SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

January 19, 2022

Ms. Mary Lear, PE
King County Department of Natural Resources and Parks
Parks and Recreation Division
201 South Jackson Street
Seattle, WA 98104

RE: CRITICAL AREA REVIEW AND WETLAND INVESTIGATION, LITTLE LAKE FOREST PARK TRAILHEAD FACILITY, KING COUNTY, WASHINGTON

Dear Ms. Lear:

Shannon & Wilson conducted a critical area review and wetland investigation to support the trailhead improvements proposed at the Little Lake Forest Park Trailhead Facility Project site (see Figure 1). The Project site consists of King County Parcel No. 1920079101, located within unincorporated King County (Sections 19 and 20, Township 20N, Range 7E, W.M.). The subject property is located within the Duwamish-Green River watershed and the Newaukum Creek drainage basin.

The purpose of this letter is to identify and characterize any critical areas on and within 100 feet of the Project site (Study Area), in accordance with the King County Critical Areas Code 21A.24. No streams, wetlands, associated buffers, or wildlife habitat conservation areas were identified in the Study Area.

BACKGROUND REVIEW

Desktop research was conducted to help identify potential critical areas within the Study Area. These data sources included:

- U.S. Natural Resources Conservation Service (NRCS) Web Soil Survey interactive map (NRCS, 2021),
- Aerial imagery (Google Earth, 2021),
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping system (USFWS, 2021),
- Washington State Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) on the Web map (WDFW, 2021),
- King County iMap interactive map (King County, 2021), and

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- U.S. National Oceanic and Atmospheric Administration (NOAA) Regional Climate Centers Agriculture Applied Climate Information System (NOAA, 2021).

According to the NRCS's Web Soil Survey, soils within the Study Area are mapped as Everett very gravelly, sandy loam, 8 to 15% slopes and Barneston gravelly, ashy, coarse, sandy loam, 8 to 15% slopes (NRCS, 2021). Neither of these soil units is identified as hydric on the King County Hydric Soils List. However, the Barneston soil unit includes Norma soils, a hydric soil unit, as a minor component (5%) where depressional landforms exist.

Review of Google Earth aerial photography did not reveal any decipherable areas of inundation or saturation associated with wetlands or waterbodies within or near the Study Area (Google Earth, 2021). A review of the USFWS NWI did not show any mapped wetlands within or near the Study Area (USFWS, 2021).

WDFW PHS on the Web map identifies the presence of resident and winter migratory elk (*Cervus elaphus*) ranges within the Project vicinity (WDFW, 2021). No other priority habitats or species are displayed within or near the Study Area.

King County iMap does not display any streams, waterbodies, wetlands, wildlife habitat areas, or flood-prone areas within the Study Area. Potential steep slope hazard areas are displayed just north and northwest of the property boundary, as represented in Figure 2.

Monthly totals and departures from normal precipitation data were collected from the Seattle-Tacoma Airport station (NOAA, 2021) for the three months preceding the December 2021 site visit. According to the Seattle-Tacoma Airport station data, monthly precipitation totals demonstrated wetter than normal conditions for the three-month period preceding the site visit (see Exhibit 1).

	Long-Term Rainfall (WETS)						
Month	30% Chance Will Have		Observed (2021) Precipitation	Condition (Dry, Normal, Wet)	Condition Value*	Weighted Value	Product (Condition Value x Weighted Value)
	Less Than	More Than					
Nov	4.79	7.74	10.26	Wet	3	3	9
Oct	2.16	4.21	5.76	Wet	3	2	6
Sept	0.66	1.74	3.02	Wet	3	1	3
Weather Station: SEA-TAC Airport, Period of Record: 1981-2010						**Sum:**	18

Table methodology adapted from *NRCS Engineering Field Handbook, Chapter 19* (NRCS, 1997)

*Condition Value:
Dry = 1
Normal = 2
Wet = 3

If Sum is:	Then:
6-9	Period Has Been Drier Than Normal
10-14	Period Has Been Normal
15-18	Period Has Been Wetter Than Normal

Exhibit 1: Precipitation Analysis for December 2021, Seattle-Tacoma Airport Station

FIELD METHODS

The Study Area was evaluated for the potential of wetlands using methods described in the U.S. Army Corps of Engineers (Corps) *Wetlands Delineation Manual* (Corps, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (U.S. Army Engineer Research and Development Center, 2010). Ground visual surveys were used to describe the vegetation community (Federal Geographic Data Committee, 2013). The Munsell Soil Color Chart was used to describe soil colors (Munsell Color, 2000).

