CRITICAL AREAS STUDY
FOR THE EDWARD MILLS PROPERTY

Site Location:
5200 Block West Mercer Way
Mercer Island, WA 98040

Tax Parcel Number:
192405-9324

Prepared for:
Joseph Greif, Greif Architects, 921 NE Boat Street, Seattle, WA 98105
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Report Dated:
March 26, 2017 (Original: Wetland and Stream Delineation Report only)
October 22, 2017 (Updated to be Critical Areas Study)

Report Prepared By:
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1. PROJECT OVERVIEW AND SITE DESCRIPTION

The original Wetland and Stream Delineation Report, completed on March 27, 2017, provided findings on a wetland and stream on tax parcel number 192405-9324, located on Mercer Island, Washington. That report has been updated to result in this report which is titled Critical Areas Study. Several comments from City staff in October, 2017 were provided in their initial review which included:

1. *A Critical Area Study, describing how the impacts to critical areas are mitigated to the greatest extend reasonably feasible so that there is no net loss in critical area function.*
2. *Information on how the driveway and side sewer are designed and located to mitigate impacts to critical areas consistent with best available science (this can be included in the Critical Area Study).*
3. *Information on how the construction is consistent with best management practices.*

The above items are addressed in Section 8 of this Critical Areas Study.

This parcel (site) is vacant, 0.86 acres (37,350 square feet) in area, and owned by Edward Mills. Mr. Mills is interested in building a single-family home on the northwest corner of the parcel and connecting it to West Mercer Way via a driveway on the north side of the parcel. The parcel is located along West Mercer Way, in the NW Quarter of Section 19, Township 24 North, Range 5 East, W.M. The parcel will be referred hereafter to as the 'site' in this report (See Figure 2, Site Aerial Photo).

Directions to the site from Mercer Island City Hall are below. The Vicinity Map shows the route and parking area:

1) From Mercer Island City Hall offices, drive west on SE 36th Street. It will become Gallagher Hill Road.
2) Turn right onto SE 40th Street and drive for 0.38 miles.
3) Turn left onto Island Crest Way and drive for 0.78 miles.
4) Turn right onto SE 46th Street and drive for 0.2 miles.
5) Turn left (south) onto West Mercer Way and drive for 0.6 miles. Watch for house number 5230 on the left and park on the shoulder on the southbound side of the road.
6) Walk across West Mercer Way. The site is a forested area just south of addressed #5230 house.

Moderately dense single-family residential development characterizes the site's surroundings. The site is part of water resource inventory (WRIA) 8 which constitutes the Cedar and Sammamish River drainages. The site is part of the Mercer Island Drainage Basin: all water on Mercer Island drains into Lake Washington which is hydrologically connected to the Puget Sound via the Montlake Cut, Portage Bay, Lake Union and the Salmon Bay. The site itself is part of a 1.3-acre forested ravine that is surrounded by houses and West Mercer Way. A seasonal stream flows west through the south end of this forest patch and much of this stream corridor is onsite. This patch of forest has a western aspect with 20-35% slopes and is covered in a mixed coniferous – deciduous forest.

Chris Holcomb, MES, and Mark Rigos, P.E, visited the site on March 18, 2017 to assess and delineate the wetland and stream. Holcomb and Rigos concluded that a wetland, designated *Wetland W*, is located on the south-central and west end of the property and that it extends a short distance offsite to the south. *Wetland W* is a category IV slope wetland that receives water from the stream and from a few seeps on its north end. The north edge of *Wetland W* was marked with 15 blue / white striped Mylar flags. Three Sample Points (SPs) were established inside or outside of *Wetland W* to justify the basis for the delineation. Mercer Island City Code (MICC) denotes streams as 'watercourses' and the onsite stream is considered to be a Type 3 watercourse. The ordinary high water mark (OHWM) of the stream was marked with 28 blue mylar flags (see Figure 2).

2. METHODOLOGY, AUTHORITY AND LIMITATIONS

A. Methodology

This wetland delineation was performed using the Routine Level 2 Methodology as described in the Washington State Wetlands Identification and Delineation Manual (Washington State Department of Ecology, March 1997). This Delineation Manual is an appropriate technical basis for determining the presence of wetlands. The Routine Level 2 Methodology is used when there is insufficient information already available to characterize the vegetation,

soils and hydrology of the project area. The wetland determination was based on the presence of the three criteria for jurisdictional wetlands; hydrophytic vegetation, hydric soils and wetland hydrology. All three criteria must be present in order to classify an area as a wetland.

B. Authority
This wetland determination is in accordance with Section 404 of the Clean Water Act, the objective of which is to "maintain and restore the chemical, physical and biological integrity of the waters of the United States" (COE, 1987).

C. Limitations
Wetlands are subject to seasonal and annual variation. Wetland determinations and delineations are not final until approved by regulatory agencies and/or jurisdictions.

