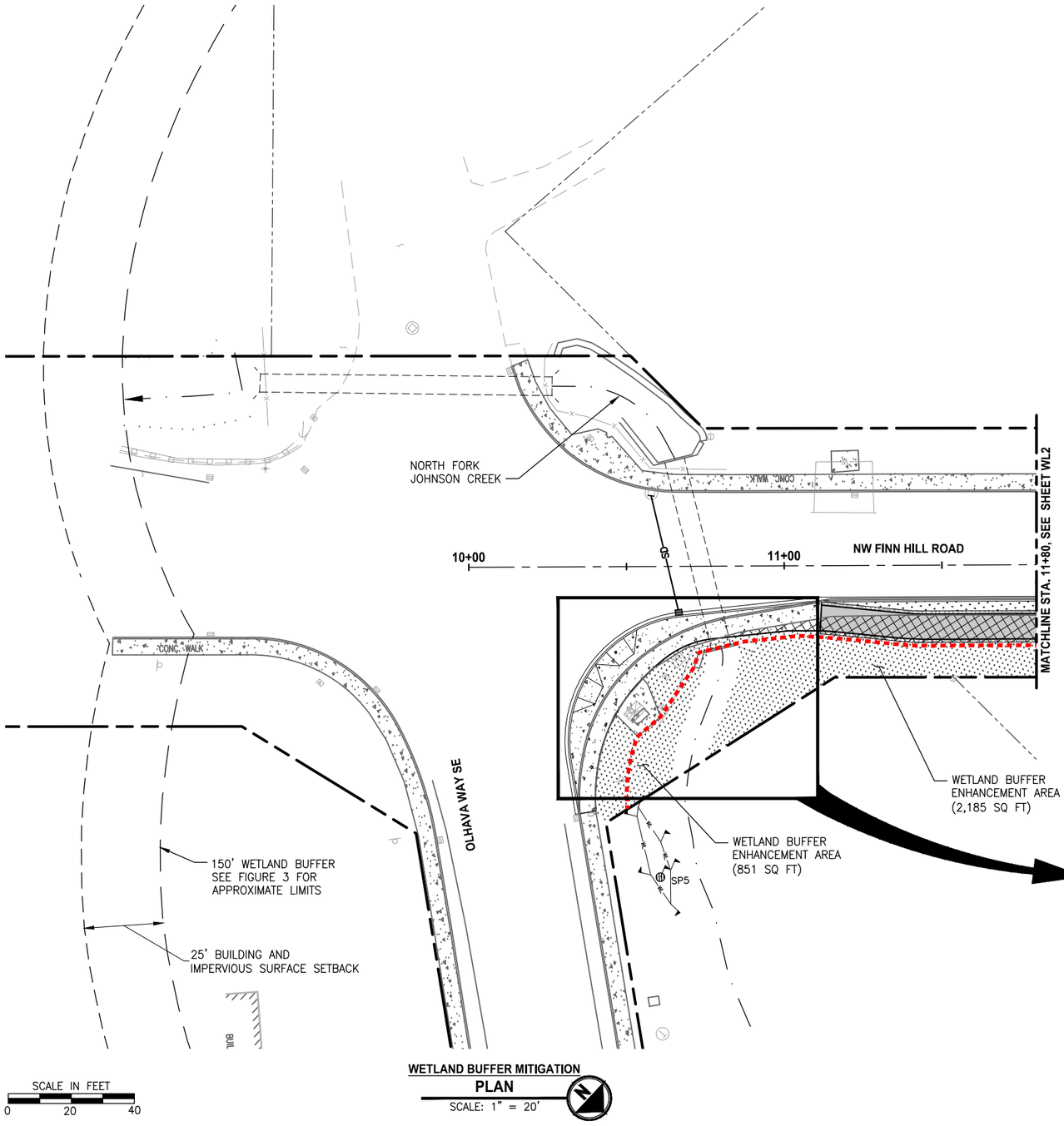
1. SEE ROADWAY PLANS FOR STORMWATER AND PATH LAYOUT.

## LEGEND

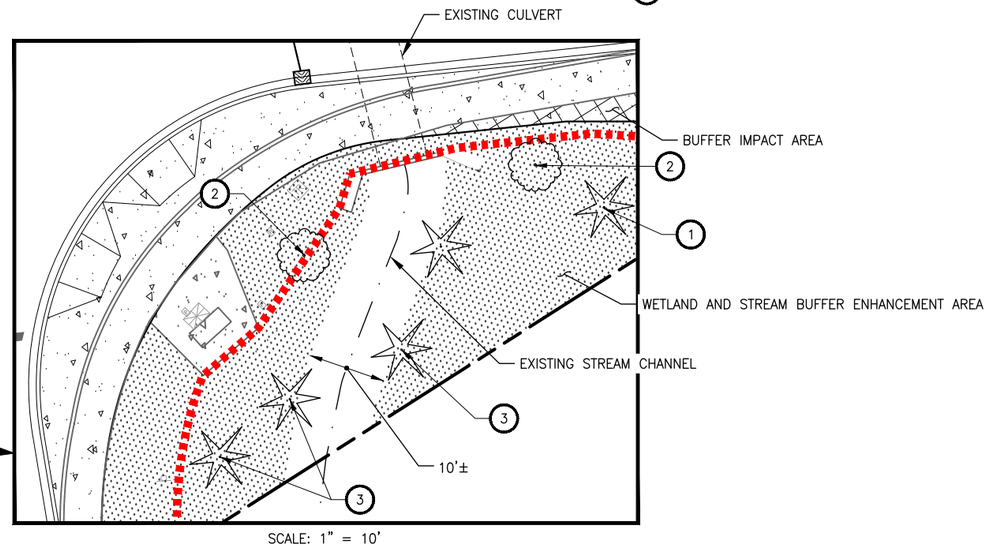
- CONCRETE SIDEWALK
- SHARED USE PATH – POROUS HMA CLASS ½" PG 70–22 ER
- MAINTAINED LAWN AREA
- BUFFER IMPACT AREA
- WETLAND AND STREAM BUFFER ENHANCEMENT AREA, SEE NOTES SHEET LS3
- STREET PLANTING STRIP
- DELINIATED WETLAND
- SOIL PLOT

## PLANTING NOTES:

1. DOUGLAS FIR, SEE NOTES AND DETAILS SHEET LS3
2. WESTERN DOGWOOD, SEE NOTES AND DETAILS SHEET LS3
3. WESTERN RED CEDAR, SEE NOTES AND DETAILS SHEET LS3




WETLAND BUFFER MITIGATION
PLAN
SCALE: 1" = 20'




SCALE: 1" = 10'

CITY OF POULSBO
CAO PERMIT 1–28–19

| REVISIONS | DATE | BY |
|---|---|---|
| | | |

DESIGNED P. STRUCK
DRAWN B. BAILEY
CHECKED J. RANES, P.E.
APPROVED

ONE INCH AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

FILE NAME 53212.002.002–FinnHill–LS
JOB No. ––
DATE 01/25/2019

ANDRZEJ LESZEK KARNIAK
STATE OF WASHINGTON
33759
REGISTERED
PROFESSIONAL ENGINEER


City of Poulsbo
200 NE Moe Street
Poulsbo, WA 98370
Ph: (360) 779-3113


PROJECT NAME
NW FINN HILL ROAD
SHARED USE PATH - OLHAVA WAY SE TO VINLAND ELEMENTARY SCHOOL
CITY OF POULSBO, WASHINGTON

# BUFFER ENHANCEMENT PLAN STA 10+00TO STA 11+80

SHEET NO. OF
LS1

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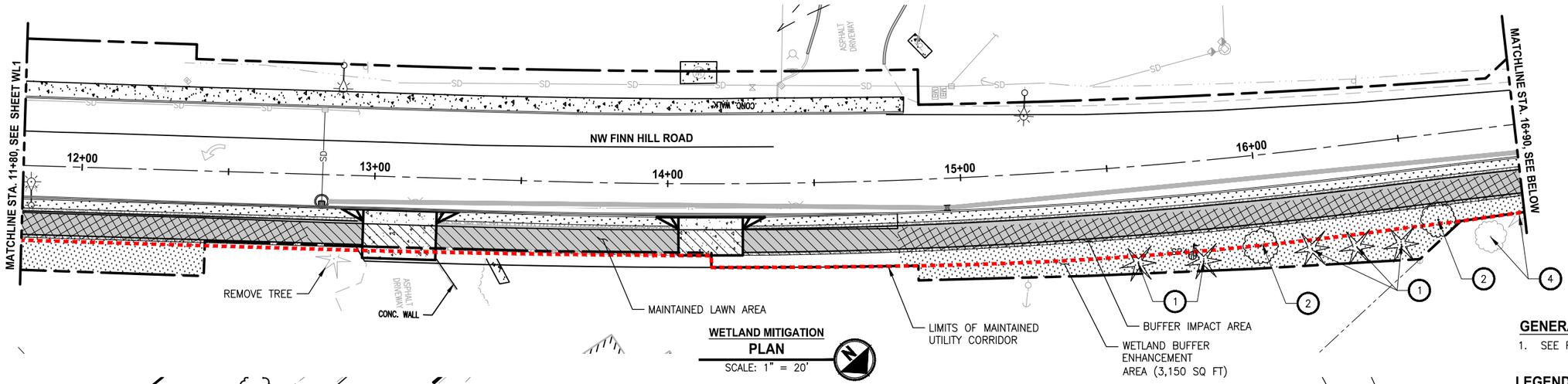
PLOTTED BY: user DATE: Wednesday, February 6, 2019 8:44:33 PM
LAYOUT: LS–01




**WETLAND MITIGATION PLAN**
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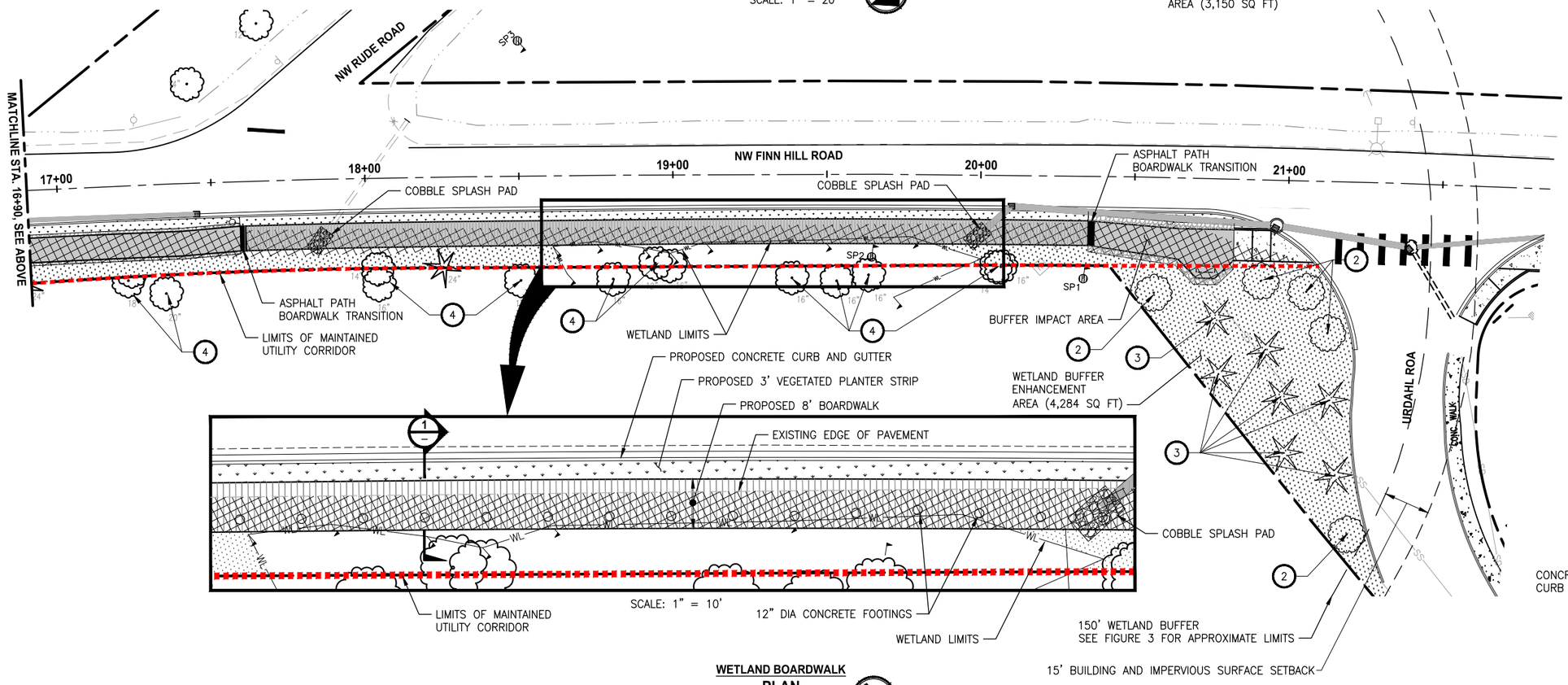



**WETLAND BOARDWALK PLAN**
SCALE: 1" = 20'

SCALE IN FEET
0 20 40

## GENERAL NOTES:

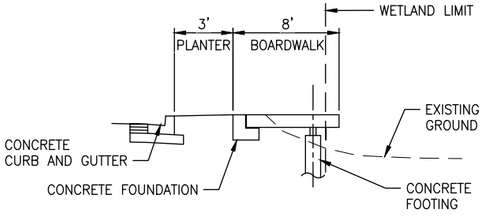
1. SEE ROADWAY PLANS FOR PATH LAYOUT.

