Puget Sound GATEWAY Program

509 5 167

SR 167 Completion Project, Stage 2: SR 167/ I-5 to SR 161 – New Expressway Project

Draft
Stage 2 Mitigation Plan

August 2023

WSDOT

Note:
Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.

SR 167 Completion Project, Stage 2: SR 167/I-5 to SR 161 – New Expressway Project

Stage 2 Mitigation Plan

DRAFT
August 21, 2023

Submitted by:
Washington State Department of Transportation
Megaprograms
Puget Sound Gateway Program | SR 167 Completion Project

Through:
WSP USA
1001 Fourth Avenue, Suite 3100 | Seattle, Washington 98154 | 206-382-5200

Prepared by:
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100 | Seattle, Washington 98121 | 206-441-9080

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Revision History

Date	Revision
May 20, 2022	Initial draft submittal
August 5, 2022	Second draft submittal
September 2, 2022	Third draft submittal
September 21, 2022	Fourth draft submittal
August 21, 2023	Fifth draft submittal

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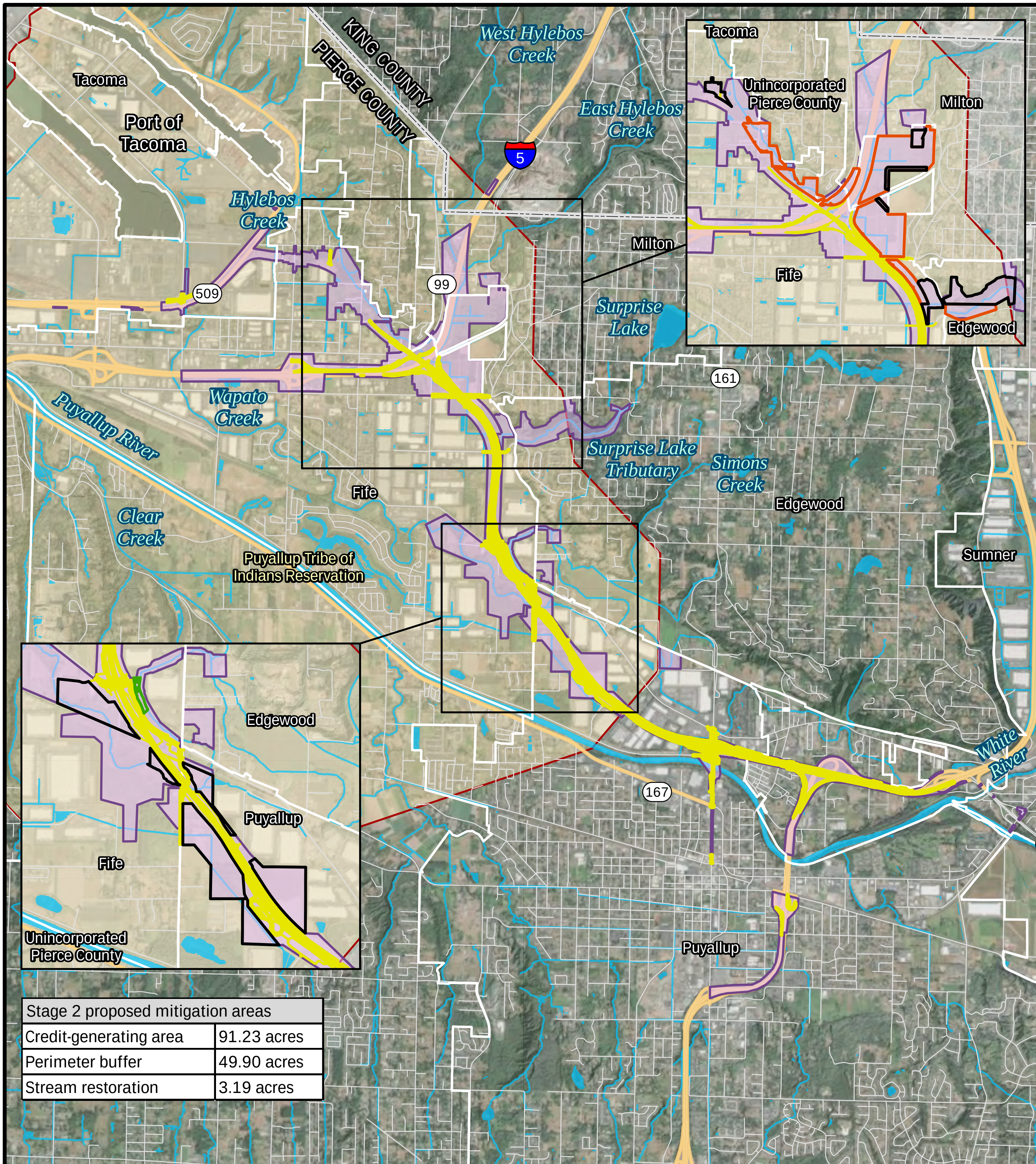
Executive Summary

The Washington State Department of Transportation (WSDOT) plans to complete the State Route (SR) 167 highway by building approximately 4 miles of a new four-lane limited-access highway as part of the SR 167 Completion Project (hereafter referred to as the Project). The SR 167 Completion Project is one of two large projects comprising WSDOT's Puget Sound Gateway Program. The new facility will begin at the current terminus in Puyallup at SR 161, extend westward through the Puyallup River Valley, and connect to Interstate 5 (I-5) near the existing Wapato Way East crossing over I-5. The Project also includes a new highway segment approximately 2 miles long. Defined as the SR 509 Spur, this new segment will extend from SR 509 near the Port of Tacoma (Port) to a new diverging diamond interchange at I-5 and SR 167 (Figure ES-1).

