Draft Critical Areas Report

Tumwater Roundabout, Operations and Maintenance Facility, and Parks Project

City of Tumwater, WA

Tumwater, Washington

January 12, 2024

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Abbreviations

CAR	Critical Areas Report
CARAs	Critical Aquifer Recharge Areas
City	City of Tumwater
DAREM	Direct Antecedent Rainfall Evaluation Method
DNR	(Washington State) Department of Natural Resources
DPS	Distinct Population Segment
Ecology	Washington State Department of Ecology
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FGDC	Federal Geographic Data Committee
FEMA	Federal Emergency Management Agency
FWHCA	Fish and Wildlife Habitat Conservation Area
GPS	Global Positioning System
HDR	HDR Engineering, Inc.
HGM	Hydrogeomorphic
IPaC	Information for Planning and Conservation
N/A	Not Applicable
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High Water Mark
PHS	Priority Habitats and Species
ROW	Right-of-Way
SF	Square Foot/Feet
SFHA	Special Flood Hazard Area
SP	Sample Plot
SWIFD	Statewide Integrated Fish Distribution
TMC	Tumwater Municipal Code
U	Unstable *(mapping designation)*
UOS	Unstable Old Slides *(mapping designation)*
URS	Unstable Recent Slides *(mapping designation)*
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area

1 Introduction

The City of Tumwater (City) is proposing to construct a new Operations and Maintenance Facility, park facility, a new roundabout at the intersection of Old Highway 99 SE and 79th Avenue SE, and frontage improvements to match existing improvement in surrounding areas.

This critical area report (CAR) has been prepared by HDR, Engineering, Inc. (HDR), to address those Critical Areas defined in the City's Critical Areas Code (Tumwater Municipal Code [TMC], Chapter 16.04.170) that occur in the project and the study area, which includes a 300-foot buffer around the tax parcels included in the project. TMC defines these critical areas as frequently flooded areas, wetlands, geologically hazardous areas, Fish and Wildlife Habitat Conservation Areas (FWHCAs), and critical aquifer recharge areas (CARAs) used for potable water.

1.1 Project Description

The Operations and Maintenance Facility on parcels 12712320400 and 12712320300 (7842 Trail End Drive SE and 1500 79th Avenue SE, respectively) will include several buildings, parking, access roads, staging areas for materials, a rain garden, and landscaping. The park facility on parcel 12712320200 (east of Trail ends Drive SE) is anticipated to include approximately 20 parking stalls, a 6,000-square-foot (SF) play area, a 1,500-SF fitness station, a welcome arch and interpretive art, 0.9 mile of paved trail, basketball and pickleball courts, open space, restrooms, and picnic areas.

The frontage improvements will match into existing frontage improvements on 79th Avenue and Trails End Road, and improvements will include stormwater improvements to meet the requirements of the City's *Drainage Design and Erosion Control Manual* (Tumwater 2018). The proposed roundabout includes improvements at the intersection of Old Highway 99 and 79th Avenue. This roundabout will be developed to be consistent with the City's Old Highway 99 corridor study and is required for truck access. The frontage improvements will include stormwater improvements to meet the City's *Drainage Design and Erosion Control Manual* and includes approximately 1,200 feet along the north side of 79th Avenue and approximately 700 feet along the east side of Trails End Road.

1.2 Study Area

The study area used for this CAR includes the tax parcels where the proposed new Operations and Maintenance Facility, park facility, new roundabout, and frontage improvements are proposed. In addition, the study area includes a 300-foot buffer around these tax parcels, as mapped in Figures 1 and 2.

The study area generally consists of a built and less developed areas. The built environment consists of primarily of existing roadways, industrial buildings to the northwest, a pick-n-pull business to the southeast, and the Olympia Airport to the west. The less developed portion of the study area consist of a relatively open and disturbed fields that appears to be actively managed and periodically mowed.

1.3 Project Setting

The topography of the study area is generally flat; though, the northeast corner of the study area slopes down and away from the project to a depressional area with no outlet. The study area generally consists of built and less developed areas. The built environment consists of primarily of existing roadways, industrial buildings to the northwest, a used car parts lot to the southeast, and the Olympia Airport to the west. The less developed portion of the study area consist of a relatively open and disturbed field that appears to be actively managed and periodically mowed.

The study area is located within Water Resource Inventory Area (WRIA) 13 (Deschutes watershed) and occurs within Section 11 and 12, Township 17N, R2W. The 270-square-mile Deschutes watershed is almost entirely within Thurston County. The Deschutes River is the major hydrologic basin in WRIA 13, with a number of smaller independent tributaries that drain into four saltwater inlets: Nisqually Reach, Henderson, Budd, and Eld. Approximately 26 percent of the watershed is within a city or designated Urban Growth Area, and much of the designated Urban Growth Areas for Olympia, Lacey, Tumwater and Rainier, along with agriculture, rural residential areas and commercial timberlands are within WRIA 13 (Ecology 2015).

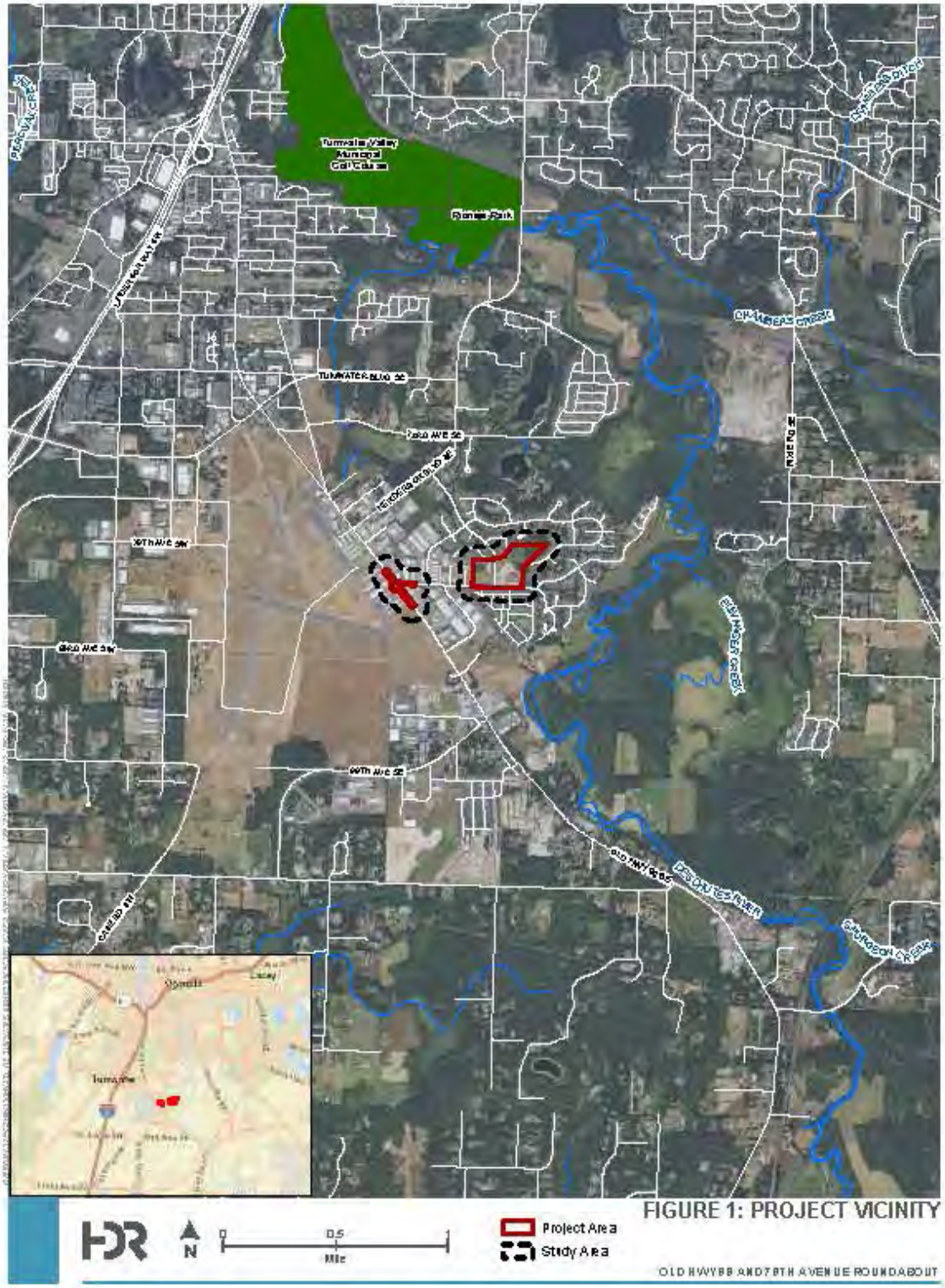

FIGURE 1: PROJECT VICINITY

OLD HWY 99 AND 79TH AVENUE ROUNDABOUT

FIGURE 2: WETLAND DELINEATION

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OLD HWY 99 AND 79TH AVENUE ROUNDABOUT

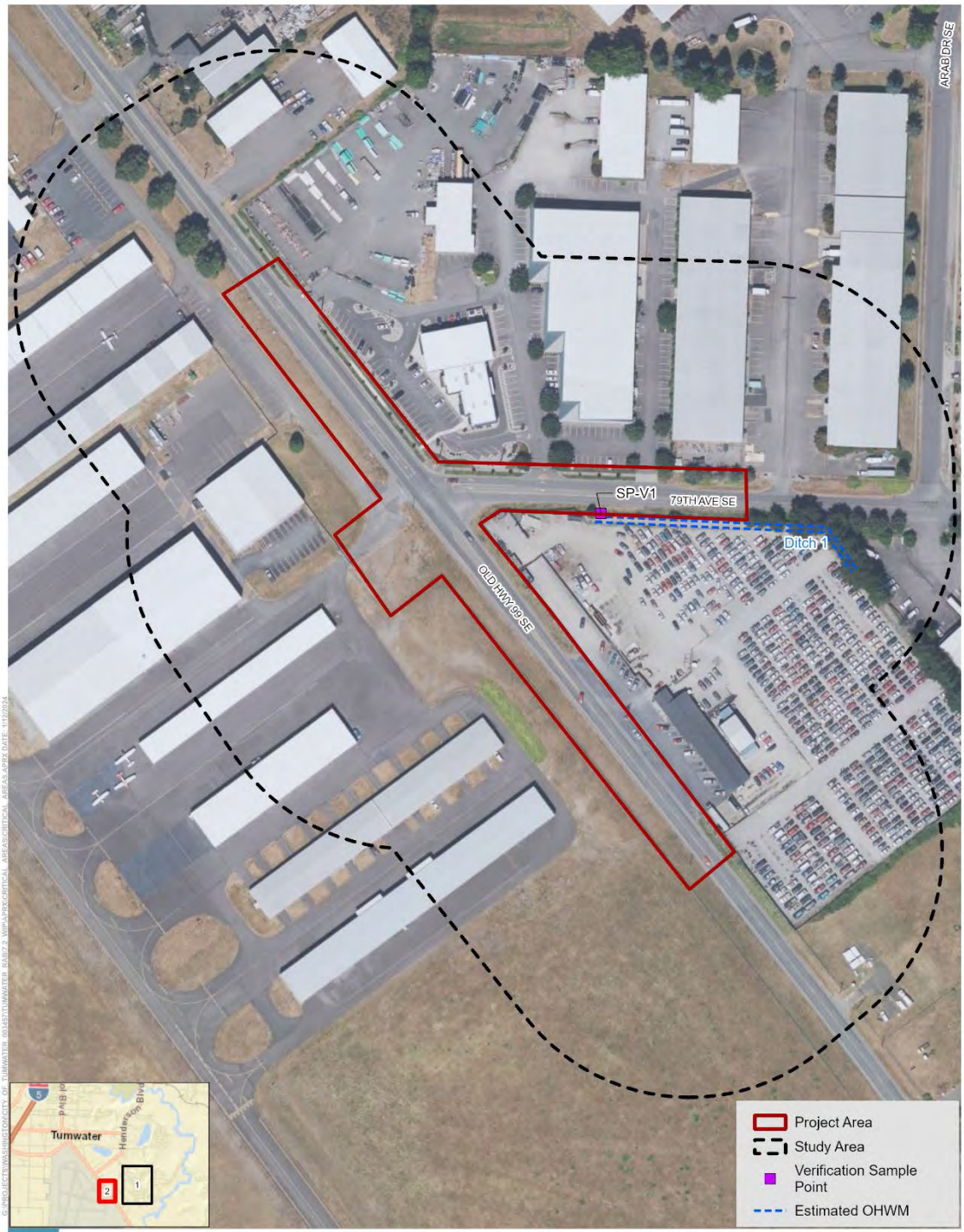

FIGURE 2: WETLAND DELINEATION
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OLD HWY 99 AND 79TH AVENUE ROUNDABOUT

2 City of Tumwater Applicable Regulations

The City regulates critical areas and their applicable buffers under TMC 16.04.170. Critical areas regulated by the City include frequently flooded areas, wetlands, geologically hazardous areas, FWHCAs, and areas with a critical recharging effect on aquifers used for potable water.