Potential wetland areas were identified using the triple-parameter approach, which considers vegetation types, soil conditions, and hydrologic conditions. For an area to be considered wetland, it must display each of the following: (a) dominant plant species that are considered hydrophytic by the accepted classification indicators, (b) soils that are considered hydric under federal definition, and (c) indications of wetland hydrology in accordance with the federal definition. Appendix A includes a more detailed summary of the federal delineation methodology.

During the site investigation, three data points describing vegetation, soil, and hydrology were collected on the subject property (see data forms in Appendix B). Data point locations were collected using a handheld global positioning system unit with an accuracy of approximately 5 feet. Additional soil pits were excavated to sample the entire site, but formal data forms were not completed for all soil pit locations where the soil conditions were similar to those reflected at the formal data point locations.

RESULTS

Shannon & Wilson conducted fieldwork on December 10, 2021, to investigate potential critical area conditions in the Study Area. The developed portion of the subject property is composed of a single-family residence (SFR), an associated gravel driveway extending to the north and south, and lawn area. Forest and understory vegetation surrounds the developed portion of the property. Topography is relatively flat within the southern and central portions of the property where the SFR and surrounding lawn exists. The northern portion of the property slopes gradually, then more steeply, downhill to the northern boundary. See site photographs in Appendix C.

A data point was collected south of the existing SFR within an overgrown lawn (DP1). Vegetation in this area included common pasture grasses, reed canarygrass (*Phalaris*

arundinacea), and dandelion (*Taraxacum officinale*). The soil profile ranged from moist to dry to a depth of more than 16 inches. From 0 to 16 inches, soils were very dark brown (10YR 2/2) loam mixed with large cobbles. Below 16 inches, a mixed matrix of brown (10YR 4/3) and very dark grayish-brown (10YR 3/2), gravelly loam was present. No hydric soil or wetland hydrology indicators were present.

The second data point (DP2) was collected north of the SFR within an unmaintained and disturbed lawn area. Vegetation was composed of reed canarygrass, and mosses were also present on the soil surface. The soil profile was dry to a depth of more than 14 inches, and it appeared disturbed. A large amount of gravel and cobble fill material appeared mixed into the surface and subsurface layers. From 0 to 10 inches, soils were very dark brown (10YR 2/2) loam mixed with large cobbles and gravel. From 10 to 14 inches, soils were very dark grayish-brown (10YR 3/2), gravelly clay loam with 5% depletions (10YR 5/2) within the matrix. Below 14 inches, soils were very dark brown (7.5YR 2.5/2), gravelly loam. No hydric soil or wetland hydrology indicators were present.

A third data point (DP3) was collected in the northeast corner of the property within a depression. Vegetation in this area was composed of red alder (*Alnus rubra*), western red cedar (*Thuja plicata*), salmonberry (*Rubus spectabilis*), stinging nettle (*Urtica dioica*), reed canarygrass, and stickywilly (*Galium aparine*). Soils were dry to a depth of below 13 inches. From 0 to 8 inches, soils were black (7.5YR 2.5/1), sandy clay loam with large pieces of wood. A charcoal layer was present between 8 and 9 inches. From 9 to 13 inches, soils were black (7.5YR 2.5/1) clay loam with dark brown (7.5YR 3/4) redoximorphic concentrations within the matrix. Below 13 inches, soils were black (7.5YR 2.5/1) clay loam with very dark brown (7.5YR 2.5/3) redoximorphic concentrations. No hydric soil or wetland hydrology indicators were present.

CONCLUSION

As indicated in the above data, the triple-parameter approach for identifying wetlands was not met anywhere within the Study Area. Additionally, no wetland or other aquatic features were observed from the edge of the property boundary or public roadways within the Study Area.

CLOSURE

The findings and conclusions documented in this letter have been prepared for specific application to this Project, and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions presented in this letter are professional opinions based on interpretation of information currently available to us, and are made within the operational scope, budget, and schedule constraints of this Project. No warranty, express or implied, is made.