## LEGEND

- CONCRETE SIDEWALK
- SHARED USE PATH – POROUS HMA CLASS ½" PG 70–22 ER
- MAINTAINED LAWN AREA
- BUFFER IMPACT AREA
- WETLAND AND STREAM BUFFER ENHANCEMENT AREA, SEE NOTES SHEET LS3
- STREET PLANTING STRIP
- DELINIATED WETLAND
- SP1 SOIL PLOT

## PLANTING NOTES:

1. DOUGLAS FIR, SEE NOTES AND DETAILS SHEET LS3
2. WESTERN DOGWOOD, SEE NOTES AND DETAILS SHEET LS3
3. WESTERN RED CEDAR, SEE NOTES AND DETAILS SHEET LS3
4. PROTECT EXISTING TREES




**SECTION 1**
NOT TO SCALE

**CITY OF POULSBO**
CAO PERMIT

| | REVISIONS | DATE | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

DESIGNED: P. STRUCK
DRAWN: B. BAILEY
CHECKED: J. RANES, P.E.
APPROVED:

ONE INCH AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

FILE NAME: 53212.002.002–FinnHill–LS
JOB No.: --
DATE: 01/28/2019

ANDRZEJ LESZEK KASHAK — STATE OF WASHINGTON — 33759 — REGISTERED PROFESSIONAL ENGINEER

City of Poulsbo
200 NE Moe Street
Poulsbo, WA 98370
Ph: (360) 779-3113

PROJECT NAME
NW FINN HILL ROAD
SHARED USE PATH - OLHAVA WAY SE TO VINLAND ELEMENTARY SCHOOL
CITY OF POULSBO, WASHINGTON

# BUFFER ENHANCEMENT PLAN STA 11+80 TO STA 21+90

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LS2

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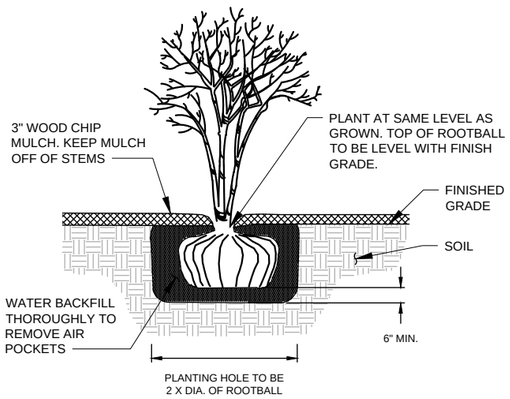
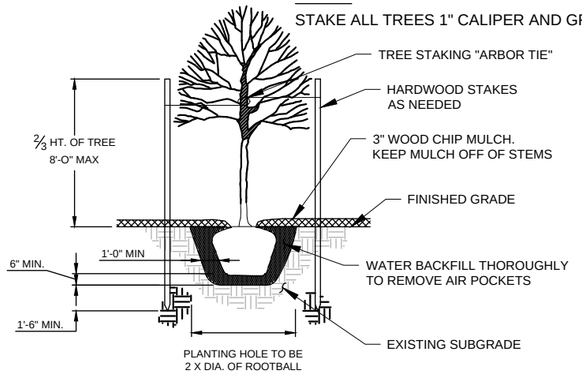



**SHRUB TREE PLANTING DETAIL** 1
NO SCALE

**NOTE:**
STAKE ALL TREES 1" CALIPER AND GREATER.




**TREE PLANTING DETAIL** 2
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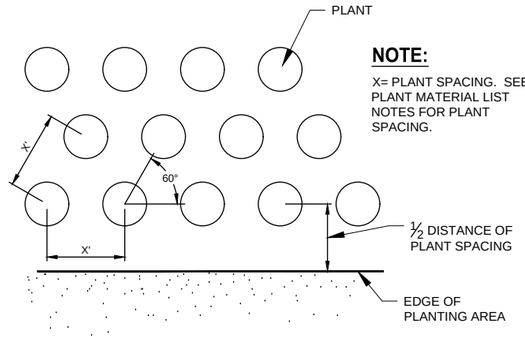
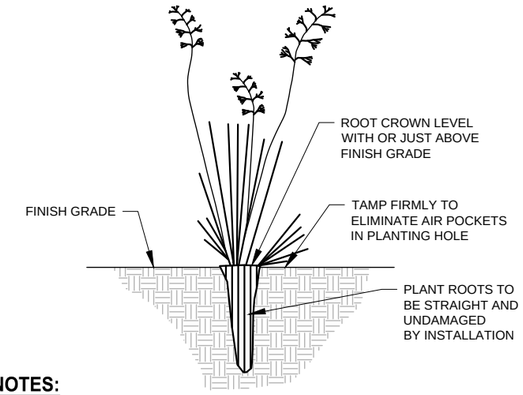



**NOTE:**
X= PLANT SPACING. SEE PLANT MATERIAL LIST NOTES FOR PLANT SPACING.

**TYPICAL GROUNDCOVER SPACING DETAIL** 3
NO SCALE




**NOTES:**

1. LEAVES AND ROOT CROWN TO REMAIN UNDAMAGED DURING PLANTING.
2. CREATE PLANTING HOLE WITH TROWEL OR BY DRIVING STEEL SPIKE INTO SOIL AND WORKING SPIKE TO WIDEN HOLE.

**GROUND COVE DETAIL** 4
NO SCALE

## GENERAL LANDSCAPE NOTES:

1. PROTECT AND RETAIN ALL NATIVE TREES AND SHRUBS IN BUFFER AREA.
2. PRIOR TO CONSTRUCTION, CLEARING LIMITS SHALL BE CLEARLY IDENTIFIED.
3. MITIGATION PLANTING PLANS REPRESENT A CONCEPTUAL PLANT LAYOUT. FINAL PLANT LOCATIONS SHALL BE DETERMINED BY THE CITY DURING CONSTRUCTION.
4. WITHIN THE BUFFER ENHANCEMENT PLANTING AREA CLEAR AND GRUB OUT ALL REED CANARY GRASS, BLACKBERRY, ENGLISH IVY AND ALL OTHER WEEDS. REMOVE AND DISPOSE OF MATERIAL. AFTER CLEARING, DISC OR TILL AREA TO A 12 INCH MIN. DEPTH. USE ONLY HAND TOOLS TO CLEAR AND CULTIVATE SOIL UNDER THE CANOPY (WITHIN AND 5' OUTSIDE THE DRIPLINE) OF EXISTING TREES. PLACE 4 INCH MIN. LAYER OF COARSE COMPOST OVER ENTIRE PLANTING AREA.
5. PLANT MATERIAL IS TO BE SUPPLIED BY NURSERIES THAT SPECIALIZE IN PLANTS NATIVE TO THE PACIFIC NORTHWEST. PLANT SUBSTITUTIONS ARE SUBJECT TO APPROVAL BY THE CITY.
6. MITIGATION PLANTING SHALL TAKE PLACE DURING THE DORMANT SEASON (NOVEMBER 1ST TO FEBRUARY 28TH). PLANTING MAY BE ALLOWED AT OTHER TIMES AFTER REVIEW AND WRITTEN APPROVAL BY THE CITY.
7. ALL DIMENSIONS FOR PLANT SIZES ARE MINIMUM REQUIREMENTS. NO PLANT SUBSTITUTIONS ARE ALLOWED WITHOUT ADVANCE APPROVAL FROM THE CITY.
8. EXISTING AREAS DISTURBED BY CONSTRUCTION ACTIVITIES AND NOT SHOWN TO BE RE-VEGETATED ON THESE PLANS SHALL BE RESTORED BY TILLING THE SOIL SURFACE TO 12 INCH DEPTH. PLACE 4 INCH COMPOST LAYER OVER THE ENTIRE AREA AND MIX INTO THE TOP 8 INCHES TO FORM A UNIFORM AND CONSISTENT TOPSOIL LAYER. HYDROSEED PER THE PLANT MATERIAL LIST.
9. NO TACKIFIER, HERBICIDE OR FERTILIZER SHALL BE USED IN THE WETLAND, STREAM OR BUFFER PLANTING AREAS.
10. SOIL MIX FOR ALL PLANTS SHALL BE IMPORTED TOPSOIL TYPE 'A' CONSISTING OF SANDY LOAM (FREE OF STICKS, STONES AND DEBRIS) EVENLY MIXED WITH 30% CLEAN FINE COMPOST.
11. FERTILIZER TABLETS FOR ALL PLANTS SHALL BE (20-10-5) 21 GRAM OR 10 GRAM TABLETS DISTRIBUTED AS FOLLOWS:
    -ALL TREES: (4) - 21 GRAM TABLETS
    -ALL SHRUBS (EXCEPT 1 GALLON): (3) - 21 GRAM TABLETS
    -ALL SHRUBS (1 GALLON): (1) - 21 GRAM TABLETS PLACE TABLETS DIRECTLY ADJACENT TO ROOTBALL.
12. BUFFER MITIGATION AREAS SHALL RECEIVE 3 INCHES OF COARSE WOOD CHIP MULCH. PRIOR TO MULCH PLACEMENT GRADE SHALL BE BROUGHT TO A UNIFORM LINE WITH NO SURFACE IRREGULARITIES. WATERING BERMS AROUND PLANTS SHALL BE HAND COMPACTED AND OF A SMOOTH AND EVEN GRADE PRIOR TO MULCH PLACEMENT. MULCH SHALL BE WATER-COMPACTED UPON PLACEMENT.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR WATERING PLANTS FOR THE FIRST YEAR. DURING JUNE 1ST THROUGH SEPTEMBER 30TH, PLANTS SHALL BE WATERED AT MINIMUM, ONCE EVERY TWO WEEKS, OR AS DIRECTED BY THE PROJECT REPRESENTATIVE. THE CITY WILL MAKE PROVISIONS FOR WATERING AS NEEDED FOR THE REMAINDER OF THE ESTABLISHMENT PERIOD AFTER THE FIRST YEAR.
14. ALL PLANTS SHALL BE GUARANTEED FOR ONE FULL YEAR FROM THE DATE OF PROJECT ACCEPTANCE. ALL REPLACED PLANTS SHALL BE RE-GUARANTEED. ALL REPLACEMENTS SHALL BE MADE WITHIN 21 DAYS OF RECEIVING WRITTEN NOTICE FROM THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL NOT BE RESPONSIBLE FOR PLANTS DYING DUE TO OWNER NEGLECT OR VANDALISM AFTER THE MAINTENANCE PERIOD.
15. A MAINTENANCE PERIOD OF 5 YEARS SHALL COMMENCE UPON COMPLETION OF ALL LANDSCAPE INSTALLATION ACTIVITIES AND SHALL INCLUDE THE FOLLOWING PERFORMED NO LESS OFTEN THAN EVERY SIX MONTHS:
    A. REMOVE ALL WEEDS OVER 3 INCHES IN HEIGHT.
    B. REPLACE DEAD OR UNHEALTHY PLANTS
    C. ENSURE ADEQUATE MOISTURE IS DELIVERED TO ALL LANDSCAPE BEDS.

## CONSTRUCTION SEQUENCE:

**BUFFER ENHANCEMENT PLANTING AREA**

1. CLEAR INVASIVE WEEDS (SEE NOTES THIS SHEET).
2. TILL AREA TO 12 INCH DEPTH.
3. INSTALL ORGANIC MATERIAL AMENDMENT (COARSE COMPOST). SEE DETAILS, THIS SHEET.
4. PLANT AREA (SEE NOTES).
5. INSTALL MULCH AND WOOD CHIPS.

## PLANT MATERIAL LIST

| LEGEND | BOTANICAL NAME | COMMON NAME | MIN SIZE / CONDITION | SPACING FT O.C. | NOTES |
|---|---|---|---|---|---|
| | **WETLAND BUFFER ENHANCEMENT AREA** | | | | |
| | GAULTHERIA SHALLON | SALAL | BARE ROOT | SPACE 4' O.C. | PLANT IN SINGLE SPECIES GROUPS OF 3 TO 8 |
| | MAHONIA NERVOSA | LOW OREGON GRAPE | BARE ROOT | | |
| | POLYSTHICUM MUNITUM | SWORD FERN | 4" POT | | |
| | HOLODISCUS DISCOLOR | OCEAN SPRAY | BARE ROOT | | |
| | ROSA NUTKANA | NOOTKA ROSE | BARE ROOT | | |
| | SYMPHORICARPOS ALBUS | SNOWBERRY | BARE ROOT | | |
| | PSUEDOTSUGA MENZIESII | DOUGLAS FIR (DF) | 4' HT | AS SHOWN | |
| | CORNUS NUTTALLII | WESTERN DOGWOOD (WD) | 4' HT | AS SHOWN | |
| | THUJA PLICATA | WESTERN RED CEDAR (RC) | 6' HT | AS SHOWN | |
| | **HYDROSEED MIX** | | | | |
| | | | **% WEIGHT** | **% PURITY** | **% GERMINATION** |
| | DWARF TALL FESCUE | | 45 | 98 | 90 |
| | DWARF PERENNIAL RYE | | 30 | 98 | 90 |
| | RED FESCUE | | 20 | 98 | 90 |
| | COLONIAL BENTGRASS | | 5 | 98 | 90 |

**CITY OF POULSBO**
CAO PERMIT

| | REVISIONS | DATE | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

DESIGNED P. STRUCK
DRAWN B. BAILEY
CHECKED J. RANES, P.E.
APPROVED

ONE INCH AT FULL SCALE. IF NOT, SCALE ACCORDINGLY
FILE NAME 53212.002.002-FinnHill-LS
JOB No. --
DATE 01/28/2019

ANDRZEJ LESZEK KASHNIAK — STATE OF WASHINGTON — 33759 — REGISTERED PROFESSIONAL ENGINEER

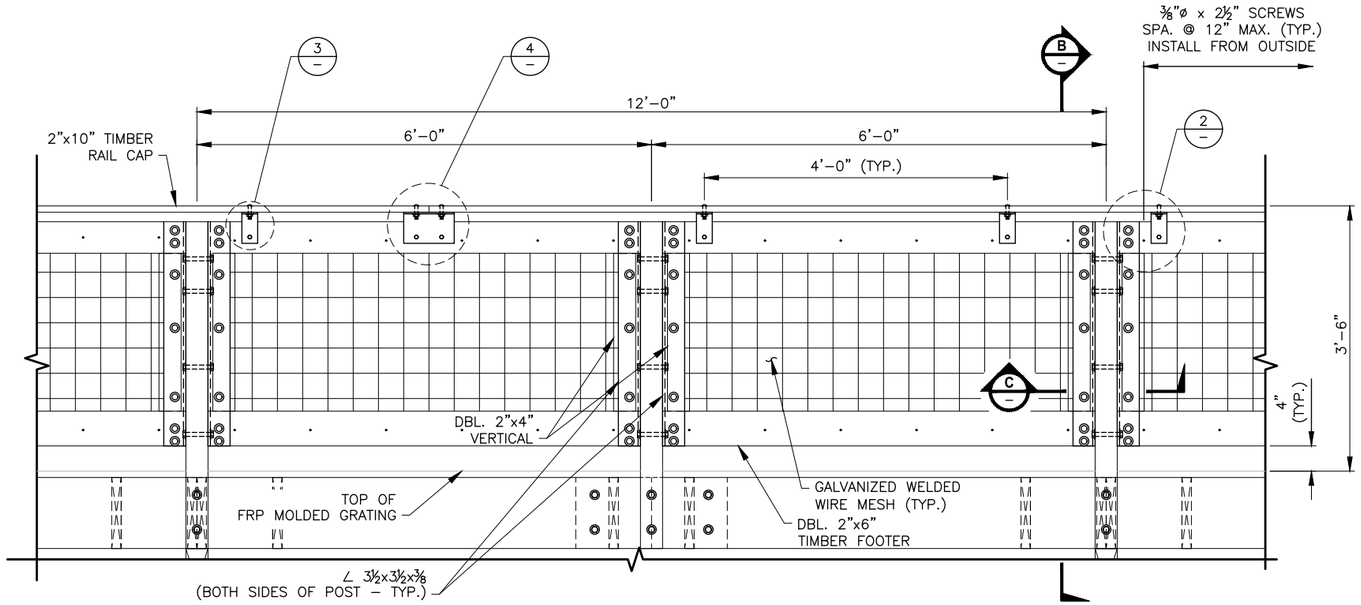
City of Poulsbo
200 NE Moe Street
Poulsbo, WA 98370
Ph: (360) 779-3113

PROJECT NAME
**NW FINN HILL ROAD**
**SHARED USE PATH - OLHAVA WAY SE TO VINLAND ELEMENTARY SCHOOL**
CITY OF POULSBO, WASHINGTON

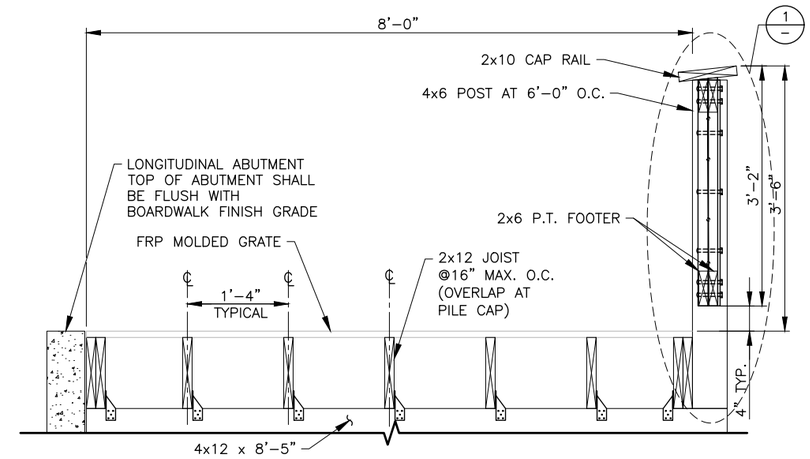
# BUFFER ENHANCEMENT DETAILS

SHEET NO. OF
**LS3**

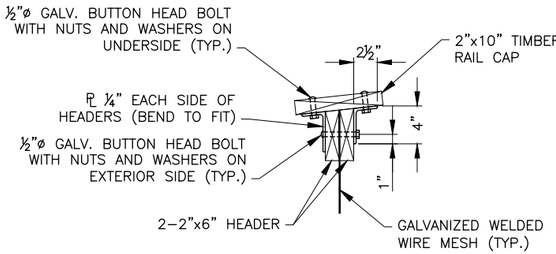
LAYOUT: LS-03 PATH: D:\Civil 3D Projects\Finn Hill Shared Use\ PLOTTED BY: user DATE: Wednesday, February 6, 2019 8:45:09 PM