This report addresses critical areas that have been identified within the study area. Critical area classifications, required buffer widths, and mitigation requirements are discussed in the applicable sections below. Results of the critical area evaluation are discussed in Section 4; impacts to critical areas are described in Section 4.5; and mitigation requirements for critical areas are described in Section 5.5.

2.1 Frequently Flooded Areas

Frequently flooded areas are referred to by the City as special flood hazard areas (SFHAs; TMC 18.38.070), which is defined as "the land subject to inundation by the base flood. Special flood hazard areas are designated on flood insurance rate maps with the letters 'A' or 'V' including AE, AO, AH, A1-99 and VE. The special flood hazard area is also referred to as the area of special flood hazard or SFHA."

As established in TMC 18.38.140, a floodplain development permit is required before any construction or development begins within any area of special flood hazard.

2.2 Wetlands

The City regulates wetlands and their buffers under TMC 16.28. As stated in TMC 16.28.030(MM), wetlands are defined as:

> …those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas to mitigate conversion of wetlands. The approved federal wetland delineation manual and applicable regional supplements shall be used for identifying and delineating a wetland.

Pursuant to TMC 16.28.090, the City requires that wetlands be rated using the *Washington State Wetland Rating System for Western Washington*: *2014 Update*, Washington State Department of Ecology (Ecology) Publication 14-06-029, or as revised. So, the *Washington State Wetland Rating System for Western Washington: 2014 Update Version 2.0, Ecology*

Publication 23-06-009 was used (Hruby and Yahnke 2023). A detailed analysis of wetland functions is not included in this report; however, a brief description of wetland functions based on the wetland rating method is included in the general description of the identified wetlands. The City determines wetland buffers based on wetland rating category, wetland habitat function score, and whether or not general mitigation measures are applied. Standard buffer zone widths shall be required for all regulated activities adjacent to regulated wetlands and are provided in TMC Tables 16.28.170(1) to (4), and are described below in Table 1 and Table 2.

Table 1. Category I Wetland Buffer Widths

Wetland Characteristics	Buffer Widths by Impact of Proposed Land Use (apply most protective if more than one criterion is met)
Wetlands of high conservation value	Low – 125 feet
	Moderate – 190 feet
	High – 250 feet
Bogs	Low – 125 feet
	Moderate – 190 feet
	High – 250 feet
Forested	Buffer width to be based on score for habitat functions or water quality functions
High level of function for habitat (score for habitat 8–9 points)	Low – 150 feet
	Moderate – 225 feet
	High – 300 feet
Moderate level of function for habitat (score for habitat 5–7 points)	Low – 75 feet
	Moderate – 110 feet
	High – 150 feet
High level of function for water quality improvement (8–9 points) and low for habitat (less than 5 points)	Low – 50 feet
	Moderate – 75 feet
	High – 100 feet
Not meeting any of the above criteria	Low – 50 feet
	Moderate – 75 feet
	High – 100 feet

Note: The table includes buffers for wetlands scoring 23 points or more for all functions or having the "special characteristics" identified in the rating system.
Source: TMC Table 16.28.170(1)

To the extent that these characteristics apply to this project, the general mitigation measures in TMC Table 16.28.170(1) would be applied. Therefore, the reduced buffers within TMC 16.28.170 Tables (1), (2), (3), and (4) apply; these are shown here in Table 1 and Table 2.

Table 2. Wetland Buffers for All Regulated Activities Adjacent to All Category II–IV Regulated Wetlands

Wetland Category	Buffer Widths by Impact of Proposed Land Use (Apple Most Protective if More than One Criteria is Met)	Habitat Function Scores		
		<5	5–7	8–9
		Buffer Widths (in feet)		
II	Low	50	75	150
	Medium	75	110	225
	High	100	150	300
III	Low	40	75	Use Category II Wetland Buffer Widths
	Medium	60	110	
	High	80	150	
IV	Low	25	25	25
	Medium	40	40	40
	High	50	50	50

Source: TMC Table 16.28.170(2) to (4)

2.3 Geologically Hazardous Areas

Geologically hazardous areas, as defined by the City (TMC 16.20.040), include areas susceptible to erosion, landslide, seismic, volcanic, tsunami, or other geological events including mass wasting, debris flows, rock falls, and differential settlement. Geologically hazardous areas are designated as those areas that are susceptible to one or more of the types of hazards described below, or other areas that the city has reason to believe are geologically hazardous.

2.3.1 Erosion Hazard Areas

Erosion hazard areas are those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as having a "moderate to severe," "severe," or "very severe" rill and inter-rill erosion hazard.

2.3.2 Landslide Hazard Areas

Landslide hazard areas are areas potentially susceptible to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible to landslides because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors.

2.3.3 Seismic/Liquefaction Hazard Areas

Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting. Ground shaking is the primary cause of earthquake damage in Washington.

2.3.4 Volcanic Hazard Areas

Volcanic hazard areas are subject to pyroclastic flows, lava flows, debris avalanche, inundation by debris flows, lahars, mudflows, or related flooding resulting from volcanic activity.

Geologically hazardous areas will be covered under a separate geotechnical memo prepared by Sage Geotechnical, who are scheduled to perform their study in 2024 and are not discussed further in this report.

2.4 Fish and Wildlife Habitat Conservation Areas

FWHCAs are critical to the protection of suitable environments for animal species and in providing a natural beauty and healthy quality of life for Tumwater and its citizens (TMC 16.32.050). FWHCAs are described as follows (TMC 16.32.050):

1. The following fish and wildlife habitat areas are to be protected within the city of Tumwater:

    a. Areas with which state or federally designated endangered, threatened, and sensitive species have a primary association. The U.S. Fish and Wildlife Service [USFWS], the National Marine Fisheries Service [NMFS], and the State Department of Fish and Wildlife [WDFW] should be consulted as appropriate;

    b. Naturally occurring ponds under twenty acres and their submerged aquatic beds that provide fish and wildlife habitats, including artificial ponds intentionally created from dry areas in order to mitigate impacts to ponds. Naturally occurring ponds do not include ponds deliberately designed and created from dry sites, such as canals, detention facilities, wastewater treatment facilities, farm ponds, temporary construction ponds, and landscape amenities;

    c. Lakes, ponds, streams, and rivers with naturally occurring populations, and waters planted with game fish planted by a governmental or tribal entity;

    d. Waters of the state as classified in Chapter 222-16 WAC [Washington Administrative Code];

    e. Areas of rare plant species and high quality ecosystems as identified by the Washington State Department of Natural Resources [DNR] through the Natural Heritage Program.

2. Endangered, threatened, and sensitive habitats and species as identified by the Washington State Department of Fish and Wildlife and the habitat primarily associated with those species.

3. Locally significant habitats and species that have been designated as per the criteria in TMC 16.32.055.

4. All areas within Tumwater meeting one or more of the criteria in subsections 1, 2 and 3 of this section are subject to the provisions of this title and shall be managed consistent with the best available science, such as the “Washington State Department of Fish and Wildlife’s Management Recommendations for Priority Habitat and Species” as written or hereafter amended.

5. “Fish and wildlife habitat conservation areas” does not include such artificial features or constructs as irrigation delivery systems, irrigation infrastructure, irrigation canals, or drainage ditches that lie within the boundaries of and are maintained by a port district or an irrigation district or company.

Riparian habitat areas (buffers) are detailed in TMC 16.32.065 and summarized in **Error! Reference source not found.** below.

Table 3. Riparian Habitat Areas

Stream Type	Recommended RHA Width
Type 1 and 2; or shorelines of the state, or shorelines of statewide significance	250 feet
Type 3; or other perennial or fish-bearing streams, 5–20 feet wide	200 feet
Type 3; or other perennial or fish-bearing streams, <5 feet wide	100 feet
Types 4 and 5	50 feet

2.5 Critical Aquifer Recharge Areas

The City regulates CARAs under TMC 16.24. CARAs means those areas with a critical recharging effect on aquifers used for potable water as defined by WAC 365-190-030. CARAs include:

1. Those areas that have prevailing geologic conditions associated with infiltration rates that create a high potential for contamination of groundwater resources or contribute significantly to the replenishment of groundwater.
2. Wellhead protection areas defined by the boundaries of the ten-year time of groundwater travel, or boundaries established using alternate criteria approved by the Washington State Department of Health in those settings where groundwater time of travel is not a reasonable delineation criterion, in accordance with WAC 246-290-135.
3. Those critical aquifer recharge areas delineated by a hydrogeologic study prepared in accordance with the Washington State Department of Ecology guidelines.
4. Susceptible groundwater management areas as designated pursuant to Chapter 173-100 WAC.
5. Special protection areas as defined by WAC 173-200-090.
6. Those aquifer recharge areas meeting the criteria for susceptibility or vulnerability established by the Washington State Department of Ecology.
7. Sole source aquifers as designated by the U.S. Environmental Protection Agency under the Sole Source Aquifer Protection Plan authorized by Section 1424(e) of the Safe Drinking Water Act of 1974.

3 Study Methods

Critical areas were identified through a two-step process. HDR biologists first reviewed existing documents listed in Section 3.1. After this review, HDR biologists completed a thorough field investigation of the study area that included wetland and stream identification, delineation, and classification; a shoreline assessment; OWHM determination; and observations of FWHCAs.

Publicly available maps listed in Section 3.1 were utilized for the evaluation of areas of frequently flooded areas, wetlands, geologically hazardous areas, FWHCAs, and CARAs.

3.1 Review of Existing Information

HDR biologists reviewed the following existing environmental documents and online resources to determine the presence of critical areas in the study area:

- DNR Wetlands of High Conservation Value Map Viewer (DNR 2023a)
- DNR Forest Practices Application Mapping Tool (DNR 2023b)
- Ecology Washington State Coastal Atlas Map (Ecology 2023)
- Flood Map Service Center (FEMA 2023)
- Historical, seasonal, and current ESRI and Google Earth aerial photographs to determine probable locations for wetlands and water bodies
- NMFS Protected Resources Application (NMFS 2023)
- NRCS Web Soil Survey for Thurston County, Washington (NRCS 2023a)
- NRCS Field Office Climate Data for Thurston County, Station (NRCS 2023b)
- USFWS National Wetlands Inventory maps (USFWS 2023a)
- USFWS Information for Planning and Conservation (IPaC) Report (USFWS 2023b)
- USGS National Hydrography Dataset Maps (USGS 2023)
- WDFW PHS on the Web (WDFW 2023a)
- WDFW SalmonScape Online Mapper (WDFW 2023b)
- Statewide Integrated Fish Distribution (SWIFD) Web Map (WDFW 2023c)

These documents provide reference information on the soils, hydrology, land use, wildlife habitat, wetlands, and streams in the study area.

3.2 Evaluation of Antecedent Precipitation

Climate data for the project was determined from the Olympia Airport Station (Station identification number 456114), located approximately 0.5 mile to 1 mile west of the project sites. As with the project sites, the Olympia Airport weather station is located in the Puget Sound Lowlands climate division and is the station closest to the study area with the requisite data history to statistically determine the normality of recent precipitation (NRCS 2023b).

Weather conditions for the November site visit were cool and sunny. In general, weather conditions were fairly typical for November in Tumwater, with a daily high temperature of 53 degrees Fahrenheit (NRCS 2023b). Rainfall was zero on the day of the November 16, 2023, site visit.