The wetlands and streams described in this report are within areas relevant to the Stage 2 portion of the SR 167 Completion Project, known as the SR 167/I 5 to SR 161 – New Expressway Project (hereafter referred to as the Stage 2). Stage 2 construction will cause unavoidable impacts to wetlands, streams, and their buffers. This report identifies those impacts and describes a plan to mitigate for them in accordance with federal, state, and local regulations.

The proposed Stage 2 is in Water Resource Inventory Area (WRIA) 10 (Puyallup-White watershed) and includes the Hylebos Creek, Wapato Creek, and Puyallup River basins in Pierce County. Hylebos Creek, Surprise Lake Tributary, Wapato Creek, the Puyallup River, and several associated tributaries are within the Stage 2 area. Stormwater runoff within the Stage 2 limits drains to Commencement Bay via these water bodies. The majority of Stage 2 is located on the Puyallup Tribe of Indians (PTOI) Reservation. The Stage 2 area consists of commercial, residential, and agricultural land uses. Historically, the Stage 2 area was covered by coniferous forests and scrub-shrub wetlands, but has been highly altered since European settlement. Currently, vegetation in the Stage 2 area is composed of a mixture of native and nonnative conifers, deciduous trees, common native shrubs, and mixed grasses, as well as agricultural crops.

Twenty-six wetlands will be temporarily and/or permanently affected by Stage 2 activities. Affected wetlands include Category II and III depressional, riverine, and slope hydrogeomorphic (HGM) classes; and palustrine emergent (PEM), scrub-shrub (PSS), and forested (PFO) Cowardin classes. Wetlands in the Stage 2 area typically provide a moderate to high level of hydrologic and water quality functionality and a low level of habitat function for wildlife. In general, wetland buffers in the Stage 2 area are also in poor condition, characterized by high intensity land uses. Nonnative and invasive vegetation is prevalent within wetlands and wetland buffers.



Stage 2 proposed mitigation areas	
Credit-generating area	91.23 acres
Perimeter buffer	49.90 acres
Stream restoration	3.19 acres

Legend

- Mitigation Site (Stage 2)
- Mitigation Site (Stage 1b)
- Fife Buffer Enhancement Site
- Study Area (Stage 1a, 1b, 2)
- Proposed Roadway Alignment
- Highway
- Roads
- Stream
- County boundary
- Jurisdictional boundary (white line)
- Puyallup Tribe of Indians Reservation Boundary

Figure ES-1.
Project Summary Map for SR-167 Completion Project.

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Esri Imagery (2023)

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Streams in the Stage 2 area will also be affected by Stage 2 activities and includes Surprise Lake Tributary, Wapato Creek, and several unnamed tributaries. Streams are characterized by frequent high flow events during the rainy season and low summer flows. Channel conditions are poor, generally highly manipulated in relation to past land uses. Riparian conditions are degraded due to development, lack of trees in much of the Stage 2 area, and the presence of invasive, nonnative vegetation. Despite poor habitat conditions, several of the streams contain salmonids, including federally listed species.

Stage 2 construction will result in permanent and temporary impacts to wetlands, streams, and buffers in the Stage 2 footprint (Table ES-1). Permanent wetland impacts will result from the placement of fill in wetlands within the Stage 2 alignment (quantities summarized in Appendix Table C-1). Construction will also result in indirect impacts due to operation of the new highway that will reduce the size of some wetlands or cause disturbance to adjacent wetland habitat. Construction can also isolate portions of wetlands, to the extent that the remaining wetland loses most functions. WSDOT has implemented all applicable minimization measures to reduce impacts to wetlands and streams to the greatest extent possible. WSDOT will continue to seek avoidance and minimization measures for impacts on wetlands and wetland buffers during final Stage 2 design and construction.

Table ES-1. Wetland, Stream, and Buffer Impacts Resulting from the SR 167 Completion Stage 2 Project.

Critical Area		Impact (acres)					
		Permanent				Temporary	
		Direct	Indirect				
		Grading/Fill	Habitat	Isolation	Shading	Long-Term (1-2 years)	Short-Term (< 1 year)
Wetland Category	II	6.98	2.30	0.00	0.00	0.87	0.52
	III	18.07	1.39	0.14	0.07	3.55	4.22
Total Wetland Impacts		25.05	3.69	0.14	0.07	4.42	4.74
		25.05	3.90			9.16	
		38.11					
Stream (ac)		0.29	NA	NA	NA	NA	0.17
Stream (LF)		1,230	NA	NA	NA	NA	539
Buffer[a]		24.51	NA	NA	NA	NA	7.89

NA = not applicable

[a] Wetland and stream buffers are combined due to overlapping buffer areas.

Fill placed in stream channels will result in permanent impacts to some streams (quantities summarized in Appendix Table C-2). Compensatory mitigation for stream impacts will be provided by increasing the total length, area, and complexity of stream channels within mitigation sites. Mitigation for permanent stream impacts is proposed at a 1.25:1 mitigation ratio.

Wetland and buffer impacts will reduce water quality and hydrologic functions as well as available wildlife habitat. Temporary wetland, stream, and buffer impacts will be mitigated by restoring temporarily cleared areas to the appropriate grade and replanting them with native vegetation. Temporarily impacted stream banks will be regraded to an approximately 2H:1V slope and disturbed areas will be replanted with native vegetation.