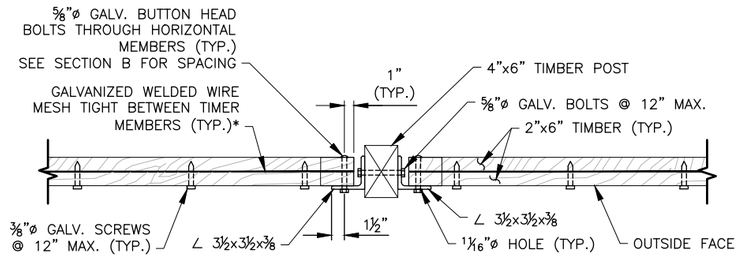

**BOARDWALK RAILING**
**ELEVATION** A S1
SCALE: 1"=1'-0"




**BOARDWALK RAILING**
**SECTION** B S1
SCALE: 1"=1'-0"

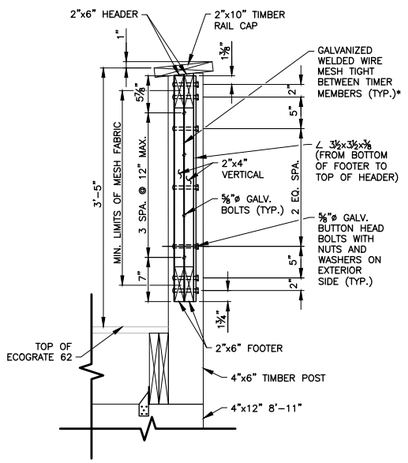



**SECTION** C
SCALE: 1–1/2"=1'–0"

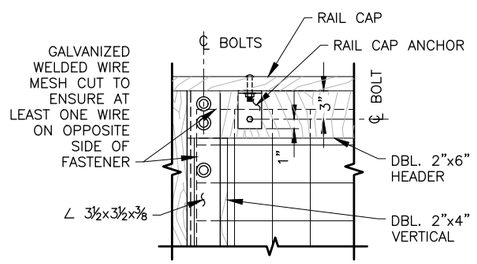



**SECTION** D
SCALE: 1–1/2"=1'–0"

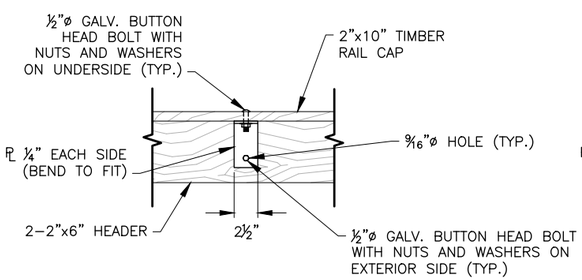
*CARE SHALL BE USED DURING INSTALLATION TO INSURE THAT SCREWS DO NOT DAMAGE OR INTERFERE WITH WELDED WIRE MESH.



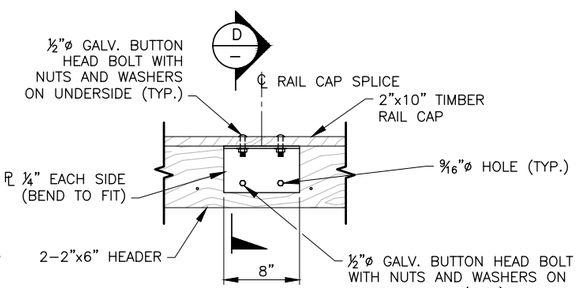

**BOARDWALK RAILING**
**DETAIL** 1
SCALE: 1–1/2"=1'–0"




**DETAIL** 2
SCALE: 1–1/2"=1'–0"




**DETAIL** 3
SCALE: 1–1/2"=1'–0"




**DETAIL** 4
SCALE: 1–1/2"=1'–0"

**WSDOT FINAL REVIEW**
NOT FOR CONSTRUCTION

| | REVISIONS | DATE | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

DESIGNED J. RANES, P.E.
DRAWN B. BAILEY
CHECKED J. RANES, P.E.
APPROVED

ONE INCH AT FULL SCALE. IF NOT, SCALE ACCORDINGLY
FILE NAME 53212.002.002-FinnHill-S
JOB No. --
DATE 04/08/19

ANDRZEJ LESZEK KASINIAK · STATE OF WASHINGTON · 33759 · REGISTERED PROFESSIONAL ENGINEER

CITY OF POULSBO · VIKING CITY

City of Poulsbo
200 NE Moe Street
Poulsbo, WA 98370
Ph: (360) 779-3113

PROJECT NAME
**NW FINN HILL ROAD**
**SHARED USE PATH - OLHAVA WAY SE TO VINLAND ELEMENTARY SCHOOL**
CITY OF POULSBO, WASHINGTON

# BOARDWALK SECTIONS AND DETAILS

SHEET NO. 27 OF 35
**S4**

LAYOUT: S4 PATH: M:\Projects\Finn Hill Reconstruction project 2016-2019\CADD\Native\ PLOTTED BY: bbailey DATE: Sunday, April 07, 2019 10:51:11 AM

CITY OF POULSBO
FINN HILL ROAD SHARED USE PATH PROJECT

**WETLAND BUFFER BOUNDARY SIGN DETAIL**

Notes:

1. Signed shall be placed at the limits of wetland buffer protection area 3-ft north of the edge of the shared use path.
2. Wetland buffer signs shall be 6” x 4” rectangle metal or durable plastic, white lettering on a green background with wetland graphics similar to sign example below.
3. Wording shall be Wetland Buffer Boundary Please Do Not Disturb. City of Poulsbo.
4. Signs shall be 100-ft on center adjacent to the buffer enhancement and wetland area. Signs shall face away from the critical area and placed on posts installed securely in the ground. Posts can be metal or wood. If wood posts are used, they must be at least 4” x 4” in size and be made of treated wood. Posts must extend a minimum of three feet above ground and be sunk at least two feet below ground. Locations to be approved by City prior to installation.
5. Contractor to provide example sign up for City approval prior to installation.

# *Appendix C: Wetland Data Forms*

# WETLAND DETERMINATION DATA FORM
**Western Mountains, Valleys, and Coast Region**

| | | | |
|---|---|---|---|
| Project Site: | Finn Hill Road Multi-Use Trail Project | Sampling Date: | 10/03/2016 |
| Applicant/Owner: | City of Poulsbo | Sampling Point: | Soil Point #1 |
| Investigator: | Phil Struck/James Guzman | City/County: | Poulsbo/Kitsap |
| Section, Township, Range: | Sec10, T26N, R1E | State: | WA |
| Landform (hillslope, terrace, etc) hillslope | Slope (%) 6% | Local relief (concave, convex, none) convex | |
| Subregion (LRR) LRRA ML RA2 | Lat 47.756 | Long -122.668 | Datum NAD83 |
| Soil Map Unit Name Poulsbo Gravelly Sandy Loam | | NWI classification PFO | |

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | ☒ Yes | ☐ No | **Is this Sampling Point within a Wetland?** | ☐ Yes | ☒ No |
| Hydric Soils Present? | ☐ Yes | ☒ No | | | |
| Wetland Hydrology Present? | ☐ Yes | ☒ No | | | |

*Remarks:*

**VEGETATION – Use scientific names of plants.**

| **Tree Stratum** (Plot size 30'_) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Red alder (*Alnus rubra*) | 30 | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 30 | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size 30'__) | | | |
| 1. Himalayan blackberry (*Rubus armeniacus*) | 40 | Yes | FACU |
| 2. Scotch broom (*Cytisus scoparius*) | 1 | No | NI |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 41 | = Total Cover | |
| **Herb Stratum** (Plot size 30'__) | | | |
| 1. Reed-canary grass (*Phalaris arundinacea*) | 40 | Yes | FACW |
| 2. Sword fern (*Polystichum munitum* ) | 10 | No | FACU |
| 3. Lady fern *(Athyrium filix-femina)* | 10 | No | FAC |
| 4. Canadian thistle (*Cirsium arvense)* | 10 | No | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 70 | = Total Cover | |
| **Woody Vine Stratum** (Plot size ) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

% Bare Ground in Herb Stratum 0

**Dominance Test Worksheet**

| | | |
|---|---|---|
| Number of Dominant Species that are OBL, FACW, or FAC: | 2 | (A) |
| Total Number of Dominant Species Across All Strata: | 3 | (B) |
| Percent of Dominant Species that are OBL, FACW, or FAC: | 66 | (A/B) |

**Prevalence Index Worksheet**

| Total % Cover of | | Multiply by |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | | x 2 = |
| FAC species | | x 3 = |
| FACU species | | x 4 = |
| UPL species | | x 5 = |
| Column totals | (A) | (B) |

Prevalence Index = B / A =

**Hydrophytic Vegetation Indicators**

| | |
|---|---|
| X | Dominance test is > 50% |
| | Prevalence test is ≤ 3.0 * |
| | Morphological Adaptations * (provide supporting data in remarks or on a separate sheet) |
| | Wetland Non-Vascular Plants * |
| | Problematic Hydrophytic Vegetation * (explain) |

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

*Remarks:*

## SOIL

**Sampling Point** SP#1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6 | 5YR 2.5/2 | 100 | | | | | Sandy loam | |
| 6-14 | 7.5YR 3/2 | 99 | 7.5YR 4/6 | 1 | C | M | Gravelly/ sandy/loam | |
| 14-18 | 7.5YR 3/2 | 98 | 7.5YR 4/6 | 2 | C | M | Gravelly/ Sandy/loam | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]**

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

**Hydric soil present?** Yes ☐ No ☒

*Remarks:*

## HYDROLOGY

**Wetland Hydrology Indicators:**

*Primary Indicators (minimum of one required: check all that apply):*

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

*Secondary Indicators (2 or more required):*

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

**Field Observations**

| | | | | |
|---|---|---|---|---|
| Surface Water Present? | ☐ Yes | ☒ No | Depth (in): | |
| Water Table Present? | ☐ Yes | ☒ No | Depth (in): | |
| Saturation Present? (includes capillary fringe) | ☐ Yes | ☒ No | Depth (in): | |

**Wetland Hydrology Present?** Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

*Remarks:*

# WETLAND DETERMINATION DATA FORM
**Western Mountains, Valleys, and Coast Region**

| | | | |
|---|---|---|---|
| Project Site: | Finn Hill Road Multi-Use Trail Project | Sampling Date: | 10/03/2016 |
| Applicant/Owner: | City of Poulsbo | Sampling Point: | Soil Point #2 |
| Investigator: | Phil Struck/James Guzman | City/County: | Poulsbo/Kitsap |
| Section, Township, Range: | Sec10, T26N, R1E | State: | WA |
| Landform (hillslope, terrace, etc) hillslope | Slope (%) 6% | Local relief (concave, convex, none) convex | |
| Subregion (LRR) LRRA ML RA2 | Lat 47.756 | Long -122.668 | Datum NAD83 |
| Soil Map Unit Name Poulsbo Gravelly Sandy Loam | | NWI classification PFO | |

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? ☒ Yes ☐ No
Hydric Soils Present? ☒ Yes ☐ No
Wetland Hydrology Present? ☒ Yes ☐ No
**Is this Sampling Point within a Wetland?** ☒ Yes ☐ No

*Remarks:*

**VEGETATION – Use scientific names of plants.**

| **Tree Stratum** (Plot size 30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Red alder (*Alnus rubra*) | 50 | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 50 | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size 30' ) | | | |
| 1. Salmonberry (*Rubus spectabilis*) | 20 | Yes | FACU |
| 2. Himalayan blackberry (*Rubus armeniacus*) | 10 | No | NI |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 30 | = Total Cover | |
| **Herb Stratum** (Plot size 30' ) | | | |
| 1. Reed-canary grass (*Phalaris arundinacea*) | 70 | Yes | FACW |
| 2. Velvet grass (*Holcus lanatus*) | 10 | No | FAC |
| 3. Soft rush (*Juncus effuses*) | 10 | No | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 90 | = Total Cover | |
| **Woody Vine Stratum** (Plot size ) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

% Bare Ground in Herb Stratum 0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index Worksheet**

| | Total % Cover of | Multiply by |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | | x 2 = |
| FAC species | | x 3 = |
| FACU species | | x 4 = |
| UPL species | | x 5 = |
| Column totals | (A) | (B) |

Prevalence Index = B / A =

**Hydrophytic Vegetation Indicators**

| | |
|---|---|
| X | Dominance test is > 50% |
| | Prevalence test is ≤ 3.0 * |
| | Morphological Adaptations * (provide supporting data in remarks or on a separate sheet) |
| | Wetland Non-Vascular Plants * |
| | Problematic Hydrophytic Vegetation * (explain) |

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

*Remarks:*

## SOIL

**Sampling Point** SP#2

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-7 | 7.5YR 3/1 | 100 | | | | | Loam | |
| 7-11 | 7.5YR 3/1 | 99 | 7.5YR 5/8 | 7 | C | M | Gravelly/ sandy/loam | |
| 11-18 | 7.5YR 3/1 | 98 | 2.5YR 4/8 | 3 | C | M | Gravelly/ Sandy/loam | Water at 16 |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]**

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

**Hydric soil present?** Yes ☒ No ☐

*Remarks:*

## HYDROLOGY

**Wetland Hydrology Indicators:**

*Primary Indicators (minimum of one required: check all that apply):*

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

*Secondary Indicators (2 or more required):*

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

**Field Observations**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | ☐ Yes | ☒ No | Depth (in): | | |
| Water Table Present? | ☒ Yes | ☐ No | Depth (in): | -16 | |
| Saturation Present? (includes capillary fringe) | ☒ Yes | ☐ No | Depth (in): | 0 | |

**Wetland Hydrology Present?** Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

*Remarks:*

# WETLAND DETERMINATION DATA FORM
**Western Mountains, Valleys, and Coast Region**

| | | | |
|---|---|---|---|
| Project Site: | Finn Road Multi-Use Trail Project | Sampling Date: | 10/03/2016 |
| Applicant/Owner: | City of Poulsbo | Sampling Point: | Soil Point #3 |
| Investigator: | Phil Struck/James Guzman | City/County: | Poulsbo/Kitsap |
| Section, Township, Range: | Sec10, T26N, R1E | State: | WA |
| Landform (hillslope, terrace, etc) hillslope | Slope (%) 6% | Local relief (concave, convex, none) convex | |
| Subregion (LRR) LRRA ML RA2 | Lat 47.756 | Long -122.699 | Datum NAD83 |
| Soil Map Unit Name Poulsbo gravelly sandy loam | | NWI classification PFO | |

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? ☐ Yes ☒ No
Hydric Soils Present? ☐ Yes ☒ No
Wetland Hydrology Present? ☐ Yes ☒ No
**Is this Sampling Point within a Wetland?** ☐ Yes ☒ No

*Remarks:*

**VEGETATION – Use scientific names of plants.**

| **Tree Stratum** (Plot size 30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Red alder (*Alnus rubra*) | 80 | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 80 | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size 30' ) | | | |
| 1. Trailing blackberry (*Rubus ursinus*) | 80 | Yes | FACU |
| 2. Himalayan blackberry (*Rubus armeniacus*) | 10 | No | FACU |
| 3. Salmonberry (*Rubus spectabilis*) | 3 | No | FAC |
| 4. | | | |
| 5. | | | |
| | 93 | = Total Cover | |
| **Herb Stratum** (Plot size 30' ) | | | |
| 1. Lady fern (*Athyrium filix-femina*) | 5 | No | FAC |
| 2. Sword fern (*Polystichum munitum* ) | 1 | No | FACU |
| 3. Lady fern (*Athyrium filix-femina*) | 1 | No | FAC |
| 4. Slough sedge (*Carex obnupta*) | 1 | No | OBL |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 8 | = Total Cover | |
| **Woody Vine Stratum** (Plot size ) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