Antecedent precipitation of the calendar year up to the date of the site investigation was approximately 24.91 inches, or 72 percent of the average. A total of 3.7 inch of precipitation was recorded for January 2023, which is below the normal range (average 7.8 inches). A total of 3.3 inch of precipitation was recorded for February 2023, which was below the normal range (average 5.09 inches). A total of 3.78 inch was recorded for March 2023, which was below the normal range (average 5.68 inches). A total of 6.21 inches of precipitation was recorded for April 2023, which was above the normal range (average 3.67 inches). A total of 0.59 inches was recorded for May 2023, which was below the normal range (average 2.26 inches). A total of 0.81 inches of precipitation was recorded for June, which is below the normal range (average 1.46). A total of 0.03 inches was recorded for July, which is below the normal range (average 0.53 inches). A total of 0.78 inches was recorded for August, which is below the normal range (average 0.96 inches). A total of 2.3 inches was recorded for September, which I above the normal range (average 2.04 inches). A total of 3.41 inches was recorded for October, which is below the normal range (average 5.06 inches).

Precipitation data for the 2 weeks prior to the start of the November 16 site visit was collected from the Olympia Airport Station. The area received 5.53 inches of precipitation in the 2 weeks prior to the field investigations, which was 139 percent of the normal rainfall for this period.

Precipitation data in the months prior to the November site visit was analyzed using the Direct Antecedent Rainfall Evaluation Method (DAREM) (Sumner et al. 2009). Conditions were determined to be normal for this time of year and were not expected to significantly influence the presence or absence of wetland hydrology indicators. The DAREM for the November investigation is provided in Appendix E.

Table 4. Summary of Precipitation between January 2023 and November 2023

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Percent of Average Recorded	30% Chance Less-Than or More-Than Ranges for Normal Precipitation (inches)
January 2023	3.7	7.8	47	<5.95 >9.02
February 2023	3.3	5.09	65	<3.09 >6.16
March 2023	3.78	5.68	67	<4.01 >6.73
April 2023	6.21	3.67	169	<2.48 >4.38
May 2023	0.59	2.26	26	<1.19 >2.75
June 2023	0.81	1.46	56	<0.85 >1.77
July 2023	0.03	0.53	6	<0.02 >0.63
August 2023	0.78	0.96	81	<0.35 >1.12
September 2023	2.3	2.04	113	<0.97 >2.38
October 2023	3.41	5.06	67	<3.3 >6.09
Total	24.91	34.55	72	N/A

3.3 Field Investigation

A field investigation was conducted by qualified HDR biologists on November 16, 2023. Field investigation methods for wetland and stream delineations are provided below.

3.3.1 Wetlands

Wetlands were identified through a two-step process. HDR staff first reviewed existing documents, including soil surveys, wetland and stream inventories, aerial photographs, and other reports listed in Section 3.1. After this review, HDR staff completed a thorough field

investigation of the study area that included wetland verification, delineation, and classification that is discussed below.

3.3.1.1 WETLAND DELINEATION AND ASSESSMENT

Biologists delineated wetlands within the study area using the three parameter methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and updated by the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region—Version 2.0* (USACE 2010). A detailed description of the field methods used in the study is provided in Appendix A. Formal paired data plots were collected to characterize the wetland identified within the study area, and verification plots were collected to characterize conditions in an additional upland area. Data from all plots are presented in Appendix B.

Delineated wetland boundaries, verification plots, and sample plots (SPs) were surveyed using a Trimble DA2 GPS capable of sub-meter accuracy. The resulting data from the delineations were then incorporated into an existing conditions map (**Error! Reference source not found.**).

Wetland habitats in the study area were also classified according to the system outlined by USFWS in *Classification of Wetlands and Deepwater Habitats of the United States (*Cowardin et al. 1979; FGDC 2013). The Cowardin system classifies wetlands based primarily on their dominant vegetation structures and water regimes. A detailed analysis of wetland functions is not included in this report, but a brief description is provided.

3.3.1.2 WETLAND RATING

Wetland ratings are used by regulatory agencies to help determine wetland buffers, mitigation replacement ratios, and permitted uses in wetlands. Ratings are based on a wetland's sensitivity to disturbance, rarity within a region, functions, and values. Generally, wetlands that have not been altered significantly due to urbanization have structural and spatial diversity, and those that are hydrologically connected to streams have a higher rating.

As required by the City, on-site wetlands were rated using the *Washington State Wetland Rating System for Western Washington: 2014 Update Version 2.0*, Ecology Publication 23-06-009 (Hruby and Yahnke 2023). Table 5 summarizes this rating system. A wetland rating form is provided in Appendix C.

Table 5. Wetland Rating System for Washington State Department of Ecology

Regulatory Agency	Wetland Category			
	I	II	III	IV
Washington State Department of Ecology City of Tumwater	Category I wetlands represent a unique or rare wetland type, are more sensitive to disturbance than most wetlands, are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime, or provide a high level of functions. Specific wetlands that meet the Category I criteria include: • Relatively undisturbed estuarine wetlands more than 1 acre in size • Wetlands of high conservation value that are identified by scientists of the Washington Natural Heritage Program/DNR • Bogs • Mature and old-growth forested wetlands more than 1 acre in size • Wetlands in coastal lagoons • Wetlands that perform many functions well (scoring a total of 23 or more points on the rating form)	Category II wetlands are difficult, though not impossible, to replace, and provide high levels of some functions. Specific wetlands that meet the Category II criteria include: • Estuarine wetlands smaller than 1 acre in size, or disturbed estuarine wetlands larger than 1 acre • Wetlands with a moderately high level of functions (scoring between 20 and 22 points total on the rating form)	Category III wetlands generally have been disturbed in some ways and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands. Specific wetlands that meet the Category III criteria include: • Wetlands with a moderate level of functions (scoring between 16 and 19 points total on the rating form) • Wetlands that can be adequately replaced with a well-planned mitigation project	Category IV wetlands have the lowest levels of functions and are often heavily disturbed. Specific wetlands that meet the Category IV criteria include: • Wetlands scoring 15 or fewer total points on the wetland rating form

Source: Hruby and Yahnke (2023), TMC 16.28.090

3.3.2 Fish and Wildlife Habitat Conservation Areas

FWHCAs were identified through a two-step process. HDR staff first reviewed existing documents including online stream inventories, aerial photographs, Priority Habitats and Species (PHS) data, and other reports that concern FWHCAs in the project vicinity. After this review, biologists completed a thorough field investigation of the study area that included stream identification, delineation, and classification and identification of other potential FWHCAs in the study area.

This section presents the methods for identifying FWHCAs in the study area, including state-designated PHS, federally listed threatened and endangered species, streams, and other FWHCAs as discussed in TMC 19.37.190.

3.3.3 Ordinary High-Water Mark Determination

HDR biologists identified the ordinary high-water mark (OHWM) in the study area following Ecology guidance for OHWM identification (Anderson et al. 2016), which is based on the

Shoreline Management Act (Revised Code of Washington 90.58.030(2)(b) and WAC 173-22-030(11)). Per Chapter 90.50 of the Washington State Shoreline Act, the OHWM is defined as:

> …that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or at it may change thereafter in accordance with permits issued by a local government or the Department of Ecology. Provided, that in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water.

3.3.4 Streams

Stream typing was determined through an assessment of the available habitat, the hydrologic condition of surface waters, the DNR Forest Practices Application Mapping Tool (DNR 2023a), WDFW SalmonScape (WDFW 2023c), and the U.S. Fish and Wildlife Service (USFWS) IPaC Report for the project (USFWS 2023b).

Stream typing follows the guidance in WAC 222-16-030, as addressed above in Section 2.4.

3.3.5 Habitats and Species

Online resources such as PHS and the USFWS IPaC tool were used to identify threatened and endangered species that may occur within the study area. During the site visits of November 16, 2023, encounters (sightings) with species of concern and observations of habitat were noted. However, this assessment did not include wildlife trap and release, fish shocking, breeding bird surveys, or any other study of fish or wildlife presence/absence.

4 Results

This section presents the results of the review of background information and the field investigation. There are no frequently flooded areas or CARAs in the study area. Wetlands, geological hazards, and FWHCAs were identified in the study area. All critical area findings are discussed below.

4.1 Frequently Flooded Areas

Per review of the Federal Emergency Management Agency (FEMA) Flood Map Service Center (FEMA 2023), the study area is not within regulatory floodways and floodplains (FEMA Flood Insurance Rate Map Panel 53067C0282F, effective June 2, 2016).

4.2 Wetlands

HDR biologists identified and delineated one wetland, Wetland 1, within the study area. The wetland delineated in the study area extended off site, as indicated by the approximate total acreage provided in Table 6 (**Error! Reference source not found.**). A description and summary of the characteristics of Wetland 1 is provided in Table 7. Wetland determination

forms are presented in Appendix B. A Wetland Rating Form is included in Appendix C. A photo appendix is included in Appendix D. The wetland and its buffer are shown on **Error! Reference source not found.**.

Table 6. Summary of Wetlands Delineated in Study Area

Wetland Name	Total Wetland Size (approx. total acres)	Wetland Size in Study Area	HGM Classification[a]	Cowardin Classification[b]	Wetland Rating[c]	Wetland Buffer (feet)[d]
Wetland 1	2.2 acres	1.3 acres	Depressional	PFO	II	110

Note: Approx. = approximate.
[a] Brinson 1993.
[b] Cowardin et al. 1979; FGDIC 2013. PFO = Palustrine Forested.
[c] Hruby and Yahnke 2023.
[d] Standard wetland buffer, as specified in TMC Table 16.28.170(2).

Table 7. Wetland 1 Summary

<table>
<tr><th colspan="3">WETLAND 1 – INFORMATION SUMMARY</th></tr>
<tr><td>Location:</td><td colspan="2">46.974350, - 122.879486</td></tr>
<tr><td colspan="2" rowspan="11">  </td><td>Local Jurisdiction</td><td>City of Tumwater</td></tr>
<tr><td>WRIA</td><td>13</td></tr>
<tr><td>Ecology Rating (Hruby and Yahnke 2023)</td><td>II</td></tr>
<tr><td>Water Quality</td><td>7</td></tr>
<tr><td>Hydrologic</td><td>8</td></tr>
<tr><td>Habitat</td><td>7</td></tr>
<tr><td>Local Rating</td><td>II</td></tr>
<tr><td>Local Buffer Width</td><td>110 feet</td></tr>
<tr><td>Wetland Size (Total)</td><td>2.2 acres</td></tr>
<tr><td>Cowardin Classification</td><td>PFO</td></tr>
<tr><td>HGM Classification</td><td>Depressional</td></tr>
<tr><td>Wetland Data Sheet(s)</td><td>W1-P1</td></tr>
<tr><td>Upland Data Sheet(s)</td><td>W1-P2</td></tr>
<tr><td>Dominant Vegetation</td><td colspan="2">Wetland 1 is a depressional wetland with palustrine forested habitat. Dominant vegetation consists of Pacific willow (Salix lasiandra, FACW) and creeping buttercup (Ranunculus repens, FAC). Other species present include western red cedar (Thuja plicata, FAC), red osier dogwood (Cornus alba, FACW), and Douglas spiraea (Spiraea douglasii, FACW). The vegetation community in Wetland 1 is hydrophytic.</td></tr>
<tr><td>Soils</td><td colspan="2">Soils in Wetland 1 are mapped as Mukilteo muck and Indianola loamy sand. Observed soils consist of 9 inches of very dark, grayish brown (10YR 3/2) loam with redoximorphic features over 7 inches of dark, yellow (2.5Y 3/2) sandy loam with redoximorphic features. Soils meet hydric soil indicators for a redox dark surface (F6).</td></tr>
<tr><td>Hydrology</td><td colspan="2">This wetland is situated in a depression with no surface water outlet. Hydrology inputs are from surface runoff and precipitation. One primary wetland hydrology indicator was observed: saturation (A3); and two secondary wetland hydrology indicators were observed: geomorphic position (D2) and FAC-neutral test (D5). A water table was observed at a depth of 14 inches near the wetland boundary.</td></tr>
<tr><td>Rationale for Delineation</td><td colspan="2">The boundaries of Wetland 1 were determined in the field where the wetland transitioned to uplands. This transition within the study area was gradual and marked by a subtle change in topography, a distinct change in vegetation and hydrology, and a faint transition in soils. The wetland boundary that extended off site was marked by a distinct topographic break and change in vegetation, soils, and hydrology.</td></tr>
<tr><td>Rationale for Local Rating</td><td colspan="2">Wetland 1 is rated Category II using the current Ecology rating system because it provides high water quality (7), high hydrologic (8), and high habitat (7) functions, scoring 22 points on the wetland rating form.</td></tr>
<tr><th colspan="3">Wetland Functions Summary</th></tr>
<tr><td>Water Quality</td><td colspan="2">Wetland 1 has high potential to provide water quality functions as the wetland is located in a depression with no surface water outlet, mapped with Mukilteo muck, has persistent plants over 95% of the wetland, and more than 25% of the total area of the wetland is seasonally ponded. It has moderate opportunity to perform the function because 10% of the area within 150 feet includes land uses that generate pollutants. Performance of this function is of moderate value to society because the wetland is located in a basin with a resource on the 303(d) list.</td></tr>
</table>

WETLAND 1 – INFORMATION SUMMARY	
Hydrologic	Wetland 1 has high potential to reduce flooding and erosion because it is a depressional wetland with no outlet, has marks of ponding between 2 feet to less than 3 feet from the surface, and a contributing basin less than 10 times the area of the unit. It has moderate opportunity to perform the function because more than 10% of the area within 150 feet of the wetland generates excess runoff. There are flooding problems that occur downstream; therefore, performance of this function is of high value.
Habitat	Wetland 1 has three vegetation structure, two hydroperiods, moderate plant diversity, moderate interspersion, and presence of special habitat features, which contributes to a moderate habitat potential. It is located within a landscape that has a moderate potential to support the habitat functions due to a moderate proportion of undisturbed habitat within a 1-kilometer radius. Performance of this function has high value to society because the wetland is mapped as a location for an individual WDFW priority species, which includes Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), and myotis spp. (*Myotis yumanensis/lucifigus*).