Unavoidable permanent and long-term temporary wetland impacts will be offset by:

- Using remaining area within the Hylebos Riparian Restoration Program (Hylebos RRP) as documented in the Stage 1b Mitigation Plan (WSDOT 2021a) and subsequent permit modifications (NWS-2020-864-DOT)
- Constructing onsite, in-kind mitigation sites within the Hylebos Creek, Wapato Creek, and Puyallup River basins at the following sites (see Figure 2):
    - Upper Surprise Lake Tributary Addition
    - Middle Surprise Lake Tributary Addition
    - Lower Surprise Lake Tributary Addition
    - Upper Hylebos Addition
    - Upper Hylebos North Addition
    - Lower Hylebos Addition
    - East Wapato RRP
    - West Wapato RRP
    - Northwest Wapato RRP
    - Puyallup North
    - Puyallup South
    - Freeman Road
    - City of Fife/Wapato Creek Buffer Enhancement

Permanent buffer impacts will be mitigated through wetland restoration and enhancement and upland buffer enhancement within the perimeter buffer of the mitigation sites. All new and replaced structures over potentially fish-bearing waters will be made fully fish passable in compliance with the 2013 Culvert Injunction (United States v. Washington 2013) and 2013 WDFW Water Crossing Design Guidelines (Barnard et al. 2013). WSDOT coordinated extensively on Stage 2 impacts and mitigation site design during the permitting process with regulatory agencies, tribal representatives, and local agencies.

WSDOT proposes a combination of wetland re-establishment, rehabilitation, enhancement, and upland enhancement credit for wetland restoration within the mitigation sites: re-establishment for upland areas that were previously wetland, rehabilitation for degraded wetlands where hydrologic processes will be restored, enhancement for existing wetlands that will not be extensively restored, and upland enhancement for upland areas within the credit-generating portion of the sites that contribute to enhanced riparian function. Construction of mitigation sites is expected to result in the following areas (Figure ES-1) (see Section 5 for detailed figures and information):

- Credit-generating area:
  - Wetland re-establishment: 42.14 acres
  - Wetland rehabilitation: 22.85 acres
  - Wetland enhancement: 5.22 acres
  - Upland enhancement: 17.83 acres
- Perimeter buffer:
  - Wetland re-establishment: 23.21 acres
  - Wetland rehabilitation: 5612 acres
  - Wetland enhancement: 2.06 acres
  - Upland enhancement: 19.02 acres
- Stream restoration: 3.19 acres

A summary of the proposed wetland mitigation acreage is provided in Table ES-2. Mitigation sites are estimated to result in excess re-establishment credit that will be credited towards future WSDOT projects. (Please note that minor discrepancies in the numbers in Table ES-2 are a result of rounding issues, and not mathematical errors. For instance, in the first row of the table 17.83 acres of upland enhancement will account for 1.1144 acres of impacts, which is rounded to 1.11.)

Temporarily cleared areas will be monitored for a minimum of 5 years after re-planting to ensure site success. Compensatory mitigation sites will be monitored for an estimated 10 years, or until performance standards are met, as approved by the regulatory agencies. Mitigation sites will be protected in perpetuity to ensure compliance with federal, state, and local regulations.

For any additional changes to the SR 167 Stage 2 Project that would result in changes to this mitigation plan, WSDOT will submit the proposed changes to the Corps, Ecology, PTOI, and other applicable regulatory agencies for review and approval prior to implementation.

WSDOT

Table ES-2. Proposed Wetland Impacts and Mitigation for the SR 167 Stage 2.[a]							
Stage 2 Wetland Impacts				**Stage 2 Mitigation Area Needed**			
Wetland Category	**Impact Type**	**Impact Area**	**Applied Mitigation Ratio**	**Upland Enhancement Area**	**Wetland Re-Establishment Area**	**Wetland Enhancement Area**	**Wetland Rehabilitation Area**
II	Permanent (includes indirect isolation)	1.11	16:1 Upland Enhancement	17.83	0.00	0.00	0.00
		0.65	1:1 Re-establishment and 8:1 Enhancement	0.00	0.65	5.22	0.00
		5.21	1:1 Re-establishment and 4:1 Rehabilitation	0.00	5.21	0.00	20.84
III		14.55	1:1 Re-establishment and 2:1 Rehabilitation	0.00	14.55	0.000	29.09
		3.67	Re-establishment only (2:1)	0.00	7.33	0.00	0.00
II	Long-term temporary	0.87	Re-establishment only (0.75:1)	0.00	0.65	0.00	0.00
III		3.55	Re-establishment only (0.5:1)	0.00	1.78	0.00	0.00
II	Indirect habitat	2.30	Re-establishment only (0.75:1)	0.00	1.73	0.00	0.00
III		1.39	Re-establishment only (0.5:1)	0.00	0.70	0.00	0.00
II	Shading	0.07	Re-establishment only (1.5:1)	0.00	0.11	0.00	0.00
Totals Summary							
Total Stage 2 impacts		**33.400**	**Total mitigation area needed (as shown in rows above) (A)**	**17.83**	**32.71**	**5.22**	**49.93**
Stage 2 Mitigation Site Credit Generating Area[b] (B)				17.83	42.14	5.22	22.85
Application of Stage 1b Hylebos RRP Excess Mitigation (C)				0.00	0.00	0.00	27.08[c]
Total Available Mitigation for Stage 2 (B+C)				**17.83**	**42.14**	**5.22**	**49.93**
Anticipated Excess Mitigation (B+C)-A				**0.00**	**9.43**	**0.00**	**0.00**

[a] Proposed mitigation assumes that mitigation sites will be constructed within 0 to 2 years of impacts stemming from road construction.