% Bare Ground in Herb Stratum 0

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 50 (A/B)

**Prevalence Index Worksheet**

| | Total % Cover of | Multiply by | |
|---|---|---|---|
| OBL species | 1 | x 1 = | 1 |
| FACW species | | x 2 = | |
| FAC species | 39 | x 3 = | 117 |
| FACU species | 91 | x 4 = | 364 |
| UPL species | | x 5 = | |
| Column totals | 131 (A) | | 482 (B) |

Prevalence Index = B / A = 3.7

**Hydrophytic Vegetation Indicators**

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Hydrophytic Vegetation Present?** Yes ☐ No ☒

*Remarks:*

## SOIL

**Sampling Point** SP#3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 7.5YR 3/2 | 100 | | | | | Loam | |
| 3-14 | 10YR 4/2 | 99 | 10YR 4/3 | 1 | C | M | Loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]**

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

**Hydric soil present?** Yes ☐ No ☒

*Remarks:*

## HYDROLOGY

**Wetland Hydrology Indicators:**

*Primary Indicators (minimum of one required: check all that apply):*

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

*Secondary Indicators (2 or more required):*

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

**Field Observations**

| | | | | |
|---|---|---|---|---|
| Surface Water Present? | ☐ Yes | ☒ No | Depth (in): | |
| Water Table Present? | ☐ Yes | ☒ No | Depth (in): | |
| Saturation Present? (includes capillary fringe) | ☐ Yes | ☒ No | Depth (in): | |

**Wetland Hydrology Present?** Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

*Remarks:*

# WETLAND DETERMINATION DATA FORM
**Western Mountains, Valleys, and Coast Region**

| | | | |
|---|---|---|---|
| Project Site: | Finn Hill Road Multi-Use Trail Project | Sampling Date: | 10/03/2016 |
| Applicant/Owner: | City of Poulsbo | Sampling Point: | Soil Point #4 |
| Investigator: | Phil Struck/James Guzman | City/County: | Poulsbo/Kitsap |
| Section, Township, Range: | Sec10, T26N, R1E | State: | WA |
| Landform (hillslope, terrace, etc) hillslope | Slope (%) 6% | Local relief (concave, convex, none) convex | |
| Subregion (LRR) LRRA ML RA2 | Lat 47.755 | Long -122.667 | Datum NAD83 |
| Soil Map Unit Name Poulsbo Gravelly Sandy Loam | | NWI classification PFO | |

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? ☐ Yes ☒ No
Hydric Soils Present? ☐ Yes ☒ No
Wetland Hydrology Present? ☐ Yes ☒ No
**Is this Sampling Point within a Wetland?** ☐ Yes ☒ No

*Remarks:*

**VEGETATION – Use scientific names of plants.**

| **Tree Stratum** (Plot size 30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Red alder (*Alnus rubra*) | 15 | No | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 15 | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size 30' ) | | | |
| 1. Himalayan blackberry (*Rubus armeniacus*) | 35 | Yes | FACU |
| 2. Scotch broom (*Cytisus scoparius*) | 5 | No | NI |
| 3. Scouler's willow (*Salix scouleriana*) | 1 | No | FAC |
| 4. | | | |
| 5. | | | |
| | 41 | = Total Cover | |
| **Herb Stratum** (Plot size 30' ) | | | |
| 1. Bracken fern (*Pteridium aquilinum*) | 20 | Yes | FACU |
| 2. Velvet grass (*Holcus lanatus*) | 20 | Yes | FAC |
| 3. English plantain (*Plantago lanceolata*) | 10 | No | FAC |
| 4. Colonial bentgrass (*Agrostis capillaris*) | 20 | Yes | FAC |
| 5. Canadian thistle (*Cirsium arvense*) | 2 | No | FACU |
| 6. Dandelion (*Taraxacum officinale*) | 5 | No | FACU |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 77 | = Total Cover | |
| **Woody Vine Stratum** (Plot size ) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

% Bare Ground in Herb Stratum 0

*Remarks:*

**Dominance Test Worksheet**

| | | |
|---|---|---|
| Number of Dominant Species that are OBL, FACW, or FAC: | 2 | (A) |
| Total Number of Dominant Species Across All Strata: | 2 | (B) |
| Percent of Dominant Species that are OBL, FACW, or FAC: | 50 | (A/B) |

**Prevalence Index Worksheet**

| Total % Cover of | | Multiply by | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | 66 | x 3 = | 198 |
| FACU species | 62 | x 4 = | 248 |
| UPL species | | x 5 = | |
| Column totals | 128 | (A) | 446 (B) |

Prevalence Index = B / A = 3.5

**Hydrophytic Vegetation Indicators**

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Hydrophytic Vegetation Present?** Yes ☐ No ☒

## SOIL

**Sampling Point** SP#4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-7 | 10YR 3/3 | 100 | | | | | Sandy loam | |
| 7-10 | 7.5YR ¾ | 100 | | | | | Sandy loam | |
| 10-16 | 7.5YR 5/6 | 98 | 5YR 5/8 | 2 | C | M | Sandy loam | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]**

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

**Hydric soil present?** Yes ☐ No ☒

*Remarks:*

## HYDROLOGY

**Wetland Hydrology Indicators:**

*Primary Indicators (minimum of one required: check all that apply):*

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves **(except MLRA 1, 2, 4A & 4B)** (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (explain in remarks)

*Secondary Indicators (2 or more required):*

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A & 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks

**Field Observations**

| | | | | |
|---|---|---|---|---|
| Surface Water Present? | ☐ Yes | ☒ No | Depth (in): | |
| Water Table Present? | ☐ Yes | ☒ No | Depth (in): | |
| Saturation Present? (includes capillary fringe) | ☐ Yes | ☒ No | Depth (in): | |

**Wetland Hydrology Present?** Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

*Remarks:*

# WETLAND DETERMINATION DATA FORM
**Western Mountains, Valleys, and Coast Region**

| | | | |
|---|---|---|---|
| Project Site: | Finn Hill Road Multi-Use Trail Project | Sampling Date: | 10/03/2016 |
| Applicant/Owner: | City of Poulsbo | Sampling Point: | Soil Point #5 |
| Investigator: | Phil Struck/James Guzman | City/County: | Poulsbo/Kitsap |
| Section, Township, Range: | Sec10, T26N, R1E | State: | WA |
| Landform (hillslope, terrace, etc) hillslope | Slope (%) 6% | Local relief (concave, convex, none) convex | |
| Subregion (LRR) LRRA ML RA2 | Lat 47.754 | Long -122.665 | Datum NAD83 |
| Soil Map Unit Name Poulsbo Gravelly Sandy Loam | | NWI classification PFO | |

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? ☒ Yes ☐ No **Is this Sampling Point within a Wetland?** ☒ Yes ☐ No
Hydric Soils Present? ☒ Yes ☐ No
Wetland Hydrology Present? ☒ Yes ☐ No

*Remarks:*

**VEGETATION – Use scientific names of plants.**

| **Tree Stratum** (Plot size 30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Red alder (*Alnus rubra*) | 10 | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | 10 | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size 30' ) | | | |
| 1. Scouler's willow (*Salix scouleriana*) | 60 | Yes | FAC |
| 2. Salmonberry (*Rubus spectabilis*) | 20 | No | FACU |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 90 | = Total Cover | |
| **Herb Stratum** (Plot size 30' ) | | | |
| 1. Reed-canary grass (*Phalaris arundinacea*) | 50 | Yes | FACW |
| 2. Soft rush (*Juncus effuses*) | 1 | No | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 51 | = Total Cover | |
| **Woody Vine Stratum** (Plot size ) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

% Bare Ground in Herb Stratum 0

*Remarks:*

**Dominance Test Worksheet**

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index Worksheet**

| | Total % Cover of | Multiply by |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | | x 2 = |
| FAC species | | x 3 = |
| FACU species | | x 4 = |
| UPL species | | x 5 = |
| Column totals | (A) | (B) |

Prevalence Index = B / A =

**Hydrophytic Vegetation Indicators**

| | |
|---|---|
| X | Dominance test is > 50% |
| | Prevalence test is ≤ 3.0 * |
| | Morphological Adaptations * (provide supporting data in remarks or on a separate sheet) |
| | Wetland Non-Vascular Plants * |
| | Problematic Hydrophytic Vegetation * (explain) |

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

## SOIL

**Sampling Point** SP#5

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 7.5YR 2.5/1 | 100 | 7.5YR 4/4 | 2 | | | Gravelly/ sandy/loam | Water at 6" |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]**

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

**Hydric soil present?** Yes ☒ No ☐

*Remarks:*

## HYDROLOGY

**Wetland Hydrology Indicators:**

*Primary Indicators (minimum of one required: check all that apply):*

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

*Secondary Indicators (2 or more required):*

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

**Field Observations**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | ☐ Yes | ☒ No | Depth (in): | | |
| Water Table Present? | ☒ Yes | ☐ No | Depth (in): | -6 | |
| Saturation Present? (includes capillary fringe) | ☒ Yes | ☐ No | Depth (in): | 0 | |

**Wetland Hydrology Present?** Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

*Remarks:*

# *Appendix D: Rating Forms*

Wetland name or number A

# RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 10/3/2016

Rated by Phil Struck Trained by Ecology? __ Yes X No Date of training 2016

**HGM Class used for rating** Depressional Wetland has multiple HGM classes? X Y ___N

**NOTE: Form is not complete without the figures requested** *(figures can be combined).*

Source of base aerial photo/map Poulsbo/Kitsap County GIS, Google Earth, and site survey

## OVERALL WETLAND CATEGORY III (based on functions X or special characteristics___)

### 1. Category of wetland based on FUNCTIONS

___**Category I** – Total score = 23 - 27

___**Category II** – Total score = 20 - 22

X **Category III** – Total score = 16 - 19

___**Category IV** – Total score = 9 - 15

| FUNCTION | Improving Water Quality | Hydrologic | Habitat | |
|---|---|---|---|---|
| | | *Circle the appropriate ratings* | | |
| Site Potential | H **M** L | H **M** L | H **M** L | |
| Landscape Potential | H **M** L | H **M** L | H **M** L | |
| Value | **H** M L | H M **L** | **H** M L | TOTAL |
| **Score Based on Ratings** | **7** | **5** | **7** | **19** |

**Score for each function based on three ratings** *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

### 2. Category based on SPECIAL CHARACTERISTICS of wetland

| CHARACTERISTIC | CATEGORY |
|---|---|
| **Estuarine** | I II |
| **Wetland of High Conservation Value** | I |
| **Bog** | I |
| **Mature Forest** | I |
| **Old Growth Forest** | I |
| **Coastal Lagoon** | I II |
| **Interdunal** | I II III IV |
| None of the above | X |

Wetland name or number A

# Maps and figures required to answer questions correctly for Western Washington

## Depressional Wetlands

| Map of: | To answer questions: | Figure # |
|---|---|---|
| Cowardin plant classes | D 1.3, H 1.1, H 1.4 | |
| Hydroperiods | D 1.4, H 1.2 | |
| Location of outlet (*can be added to map of hydroperiods)* | D 1.1, D 4.1 | |
| Boundary of area within 150 ft of the wetland *(can be added to another figure)* | D 2.2, D 5.2 | |
| Map of the contributing basin | D 4.3, D 5.3 | |
| 1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat | H 2.1, H 2.2, H 2.3 | |
| Screen capture of map of 303(d) listed waters in basin (from Ecology website) | D 3.1, D 3.2 | |
| Screen capture of list of TMDLs for WRIA in which unit is found (from web) | D 3.3 | |

## Riverine Wetlands

| Map of: | To answer questions: | Figure # |
|---|---|---|
| Cowardin plant classes | H 1.1, H 1.4 | |
| Hydroperiods | H 1.2 | |
| Ponded depressions | R 1.1 | |
| Boundary of area within 150 ft of the wetland *(can be added to another figure)* | R 2.4 | |
| Plant cover of trees, shrubs, and herbaceous plants | R 1.2, R 4.2 | |
| Width of unit vs. width of stream *(can be added to another figure)* | R 4.1 | |
| Map of the contributing basin | R 2.2, R 2.3, R 5.2 | |
| 1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat | H 2.1, H 2.2, H 2.3 | |
| Screen capture of map of 303(d) listed waters in basin (from Ecology website) | R 3.1 | |
| Screen capture of list of TMDLs for WRIA in which unit is found (from web) | R 3.2, R 3.3 | |

## Lake Fringe Wetlands

| Map of: | To answer questions: | Figure # |
|---|---|---|
| Cowardin plant classes | L 1.1, L 4.1, H 1.1, H 1.4 | |
| Plant cover of trees, shrubs, and herbaceous plants | L 1.2 | |
| Boundary of area within 150 ft of the wetland *(can be added to another figure)* | L 2.2 | |
| 1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat | H 2.1, H 2.2, H 2.3 | |
| Screen capture of map of 303(d) listed waters in basin (from Ecology website) | L 3.1, L 3.2 | |
| Screen capture of list of TMDLs for WRIA in which unit is found (from web) | L 3.3 | |

## Slope Wetlands

| Map of: | To answer questions: | Figure # |
|---|---|---|
| Cowardin plant classes | H 1.1, H 1.4 | |
| Hydroperiods | H 1.2 | |
| Plant cover of **dense** trees, shrubs, and herbaceous plants | S 1.3 | |
| Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)* | S 4.1 | |
| Boundary of 150 ft buffer (can be added to another figure) | S 2.1, S 5.1 | |
| 1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat | H 2.1, H 2.2, H 2.3 | |
| Screen capture of map of 303(d) listed waters in basin (from Ecology website) | S 3.1, S 3.2 | |
| Screen capture of list of TMDLs for WRIA in which unit is found (from web) | S 3.3 | |

Wetland name or number A

# HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

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 except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   **NO – Saltwater Tidal Fringe (Estuarine)** **YES – Freshwater Tidal Fringe**
   *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 an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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 all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (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**.

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

   **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 <3 ft diameter and less than 1 ft deep).

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 2 years.

Wetland name or number A

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

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

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 classes. 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 the wetland unit being scored.