3. WETLAND DEFINITION / METHODS

A wetland is defined as an area that is inundated or saturated by surface water 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. As stated from the Corps of Engineers Wetlands Delineation Manual (COE, 1987), wetlands are required to have the following three criteria:

A. <u>The site supports predominately hydrophytic (wetland) vegetation.</u>
Dominant vegetation is determined using the 50/20 rule as described in the 1997 Washington State Wetlands Identification and Delineation Manual. Hydrophytic vegetation have adaptations that allow these species to survive in saturated and/or inundated environments. Hydrophytic vegetation exists at a site if greater than 50% of dominant species are classified as FAC, FAC+, FACW, FACW+ or OBL. The indicator status of wetland plants is classified according to the USFWS National Wetlands Inventory and National Plant List Panel (Reed, 1988). Less common indicators of hydrologic vegetation include visual observation of plant species growing in areas of prolonged inundation and/or soil saturation, morphological adaptations, technical literature, physiological adaptations and reproductive adaptations. As shown in the table below, an indicator status is applied to each species according to its probability of occurring in wetlands.

Indicator Category	Symbol	Occurrence in Wetlands
Obligate Wetland Plants	OBL	>99%
Facultative Wetland Plants	FACW	67-99%
Facultative Plants	FAC	34-67%
Facultative Upland Plants	FACU	1-33%
Obligate Upland Plants	UPL	<1%

Note: FACW, FAC, and FACU have + and - values to represent species near the wetter end of the spectrum (+) and the drier end of the spectrum (-).

B. <u>The substrate is predominantly undrained hydric soil.</u>
Hydric soils (soils formed under wetland conditions) are a positive indicator of wetland conditions. Hydric soil is defined as a soil "that in its undrained condition, is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part." (NRCS, 1985). A preliminary determination of hydric soils for a site is made with reference to Natural Resource Conservation Service (NRCS) soil surveys (per county) and criteria established by The National Technical Committee for Hydric Soils (NTCHS). Hydric soil criteria are based on taxonomy, drainage and permeability. However, NRCS mapping units cover broad geographical areas and commonly don't include smaller inclusions of non-hydric or hydric soils. Therefore, field confirmation is necessary. Field indicators of hydric soils are examined from 18" soil pits. For non-sandy soils, indicators include presence of organic soils (Histosols), histic epipedons, sulfidic material (hydrogen sulfide), aquic or peraquic moisture regime, reducing soil conditions, hydric soil colors, verified soils appearing on the NTCHS hydric soils list and presence of iron and manganese concretions. Hydric soil colors are analyzed immediately below the A-horizon or to a depth of 10" (whichever is shallower). Hydric soils include gleyed (gray) soils, low chroma soils in an unmottled matrix or soils with high chroma mottles within a low chroma matrix. Mottles (redoxymorphic features) are spots of contrasting color. Gleyed color and chroma are determined by using the Munsell Color Charts (Munsell Color,

1992). Hydric soil indicators for non-sandy soils include high organic matter content in the surface horizon, streaking of subsurface horizons by organic matter and/or spodic horizons.

C. Substrate is saturated by water or covered by shallow water at least periodically during growing season. Typically, wetland hydrology occurs where the presence of water has an overriding influence on vegetation and soils, resulting in the development of wetland soils and wetland plant communities. Sites with wetland hydrology are periodically inundated and/or saturated during at least part of the growing season. Wetland hydrology normally exists where topography directs water into low relief areas dominated by soils with poor drainage characteristics. Areas demonstrate wetland hydrology if soils are periodically inundated or saturated to the surface for a sufficient duration during the growing season. "Sufficient duration" is considered to be greater than 12.5% of growing season days that are consecutively seasonally inundated and / or saturated to the surface. If the areas are inundated or saturated between 5-12.5% of the growing season, then they may or may not be wetlands. The growing season can either be defined by the number of frost-free days, or the period during which the soil temperature at 19.7 inches is above biological zero (41 degrees F). As a rule of thumb, the mesic growing season for Western Washington lowlands extends 245 days from March 1 to October 31 (Ecology, 1997). At each sample location, primary wetland hydrology indicators such as inundation, saturation in the upper 12", water marks, drift lines, sediment deposits and drainage patterns are noted. Secondary indicators such as oxidized root channels, water-stained leaves, local survey data, FAC-neutral test, etc. are also considered in the determination of a positive indicator for wetland hydrology.

In order to assess wetland functions and values, we rated the wetland using the Washington Department of Ecology Wetland Rating Forms for Western Washington (Ecology, 2004, updated 2008; Publication Number #04-06-025) which was applied since this version of the rating form is required under MICC 19.16.010.

4. HYDROPHYTIC VEGETATION RESULTS

Prevalent vegetation is characterized by dominant species comprising a plant community. Dominant species are those that contribute more to the character of a plant community than other species present, as estimated or measured in terms of some ecological parameter.

The site is undeveloped and covered in many larger trees and a relatively open understory. Western hemlock (FACU), big leaf maple (FACU), and red alder (FAC) comprise the tree cover over the non-wetland areas. English ivy (FACU) is dominant throughout the understory and probably reduces cover by native species. Other shrubs include Indian plum (FACU), salmonberry (FAC), English laurel (FACU), Oregon grape (FACU) and snowberry (FACU). SP-2 (Figure 5, Photo 3) was established just outside of *Wetland W* and featured some hydrophytic species (stinging nettle and salmonberry), but the overall plant community was not hydrophytic based on both the dominance test and the prevalence test. Two different Cowardin vegetation classes characterize *Wetland W*. The west and central portions are dominated by red alder, black cottonwood (FAC) salmonberry, Indian plum, English ivy and lady fern (FACW) (Figure 5, Photo 1). Sample Point 3 was established in this area (Figure 5, Photo 4). The far east end is characterized by an emergent plant community in a forest canopy gap. SP-1 was established here (Figure 5, Photo 2). SP-1 had deep, silty, saturated soils and was covered by sawbeak sedge (FACW), stinging nettle (FAC), giant horsetail (FACW) and a water cress species (OBL) that were all emerging when the fieldwork was done in mid-March. For additional information, see the Wetland Data Forms (Figure 6).