[b] Refer to bullets on page v and to Table 50 (at the end of Section 5.2) for an explanation of how these numbers were calculated. These values exclude perimeter buffer area.

[c] Refer to the SR 167 Completion Project Stage 1b permit modifications for details on excess mitigation area in the Hylebos RRP.

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Abbreviations and Acronyms

BMP	Best Management Practices
CWA	Clean Water Act
DDI	Diverging Diamond Interchange
Ecology	Washington State Department of Ecology
FMC	Fife Municipal Code
HGM	hydrogeomorphic
HPA	Hydraulic Project Approval
I-5	Interstate 5
ITS	Intelligent Transportation Systems
JARPA	Joint Aquatic Resources Permit Application
LRR	Land Resource Region
LTM	Long-term management
LWM	Large woody material
MLRA	Major Land Resource Areas
MMC	Milton Municipal Code
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High Water Mark
PCC	Pierce County Code
PEM	palustrine emergent
PFO	palustrine forested
PMC	Puyallup Municipal Code
Port	Port of Tacoma
PSE	Puget Sound Energy
PSS	palustrine scrub-shrub
PTOI	Puyallup Tribe of Indians
RCW	Revised Code of Washington
RM	River Mile
RRFB	Rectangular Rapid Flashing Beacon
RRP	Riparian Restoration Program
SPCC	Spill Prevention, Control, and Countermeasures
SR	State Route
Stage 1a	Stage 1a of the SR 167 Completion Project
Stage 1b	Stage 1b of the SR 167 Completion Project
Stage 2	Stage 2 of the SR 167 Completion Project
TESC	Temporary Erosion and Sediment Control

TMDL	Total Maximum Daily Load
TPU	Tacoma Public Utilities
Trib	Tributary
USACE	US Army Corps of Engineers
USEPA	US Environmental Protection Agency
USFWS	United State Fish and Wildlife Service
VMS	Variable Message Signs
VWIM	Virtual Weight In Motion
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

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1. Proposed Project

1.1 Introduction

As part of the Puget Sound Gateway Program, WSDOT plans to complete the SR 167 highway by building approximately 4 miles of a new four-lane limited-access highway. The new facility will begin at the current terminus in Puyallup at SR 161, extend through the Puyallup River Valley, and connect to Interstate 5 (I-5) near the existing Wapato Way East crossing over I-5. The Project also includes a new highway segment approximately 2 miles long. Defined as the SR 509 Spur, this new segment will extend from SR 509 near the Port of Tacoma (Port) to a new diverging diamond interchange at I-5 and SR 167.

The Project will be constructed in three stages, through sequential design-build contracts. The Stage 2 portion of the Project, known as the SR 167/I 5 to SR 161 – New Expressway Project (hereafter referred to as Stage 2) is the third construction contract of the Project's "Phase 1 Improvements," which encompasses the entire 6-mile corridor. Previous construction stages are referred to as Stage 1a and Stage 1b.

Stage 2 construction will cause unavoidable impacts on wetlands, streams, and their buffers. This report identifies those impacts and describes a plan to mitigate for them.

This report will support applications for relevant permits to be obtained by WSDOT via a Joint Aquatic Resources Permit Application (JARPA). The required permits and approvals related to wetlands and streams and the associated regulatory issuing agency are anticipated as follows for Stage 2:

- Section 404 Individual Permit, US Army Corps of Engineers (USACE)
- Section 401 Water Quality Certification, Washington State Department of Ecology (Ecology)
- Coastal Zone Management Consistency Certification, Ecology
- Hydraulic Project Approval (HPA), Washington Department of Fish and Wildlife (WDFW)
- Section 401 Water Quality Certification, Puyallup Tribe of Indians (PTOI)
- Tribal Development Permit, PTOI
- Shoreline Substantial Development Permit, City of Puyallup
- Land use (Critical Areas Ordinance) permits/approval as required from City of Fife, City of Edgewood, City of Puyallup, and Pierce County

The following sources of information were used in preparation of this report:

- Aerial photographs of the Project area (Google Earth Aerial 2018)

- National Wetlands Inventory map of wetland areas in the Project area (USFWS 2019a)
- Pierce County Public GIS (tax parcels and road locations) (Pierce County 2020a, 2020b)
- Hydrographic data (stream locations) for Pierce County (Pierce County 2019b)
- SalmonScape computer mapping system (WDFW 2022b)
- Washington State Priority Habitats and Species database (WDFW 2022a)
- Washington Natural Heritage Program data (WDNR 2022)
- Climate and precipitation data (NRCS 2022a)
- Soil survey maps for the Project area (NRCS 2022b)
- Soil descriptions for the Project area (NRCS 2022c, 2022d)

WSDOT coordinated extensively with regulatory agencies, the PTOI, and stakeholders on construction and design of Stage 2, particularly mitigation site selection and design, during preapplication meetings prior to permit submittal. For any additional changes to the SR 167 Stage 2 Project that would affect this mitigation plan, WSDOT will submit the proposed changes to the Corps, Ecology, PTOI, and other applicable regulatory agencies for review and approval prior to implementation.