Shannon & Wilson has prepared the enclosed "Important Information About Your Wetland Delineation Mitigation and/or Stream Classification Proposal" to assist you and others in understanding the use and limitations of our proposals.

If you have any questions, please contact me at (206) 695-6927.

Sincerely,

SHANNON & WILSON

Elyse Denkers, PWS
Ecologist, Permitting Specialist

EBD:MAC:AJS/ebd

Enc. References (2 pages)
Figure 1 – Vicinity Map
Figure 2 – Site Review Map
Appendix A – Wetland Delineation Methodology
Appendix B – Wetland Determination Data Forms
Appendix C – Site Photographs
Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report

REFERENCES

Federal Geographic Data Committee, 2013, Classification of wetlands and deepwater habitats of the United States (2nd ed.): Washington, D.C., Federal Geographic Data Committee, Wetlands Subcommittee, Report no. FGDC-STD-004-2013, 86 p., available: https://www.fgdc.gov/standards/projects/wetlands/nwcs-2013.

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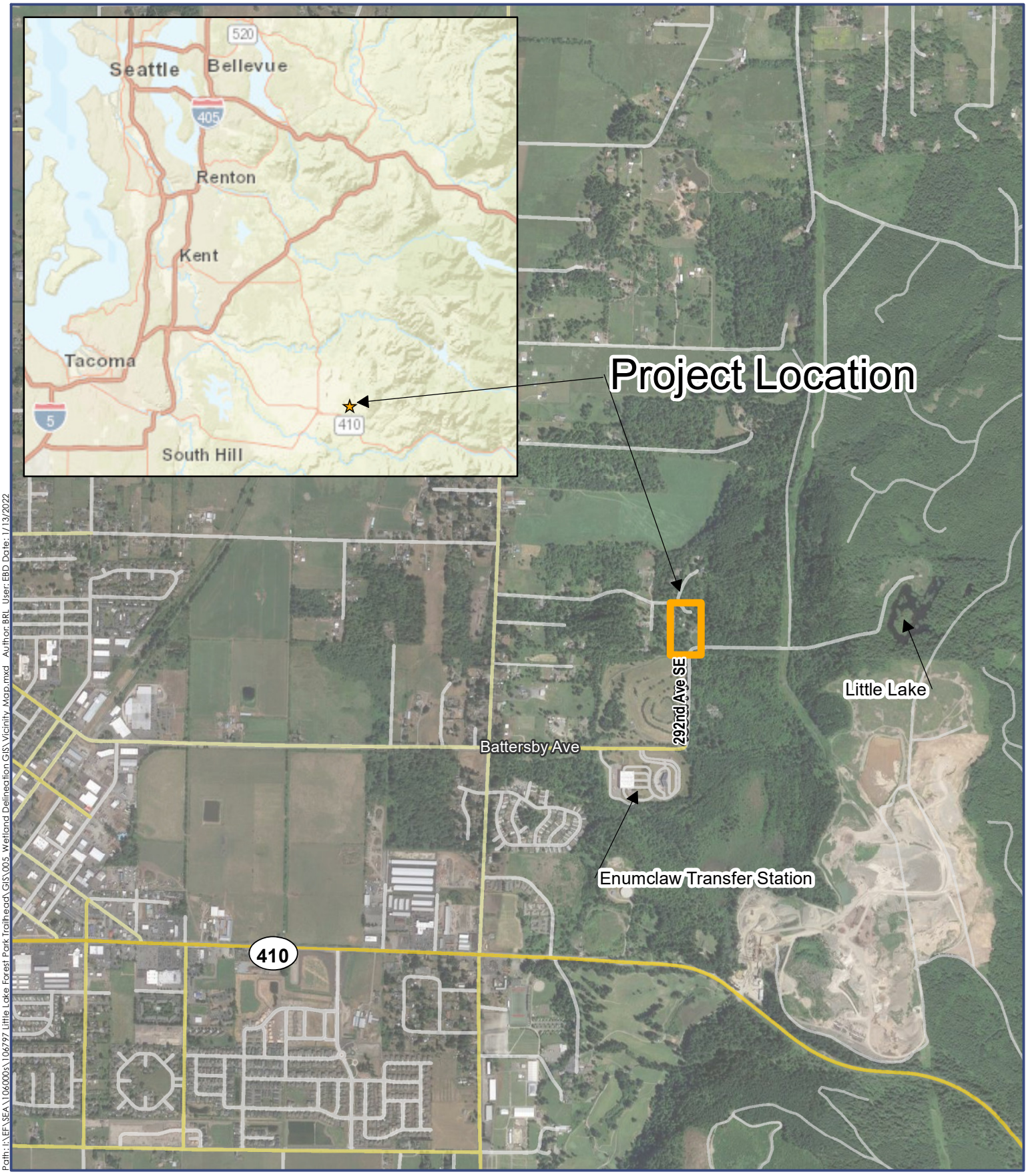