**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 HGM 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 of depression | Depressional |
| Depressional + Lake Fringe | Depressional |
| Riverine + Lake Fringe | Riverine |
| Salt Water Tidal Fringe and any other class of freshwater wetland | Treat as ESTUARINE |

*If you are still unable 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 A

## DEPRESSIONAL AND FLATS WETLANDS

### Water Quality Functions - Indicators that the site functions to improve water quality

| D 1.0. Does the site have the potential to improve water quality? | | |
|---|---|---|
| D 1.1. Characteristics of surface water outflows from the wetland:<br>Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3<br>Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2<br>Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1<br>Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1 | | 1 |
| D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*. Yes = 4 No = 0 | | 0 |
| D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes):<br>Wetland has persistent, ungrazed, plants > 95% of area points = 5<br>Wetland has persistent, ungrazed, plants > ½ of area points = 3<br>Wetland has persistent, ungrazed plants > 1/10 of area points = 1<br>Wetland has persistent, ungrazed plants < 1/10 of area points = 0 | | 5 |
| D 1.4. Characteristics of seasonal ponding or inundation:<br>*This is the area that is ponded for at least 2 months. See description in manual.*<br>Area seasonally ponded is > ½ total area of wetland points = 4<br>Area seasonally ponded is > ¼ total area of wetland points = 2<br>Area seasonally ponded is < ¼ total area of wetland points = 0 | | 2 |
| Total for D 1 | Add the points in the boxes above | 8 |

**Rating of Site Potential** If score is: ___ 12-16 = H __8__ 6-11 = M ___ 0-5 = L *Record the rating on the first page*

| D 2.0. Does the landscape have the potential to support the water quality function of the site? | | |
|---|---|---|
| D 2.1. Does the wetland unit receive stormwater discharges? | Yes = 1 No = 0 | 1 |
| D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? | Yes = 1 No = 0 | 1 |
| D 2.3. Are there septic systems within 250 ft of the wetland? | Yes = 1 No = 0 | 0 |
| D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3?<br>Source_____ | Yes = 1 No = 0 | 0 |
| Total for D 2 | Add the points in the boxes above | 2 |

**Rating of Landscape Potential** If score is: ___ 3 or 4 = H __1__ 1 or 2 = M ___ 0 = L *Record the rating on the first page*

| D 3.0. Is the water quality improvement provided by the site valuable to society? | | |
|---|---|---|
| D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? | Yes = 1 No = 0 | 1 |
| D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? | Yes = 1 No = 0 | 1 |
| D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? | Yes = 2 No = 0 | 2 |
| Total for D 3 | Add the points in the boxes above | 4 |

**Rating of Value** If score is: 3 2-4 = H ___ 1 = M ___ 0 = L *Record the rating on the first page*

Wetland name or number A

## DEPRESSIONAL AND FLATS WETLANDS

**Hydrologic Functions** - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?

| | | |
|---|---|---|
| D 4.1. Characteristics of surface water outflows from the wetland:<br>Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4<br>Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2<br>Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1<br>Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0 | | 0 |
| D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*<br>Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7<br>Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5<br>Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3<br>The wetland is a "headwater" wetland points = 3<br>Wetland is flat but has small depressions on the surface that trap water points = 1<br>Marks of ponding less than 0.5 ft (6 in) points = 0 | | 3 |
| D 4.3. Contribution of the wetland 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.*<br>The area of the basin is less than 10 times the area of the unit points = 5<br>The area of the basin is 10 to 100 times the area of the unit points = 3<br>The area of the basin is more than 100 times the area of the unit points = 0<br>Entire wetland is in the Flats class points = 5 | | 3 |
| Total for D 4 | Add the points in the boxes above | 6 |

**Rating of Site Potential** If score is: ___ **12-16 = H** **6** **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

| | | |
|---|---|---|
| D 5.1. Does the wetland receive stormwater discharges? | Yes = 1 No = 0 | 1 |
| D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? | Yes = 1 No = 0 | 1 |
| D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? | Yes = 1 No = 0 | 0 |
| Total for D 5 | Add the points in the boxes above | 2 |

**Rating of Landscape Potential** If score is: ___ **3 = H** **2** **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

| | | |
|---|---|---|
| D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*<br>The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):<br>• Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2<br>• Surface flooding problems are in a sub-basin farther down-gradient. points = 1<br>Flooding from groundwater is an issue in the sub-basin. points = 1<br>The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0<br>There are no problems with flooding downstream of the wetland. points = 0 | | 0 |
| D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? | Yes = 2 No = 0 | 0 |
| Total for D 6 | Add the points in the boxes above | 0 |

**Rating of Value** If score is: ___ **2-4 = H** ___ **1 = M** **0** **0 = L** *Record the rating on the first page*

Wetland name or number A

**These questions apply to wetlands of all HGM classes.**

**HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____Aquatic bed
____Emergent
x Scrub-shrub (areas where shrubs have > 30% cover)
x Forested (areas where trees have > 30% cover)

*If the unit has a Forested class, check if:*

x 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

4 structures or more: points = 4
3 structures: points = 2
2 structures: points = 1
1 structure: points = 0

2

H 1.2. Hydroperiods

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 ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated
x Seasonally flooded or inundated
____Occasionally flooded or inundated
x Saturated only
____Permanently flowing stream or river in, or adjacent to, the wetland
x Seasonally flowing stream in, or adjacent to, the wetland
____**Lake Fringe wetland**
____**Freshwater tidal wetland**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = 1
1 type present: points = 0

**2 points**
**2 points**

2

H 1.3. Richness of plant species

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 and you do not have to name the species.* ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species
5 - 19 species
< 5 species

points = 2
points = 1
points = 0

1

H 1.4. Interspersion of habitats

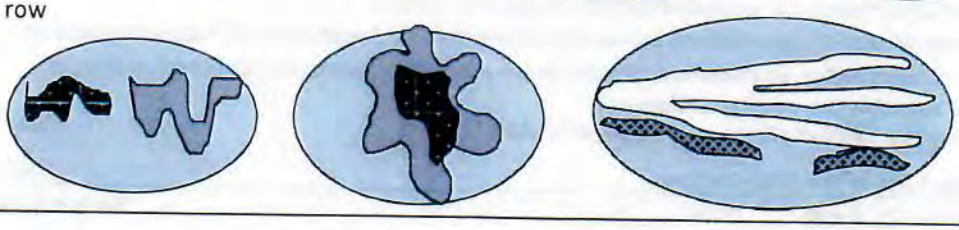
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

**None** = 0 points

**Low** = 1 point

**Moderate** = 2 points

All three diagrams in this row are **HIGH** = 3points



1

Wetland name or number A

| | |
|---|---|
| H 1.5. Special habitat features:<br>Check the habitat features that are present in the wetland. *The number of checks is the number of points.*<br>x Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long).<br>x Standing snags (dbh > 4 in) within the wetland<br>___ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)<br>___ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)*<br>x At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)*<br>x Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*) | 4 |
| Total for H 1 — Add the points in the boxes above | 10 |

**Rating of Site Potential** If score is:___**15-18 = H** 10 **7-14 = M** ___**0-6 = L** *Record the rating on the first page*

| H 2.0. Does the landscape have the potential to support the habitat functions of the site? | |
|---|---|
| H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*).<br>*Calculate:* % undisturbed habitat___ + [(% moderate and low intensity land uses)/2]___ = _____%<br>If total accessible habitat is:<br>> 1/3 (33.3%) of 1 km Polygon — points = 3<br>20-33% of 1 km Polygon — points = 2<br>10-19% of 1 km Polygon — points = 1<br>< 10% of 1 km Polygon — points = 0 | 0 |
| H 2.2. Undisturbed habitat in 1 km Polygon around the wetland.<br>*Calculate:* % undisturbed habitat___ + [(% moderate and low intensity land uses)/2]___ = _____%<br>Undisturbed habitat > 50% of Polygon — points = 3<br>Undisturbed habitat 10-50% and in 1-3 patches — points = 2<br>Undisturbed habitat 10-50% and > 3 patches — points = 1<br>Undisturbed habitat < 10% of 1 km Polygon — points = 0 | 1 |
| H 2.3. Land use intensity in 1 km Polygon: If<br>> 50% of 1 km Polygon is high intensity land use — points = (- 2)<br>≤ 50% of 1 km Polygon is high intensity — points = 0 | 0 |
| Total for H 2 — Add the points in the boxes above | 1 |

**Rating of Landscape Potential** If score is:___**4-6 = H** 1 **1-3 = M** ___**< 1 = L** *Record the rating on the first page*

| H 3.0. Is the habitat provided by the site valuable to society? | |
|---|---|
| H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.*<br>Site meets ANY of the following criteria: — points = 2<br>X It has 3 or more priority habitats within 100 m (see next page)<br>— It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)<br>— It is mapped as a location for an individual WDFW priority species<br>— It is a Wetland of High Conservation Value as determined by the Department of Natural Resources<br>— It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan<br>Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = 1<br>Site does not meet any of the criteria above — points = 0 | 2 |

**Rating of Value** If score is: 2 **2 = H** ___**1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number A

# WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **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*).

— **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 8 trees/ac (20 trees/ha ) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 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:** Woodland 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 – see web link above*).

X **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 – see web link above*).

X **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 – see web link on previous page).*

— **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 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

X **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 > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

**Note:** All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

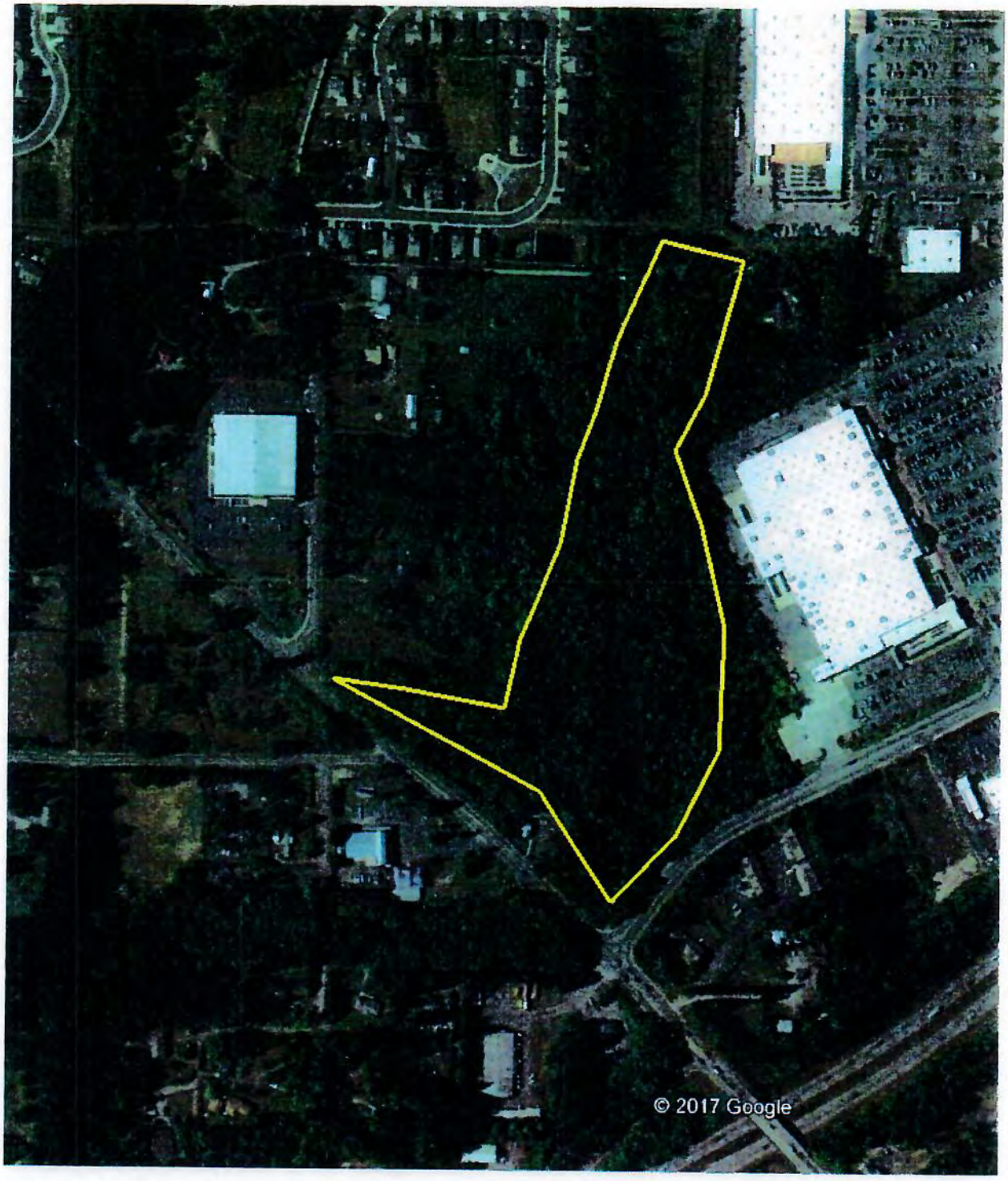
Wetland name or number A

## CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

| **Wetland Type**<br>*Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.* | **Category** |
|---|---|
| **SC 1.0. Estuarine wetlands**<br>Does the wetland meet the following criteria for Estuarine wetlands?<br>— The dominant water regime is tidal,<br>— Vegetated, and<br>— With a salinity greater than 0.5 ppt  Yes –Go to **SC 1.1**  No= **Not an estuarine wetland** | |
| SC 1.1. Is the wetland 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?<br>Yes = **Category I**  No - Go to **SC 1.2** | **Cat. I** |
| SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?<br>— The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25)<br>— 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.<br>— The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.  Yes = **Category I**  No = **Category II** | **Cat. I**<br>**Cat. II** |
| **SC 2.0. Wetlands of High Conservation Value (WHCV)**<br>SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value?  Yes – Go to **SC 2.2**  No – Go to **SC 2.3**<br>SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?<br>Yes = **Category I**  No = **Not a WHCV**<br>SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?<br>http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf<br>Yes – **Contact WNHP/WDNR and go to SC 2.4**  No = **Not a WHCV**<br>SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website?  Yes = **Category I**  No = **Not a WHCV** | **Cat. I** |
| **SC 3.0. Bogs**<br>Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.***<br>SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile?  Yes – Go to **SC 3.3**  No – Go to **SC 3.2**<br>SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?  Yes – Go to **SC 3.3**  No = **Is not a bog**<br>SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4?  Yes = **Is a Category I bog**  No – Go to **SC 3.4**<br>**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 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.<br>SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?<br>Yes = **Is a Category I bog**  No = **Is not a bog** | **Cat. I** |