5. HYDRIC SOILS RESULTS

Per the NRCS online Web Soil Survey (NRCS, 2016), two soil types cover the site. *Alderwood gravelly sandy loam 8-15% slopes* (AcG) covers the west half of the site. This soil type developed from glacial outwash. The east end of the site is covered in *Alderwood and Kitsap soils, very steep* (AkF). This soil type developed on glacial moraines and till plains. Both soil types are moderately well drained and feature water tables that are generally 18 to 37 inches below the surface. Neither of these soil *types* is hydric but field investigations area required to determine if hydric soils occupy small areas.

Soils throughout the site feature a variety of colors and textures. Much of the non-wetland area features sandy silt loams that have chroma 2 colors without redoximorphic features and this is exemplified at Sample Point 2 (Figure 5, Photo 3). Darker chroma 1 colors characterized much of *Wetland W*. This is a 'dark surface horizon' which is a

hydric soil indicator and is exemplified at SP-3 (Figure 5, Photo 4). SP-1 is located on a shelf within the ravine and has deep silty chroma 1 soils that were probably deposited from the stream and are held in place by plants. For additional soils information, see the Wetland Data Forms (Figure 6).

6. WETLAND HYDROLOGY RESULTS

A wetland can receive water from many possible sources such as precipitation, upslope surface flow runoff from precipitation, seeping shallow interflow, rising groundwater from below, tidal influences, overbank stream flooding, etc. Wetland hydrology indicators may include drainage patterns, drift lines, sediment deposition, watermarks, stream gage data, flood predictions, historic records, and visual observation of saturated soils and inundation. The 1987 manual requires inundation, flooding or saturation to the surface for at least 5 - 12.5% of the growing season to satisfy the hydrology requirements for jurisdictional wetlands (COE, 1987). Hydrological indicators include primary indicators such as saturation in the upper 12 inches or inundation on the surface and secondary indicators such as water stained leaves and the FAC-neutral test. One primary indicator or two secondary indicators are required for an area to the meet the hydrology criteria.

Water flows westward down the ravine and enters a roadside drainage ditch that flows along West Mercer Way. A seasonal stream that originates east of the site comprises much of this water. Water also emerges from a few seeps north of the stream. These seeps saturate soils downslope from them and this water either infiltrates or enters the stream via the surface. A seep located on the far east side of the site forms a small seasonal pool. This pool is not large enough to constitute a hydroperiod on the rating form; for the purposes of rating, *Wetland W* has two hydroperiods – saturated soils and a seasonal stream.

The fieldwork took place in mid-March 2017 and the preceding winter had been wetter than average. Primary hydrologic indicators for wetlands were therefore apparent. Sample Point 2 is in a gully just upslope from *Wetland W* but nonetheless did not reveal saturation in the upper 12 inches of soil (Figure 5, Photo 3). SP-1 is in the east end of *Wetland W* on a small ledge that retains silty soils that are saturated by the seasonal stream. SP-3 is in the central part of *Wetland W* and well away from the stream but is saturated to the surface from a seep located further upslope (Figure 5, Photo 4). For additional hydrology information, see the Wetland Data Forms (Figure 6).

7. WETLAND AND STREAM DETERMINATION SUMMARY

A. Background

King County iMap's wetland and stream layer, shown in Figure 3, *does not* show wetlands and streams onsite. However, it is widely understood that this information is incomplete. The NRCS Soil Map (Figure 4) indicates that the area does not have a hydric soil type. However, fieldwork demonstrated the site contains a small wetland.

B. Wetland W

Wetland W is a slope wetland, according to the hydrogeomorphic system of wetland classification. According to the Cowardin system (Cowardin et. al 1979), it could be considered a *palustrine forested wetland with seasonal saturation and a stream*. By applying the *Washington Department of Ecology Wetland Rating System for Western Washington, 2004 Update*, it was determined that *Wetland W* is a Category IV wetland. It scored 4 points for water quality functions, 10 points for hydrologic functions and 13 points for habitat functions for a total of 27 points. The water quality score is low for the following reasons. *Wetland W* comprises a steep gradient (30% on average) and is therefore not capable of retaining a large amount of water. Overall, the understory is not particularly dense in coverage – part of the wetland area includes lawns on the properties to the south – so water filtration functions are limited. The soils are not true clay or organic so denitrification functions are limited. Because the site is surrounded by residential development, the opportunity for water quality functions is high but still the overall score is low because of the wetland characteristics. The hydrologic score is moderate since more than half of the wetland is covered in rigid, un-mowed vegetation, the area includes small depressions that retain water, and steep stream gradients downgradient of the site result in high opportunity of hydrologic functions. The habitat score is low for the following reasons. *Wetland W* has only moderate plant species diversity and a few different invasive plants. It has two Cowardin vegetation classes and two hydroperiods. It only has one priority habitat (riparian) and the only special features are smaller snags and a log in its east end. Due to the dense residential development that surrounds the site, animals has fairly limited opportunity to use *Wetland W*; the forested patch that includes the site is only 1.3

acres in area (see Figure 3).