1.2 Project Location

Stage 2 is located within Pierce County, Washington, in Township 20 North, Range 3 East (Section 12) and Range 4 East (Sections 5, 6, 7, 8, 16, 17, 20, 21, 22, 23, 24, 25, 27, 28, 43, 44, 45, 46 and 49). Stage 2 is in Major Land Resource Area (MLRA) 2, Willamette and Puget Sound Valleys and in Land Resource Region (LRR) A, Northwest Forests and Coasts. The majority of the Stage 2 alignment is located on the PTOI Reservation and runs through unincorporated Pierce County and the cities of Fife, Milton, Edgewood, Puyallup, and Sumner. The project is in Water Resources Inventory Area (WRIA) 10, Puyallup-White River watershed. The Stage 2 study area is located in the Hylebos Creek (Stream 02), Wapato Creek (Stream 09), and Puyallup River (Stream 17) basins (Figure 1) and is within the regulatory jurisdictions of Pierce County, the PTOI, and the cities of Fife, Milton, Edgewood, Puyallup, and Sumner.

Portions of the Stage 2 area were delineated in 2018 and 2019 as part of the SR 167/70th Avenue East. Vicinity Bridge Replacement project (Stage 1a) (WSDOT 2019) and the SR 167/I 5 to SR 509 – New Expressway project (Stage 1b) (WSDOT 2020).

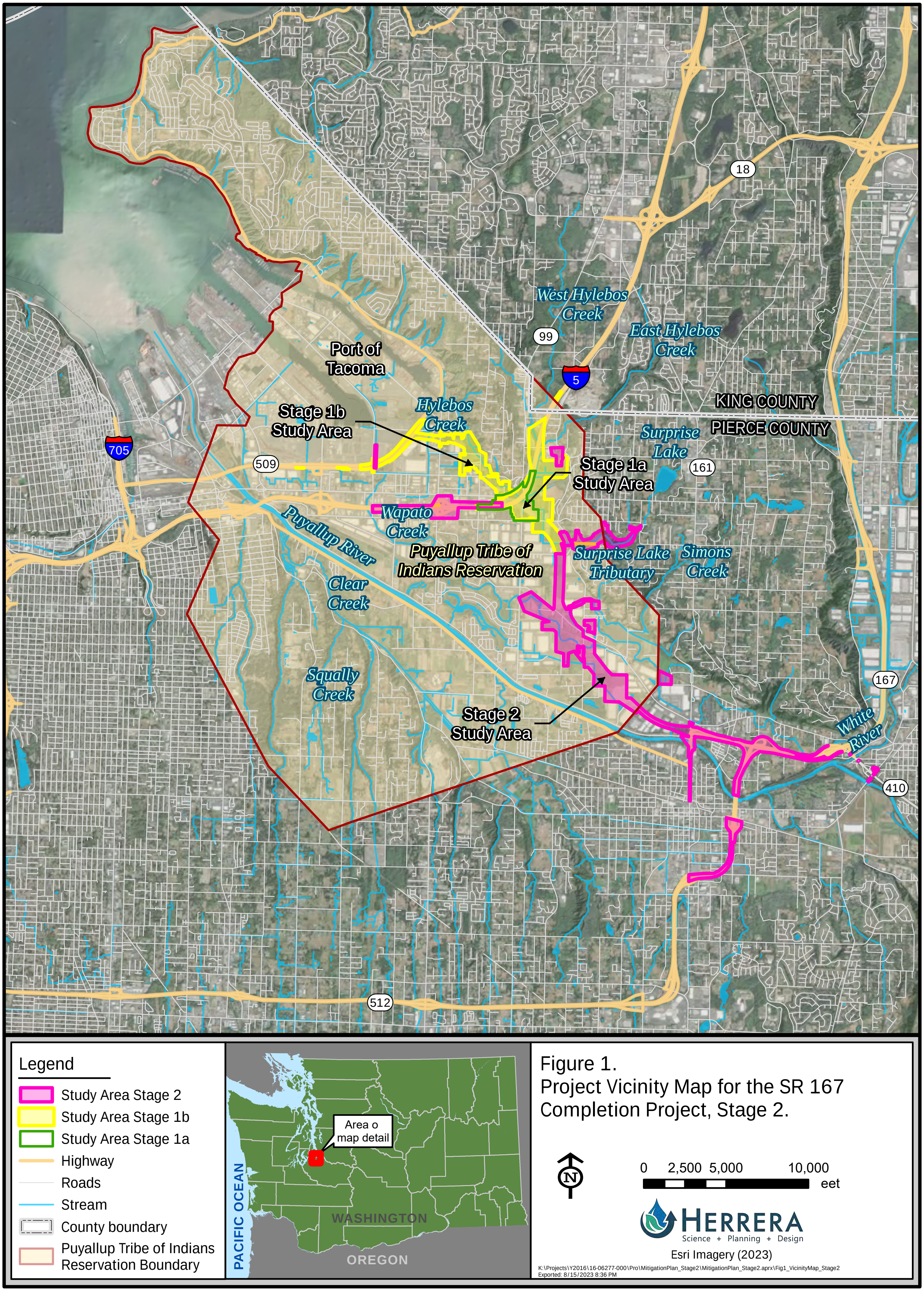


Figure 1.
Project Vicinity Map for the SR 167 Completion Project, Stage 2.

1.3 Project Purpose and Description

1.3.1 Project Purpose

Stage 2 is the third and final stage of the Project's Phase 1 Improvements, which may be delivered in more than one construction contract. The Project is part of WSDOT's Puget Sound Gateway Program, which also includes the SR 509 Completion Project in King County. Together, the projects will complete two of the Puget Sound region's most critical freight corridors and will improve access to I-5, the Ports of Tacoma and Seattle, and Seattle-Tacoma International Airport. The Project will build approximately 6 miles of a new highway to complete the unfinished segment of SR 167 in Pierce County.