Path: I:\EF\SEA\106000s\106797 Little Lake Forest Park Trailhead\GIS\005 Wetland Delineation GIS\Vicinity Map.mxd Author: BRL User: EBD Date: 1/13/2022

N

0 0.5 1
Miles

January 2022

Vicinity Map

Figure 1

Path: I:\EF\SEA\106000s\106797 Little Lake Forest Park Trailhead\GIS\005_Wetland Delineation GIS\Parcel_CAR_1.mxd Author: BRL User: EBD Date: 1/13/2022

Notes:

1. Potential steep slopes hazard areas downloaded from King County GIS.
2. Data points were collected using a hand-held GPS device with accuracy of approximately 5 feet.

January 2022

Site Review Map

Figure 2

Appendix A

Wetland Delineation Methodology

APPENDIX A: WETLAND DELINEATION METHODOLOGY

Appendix A

Wetland Delineation Methodology

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Exhibit

APPENDIX A: WETLAND DELINEATION METHODOLOGY

A.1 INTRODUCTION

The triple-parameter approach, as required in the Washington State Department of Ecology's (Ecology's) 1997 Washington State Wetlands Identification and Delineation Manual, the U.S. Army Corps of Engineers' (the Corps') 1987 Corps of Engineers Wetland Delineation Manual, and the Corps' 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) was used to identify and delineate the wetlands on the site described in this report. The triple-parameter approach requires that vegetation, soils, and hydrology are each evaluated to determine the presence or absence of wetlands. An area is considered to be a wetland if each of the following is met: (a) dominant hydrophytic vegetation is present in the area, (b) the soils in the area are hydric, and (c) the necessary hydrologic conditions within the area are met.

A determination of wetland presence was made by conducting a Routine Delineation. Corresponding upland and wetland plots were recorded to characterize surface and subsurface conditions and more accurately determine the boundaries of on-site wetlands.

A.2 WETLAND VEGETATION

Hydrophytic plants are plant species specially adapted for saturated and/or anaerobic conditions. These species can be found in areas where there is a significant duration and frequency of inundation, which produces permanently or periodically saturated soils. Hydrophytic species, due to morphological, physiological, and reproductive adaptations, have the ability to grow, effectively compete, reproduce, and thrive in anaerobic soil. Indicators of hydrophytic vegetation are based on the wetland indicator status of plant species on the national wetland plant list (Lichvar and others, 2016). Plants are categorized as Obligate (OBL), Facultative Wetland (FACW), Facultative (FAC), Facultative Upland (FACU), or Upland (UPL). Species in the facultative categories (FACW, FAC, and FACU) are recognized as occurring in both wetlands and non-wetlands to varying degrees. Most wetlands are dominated mainly by species rated as OBL, FACW, or FAC (Exhibit A-1).

Exhibit A-1 Plant Indicator Status

Plant Indicator Status Categories
Obligate Wetland (OBL) – Plants that almost always occur in wetlands.
Facultative Wetland (FACW) – Plants that usually occur in wetlands but may occur in non-wetlands.
Facultative (FAC) – Plants that occur in wetlands or non-wetlands.
Facultative Upland (FACU) – Plants that usually occur in non-wetlands but may occur in wetlands.
Obligate Upland (UPL) – Plants that almost never occur in wetlands.