C. Type 3 Watercourse

An unnamed seasonal stream enters the site from the east and flows westerly near the site's south property line. Generally, the stream is 18 inches wide and 4 inches deep and it enters a south-flowing roadside drainage ditch associated with West Mercer Way that eventually connects with other streams leading to Lake Washington. Lake Washington is a water of the state (Type 1 watercourse) that contains fish, however the stream segment onsite and roadside drainage ditch lacks fish and fish habitat due to steep gradients and hanging culverts. Because of these characteristics, the stream is a Type 3 watercourse (MICC 19.07.070A).

D. Wetland and Stream Buffers

Wetlands have buffers so that their functions and values can be protected. Vegetation should be preserved in buffers and building and road construction is not permitted in them without city approvals or permits. Buffers extend from the delineated edges of the wetland. The wetland category, as determined from the rating process, determines the wetland buffer width. Category IV wetlands are required to have a 35-foot wide buffer (MICC 19.07.080 C).

Per MICC 19.07.070 B, stream buffer widths are dependent on the stream's type. Buffers extend from the OHWM on both banks. Type 3 watercourses, such as the unnamed stream on the site, are required to have 35-foot wide buffers. Since the stream is located further south than the wetland edge, the wetland buffer comes closest to the proposed driveway for the home. As a result, the wetland buffer is more constraining than the stream buffer.

E. Buffer Alterations

Buffers can be altered to accommodate development by either buffer reduction or through a buffer averaging approach. Both wetland and stream buffers can be reduced to widths as low as 25 feet with an approved mitigation plan (MICC 19.70.070B & 19.07.080C). MICC 19.07.070B (2) stipulates that mitigation steps within the wetland and watercourse buffers include but are not limited to, installing bio-infiltration swales or ponds to retain runoff, incorporating porous materials on driveways, incorporating 'green roofs' on buildings, and replacing invasive non-native vegetation with native vegetation. MIC 19.07.070C (3) stipulates that buffers can be averaged by reducing the buffer width in one area but expanding it in others so the overall area of the buffer remains the same. The averaged buffer should be enhanced with native vegetation and buffers cannot be reduced to less than 25 feet per code.

8. HABITAT, MITIGATION AND NATIVE VEGETATION CONSERVATION STRATEGY

Wetlands provide many important primary functions. They improve water quality, as soils and leafy emergents act to filter and bind water-borne pollutants. Second, they accommodate water holding and flood storage functions by slowly releasing stormwater runoff to streams and rivers, thereby reducing the extent of downstream erosion and flooding. Third, they add wildlife habitat for a large number of invertebrate, plant and animal species. Fourth, they provide benefits to nearby human residents to allow for enjoying of wildlife and vegetation.

Through mitigation, there are opportunities to improve the ecological condition of the wetland buffer. Non-native invasive species cover the site and can be replaced with native species. English ivy is particularly dominant but there are also patches of English laurel and individual Himalayan blackberry plants growing throughout the site. English ivy should be eliminated from trees by simply cutting the roots at the trunk. Shade tolerant shrubs can replace invasive plants. Appropriate replacement plants may include salmonberry, snowberry, red elderberry, salal, Oregon grape, Indian plumb and trailing blackberry. Some of the shrubs that are removed for the home or driveway construction can be placed within the buffer as downed woody debris or installed as snags; this would provide habitat for woodpeckers and many other species.

Mercer Island Municipal Code 19.07.30.A(6) and (7) are shown below in italics and addressed further below in non-italics:

A. Allowed Alterations. The following alterations to critical areas and buffers are allowed and the applicant is not required to comply with the other regulations of this chapter, subject to an applicant satisfying the specific

conditions set forth below to the satisfaction of the code official; and subject further, that the code official may require a geotechnical report for any alteration within a geologic hazard area:

6. New Streets, Driveways, Bridges and Rights-of-Way. Construction of new streets and driveways, including pedestrian and bicycle paths, subject to the following:

a. Construction is consistent with best management practices;
b. The facility is designed and located to mitigate impacts to critical areas consistent with best available science;
c. Impacts to critical areas are mitigated to the greatest extent reasonably feasible so there is no net loss in critical area functions; and
d. The code official may require a critical area study or restoration plan for this allowed alteration.

This project is seeking a new driveway to be located within the reduced wetland buffer, or essentially further reducing the wetland buffer is what is shown on the project's Mitigation Plan design. It's interesting to note that a sanitary sewer system and legal sewer easement is actually located inside the wetland. The construction will be done consistent with best management practices, as the project includes a TESC Plan. The TESC Plan includes filter fabric fence, show trees to be protected, and armors the access road with quarry spalls to control sediment. The driveway is designed to and located to mitigate critical area impacts. For example, many of the existing trees near the driveway within the wetland buffer will be retained. As described below, there is no net loss in critical area functions. Also as noted below, a Restoration Plan (Mitigation Plan) has been designed to accommodate this project.