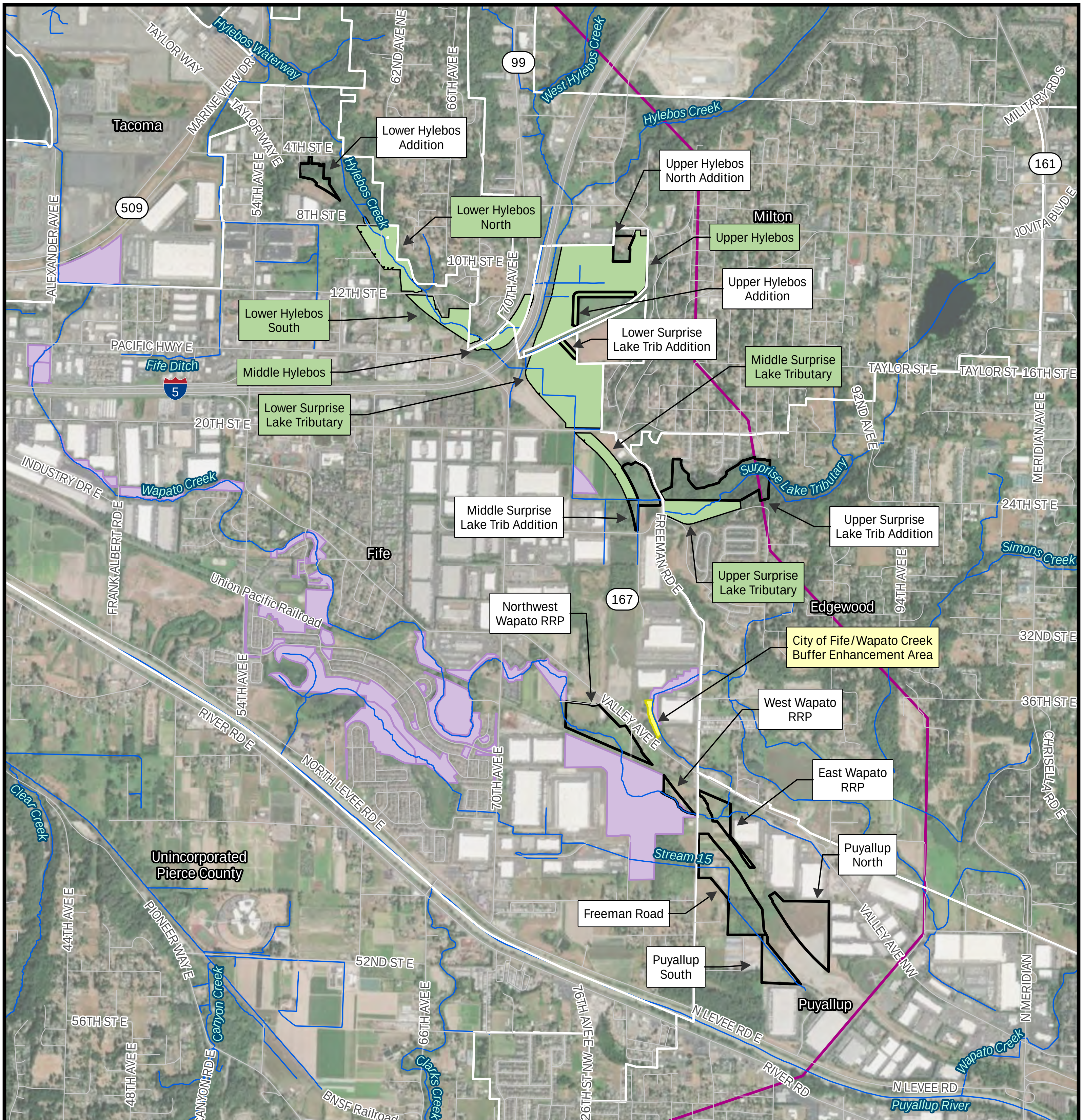
The purpose of Stage 2 is to improve regional highway connections with an extension of SR 167 to serve current and future transportation needs in northern Pierce County and to enhance regional freight mobility and Port access. Stage 2 will:

- Reduce traffic congestion
- Improve safety on arterial roads and intersections in the vicinity of Stage 2
- Provide improved system continuity between the existing SR 167 corridor and I-5
- Improve bicycle and pedestrian mobility and safety in the region
- Maintain or improve air quality in the corridor to ensure compliance with the current State Implementation Plan and the Clean Air Act

Stage 2 is needed to create system linkages, accommodate travel demand and capacity needs, and improve intermodal relationships and non-motorized transportation. The SR 167 highway currently terminates in the City of Puyallup at SR 161 (North Meridian Avenue) and does not connect to I-5 and the regional transportation highway system; this leaves a major gap in the system. As a result, local streets and major transportation routes are at or over capacity given current travel demand. This situation is expected to worsen as travel demand for the Port and major roadways increases in the Stage 2 area.