4.3 Geological Hazards

According to the Tumwater Geologically Hazardous Areas map (Tumwater 2016), geological hazards within the study area include steep slopes, which are identified in the northeast extent of the study area. No other geologically hazardous areas were identified within the study area.

An assessment of geologic hazards including erosion hazard areas, landslide hazard areas, seismic hazard areas, volcanic hazard areas, tsunami hazard areas, and other geological events including mass wasting, debris flows, rock falls and differential settlement will be included in a Draft Geotechnical Report, which will be prepared for the proposed project in 2024 by Sage Geotechnical.

4.4 Fish and Wildlife Habitat Conservation Areas

The FWHCAs identified in the study area include potentially suitable habitats for federal and state-designated threatened and endangered species, state-designated PHS. There are no habitats and species of local importance in the study area.

4.4.1 Streams

No streams, lakes, or marine waters are in the study area.

4.4.2 Ditches

There was one surface water drainage, D1, within the study area (Figure 2). D1 is approximately 8-foot-wide and approximately 405-foot-long artificial and excavated drainage feature. D1 does not meet the definition of a FWCHA and does not have a required. This feature is located on a private pick-n-pull property to the south of 79th Avenue SE and to the east of Old Highway 99 in the southwest corner of the study area. D1 and this private parcel are not proposed to be impacted by the project.

D1 was unvegetated and inundated during the field investigation. No surface flow, inlets, or outlets were observed during the field investigation. D1 is likely groundwater driven and captures surface water from 79th Avenue SE, Old Highway 99, and the pick-n-pull yard. The waterway is part of the City stormwater drainages system and drains to a detention pond to the north (Tumwater 2023).

4.4.3 Federally Listed Threatened and Endangered Species

Critical components of the habitats of federally or state-listed endangered, threatened, candidate, sensitive, and priority wildlife or plant species which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term are considered Habitats of Primary Association and a City-regulated FWHCA. Habitats of Primary Association include, but are not limited to, winter ranges, migration ranges, breeding sites, nesting sites, regular large concentrations, communal roosts, roosting sites, staging areas, and "priority habitats" listed by the WDFW.

The USFWS IPaC site indicates that the following ESA-listed species are potentially present within the study area:

- Olympia pocket gopher (*Thomomys mazama pugetensis*): threatened
- Marbled murrelet (*Brachyramphus marmoratus*): threatened
- Streaked horned lark (*Eremophila alpestris strigata*): threatened
- Yellow-billed cuckoo (*Coccyzus americanus*): threatened
- Northwestern pond turtle (*Actinemys marmorata*): Proposed threatened
- Oregon spotted frog (*Rana pretiosa*): threatened
- Monarch butterfly (*Danaus plexippus*): candidate
- Taylor's checkerspot (*Euphydryas editha taylori*): endangered
- Bull Trout (*Salvelinus confluentus*): threatened

Species proposed or listed as threatened or endangered under the Federal Endangered Species Act (ESA) that have the potential to occur within the project corridor are shown in Table 8 (NMFS 2023; USFWS 2023b; WDFW 2023a). These species are discussed further in the text below. ESA listed salmonoid species do not occur within the study area as there are no streams, lakes or marine areas located within the study area, therefore, ESA listed salmonoid species are not included the Table 8.

Table 8. Summary of Federally Threatened, Endangered, and Sensitive Species Potentially Occurring in Study Area

Species	ESU/DPS	Federal Listing Status	Agency	Critical Habitat
Birds				
Marbled murrelet (*Brachyramphus marmoratus*)	N/A	Threatened	USFWS	Designated but not in study area
Streaked horned lark (*Eremophila alpestris strigata*)	N/A	Threatened	USFWS	Designated but not in study area

Species	ESU/DPS	Federal Listing Status	Agency	Critical Habitat
Yellow-billed cuckoo (*Coccyzus americanus*)	Western DPS	Threatened	USFWS	Designated but not in study area
Mammals				
Olympia pocket gopher (*Thomomys mazama pugetensis*)	N/A	Threatened	USFWS	Designated but not in study area
Reptile and Amphibians				
Northwestern pond turtle (*Actinemys marmorata*)	N/A	Proposed threatened	USFWS	None designated
Oregon Spotted Frog *(Rana pretensis*)	N/A	Threatened	USFWS	Designated but not in study area
Fish				
Bull Trout (*Salvelinus confluentus*)	Coterminous United States	Threatened	USFWS	Designated but not in study area
Insects				
Monarch butterfly (*Danaus plexippus*)	N/A	Candidate	USFWS	None designated
Taylors checkerspot (*Euphydryas editha taylori*)	N/A	Endangered	USFWS	Designated but not in study area

DPS = Distinct Population Segment; ESU = Evolutionarily Significant Unit.

4.4.3.1 MARBLED MURRELET

Murrelets are small seabirds that spend the majority of their lives in the marine environment, returning to old-growth or mature forest stands for nesting. Most nests are in conifers more than 150 years old and in trees greater than 55 inches in diameter at breast height. Foraging marbled murrelets are most abundant in the waters of northern Puget Sound and the Strait of Juan de Fuca and are least abundant along the coast of southwestern Washington (Raphael et al. 2016).

WDFW PHS data (2023a) indicate that there are no occurrences of marbled murrelets or their habitat near the study area. Given the project location near marine waters and the nesting areas in the Cascades to the east, it is possible that a few marbled murrelets could fly over the study area while transiting between marine foraging areas and inland nesting sites. No suitable nesting habitat occurs in the study area. The project study area does not include designated critical habitat for marbled murrelet.

4.4.3.2 STREAKED HORNED LARK

In Washington, streaked horned larks are found on prairies and grassland south of Puget Sound, coastal beaches, and islands and sparsely vegetated shoreline sites on the lower Columbia River. Their habitat consists of large expanses of bare or sparsely vegetated land including fields, prairies, upper beaches, airports, and similar areas with low or sparse grassy

vegetation. Potential habitat could occur within the open fields of the Olympia Airport outside o the project area.

WDFW PHS data (2023a) indicate the presence of streaked horned lark nests within the Olympia Airport and their occurrence within the western portion of the roundabout project study area. The project study area does not include designated critical habitat for streaked horned lark, nor is the Olympia Airport designated as critical habitat.

4.4.3.3 YELLOW-BILLED CUCKOO

Yellow-billed cuckoos display a strong preference for large, continuous riparian zones with cottonwoods and willows. In Washington, nesting also takes place in fir woodlands and open brushy hillsides. WDFW PHS (2023a) data do not include any documented occurrences of yellow-billed cuckoo or their habitat within the study area. Suitable habitat for yellow-billed cuckoo does not occur in the study area. The study area does not include designated critical habitat for yellow-billed cuckoo.

4.4.3.4 OLYMPIA POCKET GOPHER

The Olympia pocket gopher is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. In Washington, Olympia pocket gophers live in well drained, easily crumbled soil, which includes many of the prairies and grassland soils that were deposited in the south Puget Sound area of Washington State after the last glacial retreat. Olympia pocket gophers are known to occupy a large area at the Olympia Airport and multiple isolated sites are scattered across its range. The Olympia Airport may contain thousands of individuals due to its size (USFW 2023d). WDFW PHS data identify the Olympia Airport as critical habitat, and has identified over 6,000 surface mounds over virtually all open grassland area at the Airport. PHS has also identified mounds on parcel 12712230301 and 12712230303, which are located directly to the west of the proposed operations and maintenance facility. The Olympia Airport is identified as critical habitat for the Olympia Pocket Gopher. A comprehensive habitat Conservation Plan for the threatened Olympia subspecies of the Mazama pocket gopher in Tumwater, Washington was prepared by Krippner Consulting (Krippner 2022).

4.4.3.5 NORTHWESTERN POND TURTLE

The northwestern pond turtle is one of two turtle species native to Washington, and they occur in open upland habitats that receive extensive sun exposure such as prairies in the Puget Sound region, oak-pine savanna and other more open forest types in the Columbia Gorge, and pasture land. The turtles utilize a variety of flowing and still water habitats in other parts of their range, but in Washington they are known to inhabit only ponds and lakes.

WDFW PHS (2023a) data do not include any documented occurrences of northwestern pond turtles or their habitat within the study area. Though not identified by PHS, the project locations are within their range, and Wetland 1 does provide suitable habitat for northwestern pond turtles. As a proposed species, critical habitat has not been proposed or designated for the northwestern pond turtle.

4.4.3.6 OREGON SPOTTED FROG

The Oregon spotted frog is highly aquatic and rarely found away from water. Extant populations occur in large shallow wetlands systems associated with a stream or stream network. Breeding habitat is seasonally flooded margins of wetlands and areas of extensive shallows (approximately 6 to 8 inches deep). WDFW PHS (2023a) data do not include any documented occurrences of Oregon spotted frog or their habitat within the study area. Though not identified by the PHS, the parks study area is within their active range, and Wetland 1 could provide suitable habitat for Oregon spotted frogs. Designated critical habitat is not located within the study area.

4.4.3.7 BULL TROUT

Bull Trout were federally listed as threatened under the ESA in 1998 and are a state candidate species. All Bull Trout within the coterminous United States are listed as threatened under a single Distinct Population Segment (DPS). This population segment is geographically segregated from other subpopulations by the Pacific Ocean and the crest of the Cascade Mountain Range. It is significant to the species as a whole because it is thought to contain the only anadromous forms of Bull Trout in the coterminous United States. No fish-bearing streams were delineated within the study areas, and therefore no Bull Trout are expected within the study area. Designated critical habitat is not located within the study area.

4.4.3.8 MONARCH BUTTERFLY

The monarch butterfly is a migratory species that relies on milkweed plants and nectar sources for reproduction and migration resources, respectively. During spring and summer, monarchs breed throughout the U.S. and southern Canada and are dependent on milkweed species (*Asclepias* spp.) for reproduction (USFS 2023). There were no observed milkweed species within the study area, and suitable habitat does not occur within the study area. As a candidate species, critical habitat has not been proposed or designated for the monarch butterfly.

4.4.3.9 TAYLOR'S CHECKERSPOT

The Taylor's checkerspot is an endemic butterfly to the Pacific Northwest that inhabits open prairies and Garry Oak meadows and balds, where abundant food plants are available for larvae and adult feeding. They are primarily associated with concentrated patches of high-quality habitat, consisting of short-statured forbs and grasses that provide food and microsite conditions needed to support larvae and adults during the spring season (USFWS 2023c).

WDFW PHS data (2023a) indicate that there are no occurrences of Taylor's checkerspot or their habitat within the study area. Based on observed vegetation within the study area, suitable habitat does not occur within the study area.

4.4.4 State-Designated Priority Habitats and Species

State-designated PHS are another category of Habitats of Primary Association and a City-regulated FWHCA.