7. New Utility Facilities. New utilities, not including substations, subject to the following:

a. Construction is consistent with best management practices;
b. The facility is designed and located to mitigate impacts to critical areas consistent with best available science;
c. Impacts to critical areas are mitigated to the greatest extent reasonably feasible so there is no net loss in critical area functions;
d. Utilities shall be contained within the footprint of an existing street, driveway, paved area, or utility crossing where possible; and
e. The code official may require a critical area study or restoration plan for this allowed alteration.

The only difference above 6 and 7 above is provision d. The proposed side sewer is proposed to connect into the existing sewer pipe in an existing sewer easement, so provision d is met that the utility footprint is already present.

A detailed mitigation plan has been designed for the project and is attached with the building permit application submittal. Two sheets on 24" x 36" comprise the mitigation design. A portion of the proposed driveway extends into the 35-foot wide standard wetland buffer and into the 25-foot wide reduced wetland buffer. The entire driveway does not encroach into these buffers though. As part of the mitigation, the entire remaining wetland buffer has been proposed to be restored. Hundreds of native trees, shrubs and groundcover are proposed between the driveway and the wetland boundary for restoration. In the existing condition, the wetland buffer is degraded. It is primarily comprised of non-native invasive vegetation such as primarily English ivy and to a less extent Himalayan blackberry. These invasive plants provide low habitat functions. All of those plants will be removed in the new wetland buffer. With a diversity of 10 new native plant species, the buffer will be drastically improved over the existing condition from a habitat standpoint. As a result, there will be no net loss in critical area function with a narrower buffer corridor, because the existing buffer is so significantly degraded and will be substantially improved. The proposed mitigation ends at the wetland boundary, but if necessary, I believe the applicant would be willing to restore portions of the actual wetland, because the wetland itself is partly degraded due to the dominance of English ivy and Himalayan blackberry.

The driveway has been slightly swooped into the wetland buffer so that it could be a longer driveway, and not be as steep of a slope percentage. If the driveway had to be re-located outside the wetland buffer then the driveway would be steeper and/or there would be more excavation to build the driveway to access the home. The proposed driveway reduces the amount of excavation for the project, which also reduces the number of material hauling trucks on West Mercer Way.

The civil engineering plans show the proposed side sewer connecting into the existing public sanitary sewer main located inside the wetland. It's very unusual that the sewer pipe and sewer main are located in the wetland. A second option would be to install the side sewer so that it connects into the sewer main in West Mercer Way, but it's a lot of extra pipe, trenching, backfill and construction. The area of the proposed side sewer will be restored with native shrubs following side sewer construction and will be shown on the Final Mitigation Plan.

The civil engineering plans will include a TESC (Temporary Erosion and Sedimentation Control) Plan so that construction is consistent with best management practices. Please refer to the civil engineering plans for detailed information.