1.3.2 Project Description

Stage 2 will complete the final stage of the SR 167 Completion Project Phase 1 Improvements and will be delivered via Design-Build method. Stage 2 includes construction of a four-lane highway between SR 161 and I-5, along with several new interchanges, and the construction of the compensatory wetland and stream mitigation sites in addition to other environmental mitigation and enhancements to compensate for project impacts. Compensatory mitigation sites consist of expanding several Hylebos Riparian Restoration Program (RRP) sites that were permitted as part of Stage 1b, as well as constructing one additional mitigation site in the Hylebos basin; constructing three mitigation sites in the Wapato Creek basin (referred to as the Wapato RRP); and constructing three mitigation sites in the Puyallup River basin (Figure 2).



Legend

- Mitigation Site (Stage 2)
- Mitigation Site (Stage 1b)
- PTOI Boundary
- Existing Mitigations Sites by PTOI and Other Agencies
- City of Fife/Wapato Creek Buffer Enhancement Area
- Stream (Pierce County)
- Jurisdictional boundary (white line)

Figure 2.
Proposed Mitigation Sites for the SR 167 Completion Project, Stage 2

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Stage 2 elements and construction activities include, but are not limited to, the following:

- Land clearing and fencing
- Staging areas
- Transportation and roadway infrastructure
- Tolling and intelligent transportation system (ITS) infrastructure
- Bridges and retaining walls
- Culverts and fish passable crossings
- Shared-use path (SUP)
- Utility relocations
- Dismantling of the relocated Puyallup River Steel Truss bridge (previously removed bridge), consistent with current regulations for stormwater compliance as well as standard WSDOT BMPs
- Stormwater facilities, including detention ponds, stormwater wetlands, swales, bioretention planters, outfall structures, and ditches
- Environmental mitigation and enhancement, stream channel and floodplain modifications, the Wapato RRP for Wapato Creek and Puyallup River sites

Additional details on these Stage 2 elements and construction activities are described further below.

1.3.2.1 Land Clearing and Fencing

Land clearing and installation of fencing including:

- Clearing and grubbing within Stage 2 boundaries to remove vegetation to allow for construction activities and to remove invasive plants
- Installation of fencing along the perimeter of the WSDOT Right of Way and Limited Access areas to prevent trespassing

1.3.2.2 Transportation and Roadway Infrastructure

Highway improvements including:

- A new approximately 4-mile SR 167 alignment between SR 161 and I-5 supported on embankments

- Widening of the SR 167 alignment between SR 161 and SR 410 to provide two continuous SR 167 travel lanes in each direction
- Completion of the diverging diamond interchange (DDI) with I-5/SR 509 Spur/SR 167 constructed as part of Stage 1b with new traffic signals
- A new I-5 southbound auxiliary lane between the new I-5 DDI southbound SR 167 off-ramp to southbound I-5 and the 54th Avenue East exit
- A new roundabout half interchange with SR 167 at Valley Avenue East. The full interchange is environmentally reviewed to allow for future completion
- A new DDI with SR 167 at SR 161 with new traffic signals including sidewalks and streetscape landscaping
- New collector-distributor roadways between SR 161/North Meridian Avenue and SR 512
- New pavement markings, sign structures, Toll Gantries, ramp meters, overhead lighting structures, Closed Circuit Television (CCTV) support structures, and lighting structures

Local roadway improvements including:

- Widening of 20th Street East, including sidewalks, streetscape landscaping, and bicycle lanes, between the Interurban Trail parking lot to the easterly limits of WSDOT Right of Way (approximately 1,200 feet) , including sidewalks and streetscape landscaping along both sides
- Realignment of Valley Avenue East between 36th Street East and Freeman Road East
- Realignment and widening of Freeman Road East, including sidewalks and streetscape landscaping, between Valley Avenue East to the southerly limits of WSDOT Right of Way (approximately 2,000 feet)
- Reconstruction of North Levee Road and North Levee Road East, including streetscape landscaping, from approximately 350 feet west of North Meridian Avenue to the east side of North Meridian Avenue to support shared-use path construction
- Widening of southbound North Meridian Avenue, including new sidewalk and streetscape landscaping, from the south

side of the existing Puyallup River bridge to approximately 600 feet south for additional right-turn storage for traffic turning west onto River Road

- Rechannelization of North Meridian Avenue at East/West Stewart Avenue to provide a left-turn lane

1.3.2.3 Tolling and Intelligent Transportation System Infrastructure

Toll Infrastructure and ITS components, including:

- Two new Toll Points near 26th Street East. Two additional toll points west of North Meridian Avenue would be installed when the full Valley Interchange is completed
- ITS along the length of the new SR 167 highway including several new Variable Message Signs (VMS)
- Ramp meters at several locations
- Rectangular Rapid Flashing Beacons (RRFB) for the pedestrian crossings at the Valley Avenue East and SR 167 interchange
- A new railroad signal at the Union Pacific Railroad (UPRR) crossing of Freeman Road East
- One new Weigh in Motion (WIM) location in each and associated weigh station inspection facility between Valley Avenue East and SR 161 along northbound SR 167

1.3.2.4 Bridges

Eight new roadway bridge structures and one new shared-use path bridge structure, including:

- A new five-lane structure over 20th Street East (Bridge No. 23)
- A new four-lane structure over 26th Street East (Bridge No. 24)
- A new four-lane structure over Valley Avenue East (Bridge No. 25)
- A new four-lane structure over UPRR (Bridge No. 26)
- A new four-lane structure over Freeman Road East and Wapato Creek (Stream 09) (Bridge No. 27)
- A new four-lane structure over SR 161 (Bridge No. 28)

- A new four-lane structure over Milwaukee Avenue East (Bridge No. 29)
- A new three-lane structure over Wapato Creek (Stream 09) (Bridge No. 30)
- A new shared-use path structure over Wapato Creek (Stream 09) (Bridge No. 31)