The WDFW PHS database (WDFW 2023a) lists occurrences of big brown bat (*Eptesicus fuscus*), myotis spp. (*Myotis yumanensis/lucifigus*) and Townsend's big-eared bat (*Corynorhinus*

townsendii) as having the species or their habitat occurring within or near the study area. The Oregon vesper sparrow (*Pooecetes gramineus affinis*) is also listed as occurring within the roundabout study area, with nests observed within the Olympia Airport.

4.5 Critical Aquifer Recharge Areas

There are no Critical Aquifer Recharge Areas located within the study area.

5 Impacts

This section describes project impacts to critical areas within the study area. Impacts to frequently flooded areas, wetlands, streams, threatened and endangered species, and other FWHCAs are considered.

5.1 Frequently Flooded Areas

There are no floodplains within the study area, therefore, there will be no impacts to floodplains.

5.2 Wetlands

There are no wetland or wetland buffer impacts. With the avoidance of Wetland A and the implementation of Best Management Practices to minimize sedimentation and erosion during construction, both temporary and permanent impacts to wetlands and wetland buffers will be avoided. Wetland 1 is mapped in Figure 2 and the Trails End Park Master Plan is provided in Appendix F. There are no other project impacts that occur in the vicinity of Wetland 1.

Documentation of mitigation sequencing relating to wetland impacts is provided in Section 5.5.

5.3 Geological Hazards

An assessment of geologic hazards including erosion hazard areas, landslide hazard areas, seismic hazard areas, volcanic hazard areas, tsunami hazard areas, and other geological events including mass wasting, debris flows, rock falls and differential settlement will be included in a Draft Geotechnical Report, which will be prepared for the proposed project in 2024 by Sage Geotechnical.

5.4 Fish and Wildlife Habitat Conservation Areas

This section describes project impacts to FWHCAs, including threatened, endangered, and sensitive species; water bodies; and other FWHCAs.

5.4.1 Streams

There are no streams within the study area; therefore, there will be no impacts to streams.

5.4.2 Federal and State Threatened, Endangered, and Sensitive Species

Per TMC 16.32.050,

> No person, corporation, or other legal entity shall engage in construction on a site which supports a protected fish and wildlife habitat area as defined by this chapter without having received approval for proper protection or mitigation by the city

through the environmental review process and/or applicable discretionary permit(s) and construction permit(s).

Anticipated impacts to state and ESA-listed species in the study area are summarized below.

5.4.2.1 MARBLED MURRELET

Based on no documented occurrences and lack of suitable habitat in the study area, no impacts to marbled murrelets are anticipated to occur as a result of the proposed project.

5.4.2.2 STREAKED HORNED LARK

The streaked horned lark is known to occur near the study area. There is no ground disturbance that will occur within potential suitable habitat. Indirect impacts to the streaked horned lark may occur from noise during construction. Therefore, the project may affect, but is not likely to adversely affect, the streaked horned lark.

5.4.2.3 YELLOW-BILLED CUCKOO

Based on no documented occurrences and lack of suitable habitat in the study area, no impacts to yellow-billed cuckoos are anticipated to occur as a result of the proposed project.

5.4.2.4 OLYMPIA POCKET GOPHER

A habitat conservation plan for the threatened Olympia pocket gopher was developed in April 2022 and discussed potential impacts to the pocket gopher as a result of the project. (Krippner Consulting 2022). In summary, impacts to Olympia pocket gophers incidental to the proposed development may result from direct and indirect impacts. Direct impacts are those caused by or resulting from the proposed project and include, but are not limited to, mortality of individuals due to crushing within burrows as a result of heavy equipment operations; or injury of individuals during digging, soil excavation, or trenching activities. Indirect impacts are those caused by, or resulting from, the proposed project and are later in time but are still reasonably certain to occur. Indirect impacts include effects such as removal of vegetation that the species eats, or compaction of soils resulting in destroyed burrow systems. Gophers are likely to be impacted on the project site both directly by excavation and grading activities and indirectly by activities that result in vegetation removal and soil compaction during construction.

5.4.2.5 NORTHWESTERN POND TURTLE

Northwestern pond turtles are not documented to occur in the study area based on review of WDFW PHS data (2023a), and critical habitat is not designated or proposed. Wetland 1 does provide potential habitat, though no impacts are associated with Wetland 1. Therefore, no impacts to northwestern pond turtles or their habitat are expected to occur as a result of the proposed project.

5.4.2.6 OREGON SPOTTED FROG

Oregon spotted frogs are not documented to occur in the study area based on a review of WDFW PHS data (2023a) and there is no designated critical habitat within the study area. Wetland 1 does provide potential habitat, though no impacts are associated with Wetland 1. Therefore, no impacts to Oregon spotted frogs or their habitat are expected to occur as a result of the proposed project..

5.4.2.7 MONARCH BUTTERFLY

Monarch butterflies are not expected to occur in the study area, and critical habitat is not designated or proposed. Habitat supporting breeding and larval monarch butterflies is not present in areas that would be subject to land disturbance and vegetation removal; therefore, habitat would not be reduced, disturbed, or eliminated. The project is expected to have no effect on monarch butterflies.

5.4.2.8 TAYLOR'S CHECKERSPOT

Taylor's checkerspot butterflies are not expected to occur in the study area, and there is no designated critical habitat in the study area. Habitat supporting breeding and larval Taylor's checkerspot butterflies is not present in areas that would be subject to land disturbance and vegetation removal; therefore, habitat would not be reduced, disturbed, or eliminated. Though the study areas do include grassy patches, much is actively managed and disturbed. The project is expected to have no effect on Taylor's checkerspot.

5.4.2.9 BIG BROWN BAT

The big brown bat is known to occur near the study area. Indirect impacts to the little brown bat may occur from noise during construction. Therefore, the project may affect, but is not likely to adversely affect, the little brown bat.

5.4.2.10 YUMA MYOTIS

The Yuma myotis is known to occur near the study area. Indirect impacts to the Yuma myotis may occur during construction from noise. Therefore, the project may affect, but is not likely to adversely affect, Yuma myotis.

5.4.2.11 TOWNSEND'S BIG-EARED BAT

The Townsend's big-eared bat is known to occur near the study area. Indirect impacts to the Yuma myotis may occur during construction from noise. Therefore, the project may affect, but is not likely to adversely affect, Yuma myotis.

5.5 Critical Aquifer Recharge Areas

There are no Critical Aquifer Recharge Areas located within the study area.

6 Mitigation

No mitigation is required for the proposed project as there are no direct or indirect impacts to wetlands, streams, frequently flooded areas, geologically hazardous areas, or CARAs. Potential impacts to the Olympia pocket gopher are covered under the Habitat Conservation Plan for Threatened Olympia Subspecies of the Mazama pocket gopher (Krippner 2022).

7 References

Anderson, P.S., S. Meyer, P. Olson, and E. Stockdale

2016 Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State. Shorelands and Environmental Assistance Program, Olympia, Washington: Washington State Department of Ecology Publication 16-06-029.

Brinson, M.M.

1993 *A Hydrogeomorphic Classification of Wetlands*. Technical Report WRP-DE-4, prepared for the U.S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe

1979 Classification of Wetlands and Deepwater Habitats of the United States. Government Printing Office, Washington, DC.

DNR (Washington Department of Natural Resources)

2023a Washington Natural Heritage Program Wetlands of High Conservation Value Map Viewer. https://www.dnr.wa.gov/NHPwetlandviewer. Accessed December 2023.

2023b Forest Practices Application Mapping Tool. https://fpamt.dnr.wa.gov/default.aspx. Accessed December 2023.

Ecology (Washington State Department of Ecology)

2015 Watershed Restoration and Enhancement Plan WRIA 13 Deschutes Watershed. https://apps.ecology.wa.gov/publications/documents/2211015.pdf

2023 Washington State Coastal Atlas Map. https://apps.ecology.wa.gov/coastalatlasmap.

Environmental Laboratory

1987 *Corps of Engineers Wetlands Delineation Manual.* Technical Report Y-87-1. Department of the Army, Waterways Experiment Station. Vicksburg, Mississippi. https://www.lrh.usace.army.mil/Portals/38/docs/USACE%2087%20Wetland%20Delineation%20Manual.pdf

FGDC (Federal Geography Data Committee)

2013 Classification of Wetlands and Deepwater Habitats of the United States. https://fgdc.gov/standards/projects/FGDC-standards-projects/wetlands/nvcs-2013 . Accessed December 2023.

FEMA (Federal Emergency Management Agency)

2023 FEMA Flood Map Service Center. https://msc.fema.gov/portal/home. Accessed December 2023.

FGDC (Federal Geographic Data Committee)

2013 *Classification of Wetlands and Deepwater Habitats of the United States*. Adapted from Cowardin, Carter, Golet, and LaRoe (1997). FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington DC. https://www.fgdc.gov/standards/projects/wetlands/nwcs-2013. Accessed December 2021.

Hruby and Yahnke.

2023 *Washington State Wetland Rating System for Western Washington: 2014 Update Version 2.0*. Washington State Department of Ecology Publication 23-06-009. Olympia, Washington: Washington Department of Ecology.

Krippner Consulting, LLC

2022 Tumwater Operations & Maintenance Facility Habitat Conservation Plan for the threatened Olympia subspecies of the Mazama pocket gopher (*Thomomys mazama* pugetensis) in Tumwater, Washington. Drafted in April 2022.

NMFS (National Marine Fisheries Service)

2023 Protected Resources Application: West Coast Region Version 1.0. https://www.webapps.nwfsc.noaa.gov/portal/apps/webappviewer/index.html?id=7514c715b8594944a6e468dd25aaacc9. Accessed December 2023.

NRCS (Natural Resources Conservation Service)

2023a NRCS Web Soil Survey for Snohomish County, Washington.

2023b NRCS Field Office Climate Data for Thurston County, Olympia Airport Station.

Raphael, M.G., Falxa, G.A., Lynch, D., Nelson, K.S, Pearson, S.F., Shirk, A.J., and R.D. Young

2016 Status and trend of nesting habitat for the marbled murrelet under the Northwest Forest Plan. In: G.A. Falxa and M.G. Raphael, tech. coords. 2016. Northwest Forest Plan—the first 20 years (1994–2013): status and trend of marbled murrelet populations and nesting habitat. General Technical Report PNW-GTR-933. Portland, Oregon: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: Chapter 2. May 2016. https://www.fs.fed.us/pnw/pubs/pnw_gtr933.pdf

Sumner, J.P., M.J. Vepraskas, and R.K. Kolka

2009 Methods to Evaluate Normal Rainfall for Short-Term Wetland Hydrology Assessment. USDA (U.S. Department of Agriculture) Northern Research Station. Wetlands Volume 29, No. 3 (September 2009), pp. 1049–1062.

Tumwater (City of Tumwater)

2016 Geologically Hazardous Areas Map of Tumwater. Published December 27, 2016. https://www.ci.tumwater.wa.us/home/showpublisheddocument/12080/636185240922730000

2018 Drainage Design and Erosion Control Manual. Published Jan 1, 2018. https://www.ci.tumwater.wa.us/home/showdocument?id=20481

2023 Explore Tumwater! Online GIS Map. https://tumwater.maps.arcgis.com/apps/webappviewer/index.html?id=fe9154d990bb4092ad38843328d20d12. Accessed December 2023.

USACE (U.S. Army Corps of Engineers)

2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*. ERDC/EL TR-10-3. https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/7646

USFS (U.S. Forest Service)

2023 Monarch Butterfly Habitat Needs. https://www.fs.usda.gov/wildflowers/pollinators/Monarch_Butterfly/habitat/index.shtml

USFWS (U.S. Fish and Wildlife Service)

2023a National Wetlands Inventory. Wetlands Online Mapper. https://www.fws.gov/wetlands/data/mapper.html. Accessed December 2023.

2023b Customized IPaC Trust Resource Report.

2023c Taylors Checkerspot Butterfly. https://www.fws.gov/species/taylors-checkerspot-euphydryas-editha-taylori. Accessed December 2023.

2023d Olympia Pocket Gopher. https://www.fws.gov/species/olympia-pocket-gopher-thomomys-mazama-pugetensis. Accessed December 2023.

USGS (U.S. Geological Survey)

2023 National Hydrography Dataset maps. https://www.usgs.gov/national-hydrography/national-hydrography-dataset.https://www.fws.gov/wetlands/data/mapper.html Accessed December 2023.