Source: Lichvar and others, 2016

The approximate percentage of absolute cover for each of the different plant species occurring within the tree, sapling/shrub, woody vine, and herbaceous strata was determined. Trees within a 30-foot radius; sapling/shrubs and woody vines within a 15-foot radius; and herbaceous species within a 5-foot radius of each data point were identified and noted. However, where site conditions merited it, the dimensions of the tree, sapling/shrub, woody vine, and herbaceous strata were modified.

The dominance test is the primary hydrophytic vegetation indicator and it is used in all wetland delineations. Dominant plant species are considered to be those that, when cumulatively totaled in descending order of absolute percent cover, exceed 50% of the total absolute cover for each vegetative stratum. Any additional species individually representing 20% or greater of the total absolute cover for each vegetative strata are also considered dominant. Hydrophytic vegetation is considered to be present when greater than 50% of the dominant plant species within the area had an indicator status of OBL, FACW, or FAC.

If a plant community does not meet the dominance test in areas where hydric soils and wetland hydrology are present, vegetation is reevaluated using the prevalence index, plant morphological adaptations for living in wetlands, and/or abundance of bryophytes (e.g., mosses) adapted to living in wetlands. The prevalence index is a weighted average that takes into account the abundance of all plant species within the sampling area to determine if hydrophytic vegetation is more or less prevalent. Using the prevalence index, all plants within the sampling area are grouped by wetland indicator status and absolute percent cover is summed for each group. Total cover for each indicator status group is weighted by the following multipliers: OBL=1, FACW=2, FAC=3, FACU=4, UPL=5. The prevalence index is calculated by dividing the sum of the weighted totals by the sum of total cover in the sampling area. A prevalence index of 3.0 or less indicates that hydrophytic vegetation is present.

A.3 HYDRIC SOILS

Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (U.S. Department of Agriculture [USDA] Soil Conservation Service [SCS], 1994). Repeated periods of saturation and inundation for more than a few days, in combination with soil microbial activity, causes depletion in oxygen (anaerobic conditions) and results in delayed decomposition of organic matter and reduction of iron, manganese, and sulfur elements. As a result of these processes, most hydric soils develop distinctive characteristics observable in the field during both wet and dry periods (Vasilas and others, 2018). These characteristics may be exhibited as an accumulation of organic matter; bluish-gray, green-gray, or low chroma and high value soil colors; mottling or other concentrations of iron and manganese; and/or hydrogen sulfide odor similar to a rotten egg smell.

The USDA Natural Resources Conservation Service (NRCS) developed official hydric soil indicators as summarized in Field Indicators of Hydric Soils in the United States (Vasilas and others, 2018). These indicators were developed to assist in delineation of hydric soils and are based predominantly on hydric soils near the margins of wetlands. Some hydric soils, including soils within the wettest parts of wetlands, may lack any of the approved hydric soil indicators. If a hydric soil indicator is present, the soil is determined to be hydric. If no hydric soil indicator is present, additional site information is used to assess whether the soil meets the definition of hydric soil.

Identification of hydric soils was aided through observation of surface hydrologic characteristics and indicators of wetland hydrology (e.g., drainage patterns). Soil characteristics were observation at several data points, placed both inside and outside the wetland. Holes were dug with a shovel to the depth needed to document an indicator or to confirm the absence of hydric soil indicators. Soil organic content was estimated visually and texturally. Soil colors were examined in the field immediately after sampling. Dry soils were moistened. Soil colors were determined through analysis of the hue, value, and chroma best represented in the Munsell® Soil Color Chart (Munsell Color, 1992).

A.4 WETLAND HYDROLOGY

Wetland hydrology is determined by observable evidence that inundation or soil saturation have occurred during a significant portion of the growing season repeatedly over a period of years so that wet condition have been sufficient to produce wetland vegetation and hydric soils. Wetland hydrology indicators give evidence of a continuing wetland hydrologic regime. Wetland hydrology criteria were considered to be satisfied if it appeared that wetland hydrology was present for at least 5 to 12.5% (12 to 31 days) of the growing

season. The growing season in western Washington is typically considered to be from March 1 to October 31 (244 days). However, the growing season is considered to have begun when: (a) evidence of plant growth has begun on two non-evergreen vascular plants, and (b) the soil reaches a temperature of 41 degrees Fahrenheit at a depth of 12 inches. The Seattle District Corps of Engineers requires 14 consecutive days of inundation or saturation for wetland hydrology to be considered present.