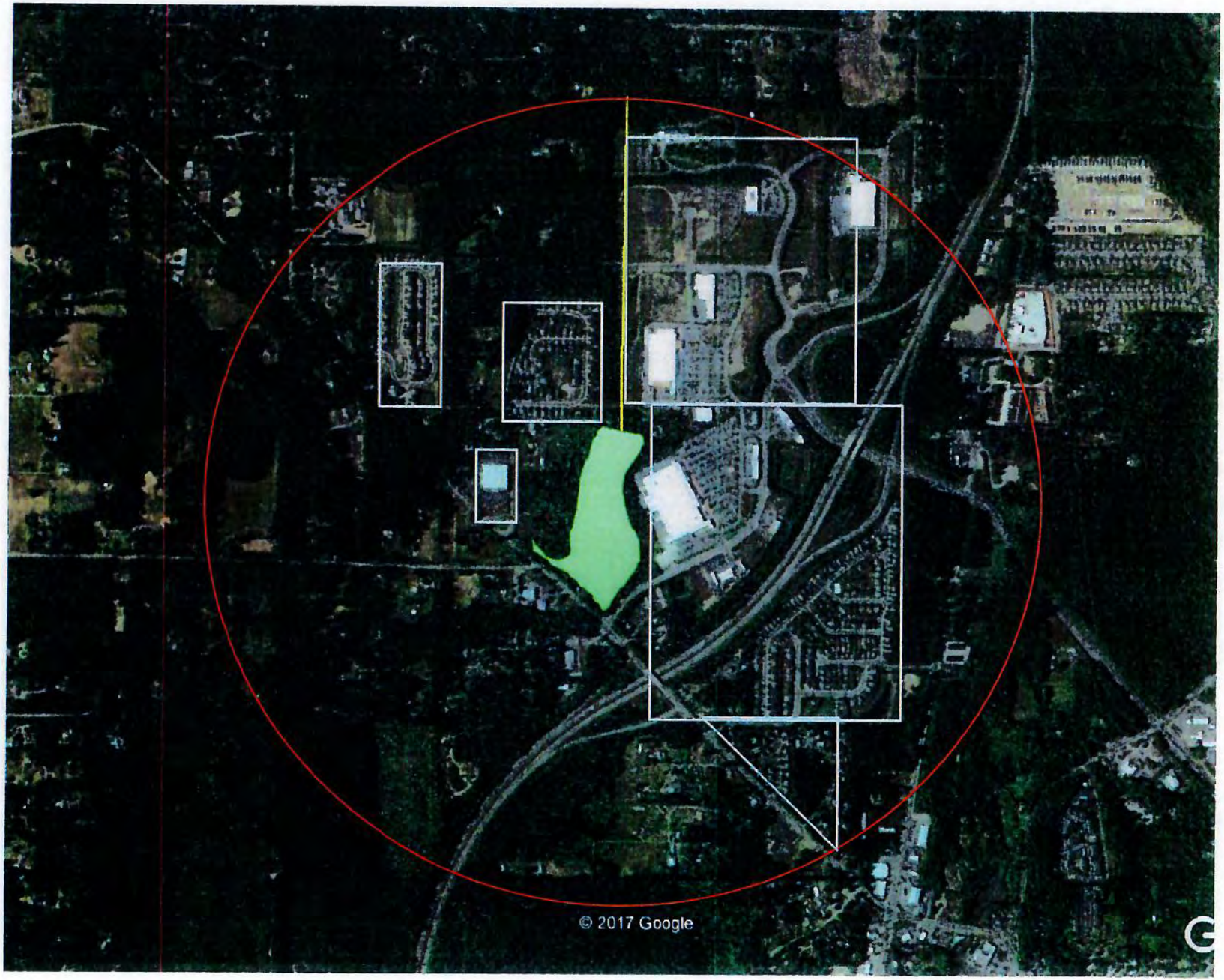
Wetland name or number A

| | |
|---|---|
| **SC 4.0. Forested Wetlands** *This page left blank intentionally*<br>Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA 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.***<br>— **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/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.<br>— **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).<br>Yes = **Category I** No = **Not a forested wetland for this section** | **Cat. I** |
| **SC 5.0. Wetlands in Coastal Lagoons**<br>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?<br>— 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<br>— The lagoon in which the wetland is located contains ponded 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)*<br>Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon**<br>SC 5.1. Does the wetland meet all of the following three conditions?<br>— The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).<br>— 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.<br>— The wetland is larger than $^{1}/_{10}$ ac (4350 ft$^2$)<br>Yes = **Category I** No = **Category II** | **Cat. I**<br>**Cat. II** |
| **SC 6.0. Interdunal Wetlands**<br>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***<br>In practical terms that means the following geographic areas:<br>— Long Beach Peninsula: Lands west of SR 103<br>— Grayland-Westport: Lands west of SR 105<br>— Ocean Shores-Copalis: Lands west of SR 115 and SR 109<br>Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating**<br>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2**<br>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?<br>Yes = **Category II** No – Go to **SC 6.3**<br>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?<br>Yes = **Category III** No = **Category IV** | **Cat I**<br>**Cat. II**<br>**Cat. III**<br>**Cat. IV** |
| **Category of wetland based on Special Characteristics**<br>If you answered No for all types, enter "Not Applicable" on Summary Form | NA |

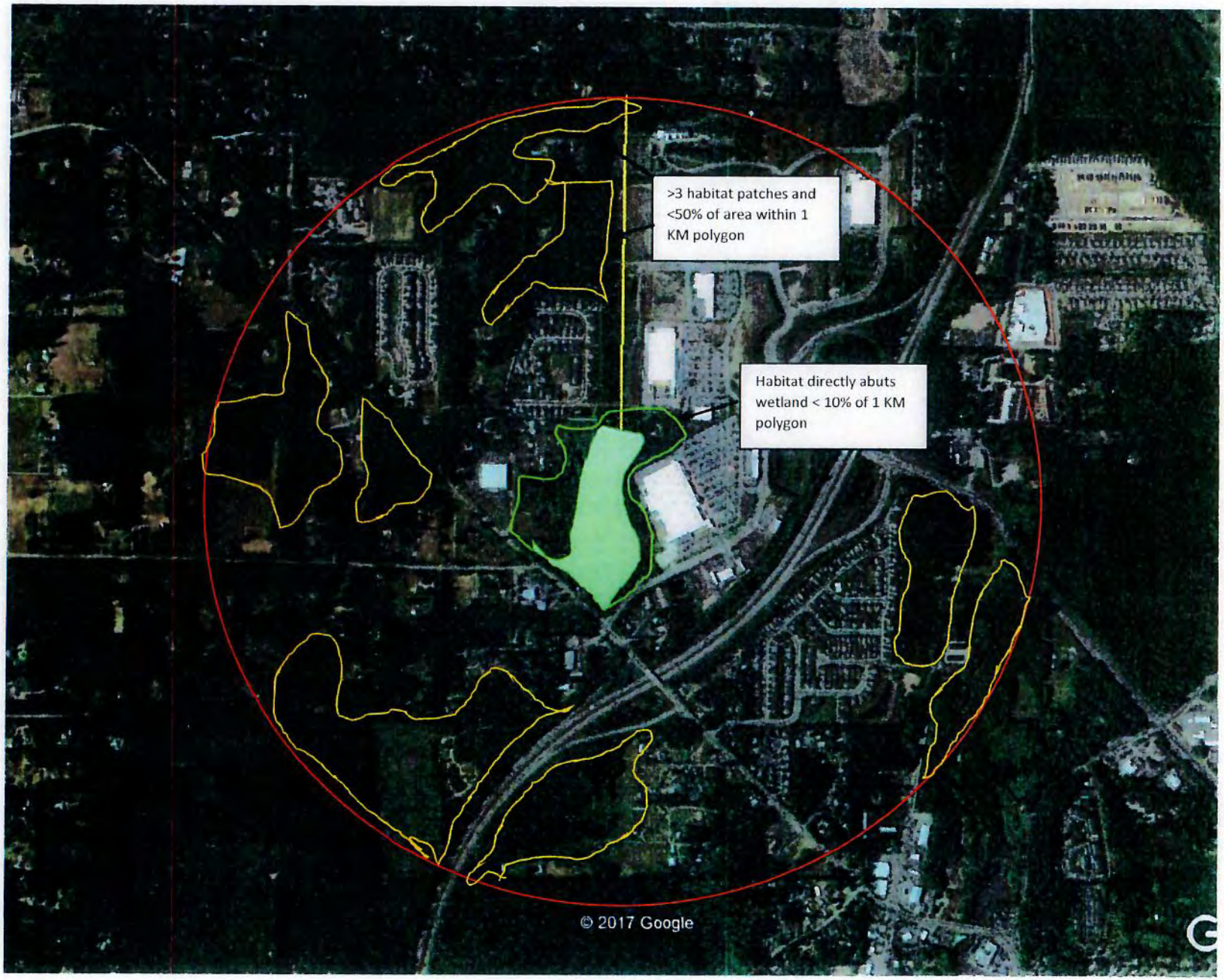



Scale: 1" ~ 300'

**Approx. Wetland Limits and Adjacent Land Use**

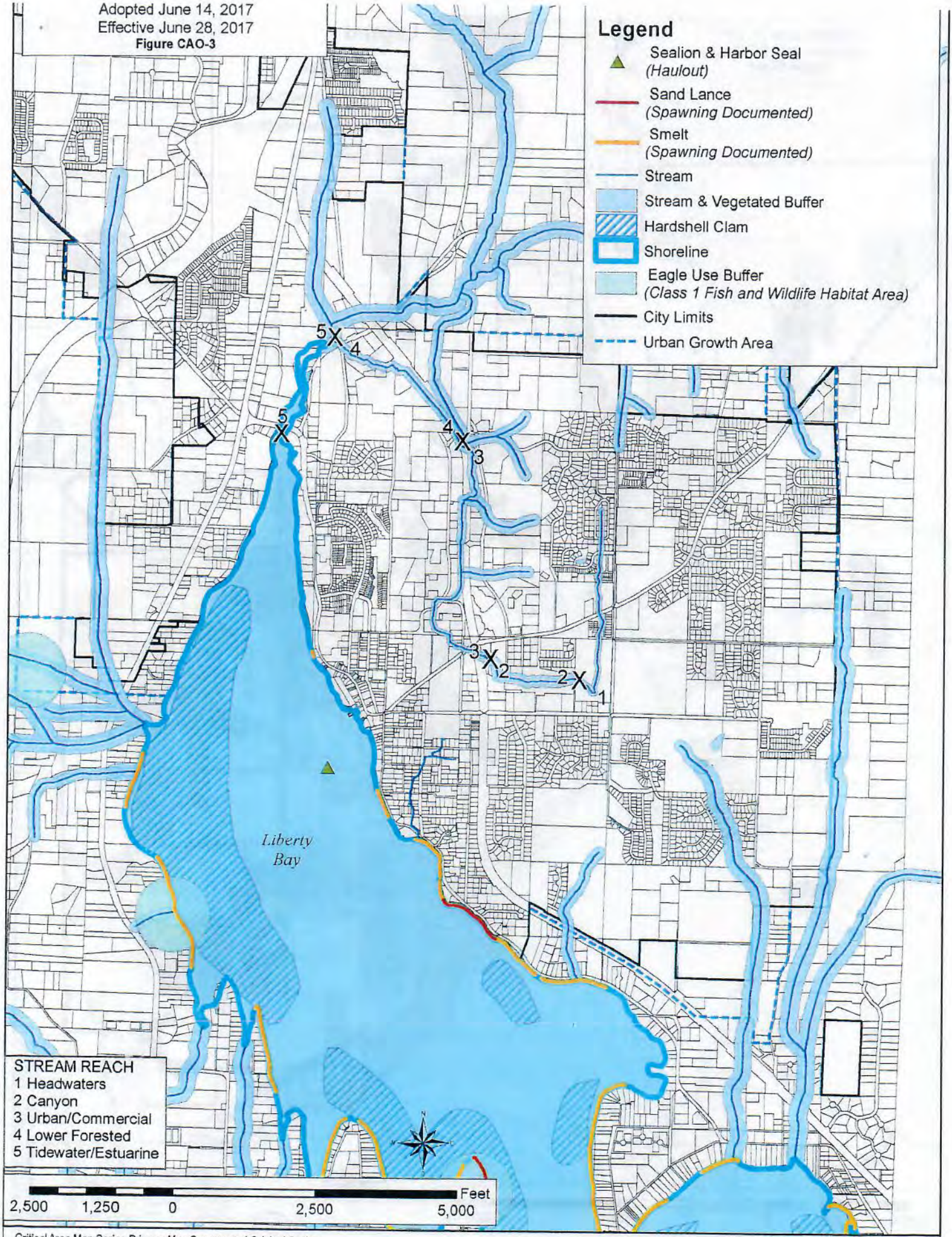



High Intensity Land Use < 50% - 1 Km Polygon




Accessible Habitat and Undisturbed Habitat - 1 Km Polygon

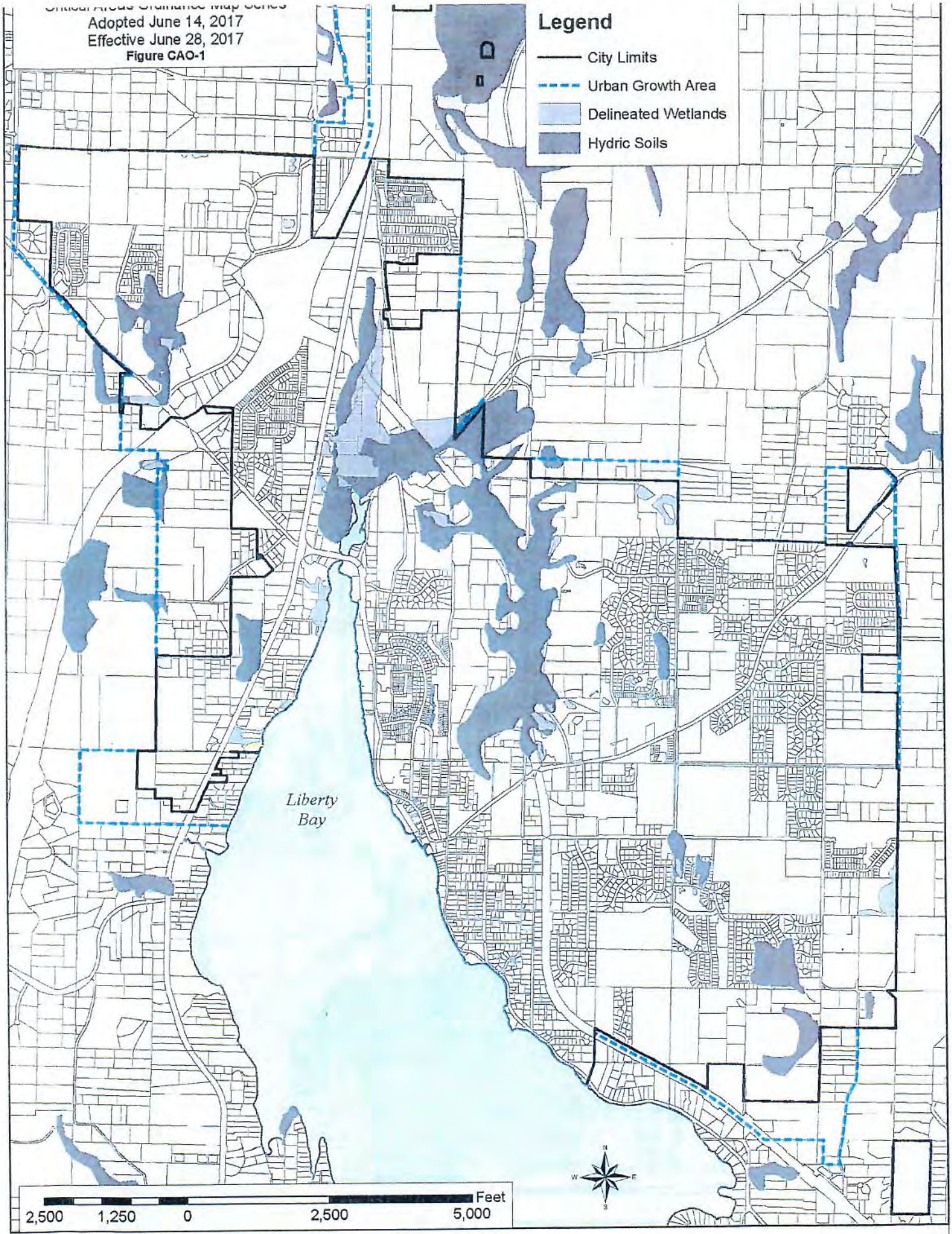
Adopted June 14, 2017
Effective June 28, 2017
**Figure CAO-3**




Critical Area Map Series Primary Map Sources and Original Scales:
Delineated Wetlands compiled using Plat Maps from the City of Poulsbo Planning Department.
Hydric Soils United States Department of Agriculture, Soil Conservation Service in cooperation with the Washington State Department of Natural Resources and Washington State University Agricultural Research Center 1977 1:24,000
W.S.D.N.R. Hydrography, Washington State Department of Fish and Wildlife 1:24,000

This critical area map series is intended for general critical area planning. These maps are schematic representations of physical features, infrastructure and land ownership boundaries. The map information was derived from available public records and existing

Critical Areas Ordinance Map Series
Adopted June 14, 2017
Effective June 28, 2017
**Figure CAO-1**