WDFW (Washington State Department of Fish and Wildlife)

2023a Priority Habitats and Species on the Web. https://geodataservices.wdfw.wa.gov/hp/phs/. Accessed February 2021.

2023b Statewide Integrated Fish Distribution (SWIFD) Web Map

2023c SalmonScape. https://apps.wdfw.wa.gov/salmonscape/map.html. Accessed December 2023.

Appendix A. Wetland Delineation Methods

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Wetland Delineation Methodology

Wetlands are defined as areas saturated or inundated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions. The methods used to delineate the on-site wetlands conform to methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region* (USACE 2010). All delineated wetlands were instrument-surveyed and mapped on project base maps.

To be considered a wetland, an area must have hydrophytic vegetation, hydric soils, and wetland hydrology. HDR staff collected data on these parameters in areas representative of typical site conditions. Staff collected additional data in associated uplands, as needed, to confirm wetland boundaries. Wetland boundaries and wetland data plot locations in the study area were surveyed using a Trimble GPS unit.

Vegetation

The dominant plants and their wetland indicator statuses were evaluated to determine if the vegetation was hydrophytic. To determine which plants were dominant at a sample plot, biologists applied the 50/20 rule per U.S. Army Corps of Engineers (USACE) recommendations. Under this guidance, absolute cover estimates were made for each species found rooted within the sample plot, for each vegetative strata found in the habitat (tree, sapling/shrub, herb, and woody vine). The species that had the most cover was included along with the next species until the absolute cover of these totaled more than 50 percent of the total absolute cover. Any other species that represented at least 20 percent of the total absolute cover was also included as a dominant species for that vegetative stratum.

Sample plots varied in size depending on site topography and habitat complexity. The objective of establishing a plot was to depict particular plant associations that reflect specific water regimes or other ecological factors. Therefore, on steep-sided riparian areas, a plot may consist of a narrow strip along the water's edge, or, within a broader area, a plot may be a 30-foot-diameter circular area.

Hydrophytic vegetation is defined as vegetation adapted to wetland conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants in each stratum must be Facultative, Facultative Wetland, or Obligate, based on the wetland indicator category assigned to each plant species on the National Wetland Plant List developed by USACE (USACE 2018). Table A-1 below lists the definitions of the indicator categories. If the plant community failed to meet the above hydrophytic vegetation criterion, but indicators of hydric soil and wetland hydrology were both present, additional indicators of hydrophytic vegetation were assessed per USACE recommendations (USACE 2010).

Table A-1. Definitions of wetland plant indicator categories used to determine the presence of hydrophytic vegetation

Wetland Indicator Category	Symbol	Definition
Obligate Wetland Plants	OBL	Almost always occur in wetlands
Facultative Wetland Plants	FACW	Usually occur in wetlands, but may occur in non-wetlands
Facultative Plants	FAC	Occur in wetlands and non-wetlands
Facultative Upland Plants	FACU	Usually occur in non-wetlands, but may occur in wetlands
Upland Plants	UPL	Almost never occur in wetlands

Source: Lichvar et al. (2012).

HDR biologists identified plants to species in the field and estimated percent cover of dominant plants. Scientific and common plant names follow currently accepted nomenclature and are consistent with *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973) and the PLANTS Database (USDA NRCS 2021b). During the field investigation, staff observed and recorded the dominant plant species on data sheets for each data plot.

Soils

Generally, an area must contain hydric soils to be a wetland. Hydric soil forms when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (12 inches). Biological activities in saturated soil result in reduced oxygen concentrations and organisms turn to anaerobic processes for metabolism. Over time, anaerobic biological processes result in certain soil color patterns, which are used as indicators of hydric soil. Typically, low-chroma colors are formed in the soil matrix, and bright-colored redoximorphic features form within the matrix. Other important hydric soil indicators include organic matter accumulations in the surface horizon, reduced sulfur odors, and organic matter staining in the subsurface (USDA NRCS 2018).

HDR staff examined soils by excavating sample pits to a depth of 20 inches to observe soil profiles, colors, and textures. In some cases, a shallower soil pit was adequate to document hydric soil indicators. Munsell color charts (Munsell Color 2009) were used to describe soil colors.

Hydrology

Project staff examined the area for evidence of wetland hydrology. Wetland hydrology criteria were considered to be satisfied if evidence indicated that the area is inundated or saturated to the surface for a consecutive number of days greater than or equal to 12.5 percent of the growing season. The growing season for the area was determined based on the period in which temperatures are above 32 degrees Fahrenheit during 5 out of 10 years using the long-term climatological data collected by the U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS) (2021a). Using the USDA NRCS Climate Analysis for Wetlands (WETS) table for the nearest station with sufficient data.

Wetland hydrology indicators are divided into two categories: primary and secondary indicators (USACE 2010). Primary indicators of hydrology include surface inundation, high water table, and saturated soils. The presence of one primary indicator is sufficient to conclude that wetland hydrology is present. In the absence of a primary indicator, observation of two or more secondary indicators is required to conclude

that wetland hydrology is present. Secondary indicators of hydrology include dry season water table, shallow aquitard, and FAC-neutral test (USACE 2010).

References

Environmental Laboratory

1987 *Corps of Engineers Wetlands Delineation Manual.* Technical Report Y-87-1. Department of the Army, Waterways Experiment Station. Vicksburg, Mississippi.

Hitchcock, C.L., and A. Cronquist

1973 *Flora of the Pacific Northwest*. University of Washington Press. Seattle, Washington.

Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner

2012 National Wetland Plant List Indicator Rating Definitions. July 2012. U.S. Army Corps of Engineers. Engineer Research and Development Center.

Munsell Color

2009 *Munsell® Soil Color Charts*. Revised Edition. Munsell® Color, GretagMacBeth, New York.

USACE (U.S. Army Corps of Engineers)

2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0). *https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/7646*

2018 National Wetland Plant List, Version 3.4. *http://wetland-plants.usace.army.mil/nwpl_static/data/DOC/lists_2018/National/National_2018v1.pdf.* U.S. Army Corps of Engineers Engineer Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire.

USDA NRCS (U.S. Department of Agriculture, Natural Resources Conservation Service)

2018 Field Indicators of Hydric Soils in the United States, Version 8.2. L.M. Vasilas, G.W. Hurt and J.F. Berkowitz (eds.). USDA NRCS, in cooperation with the National Technical Committee for Hydric Soils.

2021a USDA Field Office Climate Data for Quilcene 2 SW (Station ID 456846). WETS Table. Created January 26, 2021.

2021b The PLANTS Database. National Plant Data Team, Greensboro, NC 27401-4901 USA. *http://plants.usda.gov.* Accessed January 2021.

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Appendix B. Wetland Data Sheets

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

Project/Site: Tumwater Old Hwy 99 & 79th Ave | City/County: Thurston | Sampling Date: 11/16/2023

Applicant/Owner: City of Tumwater | State: WA | Sampling Point: W1-P1

Investigators: T.PARRY, C.GINTHER | Section, Township, Range: T17N R2W S12

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%): 2

Subregion (LRR): A - Northwestern Forest, | Lat: 46.974350 | Long: -122.879486 | Datum: WGS84

Soil Map Unit Name: Mukilteo muck | NWI Classification: PSSC

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

Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No ____			
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**		
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	Yes X	No ____

Remarks:

Sample point located in wetland mapped by NWI. Wetland boundary gradually transitions to upland to the west where SP-V4 is located.

VEGETATION – Use scientific names of plants.

	Absolute	Dominant	Indicator
Tree Statum (Plot size: 3m)	% Cover	Species?	Status
1. Salix lasiandra	100	Yes	FACW
2.			
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m)			
1. Salix lasiandra	40	Yes	FACW
2. Spiraea douglasii	7	No	FACW
3.			
4.			
5.			
	47	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Ranunculus repens	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: 2m)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	147	x2=	294
FAC species	5	x3=	15
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	152 (A)		309 (B)

Prevalence Index = B/A= 2.03

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide 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 X No ____

Remarks:

Ground cover consists of leaf litter.

SOIL

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
0-9	10YR 3/2	95	10YR 3/4	5	C	M	Loam	
9-16	2.5Y 3/2	90	7.5YR 3/4	10	C	M	Sandy Loam	Fine

[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 MLRLA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X 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 X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Tables (A2)
- X 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 Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 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) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches): ___
Water Table Present?	Yes	X	No	___	Depth (inches): 14.0
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 11.0

Wetland Hydrology Present? Yes X No ___

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

Remarks:

Standing surface water approximately 30 LF and 1.5 vertical feet away to the west.

Additional Reference Data: Photos

Photo Name: Photo_231116120118

Photo Name: Photo_231116120135

Photo Name: Photo_231116120124

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

Project/Site: Tumwater Old Hwy 99 & 79th Ave | City/County: Thurston | Sampling Date: 11/16/2023

Applicant/Owner: City of Tumwater | State: WA | Sampling Point: W1-P2

Investigators: T.PARRY, C.GINTHER | Section, Township, Range: T17N R2W S12

Landform (hillslope, terrace, etc.): Hillslope | Local Relief (concave, convex, none): Concave | Slope(%): 2

Subregion (LRR): A - Northwestern Forest, | Lat: 46.974293 | Long: -122.879494 | Datum: WGS84

Soil Map Unit Name: Indianola loamy sand | NWI Classification: PSSC

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

Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No ____			
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**		
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X

Remarks:

Upslope of W1-P1 as marked by a dense Himalayan blackberry thicket to the southeast. 15 LF and 1 vertical foot from W1-P1.

VEGETATION – Use scientific names of plants.

		Absolute	Dominant	Indicator
Tree Statum	(Plot size: 3m)	% Cover	Species?	Status
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 2m)			
1.	Rubus armeniacus	35	Yes	FAC
2.				
3.				
4.				
5.				
		35	= Total Cover	
Herb Stratum	(Plot size: 1m)			
1.	Carex leptopoda	25	Yes	FAC
2.	Urtica dioica	20	Yes	FAC
3.	Ranunculus repens	10	No	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		55	= Total Cover	
Woody Vine Stratum	(Plot size: 2m)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 45

Dominance Test Worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	0
FAC species	90	x3=	270
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	90 (A)		270 (B)

Prevalence Index = B/A= 3.00

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

The salix pictured in the plot photos is rooted outside of the tree stratum and is within the wetland. Sample point is recorded at the edge of a moss line.

SOIL

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
0-5	10YR 3/2	98	10YR 3/3	2	C	M	Sandy Loam	
5-11	2.5Y 3/3	93	10YR 3/6	7	C	M	Sandy Loam	Fine
11-24	2.5Y 4/3	85	10YR 3/4	15	C	M	Sandy 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 MLRLA 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Tables (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 Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 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) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel 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 X Depth (inches): ___

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

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** **X**

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

Remarks:

Dry to a depth of 24 inches. Geomorphic position does not apply as this is above the above the toe of the slope and is not located in a depression landform.

Additional Reference Data: Photos

Photo Name: Photo_231116122615

Photo Name: Photo_231116122558

Photo Name: Photo_231116122605

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

Project/Site: Tumwater Old Hwy 99 & 79th Ave | City/County: Thurston | Sampling Date: 11/16/2023

Applicant/Owner: City of Tumwater | State: WA | Sampling SP-V1

Investigators: T. PARRY, C. GINTHER | Section, Township, Range: T17N R2W S11

Landform (hillslope, terrace, etc.): Toeslope | Local Relief (concave, convex, none): None | Slope(%): 2

Subregion (LRR): A - Northwestern Forest, | Lat: 46.972023 | Long: -122.890762 | Datum: WGS84

Soil Map Unit Name: Nisqually loamy fine sand | NWI Classification: UPL

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

Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	Yes ____ No X

Remarks:

Verification taken adjacent to 79th Ave SE located at the toe of the slope. This is in a narrow area upslope of the drainage ditch on the offsite parcel. This verification point was recorded to confirm upland conditions.

VEGETATION – Use scientific names of plants.