Wetland hydrology was evaluated by direct visual observation of surface inundation or soil saturation in data plots. The area near each data point was examined for indicators of wetland hydrology. Wetland hydrology indicators are categorized as primary or secondary based on their estimated reliability. Wetland hydrology was considered present if there was evidence of one primary indicator or at least two secondary indicators.

Some primary indicators include surface water, a shallow water table or saturated soils observed within 12 inches of the surface, dried watermarks, drift lines, sediment deposits, water-stained leaves, and algal mat/crust. Some secondary indicators include a water table within 12 to 24 inches of the surface during the dry season; drainage patterns; a landscape position in a depression, drainage, or fringe of a water body; and a shallow restrictive layer capable of perching water within 12 inches of the surface.

A.5 DISCLAIMER

This methodology was prepared for reference use only and is not intended to replace Ecology's 1997 Washington State Wetlands Identification and Delineation Manual, the 1987 Corps Wetland Delineation Manual, or the Corps' 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0).

A.6 REFERENCES

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Appendix B

Wetland Determination Data Forms

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

Project Site: Litlle Lake Forest Trailhead Park (Parcel 1920079101) City/County: Enumclaw/WA Sampling Date: 12/10/2021

Applicant/Owner: King County State: WA Sampling Point: DP1

Investigator(s): Merci Clinton, Elyse Denkers Section, Township, Range: S20 T20N R7E

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): A Lat: 47.210288 Long: -121.952611 Datum: NAD83

Soil Map Unit Name: Barneston gravelly ashy coarse sandy loam, 8 to 15 percent slopes 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? Are "Normal Circumstances" present? Yes ☒ No ☐

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 the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **Precipitation totals from Seatac Airport (USDA NRCS, 2021b) demonstrated wetter than normal conditions for the three-month period preceding the site visit.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ____, 20% = ____	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
50% = ____, 20% = ____	0	= Total Cover	
Herb Stratum (Plot size: 3')			
1. *Poa sp.*	80	yes	FAC
2. *Phalaris arundinacea*	60	yes	FACW
3. *Taraxacum officinale*	5	no	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ____, 20% = ____	140	= Total Cover	
Woody Vine Stratum (Plot size: 15')			
1.			
2.			
50% = ____, 20% = ____	0	= 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:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
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: overgrown/unmaintained lawn area

Project Site: Litlle Lake Forest Trailhead Park (Parcel 1920079101)

SOIL Sampling Point: DP-1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10yr2/2	100					loam	large cobbles
16+	10YR4/3	20					gravelly lm	
16+	10YR3/2	80						

[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 Soils Present? **Yes** ☐ **No** ☒

Remarks: Very gravelly with large cobbles.

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 Stresses 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):	na
Water Table Present?	Yes	☐	No	☒	Depth (inches):	na
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):	na

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: Litlle Lake Forest Trailhead Park (Parcel 1920079101) City/County: Enumclaw/WA Sampling Date: 12/10/2021

Applicant/Owner: King County State: WA Sampling Point: DP2

Investigator(s): Merci Clinton, Elyse Denkers Section, Township, Range: S20 T20N R7E

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): A Lat: 47.211683 Long: -121.952501 Datum: NAD83

Soil Map Unit Name: Barneston gravelly ashy coarse sandy loam, 8 to 15 percent slopes 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? Are "Normal Circumstances" present? Yes ☐ No ☒

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 the Sampled Area within a Wetland?**	**Yes ☐ No ☐**
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **Precipitation totals from Seatac Airport (USDA NRCS, 2021b) demonstrated wetter than normal conditions for the three-month period preceding the site visit.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ____, 20% = ____	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
50% = ____, 20% = ____	0	= Total Cover	
Herb Stratum (Plot size: 3')			
1. *Phalaris arundinacea*	100	yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ____, 20% = ____		= Total Cover	
Woody Vine Stratum (Plot size: 15')			
1.			
2.			
50% = ____, 20% = ____	0	= 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:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
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: Bryophytes (5-10%) present on soil surface

Project Site: Litlle Lake Forest Trailhead Park (Parcel 1920079101)

SOIL

Sampling Point: DP2

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR2/2	100					Loam	Gravely
10-14	10YR3/2	95	10YR5/2	5	D	M	Clay Loam	
14+	7.5YR2.5/2	100					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 Soils Present? **Yes** ☐ **No** ☒

Remarks: Lots of cobbles, looks like gravel was placed here and then soil pushed over it.