9. REFERENCES

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APPENDIX

Figure 1: Vicinity Map

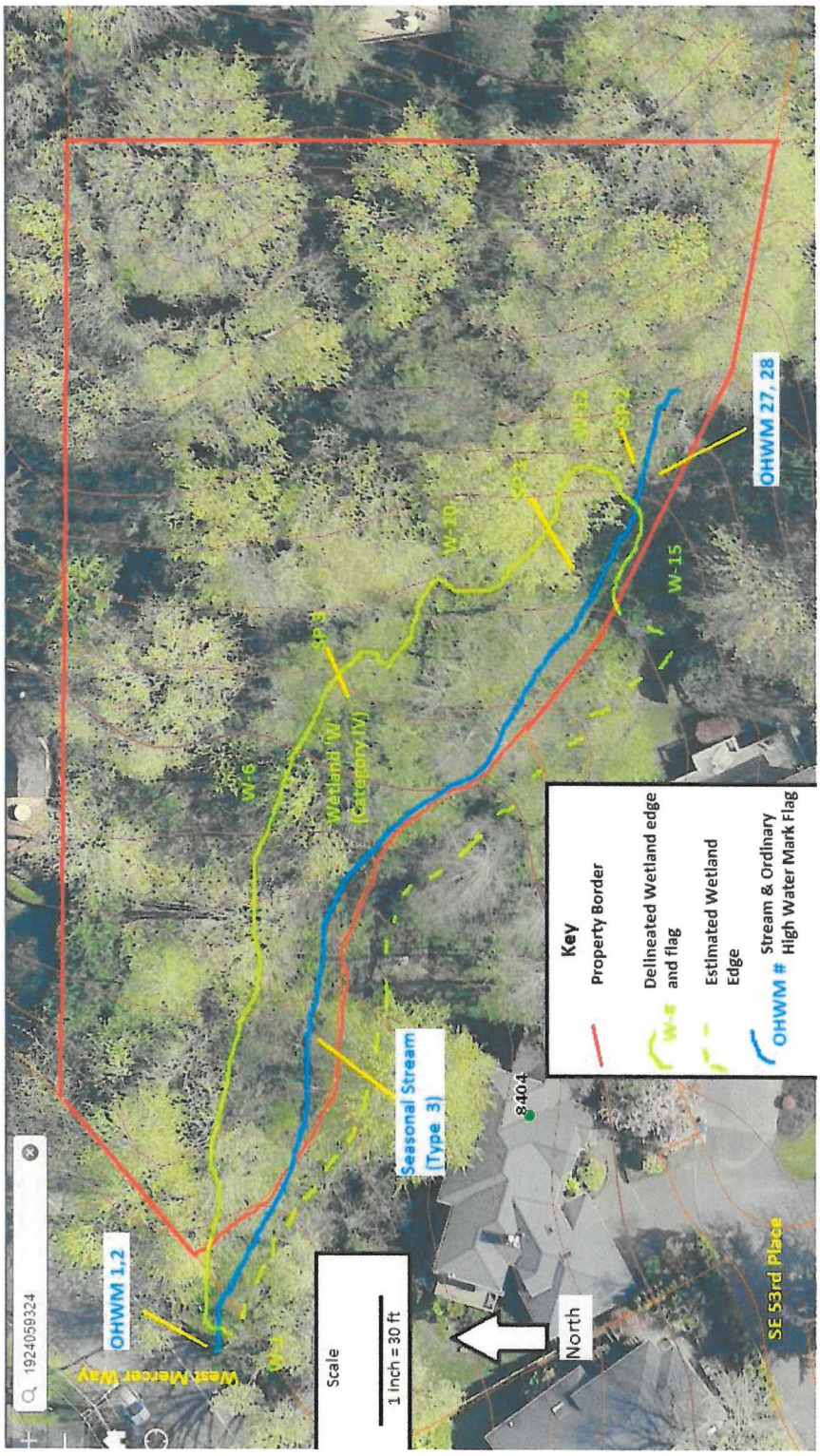


Figure 2: Aerial Photo

Figure 3: Landscape Aerial Photo

Soil Map—King County Area, Washington

Map Unit Legend

King County Area, Washington (WA633)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AgC	Alderwood gravelly sandy loam, 8 to 15 percent slopes	1.3	55.3%
AkF	Alderwood and Kitsap soils, very steep	1.0	44.7%
Totals for Area of Interest		2.3	100.0%

Figure 4: NRCS Soil Type Map

Figure 5: Project Photos

Picture 1: View of the western end of *Wetland W*. The onsite stream is in the upper left and the lawn is part of the property directly south of the site.

Picture 2: View of Sample Point 1, located within the east end of *Wetland W*. The photo was taken in mid-March and various emergent plants were sprouting including sawbeak sedge and giant horsetail.

Picture 3: View of Sample Point 2, located just outside of *Wetland W*. This area had some hydrophytic plants such as stinging nettle but the plant community was not hydrophytic. Additionally, the soils had chroma 2 colors without redoximorphic features and were therefore not hydric and wetland hydrology was not present.

Picture 4: View of Sample Point 3, located on the central part of the site and within *Wetland W*. This area featured a hydrophytic plant community (lady fern had was dead and had not emerged at the time of the photo and red alder is not visible in this picture). The area also featured soils with chroma 1 colors that were saturated to the surface.

Figure 6: Wetland Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tax Parcel 1924059324 City/County: Mercer Island Sampling Date: March 18, 2017

Applicant/Owner: Edward Mills, Applicant State: WA Sampling Point: 1

Investigator(s): Chris Holcomb, MES Section, Township, Range: NW quarter, Section 19, Township 24, Range 5

Landform (hillslope, terrace, etc.): Stream drainage on hillslope Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR): A Lat: 47.555159 Long: -122.225281 Datum: NAD 83

Soil Map Unit Name: Alderwood and Kitsap soils, very steep (AkF) NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (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 the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

This sample point is located in a small ledge next to a stream channel. The area has deep silty saturated soils and is dominated by emergent plants.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 100 sq. ft.)			
1. Salmonberry (Rubus spectabilis)	10	Yes	FAC
2. Himalayan Blackberry (Rubus armeniacus)	5	Yes	FACU
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: 100 sq. ft.)			
1. Stinging nettle (Urtica dioica)	40	Yes	FAC
2. Sawbeak Sedge (Carex stipata)	10	Yes	FACW
3. Giant Horsetail (Equisetum telmatea)	20	Yes	FACW
4. Rorrippa Species	15	Yes	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.3 (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:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 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 %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					Silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: 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]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ 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 (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ 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, and 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 (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 4

Water Table Present? Yes ✓ No ___ Depth (inches): 3

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

A seasonal stream flowed near the test pit (surface water). The test pit itself revealed a high water table and saturation to the surface.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Tax Parcel 1924059324 City/County: Mercer Island Sampling Date: March 18, 2017

Applicant/Owner: Edward Mills, Applicant State: WA Sampling Point: 2

Investigator(s): Chris Holcomb, MES Section, Township, Range: NW quarter, Section 19, Township 24, Range 5

Landform (hillslope, terrace, etc.): Stream drainage on hillslope Local relief (concave, convex, none): Concave Slope (%): 20

Subregion (LRR): A Lat: 47.555077 Long: -122.225072 Datum: NAD 83

Soil Map Unit Name: Alderwood and Kitsap soils, very steep (AkF) NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (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 the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

This sample point is located in the bottom of a depression. It is in an area just outside of the edge of Wetland W and about 30 ft upslope from SP1. It lacked hydric soils, lacked wetland hydrology indicators and the plant community was not hydrophytic.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 100 sq. ft.)			
1. Salmonberry (Rubus spectabilis)	20	Yes	FAC
2. Himalayan Blackberry (Rubus armeniacus)	10	Yes	FACU
3.			
4.			
5.			
	30 = Total Cover		
Herb Stratum (Plot size: 100 sq. ft.)			
1. Stinging nettle (Urtica dioica)	40	Yes	FAC
2. Sword Fern (Polystichum munitum)	30	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (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 60	x 3 =	180
FACU species 40	x 4 =	160
UPL species	x 5 =	
Column Totals: 100 (A)		340 (B)

Prevalence Index = B/A = 3.4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

The dominance test was inconclusive so the prevelance test was employed and it was determined that the plant community was not hydrophytic.