Critical Area Map Series Primary Map Sources and Original Scales:
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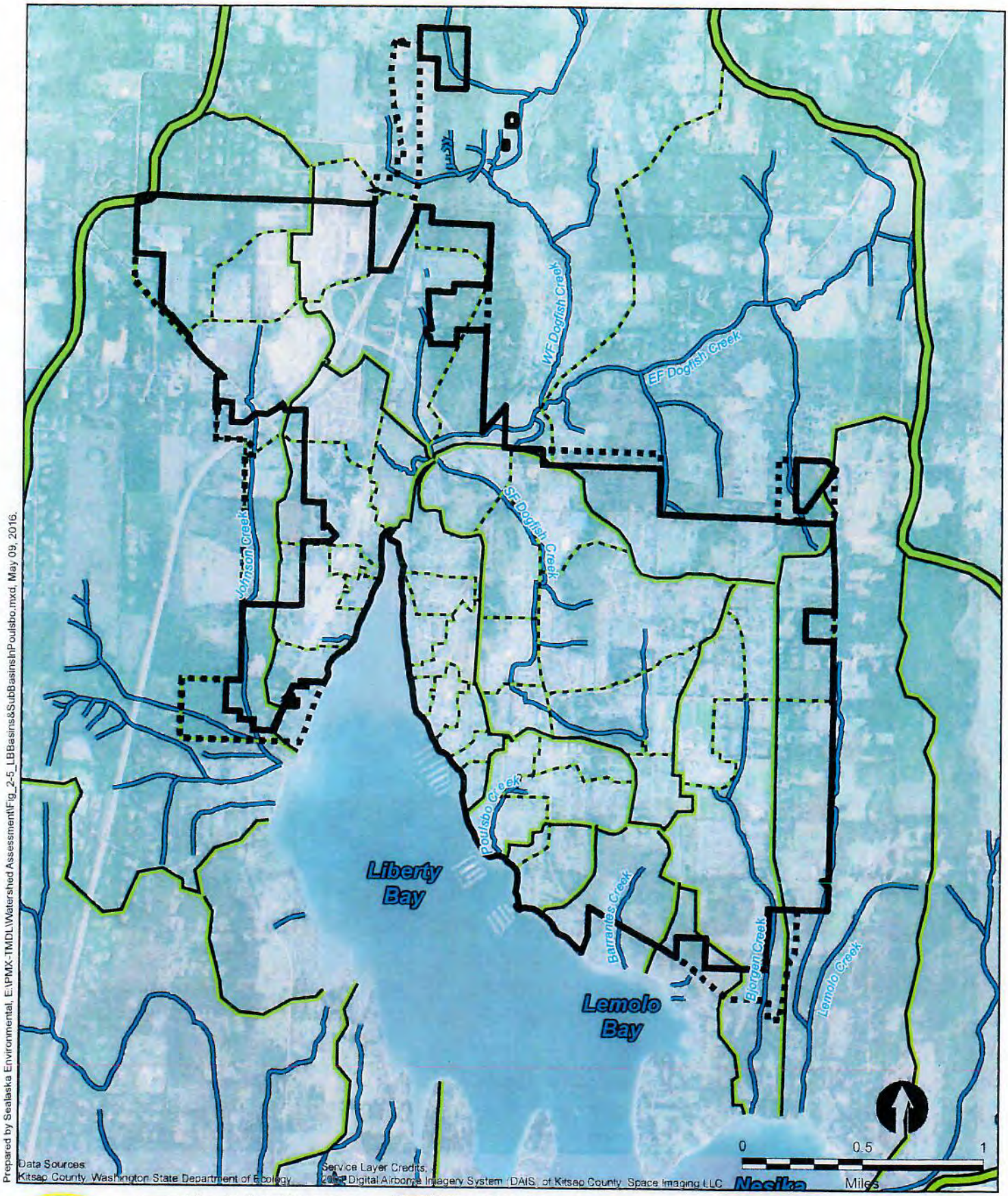
Hydric Soils United States Department of Agriculture, Soil Conservation Service in cooperation with the Washington State Department of Natural Resources and Washington State University Agricultural Research Center 1977 1:24,000
W.S.D.N.R. Hydrography, Washington State Department of Fish and Wildlife 1:24,000

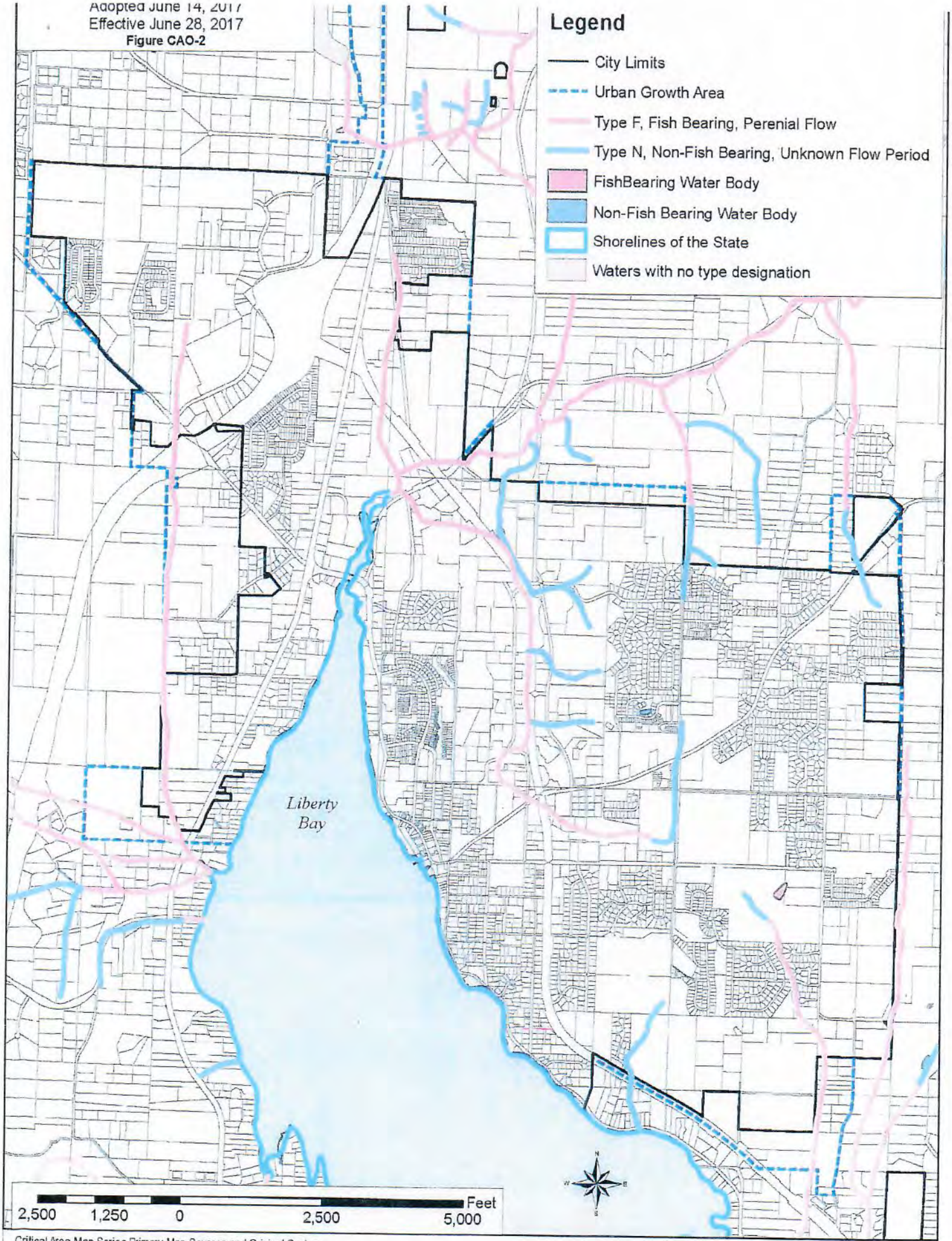
This critical area map series is intended for general critical area planning. These maps are schematic representations of physical features, infrastructure, and land ownership boundaries. The map information was derived from available public records and existing




Prepared by Sealaska Environmental, E:\PMX-TMDL\Watershed Assessment\Fig_2-5_LBBasins&SubBasinsInPoulsbo.mxd, May 09, 2016.

**Figure 2-5**
**Streams Basins and Sub-Basins In City of Pouslbo**
**TMDL Implementation Plan**
**City of Poulsbo**

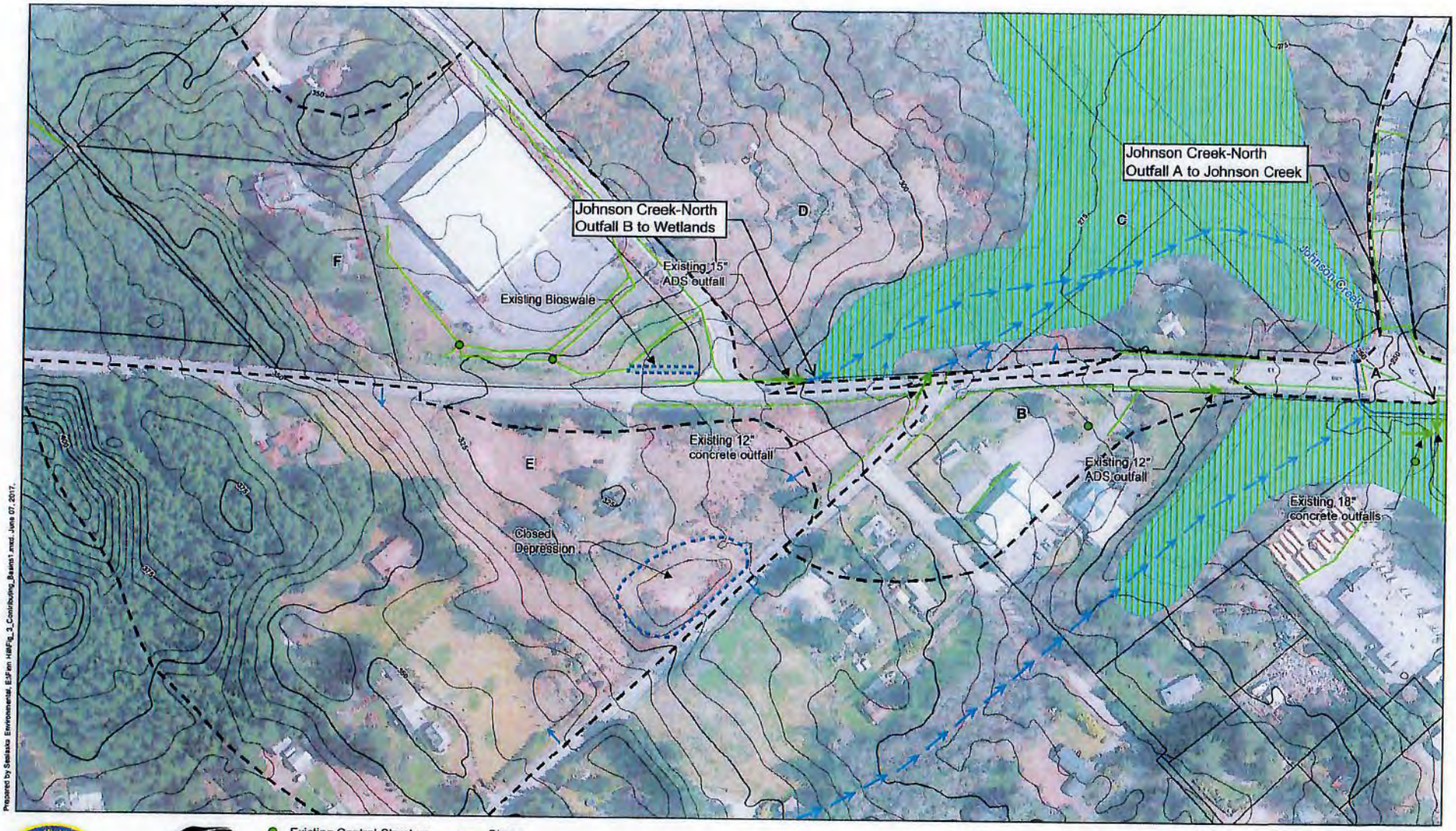
Adopted June 14, 2017
Effective June 28, 2017
**Figure CAO-2**




Critical Area Map Series Primary Map Sources and Original Scales:
Delineated Wetlands compiled using Plat Maps from the City of Poulsbo Planning Department.
Hydric Soils United States Department of Agriculture, Soil Conservation Service in cooperation with the Washington State Department of Natural Resources and Washington State University Agricultural Research Center 1977 1:24,000
W.S.D.N.R. Hydrography, Washington State Department of Fish and Wildlife 1:24,000

This critical area map series is intended for general critical area planning. These maps are schematic representations of physical features, infrastructure, and land ownership boundaries. The map information was derived from available public records and existing

# *Appendix E: Basin Maps*




Prepared by Sealaska Environmental, E:\Fen Hill\Fig_3_Contributing_Basins1.mxd, June 07, 2017.

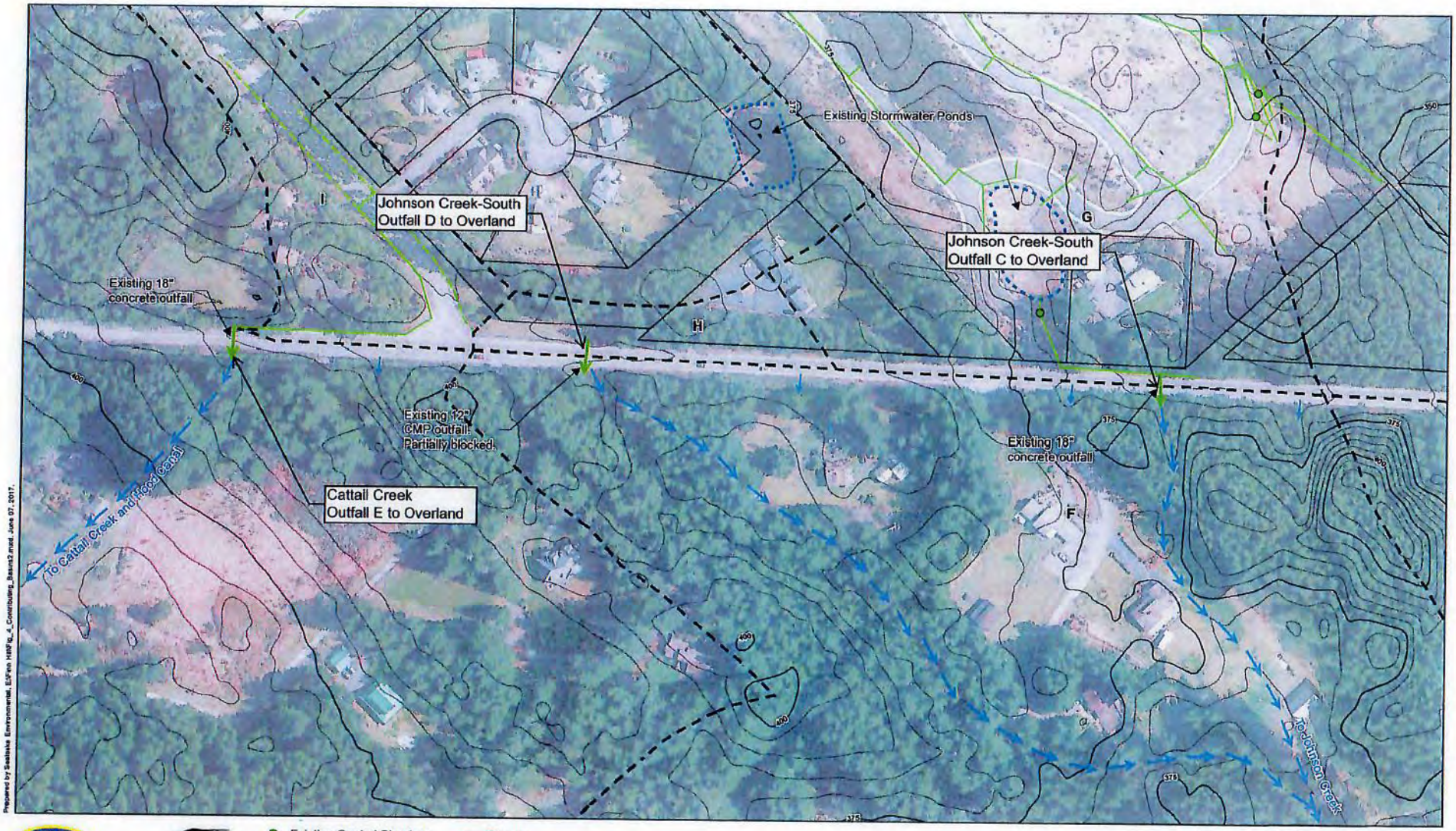
SEALASKA ENVIRONMENTAL

- Existing Control Structure
- Existing Stormwater Pipe
- Existing Stormwater Ditch
- Existing Stormwater Outfall
- Parcel Boundary
- Stream
- Intermittent Stream
- Downstream Flow Direction
- Approx. Wetlands
- Contributing Areas and Basin I.D.