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 Stresses 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):	na
Water Table Present?	Yes	☐	No	☒	Depth (inches):	na
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):	na

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: Litlle Lake Forest Trailhead Park (Parcel 1920079101) City/County: Enumclaw/WA Sampling Date: 12/10/2021

Applicant/Owner: King County State: WA Sampling Point: DP3

Investigator(s): Merci Clinton, Elyse Denkers Section, Township, Range: S20 T20N R7E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): A Lat: 47.21163 Long: -121.95222 Datum: NAD83

Soil Map Unit Name: Barneston gravelly ashy coarse sandy loam, 8 to 15 percent slopes 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? Are "Normal Circumstances" present? Yes ☒ No ☐

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 the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: **Precipitation totals from Seatac Airport (USDA NRCS, 2021b) demonstrated wetter than normal conditions for the three-month period preceding the site visit.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	10	yes	FAC
2. *Thuja plicata*	10	yes	FAC
3.			
4.			
50% = ____, 20% = ____	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rubus spectabilis*	40	yes	FAC
2.			
3.			
4.			
5.			
50% = ____, 20% = ____	40	= Total Cover	
Herb Stratum (Plot size: 3')			
1. *Urtica dioica*	20	yes	FAC
2. *Phalaris arundinacea*	80	yes	FACW
3. *Galium aparine*	5	no	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ____, 20% = ____	105	= Total Cover	
Woody Vine Stratum (Plot size: 15')			
1.			
2.			
50% = ____, 20% = ____	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x1 =	____
FACW species	____	x2 =	____
FAC species	____	x3 =	____
FACU species	____	x4 =	____
UPL species	____	x5 =	____
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:

Project Site: Litlle Lake Forest Trailhead Park (Parcel 1920079101)

SOIL Sampling Point: DP3

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR2.5/1	100					SCL	
8-9	charcol layer	100						
9-13	7.5YR2.5/1	97	7.5YR3/4	3	R	M	Clay Loam	
13+	7.5YR2.5/1	98	7.5YR2.5/3	2	R	M	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 Soils Present? **Yes** ☐ **No** ☒

Remarks: Top layer large pieces of wood mixed in.

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 Stresses 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):	na
Water Table Present?	Yes	☐	No	☒	Depth (inches):	na
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):	na

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

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

Remarks:

Appendix C

Site Photographs

Photographs from December 10, 2021, Natural Resources Site Visit, and November 30, 2021, Geotechnical Site Visit (documented in separate letter)

APPENDIX C: SITE PHOTOGRAPHS

Exhibit C-1: Southern portion of Property and General Location of DP1, Facing North (11/30/2021)

Exhibit C-2: Soil Pit Associated with DP1 (12/10/2021)

Exhibit C-3: Facing East from DP2 (12/10/2021)

Exhibit C-4: Northern Portion of Property, Facing North from DP2 (12/10/2021)

Exhibit C-5: Facing North at DP3 (12/10/2021)

Exhibit C-6: Northern Portion of Property, Facing North (12/10/2021)

SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Attachment to and part of Report: 106797-002
Date: January 19, 2022
To: Ms. Mary Lear, PE
King County Department of Natural Resources and Parks

Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report

A WETLAND/STREAM REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

Wetland delineation/mitigation and stream classification reports are based on a unique set of project-specific factors. These typically include the general nature of the project and property involved, its size and configuration, historical use and practice, the location of the project on the site and its orientation, and the level of additional risk the client assumed by virtue of limitations imposed upon the exploratory program. The jurisdiction of any particular wetland/stream is determined by the regulatory authority(ies) issuing the permit(s). As a result, one or more agencies will have jurisdiction over a particular wetland or stream with sometimes confusing regulations. It is necessary to involve a consultant who understands which agency(ies) has jurisdiction over a particular wetland/stream and what the agency(ies) permitting requirements are for that wetland/stream. To help reduce or avoid potential costly problems, have the consultant determine how any factors or regulations (which can change subsequent to the report) may affect the recommendations.