SOIL

Sampling Point: 2

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100					Sandy Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: 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]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ 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 (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ 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, and 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 (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

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: Tax Parcel 1924059324 City/County: Mercer Island Sampling Date: March 18, 2017

Applicant/Owner: Edward Mills, Applicant State: WA Sampling Point: 3

Investigator(s): Chris Holcomb, MES Section, Township, Range: NW quarter, Section 19, Township 24, Range 5

Landform (hillslope, terrace, etc.): Stream drainage on hillslope Local relief (concave, convex, none): Concave Slope (%): 20

Subregion (LRR): A Lat: 47.555375 Long: -122.225353 Datum: NAD 83

Soil Map Unit Name: Alderwood gravelly sandy loam 8-15% slopes (AcG) NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (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 the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

This sample point is located just inside Wetland W in the central part of the site. It is located on a rise bewteen the stream and a saturated area that comes out of a seep on the hillside.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 100 sq. ft.)	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: 100 sq. ft.)			
1. Salmonberry (Rubus spectabilis)	10	Yes	FAC
2. English Ivy (Hedera helix)	60	Yes	FACU
3.			
4.			
5.			
	70 = Total Cover		
Herb Stratum (Plot size: 100 sq. ft.)			
1. Lady Fern (Athyrium filix femina)	10	Yes	FACW
2. Sword Fern (Polystichum munitum)	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 3

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					Sandy Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: 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]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ 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 (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ 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, and 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 (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 8

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

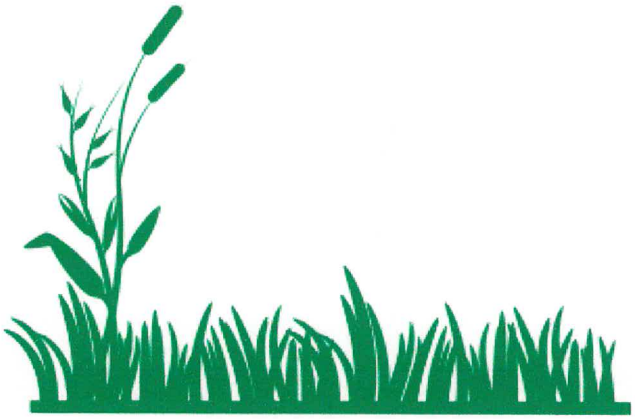
Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

The area is saturated by a seep further upslope.

Figure 7: Wetland Rating Forms



Wetland name or number W

WETLAND RATING FORM – WESTERN WASHINGTON

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

Name of wetland (if known): Parkwood Limited Partnership, Tax Parcel 1924059324 Date of site visit: 3/18/17

Rated by Chris Holcomb, MES Trained by Ecology? Yes ✓ No ___ Date of training 2/ 2014

SEC: 19 TWNSHP: 24 RNGE: 5 Is S/T/R in Appendix D? Yes ___ No ✓

Map of wetland unit: Figure 1 Estimated size .2 acres

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV ✓

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

Score for Water Quality Functions	4
Score for Hydrologic Functions	10
Score for Habitat Functions	13
TOTAL score for Functions	27

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply ✓

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

Summary of basic information about the wetland unit

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

Wetland name or number W

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

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

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

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

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

Wetland name or number W

Classification of Wetland Units in Western Washington

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

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO – go to 2 ✓ **YES** – the wetland class is **Tidal Fringe**

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

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

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3✓ **YES** – The wetland class is **Flats**

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

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO – go to 4 ✓ **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
✓ The wetland is on a slope (*slope can be very gradual*),
✓ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
✓ The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**✓

Wetland name or number W

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

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

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

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

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

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

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

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

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

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

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

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

Wetland name or number W

		Points (only 1 score per box)
S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	
S	**S 1. Does the wetland unit have the potential to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance)* points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0 ✓ 25-31% slope	0
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points ✓	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 ✓ Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___ 2
S	**Total for S 1** *Add the points in the boxes above*	2
S	**S 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland ✓ Residential, urban areas, or golf courses are within 150 ft upslope of wetland — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p.67)* multiplier 2
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	4

Comments

Wetland name or number W

S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	S 3. Does the wetland unit have the potential to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	3
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	2
S	*Add the points in the boxes above*	5
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* — Wetland has surface runoff that drains to a river or stream that has flooding problems ✓ Other Since the area has steep gradients leading down to Lake Washington, streams are likely to cause erosion and damage residential properties. *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is **2** ✓ **NO** multiplier is **1**	*(see p. 70)* multiplier 2
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	10