0 100 200
Feet
1 inch = 150 feet

N

**Figure 2-2**
**Contributing Areas and Drainage Basins**
Finn Hill Road
City of Poulsbo




Prepared by Sealaska Environmental, E:\Finn Hill\Fig_4_Contributing_Basins3.mxd, June 07, 2017.

**Figure 2-3**
**Contributing Areas and Drainage Basins**
Finn Hill Road
City of Poulsbo

# *Appendix F: Photographs*

In-tact wetland buffer area.

Wetland A.

Buffer area east of Wetland A.

Typical buffer enhancement area.

# *Appendix G: NRCS Soil Survey*

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Kitsap County Area, Washington

March 8, 2017

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kitsap County Area, Washington
Survey Area Data: Version 12, Sep 8, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 9, 2010—Aug 20, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Kitsap County Area, Washington (WA635) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| 1 | Alderwood gravelly sandy loam, 0 to 8 percent slopes | 14.3 | 3.7% |
| 18 | Indianola loamy sand, 0 to 5 percent slopes | 0.8 | 0.2% |
| 19 | Indianola loamy sand, 5 to 15 percent slopes | 2.7 | 0.7% |
| 22 | Kapowsin gravelly ashy loam, 0 to 6 percent slopes | 3.9 | 1.0% |
| 32 | McKenna gravelly loam | 37.6 | 9.8% |
| 39 | Poulsbo gravelly sandy loam, 0 to 6 percent slopes | 105.2 | 27.4% |
| 40 | Poulsbo gravelly sandy loam, 6 to 15 percent slopes | 181.6 | 47.3% |
| 43 | Poulsbo-Ragnar complex, 6 to 15 percent slopes | 36.2 | 9.4% |
| 59 | Sinclair very gravelly sandy loam, 2 to 8 percent slopes | 1.4 | 0.4% |
| **Totals for Area of Interest** | | **383.8** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the

scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Kitsap County Area, Washington

## 1—Alderwood gravelly sandy loam, 0 to 8 percent slopes

### Map Unit Setting

*National map unit symbol:* 2t625
*Elevation:* 50 to 800 feet
*Mean annual precipitation:* 25 to 60 inches
*Mean annual air temperature:* 48 to 52 degrees F
*Frost-free period:* 160 to 240 days
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Alderwood and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Alderwood

#### Setting

*Landform:* Ridges, hills
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest, talf
*Down-slope shape:* Linear, convex
*Across-slope shape:* Convex
*Parent material:* Glacial drift and/or glacial outwash over dense glaciomarine deposits

#### Typical profile

*A - 0 to 7 inches:* gravelly sandy loam
*Bw1 - 7 to 21 inches:* very gravelly sandy loam
*Bw2 - 21 to 30 inches:* very gravelly sandy loam
*Bg - 30 to 35 inches:* very gravelly sandy loam
*2Cd1 - 35 to 43 inches:* very gravelly sandy loam
*2Cd2 - 43 to 59 inches:* very gravelly sandy loam

#### Properties and qualities

*Slope:* 0 to 8 percent
*Depth to restrictive feature:* 20 to 39 inches to densic material
*Natural drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 18 to 37 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4s
*Hydrologic Soil Group:* B
*Other vegetative classification:* Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)
*Hydric soil rating:* No

### Minor Components

#### Mckenna

*Percent of map unit:* 5 percent
*Landform:* Depressions, drainageways
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

#### Everett

*Percent of map unit:* 5 percent
*Landform:* Kames, eskers, moraines
*Landform position (two-dimensional):* Summit, shoulder
*Landform position (three-dimensional):* Crest, interfluve
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Hydric soil rating:* No

#### Shalcar

*Percent of map unit:* 3 percent
*Landform:* Depressions
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

#### Norma

*Percent of map unit:* 2 percent
*Landform:* Depressions, drainageways
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## 18—Indianola loamy sand, 0 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* 2t62k
*Elevation:* 0 to 980 feet
*Mean annual precipitation:* 30 to 81 inches
*Mean annual air temperature:* 48 to 50 degrees F
*Frost-free period:* 170 to 210 days
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Indianola and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Indianola

#### Setting

*Landform:* Eskers, kames, terraces
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Sandy glacial outwash

#### Typical profile

*Oi - 0 to 1 inches:* slightly decomposed plant material
*A - 1 to 6 inches:* loamy sand
*Bw1 - 6 to 17 inches:* loamy sand
*Bw2 - 17 to 27 inches:* sand
*BC - 27 to 37 inches:* sand
*C - 37 to 60 inches:* sand

#### Properties and qualities

*Slope:* 0 to 5 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 99.90 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.9 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4s
*Land capability classification (nonirrigated):* 4s
*Hydrologic Soil Group:* A
*Other vegetative classification:* Droughty Soils (G002XV402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)
*Hydric soil rating:* No

### Minor Components

#### Alderwood

*Percent of map unit:* 8 percent
*Landform:* Ridges, hills
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest, talf
*Down-slope shape:* Linear, convex
*Across-slope shape:* Convex
*Hydric soil rating:* No

#### Everett

*Percent of map unit:* 5 percent
*Landform:* Kames, eskers, moraines
*Landform position (two-dimensional):* Summit, shoulder
*Landform position (three-dimensional):* Crest, interfluve
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Hydric soil rating:* No

**Norma**

*Percent of map unit:* 2 percent
*Landform:* Depressions, drainageways
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## 19—Indianola loamy sand, 5 to 15 percent slopes

**Map Unit Setting**

*National map unit symbol:* 2t635
*Elevation:* 0 to 980 feet
*Mean annual precipitation:* 30 to 81 inches
*Mean annual air temperature:* 48 to 50 degrees F
*Frost-free period:* 170 to 210 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Indianola and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Indianola**

**Setting**

*Landform:* Eskers, kames, terraces
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Sandy glacial outwash

**Typical profile**

*Oi - 0 to 1 inches:* slightly decomposed plant material
*A - 1 to 6 inches:* loamy sand
*Bw1 - 6 to 17 inches:* loamy sand
*Bw2 - 17 to 27 inches:* sand
*BC - 27 to 37 inches:* sand
*C - 37 to 60 inches:* sand

**Properties and qualities**

*Slope:* 5 to 15 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 99.90 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.9 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 4e
*Land capability classification (nonirrigated):* 4s
*Hydrologic Soil Group:* A
*Other vegetative classification:* Droughty Soils (G002XN402WA), Droughty Soils (G002XS401WA)
*Hydric soil rating:* No

**Minor Components**

**Alderwood**

*Percent of map unit:* 8 percent
*Landform:* Ridges, hills
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Nose slope, talf
*Down-slope shape:* Linear, convex
*Across-slope shape:* Convex
*Hydric soil rating:* No

**Everett**

*Percent of map unit:* 5 percent
*Landform:* Kames, eskers, moraines
*Landform position (two-dimensional):* Shoulder, footslope
*Landform position (three-dimensional):* Crest, base slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Hydric soil rating:* No

**Norma**

*Percent of map unit:* 2 percent
*Landform:* Depressions, drainageways
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## 22—Kapowsin gravelly ashy loam, 0 to 6 percent slopes

**Map Unit Setting**

*National map unit symbol:* 2t61w
*Elevation:* 50 to 900 feet
*Mean annual precipitation:* 30 to 50 inches
*Mean annual air temperature:* 48 to 52 degrees F
*Frost-free period:* 150 to 220 days
*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Kapowsin and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Description of Kapowsin

### Setting

*Landform:* Moraines
*Landform position (two-dimensional):* Toeslope, summit
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Parent material:* Volcanic ash mixed with glacial drift over dense glaciomarine deposits

### Typical profile

*Ap - 0 to 7 inches:* gravelly ashy loam
*Bhs - 7 to 11 inches:* gravelly ashy loam
*Bs1 - 11 to 15 inches:* gravelly ashy loam
*2Bs2 - 15 to 25 inches:* loam
*3Bstm - 25 to 29 inches:* loam
*3Cd - 29 to 59 inches:* gravelly loam

### Properties and qualities

*Slope:* 0 to 6 percent
*Depth to restrictive feature:* About 25 inches to cemented horizon; About 29 inches to densic material
*Natural drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* About 11 to 24 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 5.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3s
*Hydrologic Soil Group:* B
*Other vegetative classification:* Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XN302WA)
*Hydric soil rating:* No

## Minor Components

### Alderwood

*Percent of map unit:* 5 percent
*Landform:* Ridges, hills
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest, talf
*Down-slope shape:* Linear, convex
*Across-slope shape:* Convex
*Hydric soil rating:* No

### Dupont

*Percent of map unit:* 2 percent
*Landform:* Depressions, troughs
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave

*Hydric soil rating:* Yes

**Norma**

*Percent of map unit:* 2 percent
*Landform:* Depressions, drainageways
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

**Mckenna**

*Percent of map unit:* 2 percent
*Landform:* Depressions, drainageways
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

**Harstine**

*Percent of map unit:* 2 percent
*Landform:* Ridges
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Hydric soil rating:* No

**Neilton**

*Percent of map unit:* 2 percent
*Landform:* Outwash terraces
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Hydric soil rating:* No

## 32—McKenna gravelly loam

### Map Unit Setting

*National map unit symbol:* 2h6n
*Elevation:* 50 to 500 feet
*Mean annual precipitation:* 30 to 60 inches
*Mean annual air temperature:* 48 to 52 degrees F
*Frost-free period:* 150 to 180 days
*Farmland classification:* Prime farmland if drained

### Map Unit Composition

*Mckenna and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Mckenna**

**Setting**

*Landform:* Depressions

**Typical profile**

*H1 - 0 to 6 inches:* gravelly ashy loam
*H2 - 6 to 28 inches:* very gravelly loam
*H3 - 28 to 41 inches:* very gravelly sandy loam

**Properties and qualities**

*Slope:* 0 to 6 percent
*Depth to restrictive feature:* 28 to 40 inches to densic material
*Natural drainage class:* Poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 0 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6w
*Hydrologic Soil Group:* D
*Other vegetative classification:* Wet Soils (G002XN102WA)
*Hydric soil rating:* Yes

**Minor Components**

**Norma**

*Percent of map unit:* 10 percent
*Landform:* Depressions
*Hydric soil rating:* Yes

**Unnamed**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

## 39—Poulsbo gravelly sandy loam, 0 to 6 percent slopes

**Map Unit Setting**

*National map unit symbol:* 2h6w
*Elevation:* 0 to 490 feet
*Mean annual precipitation:* 35 inches
*Mean annual air temperature:* 50 degrees F
*Frost-free period:* 210 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Poulsbo and similar soils:* 95 percent

*Minor components:* 5 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Poulsbo**

**Setting**
*Landform:* Terraces, moraines
*Parent material:* Basal till with volcanic ash in the upper part

**Typical profile**
*H1 - 0 to 2 inches:* gravelly ashy sandy loam
*H2 - 2 to 24 inches:* gravelly ashy sandy loam
*H3 - 24 to 60 inches:* very gravelly sandy loam

**Properties and qualities**
*Slope:* 0 to 6 percent
*Depth to restrictive feature:* 20 to 40 inches to densic material
*Natural drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 12 to 30 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.9 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4s
*Hydrologic Soil Group:* B/D
*Other vegetative classification:* Limited Depth Soils (G002XN302WA)
*Hydric soil rating:* No

**Minor Components**

**Norma**
*Percent of map unit:* 5 percent
*Landform:* Depressions
*Hydric soil rating:* Yes

## 40—Poulsbo gravelly sandy loam, 6 to 15 percent slopes

**Map Unit Setting**
*National map unit symbol:* 2h6y
*Elevation:* 0 to 490 feet
*Mean annual precipitation:* 35 inches
*Mean annual air temperature:* 50 degrees F
*Frost-free period:* 210 days
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**
*Poulsbo and similar soils:* 95 percent

*Minor components:* 5 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Poulsbo**

**Setting**
*Landform:* Terraces, moraines
*Parent material:* Basal till with volcanic ash in the upper part

**Typical profile**
*H1 - 0 to 2 inches:* gravelly ashy sandy loam
*H2 - 2 to 24 inches:* gravelly ashy sandy loam
*H3 - 24 to 60 inches:* very gravelly sandy loam

**Properties and qualities**
*Slope:* 6 to 15 percent
*Depth to restrictive feature:* 20 to 40 inches to densic material
*Natural drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 12 to 30 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.9 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4s
*Hydrologic Soil Group:* B/D
*Other vegetative classification:* Limited Depth Soils (G002XN302WA)
*Hydric soil rating:* No

**Minor Components**

**Norma**
*Percent of map unit:* 5 percent
*Landform:* Depressions
*Hydric soil rating:* Yes

## 43—Poulsbo-Ragnar complex, 6 to 15 percent slopes

**Map Unit Setting**
*National map unit symbol:* 2h71
*Elevation:* 300 to 1,000 feet
*Mean annual precipitation:* 35 to 65 inches
*Mean annual air temperature:* 50 to 54 degrees F
*Frost-free period:* 150 to 210 days
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**
*Poulsbo and similar soils:* 40 percent

*Ragnar and similar soils:* 30 percent
*Minor components:* 5 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Poulsbo

#### Setting

*Landform:* Terraces, moraines
*Parent material:* Basal till with volcanic ash in the upper part

#### Typical profile

*H1 - 0 to 2 inches:* gravelly ashy sandy loam
*H2 - 2 to 24 inches:* gravelly ashy sandy loam
*H3 - 24 to 60 inches:* very gravelly sandy loam

#### Properties and qualities

*Slope:* 6 to 15 percent
*Depth to restrictive feature:* 20 to 40 inches to densic material
*Natural drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 12 to 30 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.9 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4s
*Hydrologic Soil Group:* B/D
*Other vegetative classification:* Limited Depth Soils (G002XN302WA)
*Hydric soil rating:* No

### Description of Ragnar

#### Setting

*Landform:* Terraces
*Parent material:* Glacial outwash with some volcanic ash in the upper part

#### Typical profile

*H1 - 0 to 4 inches:* ashy fine sandy loam
*H2 - 4 to 21 inches:* ashy fine sandy loam
*H3 - 21 to 60 inches:* loamy sand

#### Properties and qualities

*Slope:* 6 to 15 percent
*Depth to restrictive feature:* 20 to 40 inches to strongly contrasting textural stratification
*Natural drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.9 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* A
*Other vegetative classification:* Droughty Soils (G002XN402WA)
*Hydric soil rating:* No

**Minor Components**

**Norma**
*Percent of map unit:* 5 percent
*Landform:* Depressions
*Hydric soil rating:* Yes

## 59—Sinclair very gravelly sandy loam, 2 to 8 percent slopes

**Map Unit Setting**
*National map unit symbol:* 2h7l
*Elevation:* 0 to 490 feet
*Mean annual precipitation:* 25 to 50 inches
*Mean annual air temperature:* 50 degrees F
*Frost-free period:* 200 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**
*Sinclair and similar soils:* 95 percent
*Minor components:* 5 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Sinclair**

**Setting**
*Landform:* Till plains
*Parent material:* Basal till

**Typical profile**
*H1 - 0 to 8 inches:* very gravelly sandy loam
*H2 - 8 to 25 inches:* very gravelly sandy loam
*H3 - 25 to 60 inches:* very gravelly sandy loam

**Properties and qualities**
*Slope:* 2 to 8 percent
*Depth to restrictive feature:* 20 to 30 inches to densic material
*Natural drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 18 to 29 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.1 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4s
*Hydrologic Soil Group:* B
*Other vegetative classification:* Limited Depth Soils (G002XN302WA)
*Hydric soil rating:* No

**Minor Components**

**Norma**

*Percent of map unit:* 5 percent
*Landform:* Depressions
*Hydric soil rating:* Yes

# References

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