	Absolute	Dominant	Indicator
Tree Statum (Plot size: 3m)	% Cover	Species?	Status
1. Ilex aquifolium	35	Yes	FACU
2.			
3.			
4.			
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m)			
1. Symphoricarpos albus	25	Yes	FACU
2. Lonicera involucrata	10	Yes	FAC
3.			
4.			
5.			
	35	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Schedonorus arundinaceus	30	Yes	FAC
2. Rumex acetosa	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	45	= Total Cover	
Woody Vine Stratum (Plot size: 2m)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 20

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		x1=	
FACW species		x2=	0
FAC species	55	x3=	165
FACU species	60	x4=	240
UPL species		x5=	0
Column Totals:	115 (A)		405 (B)

Prevalence Index = B/A= 3.52

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide 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 X No ____

Remarks:

SOIL

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	10YR 2/1	100					Sandy Loam	Fine sand

[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 MLRLA 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Tables (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 Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 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) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel 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 X Depth (inches): ___

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

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

Wetland Hydrology Present? **Yes** ___ **No** **X**

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

Remarks:

Dry to a depth of 16 inches. Located approximately 3 vertical feet higher than the surface water in the offsite drainage ditch.

Additional Reference Data: Photos

Photo Name: Photo_231116093739

Photo Name: Photo_231116093744

Photo Name: Photo_231116093735

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

Project/Site: Tumwater Old Hwy 99 & 79th Ave | City/County: Thurston | Sampling Date: 11/16/2023

Applicant/Owner: City of Tumwater | State: WA | Sampling Point: SP-V2

Investigators: T' PARRY, C. GINTHER | Section, Township, Range: T17N R2W S12

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): None | Slope(%): 0

Subregion (LRR): A - Northwestern Forest, | Lat: 46.973732 | Long: -122.883278 | Datum: WGS84

Soil Map Unit Name: Nisqually loamy fine sand | NWI Classification: UPL

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

Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No ____	
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?** Yes ____ No X

Remarks:

Small swale located near barn structure located onsite. Located in lowest position that goes north to south with north side ending at residential development. Swale is the lowest position on the parcel to most likely support wetlands.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Statum (Plot size: 3m)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Schedonorus arundinaceus	40	Yes	FAC
2. Phalaris arundinacea	30	Yes	FACW
3. Holcus lanatus	10	No	FAC
4. Rumex acetosa	5	No	FAC
5. Vicia sp.	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 2m)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 10

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	30	x2=	60
FAC species	60	x3=	180
FACU species		x4=	0
UPL species		x5=	0
Column Totals:	90 (A)		240 (B)

Prevalence Index = B/A= 2.67

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide 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 X No ____

Remarks:

Vicia sp. is unknown to species level.

SOIL

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
0-6	10YR 2/1	100					Loam	
6-16	10YR 2/1	100					Sandy Loam	Fine sand

[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 MLRLA 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Tables (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 Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 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) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel 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 X Depth (inches): ___

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

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No X**

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

Remarks:

Dry to 16 inches with no indication of hydrology.

Additional Reference Data: Photos

Photo Name: Photo_231116103639

Photo Name: Photo_231116103647

Photo Name: Photo_231116103659

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

Project/Site: Tumwater Old Hwy 99 & 79th Ave | City/County: Thurston | Sampling Date: 11/16/2023

Applicant/Owner: City of Tumwater | State: WA | Sampling Point: SP-V3

Investigators: T.PARRY, C.GINTHER | Section, Township, Range: T17N R2W S12

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): None | Slope(%): 0

Subregion (LRR): A - Northwestern Forest, | Lat: 46.972664 | Long: -122.884636 | Datum: WGS84

Soil Map Unit Name: Nisqually loamy fine sand | NWI Classification: UPL

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

Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	Yes ____ No X

Remarks:

West of the parcel in lowest point of a localized swale with no inlet or outlet. To west of verification point there is commercial development that provides sheet flow to the area.

VEGETATION – Use scientific names of plants.

	Absolute	Dominant	Indicator
Tree Statum (Plot size: 3m)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Schedonorus arundinaceus	90	Yes	FAC
2. Galium aparine	7	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	97	= Total Cover	
Woody Vine Stratum (Plot size: 2m)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 3

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=	0
FAC species	90	x3=	270
FACU species	7	x4=	28
UPL species		x5=	0
Column Totals:	97 (A)		298 (B)

Prevalence Index = B/A= 3.07

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide 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 X No ____

Remarks:

SOIL

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
0-7	10YR 2/2	100					Loam	
7-18	7.5YR 2.5/2	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 MLRLA 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Tables (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 Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 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) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel 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 X Depth (inches): ___

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

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No X**

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

Remarks:

Dry to depth of 18 inches.

Additional Reference Data: Photos

Photo Name: Photo_231116110452

Photo Name: Photo_231116110401

Photo Name: Photo_231116110413

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

Project/Site: Tumwater Old Hwy 99 & 79th Ave | City/County: Thurston | Sampling Date: 11/16/2023

Applicant/Owner: City of Tumwater | State: WA | Sampling Point: SP-V4

Investigators: T. PARRY, C.GINTHER | Section, Township, Range: T17N R2W S12

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

Subregion (LRR): A - Northwestern Forest, | Lat: 46.973728 | Long: -122.880150 | Datum: WGS84

Soil Map Unit Name: Indianola loamy sand | NWI Classification: PEM1C

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

Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No ____			
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**		
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	Yes ____	No X

Remarks:

Verification point on mid-slope point between mapped upland and NWI mapped wetland.

VEGETATION – Use scientific names of plants.

	Absolute	Dominant	Indicator
Tree Statum (Plot size: 3m)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m)			
1. Rubus armeniacus	5	Yes	FAC
2. Mahonia aquifolium	5	Yes	FACU
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Phalaris arundinacea	75	Yes	FACW
2. Urtica dioica	15	No	FAC
3. Galium aparine	10	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 2m)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	75	x2=	150
FAC species	20	x3=	60
FACU species	15	x4=	60
UPL species		x5=	0
Column Totals:	110 (A)		270 (B)

Prevalence Index = B/A= 2.45

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide 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 X No ____

Remarks:

SOIL

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
0-5	7.5YR 2.5/2	100					Loam	
5-10	7.5YR 2.5/2	100					Sandy Loam	Fine
10-16	10YR 3/3	15					Sandy Loam	Fine, mixed matrix
	10YR 2/2	85						

[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 MLRLA 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Tables (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 Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 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) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel 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 X Depth (inches): _____

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

Saturation Present? Yes ___ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No X**

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

Remarks:

Dry to a depth of 16 inches.

Additional Reference Data: Photos

Photo Name: Photo_231116114139

Photo Name: Photo_231116114129

Photo Name: Photo_231116114147

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

Project/Site: Tumwater Old Hwy 99 & 79th Ave | City/County: Thurston | Sampling Date: 11/16/2023

Applicant/Owner: City of Tumwater | State: WA | Sampling Point: SP-V5

Investigators: T. PARRY, C.GINTHER | Section, Township, Range: T17N R2W S12

Landform (hillslope, terrace, etc.): Hillslope | Local Relief (concave, convex, none): None | Slope(%): 2

Subregion (LRR): A - Northwestern Forest, | Lat: 46.974278 | Long: -122.879799 | Datum: WGS84

Soil Map Unit Name: Indianola loamy sand | NWI Classification: UPL

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

Are Vegetation: ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation: ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	Yes ____ No X

Remarks:

Mid-slope bench located in upland, just outside the boundary of a mapped NWI wetland. Conditions upslope lack indicators of wetland conditions. Downslope are mature Douglas fir and bigleaf maple closer to wetland boundary.

VEGETATION – Use scientific names of plants.

	Absolute	Dominant	Indicator
Tree Statum (Plot size: 3m)	% Cover	Species?	Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m)			
1. Rubus arizonensis	30	Yes	FACU
2. Symphoricarpos albus	25	Yes	FACU
3. Rubus armeniacus	5	No	FAC
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Phalaris arundinacea	85	Yes	FACW
2. Urtica dioica	10	No	FAC
3. Galium aparine	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 2m)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	85	x2=	170
FAC species	15	x3=	45
FACU species	60	x4=	240
UPL species		x5=	0
Column Totals:	160 (A)		455 (B)

Prevalence Index = B/A= 2.84

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide 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 X No ____

Remarks:

Prevalence index less than 3.

SOIL

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	2.5 Y 3/3	100					Sandy Loam	Fine

[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 MLRLA 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Tables (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 Aeriel Imagery (B
- ___ Sparsley Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MRLA 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) (**MRLA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aeriel 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? Yes ___ No ___ Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No X**

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

Remarks:

Dry to a depth of 16 inches.

Additional Reference Data: Photos

Photo Name: Photo_231116133334

Photo Name: Photo_231116133325

Photo Name: Photo_231116133342

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Appendix C. Wetland Rating Sheets

Wetland name or number: Wetland 1

RATING SUMMARY - Western Washington

Name of wetland (or ID#): Wetland 1 **Date of site visit:** 11/16/2023

Rated By: Cheyenne Ginther & Trey Parry **Trained by Ecology? Yes** [X] **No** [ ] **Date of Training:** 03/11/2021

HGM Class used for rating: Depressional

Wetland has multiple HGM classes? Yes [ ] **No** [X]

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

Source of base aerial photo/map:

OVERALL WETLAND CATEGORY: [**Category II**] (based on functions [X] or special characteristics [ ])

1. Category of wetland based on FUNCTIONS

[ ] **Category I** - Total score = 23 - 27

[X] **Category II** - Total score = 20 - 22

[ ] **Category III** - Total score = 16 - 19

[ ] **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Site Potential	**H**	**H**	**M**	
Landscape Potential	**M**	**M**	**M**	
Value	**M**	**H**	**H**	**Total**
Score Based on Ratings	**7**	**8**	**7**	**22**

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

9 = H,H,H

8 = H,H,M

7 = H,H,L

7 = H,M,M

6 = H,M,L

6 = M,M,M

5 = H,L,L

5 = M,M,L

4 = M,L,L

3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	
Wetland of High Conservation Value	
Bog	
Forested	
Coastal Lagoon	
Interdunal	
None of the above	**Not Applicable**

Wetland name or number: Wetland 1

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	2
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	3
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	4
Map of the contributing basin	D 4.3, D 5.3	5
1km Polygon: Area that extends 1km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	6
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	7
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	8

Wetland name or number: Wetland 1

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0 Does the site have the potential to improve water quality?

D 1.1 What are the characteristics of surface water outflows from the wetland?		
Wetland has no surface water outlet.	points = 3	
Wetland has an intermittently flowing, or highly constricted, outlet.	points = 2	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	
Wetland is a flat depression whose outlet is a permanently flowing ditch.	points = 1	**Score: 3**
D 1.2 Can the soil 2in below the surface be identified as true clay or organic soil?		
Mapped as true clay or organic (muck or peat)	points = 4	
Soil texture identified as clay or organic in field	points = 4	
Soil texture identified as clay or organic by laboratory test	points = 4	
None of the above	points = 0	**Score: 4**
D 1.3 What are the characteristics and distribution of persistent plants?		
Wetland has persistent, ungrazed, plants > 95% of area	points = 5	
Wetland has persistent, ungrazed, plants > 50% of area	points = 3	
Wetland has persistent, ungrazed plants > 10% of area	points = 1	
Wetland has persistent, ungrazed plants < 10% of area	points = 0	**Score: 5**
D 1.4 What are the characteristics of seasonal ponding or inundation in the wetland area?		
Area seasonally ponded is > 50% total area of wetland	points = 4	
Area seasonally ponded is > 25% total area of wetland	points = 2	
Area seasonally ponded is < 25% total area of wetland	points = 0	**Score: 2**
	Total for D 1:	**14**

Rating of Site Potential [X] **12-16 = H** [ ] **6-11 = M** [ ] **0-5 = L** *Record the rating on the first page*

D 2.0 Does the landscape have the potential to support the water quality function of the site?