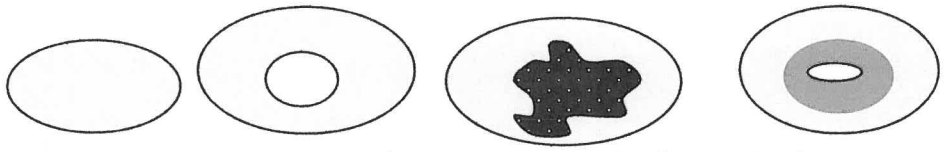
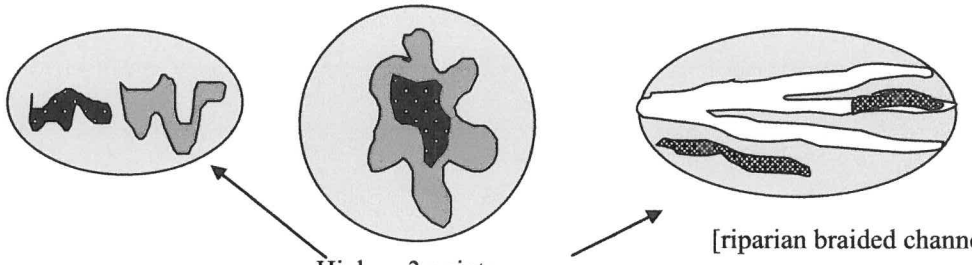
Comments

Wetland name or number W

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)***	**Figure** ___
Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres. ____Aquatic bed __✓__Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) __✓__Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ____The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more points = 4 3 structures points = 2 2 structures points = 1 ✓ 1 structure points = 0 Map of Cowardin vegetation classes	1
H 1.2. <u>Hydroperiods</u> ***(see p. 73)***	**Figure** ___
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods) ____Permanently flooded or inundated — 4 or more types present — points = 3 ____Seasonally flooded or inundated — 3 types present — points = 2 __✓__Occasionally flooded or inundated — 2 types present — point = 1 ✓ ____Saturated only — 1 type present — points = 0 ____Permanently flowing stream or river in, or adjacent to, the wetland __✓__Seasonally flowing stream in, or adjacent to, the wetland ____***Lake-fringe wetland* = 2 points** ____***Freshwater tidal wetland* = 2 points** Map of hydroperiods	1
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species points = 2 *List species below if you want to:* 5 - 19 species points = 1 < 5 species points = 0 Black cottonwood, red alder, western hemlock, western red cedar, big leaf maple Indian plum, salmonberry, English ivy, English laurel, Himalayan blackberry lady fern, giant horsetail, water cress species, sawbeak sedge, stinging nettle, sword fern, Kentucky bluegrass 17 species that meet the requirement of covering 10 square feet	1

Total for page 3

Wetland name or number W

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

Comments

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** ✓— No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	**Figure** ___ 2
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? The forest patch including Wetland W is only 1.3 acres in area. YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres?✓ Lake Washington YES = **1 point** NO = **0 points**	1

Total for page 3

Wetland name or number W

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*** Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ____**Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*). ____**Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock. ____**Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*). ✓ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*). ____**Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ____ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).* ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	1

Wetland name or number W

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)***	
There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5	
The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5	
✔There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed Wetlands likley along Lake Wash shore and some were observed from West Mercer Way. points = 3	3
The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3	
There is at least 1 wetland within ½ mile. points = 2	
There are no wetlands within ½ mile. points = 0	
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	7
TOTAL for H 1 from page 14	6
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	13

THE EVERGREEN STATE COLLEGE

In recognition of completion

of the course of study approved by the faculty

Christopher Robin Holcomb

is awarded the degree

MASTER OF ENVIRONMENTAL STUDIES

with all its honors, privileges and obligations,
conferred at Olympia, Washington,
on the Fourteenth day of December, Two Thousand and Twelve.

CHAIR, BOARD OF TRUSTEES
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University of Washington Extension

CERTIFIES THAT

Chris R Holcomb

SUCCESSFULLY COMPLETED THE 2005-2006

Certificate Program in

Wetland Science and Management

THIS TWENTY-FIRST DAY OF JUNE IN THE YEAR
TWO THOUSAND SIX

David Szatmary
Vice Provost
UW Extension

Figure 8: Certifications

Washington State University

To all to whom these presents shall have come: Greeting.

Be it known that we, the President and Faculty of the University
under authority of the Board of Regents and the laws of the State of Washington, have admitted

Mark Joseph Rigos

to the degree of

Bachelor of Science
in Biology

with all the Rights, Privileges, and Dignities to that degree appertaining.

Given at Pullman in the State of Washington, on the Tenth day of May in the Year One Thousand Nine Hundred and Ninety-seven of the Republic the Two Hundred and Twenty-first, and the State of Washington the One Hundred and Eighth.

Samuel H. Smith
President of the University

John W. Ellis
President of the Board of Regents

Richard Chinn Environmental Training, Inc.

certifies that

Mark J. Rigos

has successfully completed a

38 Hour Army Corps of Engineers Wetland Delineation & Management Training Program

Issued Certificate No. 982 and 2.8 CEUs on this fifteenth day of April, 1999 in SEattle, Washington

Richard Chinn, CET

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This training has been based in part on the U. S. Army Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1 (1987 manual), as provided for in the training materials developed in conjunction with Section 307(e) of the Water Resources Development Act of 1990 for the Wetland Delineator Certification Program.

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