Unless your consultant indicates otherwise, your report should not be used:

- If the size or configuration of the proposed project is altered.
- If the location or orientation of the proposed project is modified.
- If there is a change of ownership.
- For application to an adjacent site.
- For construction at an adjacent site or on site.
- Following floods, earthquakes, or other acts of nature.

Wetland/stream consultants cannot accept responsibility for problems that may develop if they are not consulted after factors considered in their reports have changed. Therefore, it is incumbent upon you to notify your consultant of any factors that may have changed prior to submission of our final report.

Wetland boundaries identified and stream classifications made by Shannon & Wilson are considered preliminary until validated by the U.S. Army Corps of Engineers (Corps) and/or the local jurisdictional agency. Validation by the regulating agency(ies) provides a certification, usually written, that the wetland boundaries verified are the boundaries that will be regulated by the agency(ies) until a specified date, or until the regulations are modified, and that the stream has been properly classified. Only the regulating agency(ies) can provide this certification.

MOST WETLAND/STREAM "FINDINGS" ARE PROFESSIONAL ESTIMATES.

Site exploration identifies wetland/stream conditions at only those points where samples are taken and when they are taken, but the physical means of obtaining data preclude the determination of precise conditions. Consequently, the information obtained is intended to be sufficiently accurate for design but is subject to interpretation. Additionally, data derived through sampling and subsequent laboratory testing are extrapolated by the consultant who then renders an opinion about overall conditions, the likely reaction to proposed construction activity, and/or appropriate design. Even under optimal circumstances, actual conditions may differ from those thought to exist because no consultant, no matter how qualified, and no exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time. Nothing can be done to prevent

the unanticipated, but steps can be taken to help reduce their impacts. For this reason, most experienced owners retain their consultants through the construction or wetland mitigation/stream classification stage to identify variances, conduct additional evaluations that may be needed, and recommend solutions to problems encountered on site.

WETLAND/STREAM CONDITIONS CAN CHANGE.

Since natural systems are dynamic systems affected by both natural processes and human activities, changes in wetland boundaries and stream conditions may be expected. Therefore, delineated wetland boundaries and stream classifications cannot remain valid for an indefinite period of time. The Corps typically recognizes the validity of wetland delineations for a period of five years after completion. Some city and county agencies recognize the validity of wetland delineations for a period of two years. If a period of years has passed since the wetland/stream report was completed, the owner is advised to have the consultant reexamine the wetland/stream to determine if the classification is still accurate.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or water fluctuations may also affect conditions and, thus, the continuing adequacy of the wetland/stream report. The consultant should be kept apprised of any such events and consulted to determine if additional evaluation is necessary.

THE WETLAND/STREAM REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when plans are developed based on misinterpretation of a wetland/stream report. To help avoid these problems, the consultant should be retained to work with other appropriate professionals to explain relevant wetland, stream, geological, and other findings, and to review the adequacy of plans and specifications relative to these issues.

DATA FORMS SHOULD NOT BE SEPARATED FROM THE REPORT.

Final data forms are developed by the consultant based on interpretation of field sheets (assembled by site personnel) and laboratory evaluation of field samples. Only final data forms are customarily included in a report. These data forms should not, under any circumstances, be drawn for inclusion in other drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to reduce the possibility of misinterpreting the forms. When this occurs, delays, disputes, and unanticipated costs are frequently the result.

To reduce the likelihood of data from misinterpretation, contractors, engineers, and planners should be given ready access to the complete report. Those who do not provide such access may proceed under the mistaken impression that simply disclaiming responsibility for the accuracy of information always insulates them from attendant liability. Providing the best available information to contractors, engineers, and planners helps prevent costly problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because a wetland delineation/stream classification is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in written transmittals. These are not exculpatory clauses designed to foist the consultant's liabilities onto someone else; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

THERE MAY BE OTHER STEPS YOU CAN TAKE TO REDUCE RISK.

Your consultant will be pleased to discuss other techniques or designs that can be employed to mitigate the risk of delays and to provide a variety of alternatives that may be beneficial to your project.