D 2.1 Does the wetland unit receive stormwater discharges?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 2.2 Is >10% of the area within 150ft of the wetland in land uses that generate pollutants in surface runoff?		
Yes	points = 1	
No	points = 0	**Score: 1**
D 2.3 Are there septic systems within 250ft of the wetland?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 2.4 Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3?		
Yes	points = 1	
No	points = 0	**Score: 0**

Wetland name or number: Wetland 1

D 2.5 What are the other sources of pollutants coming into the wetland?	
Total for D 2:	**1**

Rating of Landscape Potential [ ] **3-4 = H** [X] **1-2 = M** [ ] **0 = L** *Record the rating on the first page*

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

Rating of Value [ ] **2-4 = H** [X] **1 = M** [ ] **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

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

D 4.0 Does the site have the potential to reduce flooding and erosion?		
D 4.1 What are the characteristics of surface water outflows from the wetland?		
Wetland has no surface water outlet.	points = 4	
Wetland has an intermittently flowing, or highly constricted, outlet.	points = 2	
Wetland is a flat depression whose outlet is a permanently flowing ditch.	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	**Score: 4**
D 4.2 What is the depth of storage during the wet periods?		
Marks of ponding are 3ft or more above the surface or bottom of the outlet.	points = 7	
Marks of ponding are between 2ft to <3ft from the surface or bottom of the outlet.	points = 5	
Marks of ponding are at least 0.5ft to <2ft from the surface or the bottom of the outlet.	points = 3	
The wetland is a "headwater" wetland.	points = 3	
The wetland is flat but has small depressions on the surface that trap water.	points = 1	
Marks of ponding are less than 0.5ft (6in).	points = 0	**Score: 5**

Wetland name or number: Wetland 1

D 4.3 What is the contribution of the wetland to storage in the watershed?		
The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
Entire wetland is in the Flats class	points = 5	**Score: 5**
	Total for D 4:	**14**

Rating of Site Potential [X] **12-16 = H** [ ] **6-11 = M** [ ] **0-5 = L** *Record the rating on the first page*

D 5.0 Does the landscape have the potential to support hydrologic functions of the site?		
D 5.1 Does the wetland unit receive stormwater discharges?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 5.2 Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?		
Yes	points = 1	
No	points = 0	**Score: 1**
D 5.3 Is more than 25% of the contributing basin of the wetland covered with intensive human land uses?		
Yes	points = 1	
No	points = 0	**Score: 1**
	Total for D 5:	**2**

Rating of Landscape Potential [ ] **3 = H** [X] **1-2 = M** [ ] **0 = L** *Record the rating on the first page*

D 6.0 Are the hydrologic functions provided by the site valuable to society?		
D 6.1 Is the wetland in a landscape that has flooding problems?		
Flooding occurs in a sub-basin that is immediately down-gradient of the wetland.	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
Flooding from groundwater is an issue in the basin.	points = 1	
The existing or potential outflow from the wetland is so constrained that water cannot reach areas that flood.	points = 0	
There are no problems with flooding downstream of the wetland.	points = 0	**Score: 2**
D 6.2 Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?		
Yes	points = 2	
No	points = 0	**Score: 0**
	Total for D 6:	**2**

Rating of Value [X] **2-4 = H** [ ] **1 = M** [ ] **0 = L** *Record the rating on the first page*

Wetland name or number: Wetland 1

HABITAT FUNCTIONS

These questions apply to wetlands of all HGM classes - Indicators that the site functions to provide important habitat

H 1.0 Does the wetland have the potential to provide habitat for many species?

H 1.1 What is the structure of the plant community?

- [ ] Aquatic Bed
- [ ] Emergent
- [x] Scrub-shrub
- [x] Forested
- [x] Multiple strata within the Forested class (canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)

4 structures or more	points = 4	
3 structures	points = 2	
2 structures	points = 1	
1 structure	points = 0	
No structures present	points = 0	**Score: 2**

H 1.2 What are the hydroperiods that meet the size thresholds in the wetland?

- [ ] Permanently flooded or inundated
- [x] Seasonally flooded or inundated
- [ ] Occasionally flooded or inundated
- [x] Saturated only
- [ ] Permanently flowing stream or river in, or adjacent to, the wetland
- [ ] Seasonally flowing stream in, or adjacent to, the wetland
- [ ] Lake Fringe wetland
- [ ] Freshwater Tidal wetland

4 or more types present	points = 3	
3 types present or Lake Fringe / Freshwater Tidal Fringe	points = 2	
2 types present	points = 1	
1 type present	points = 0	
None present	points = 0	**Score: 1**

H 1.3 What is the richness of the plant species in the wetland?

>19 species	points = 2	
5-19 species	points = 1	
<5 species	points = 0	**Score: 1**

Wetland name or number: Wetland 1

H 1.4 What is the interspersion of habitats?

High	points = 3	
Moderate	points = 2	
Low	points = 1	
None	points = 0	**Score: 2**

H 1.5 What are the special habitat features in the wetland?

- [✓] Large, downed, woody debris within the wetland (>4in diameter and 6ft long).
- [✓] Standing snags (dbh >4in) within the wetland
- [ ] Undercut banks are present for at least 6.6ft (2m) and/or overhanging plants extend at least 3.3ft (1m) over open water or a stream (or ditch) in, or contiguous with the wetland, for at least 33ft (10m)
- [ ] Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30 degree slope) OR signs of recent beaver activity are present (cut shrubs or trees that have not yet weathered where wood is exposed)
- [✓] At least 0.25ac of thin-stemmed persistent plants 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 every stratum of plants (see H 1.1 for list of strata)

6 habitats selected	points = 6	
5 habitats selected	points = 5	
4 habitats selected	points = 4	
3 habitats selected	points = 3	
2 habitats selected	points = 2	
1 habitat selected	points = 1	
No habitats selected	points = 0	**Score: 4**

Total for H 1: 10

Rating of Site Potential [ ] **15-18 = H** [X] **7-14 = M** [ ] **0-6 = L** *Record the rating on the first page*

H 2.0 Does the landscape have the potential to support habitat functions of the site?

H 2.1 What is the percentage of accessible habitat within 1km of the wetland?

>33% of 1km Polygon	points = 3	
20-33% of 1km Polygon	points = 2	
10-19% of 1km Polygon	points = 1	
<10% of 1km Polygon	points = 0	**Score: 0**

H 2.2 What is the percentage of total habitat in a 1km polygon around the wetland?

Total habitat is >50% of the Polygon	points = 3	
Total habitat is 10-50% of the Polygon and in 1-3 patches	points = 2	
Total habitat is 10-50% of the Polygon and in >3 patches	points = 1	
Total habitat is <10% of the Polygon	points = 0	**Score: 1**

Wetland name or number: Wetland 1

H 2.3 What is the land use intensity in the 1km polygon?

50% of the Polygon is high intensity land use	points = -2	
<50% of the Polygon is high intensity land use	points = 0	**Score: 0**
	Total for H 2:	**1**

Rating of Landscape Potential [ ] **4-6 = H** [X] **1-3 = M** [ ] **0 = L** *Record the rating on the first page*

H 3.0 Is the habitat provided by the site valuable to society?

H 3.1 Does the site provide habitat for species valued in laws, regulations, or policies?

- [ ] Aspen Stands
- [ ] Biodiversity Areas and Corridors
- [ ] Herbaceous Balds
- [ ] Old-growth/Mature Forests
- [ ] Oregon White Oak
- [ ] Riparian
- [ ] Westside Prarie
- [ ] Fresh Deepwater
- [ ] Instream
- [ ] Nearshore (Coastal, Open Coast, Puget Sound)
- [ ] Caves
- [ ] Cliffs
- [✓] Snags and Logs
- [ ] Talus

The following criteria automatically score 2 points:

- [ ] The wetland provides habitat for Threatened or Endangered species
- [✓] The wetland is mapped as a location for an individual WDFW priority species
- [ ] The wetland is a Wetland of High Conservation Value
- [ ] The wetland has been categorized as an important habitat site in a local plan

The wetland has 3 or more WDFW priority habitats within 100m, or meets the criteria for societal value	points = 2	
The site has 1 or 2 WDFW priority habitats within 100m	points = 1	
The site does not meet any of the criteria for societal value	points = 0	**Score: 2**
	Total for H 3:	**2**

Rating of Value [X] **2 = H** [ ] **1 = M** [ ] **0 = L** *Record the rating on the first page*

Wetland name or number: Wetland 1

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

SC 1.0 Estuarine Wetlands

SC 1.1 Does the wetland meet all of the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal

☐ The wetland is vegetated

☐ The water salinity is greater than 0.5 ppt

Yes - Go to SC 1.2

No - Not an Estuarine Wetland **Result:**

SC 1.2 Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

Yes - Category I Estuarine Wetland

No - Go to SC 1.3 **Result:**

SC 1.3 Is the wetland unit at least 1ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 10% cover of non-native plant species.

☐ At least 75% of the landward edge of the wetland has a 100ft buffer of shrub, forest, or un-grazed or un-mowed grassland

☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

Yes - Category I Estuarine Wetland

No - Category II Estuarine Wetland **Result:**

SC 2.0 Wetlands of High Conservation Value

SC 2.1 Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer?

Yes - Category I Wetland of High Conservation Value

No - Go to SC 2.2 **Result:**

SC 2.2 Does the wetland have a rare plant species, rare plant community, or high-quality common plant community that may qualify the site as a WHCV?

Yes - Category I Wetland of High Conservation Value

No - Not a Wetland of High Conservation Value **Result:**

Wetland name or number: Wetland 1

SC 3.0 Bogs

SC 3.1 Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16in or more of the first 32in of the soil profile?

Yes - Go to SC 3.3
No - Go to SC 3.2 **Result:**

SC 3.2 Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

Yes - Go to SC 3.3
No - Not a Bog Wetland **Result:**

SC 3.3 Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least 30% cover of plant species listed in the table provided in the instructions?

Yes - Category I Bog Wetland
No - Go to SC 3.4 **Result:**

SC 3.4 Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann Spruce, or western white pine AND any of the species (or combinations of species) listed in the table found in the instructions provide more than 30% of the cover under the canopy?

Yes - Category I Bog Wetland
No - Not a Bog Wetland **Result:**

SC 4.0 Forested Wetlands

SC 4.1 Does the wetland have at least 1 contiguous acre of forest that meets one of the following criteria?

☐ Old-growth forests
☐ Mature forests

Yes - Category I Forested Wetland
No - Not a Forested Wetland **Result:**

Wetland name or number: Wetland 1

SC 5.0 Wetlands in Coastal Lagoons

SC 5.1 Coastal Lagoons: Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or rocks

☐ The depression in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the open water area (measured near the bottom)

Yes - Go to SC 5.2

No - Not a Coastal Lagoon Wetland **Result:**

SC 5.2 Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species).

☐ At least 75% of the landward edge of the wetland has a 100ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ the wetland is larger than 0.10ac (4350 sqft)

Yes - Category I Coastal Lagoon

No - Category II Coastal Lagoon **Result:**

SC 6.0 Interdunal Wetlands

SC 6.1 Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership WBUO)?

Yes - Go to SC 6.2

No - Not an Interdunal Wetland **Result:**

SC 6.2 Is the wetland 1ac or larger in size, or a mosaic that is 1ac or larger in size?

Wetland is larger than 1ac in size - Go to SC 6.3

Wetland is a mosaic larger than 1ac is size - Category II Interdunal Wetland

No - Go to SC 6.4 **Result:**

SC 6.3 Does the wetland score 8 or 9 points for the habitat functions?

Yes - Category I Interdunal Wetland

No - Category II Interdunal Wetland **Result:**

SC 6.4 Is the wetland unit between 0.1ac and 1ac, or in a mosaic of wetlands that is between 0.1ac and 1ac in size?

Yes - Category III Interdunal Wetland

No - Category IV Interdunal Wetland **Result:**

Wetland name or number: Wetland 1

Category of wetland based on Special Characteristics	
If you answered No for all types, enter "Not Applicable" on Summary Form	**Final Category: Not Applicable**

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Appendix D. Site Photos

Photo 1: Looking SE adjacent to west side of Old Highway 99 on NW side of Roundabout Project

Photo 2: Looking SE adjacent to material staging area.

Photo 3: D1 photographed facing west outside of the project area on the private Pick-n-pull parcel.

Photo 4: Representative upland conditions on Parcel 12712320400.

Photo 5: Upland areas, as investigated at SP-V2, and an old building on Parcel 12712320400.

Photo 6: Location of demolished building from 2018 on parcel 12712320300.

Photo 7: Representative uplands, as investigated using SP-V4 and SP-V5, upslope of the Wetland W1.

Photo 8: Representative upland conditions as photographed looking east along 79th Street

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Appendix E. Additional Tables and Information

Table 1. Direct Antecedent Rainfall Evaluation Method for November 2023

Month	30% less than	Average	30% more than	Rainfall (in.)	Condition	Condition Value	Month Weight Value	Product
August	0.35	0.96	1.12	0.78	N	2	1	2
September	0.97	2.04	2.38	2.3	N	2	2	4
October	3.3	6.09	6.09	3.41	N	2	3	6
				Total: 6.49				**Condition: 12, Normal**

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Appendix F. Trail End Park Preferred Master Plan

Preferred Master Plan

Trails End Park Master Plan

RWD Landscape Architects
360.456.3813