1.3.2.5 Culverts

The following culverts will be modified associated with transportation and roadway elements:

- Removal of existing non-fish-use culverts at 20th Street East (WDFW Site IDs 935156, 935669, 935791)
- Removal of a non-fish-use culvert in the future Right of Way (WDFW Site ID 935151)
- Replacement of existing fish passable crossing at Wapato Creek (WDFW Site ID 105 R120918a) with a new fish passable crossing associated with realignment of Freeman Road (see Bridge No. 30 above)
- Repair the section across WSDOT SR 167 Right of Way (WDFW Site ID 105 R121519a)
- Removal of culvert (WDFW Site ID 935130) at an unnamed tributary to the Puyallup River
- Replacement of existing stormwater culverts (WDFW Site IDs 935154, 935155, and 935168)
- Removal of miscellaneous structures on WSDOT-owned Right of Way

The following culverts will be removed associated with mitigation and enhancement sites:

- Removal of the existing culvert (WDFW Site ID 935100) at Wapato Creek (Stream 09)
- Extending the non-fish-use culvert (WDFW Site ID 935282) conveying Stream 15 at Freeman Road

1.3.2.6 Shared-Use Paths

- A new shared use path trail system between 20th Street East and North Meridian Avenue including connections to Interurban Trail near 20th Street East, the Puyallup

Recreation Center, and the Riverwalk Trail near North Meridian Avenue. The new shared use path will cross the Puyallup River on the existing North Meridian Avenue Bridge and connect to the Riverwalk Trail along the Puyallup River's south bank. The existing North Meridian Avenue Bridge will be modified to remove the existing sidewalk, reduce lane and shoulder widths, and install a concrete barrier to separate vehicles from pedestrians

- A new shared-use path structure crossing under the new SR 167 alignment near the Puyallup Recreation Center

1.3.2.7 Coordination of Utility Relocations

- The design-builder will be responsible for coordination of the following utilities to be relocated or constructed within the Stage 2 limits:
    - City of Fife Sewer
    - City of Fife Stormwater
    - City of Fife Water
    - City of Puyallup Sewer
    - City of Puyallup Stormwater
    - City of Puyallup Water
    - Puget Sound Energy (PSE) Power within City of Fife Right of Way
    - Tacoma Public Utilities (TPU) Fiber and Power
    - Lumen within WSDOT Right of Way
- The following utilities are located within the Stage 2 limits and will be responsible for their own relocation activities:
    - PSE Gas and Power
    - Telecommunications providers such as AT&T, Comcast, Level3, Lumen (outside of WSDOT Right of Way), T-Mobile, Zayo, and others
- Protecting existing utilities that are not being relocated within Stage 2 limits

1.3.2.8 Stormwater Facility, Outfall Structure, and Ditches

- Constructing new stormwater wetlands, combined stormwater treatment wetland/detention ponds, and new and expanded detention ponds
- Constructing enhanced water quality treatment facilities, flow control facilities, drainage collection and conveyance system, flow dispersal trenches, engineered dispersion, proprietary runoff treatment devices, bioretention areas, rock dispersion outfalls, and naturalized stormwater outfall channels to manage stormwater
- Replacement of existing Puyallup River (Stream 17) outfall east of North Meridian Avenue on the north bank of the river

1.3.2.9 Retaining Walls

- New permanent and temporary retaining walls, barriers, moment slabs, and bridge approach slabs

1.3.2.10 Environmental Mitigation and Enhancement, and Creek Channel Modifications

- New roadside restoration, including removal of invasive species and native plant establishment
- Constructing new mitigation sites
- Modifying Wapato Creek channel to enhance wetland mitigation functions and connectivity to adjacent mitigation sites

1.4 Project Schedule

Stage 2 construction is expected to begin in summer 2024 and extend until fall 2029. WSDOT is planning to issue Notice to Proceed to the future design-builder in summer 2024. The design-builder will be required to submit preliminary plans (30 to 60 percent design) and then final plans (90 percent design) before they release them for construction. Stream and wetland mitigation site construction will begin at the same time as, or prior to, road construction to minimize potential impacts due to temporal loss of wetlands.

1.5 Responsible Parties

WSDOT will administer construction of the new Stage 2 through a design-build contract. WSDOT will monitor temporarily cleared wetlands for 5 years, and the mitigation sites for 10 years, or until performance standards are met, as determined by regulatory agencies, to ensure mitigation site success. Once all monitoring and adaptive management is complete, WSDOT will maintain ownership of all sites, which will be protected and maintained in perpetuity (see Section 8.5, Legal Mechanism for Long-Term Protection).

1.6 Project Area

The Stage 2 area includes existing and proposed WSDOT Right of Way, temporary construction easements, and other locations where Stage 2-related activities are expected to occur, such as the compensatory mitigation sites (Figure 1). The Stage 2 area overlaps with wetlands that were delineated as part of the SR 167 Completion's Stage 1a and Stage 1b Projects. Wetlands and streams that were delineated as part of the Stage 1a and Stage 1b effort will be affected by Stage 2 construction.

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2. Existing Conditions

Implementation of Stage 1b mitigation, referred to as the Hylebos RRP, includes approximately 149 acres of wetland, stream, and upland restoration. Mitigation involves more than 10,000 linear feet of stream restoration to Surprise Lake Tributary, Hylebos Creek, and other small tributaries. Work, currently underway with Stage 1b, will realign the ditched and channelized alignment to a natural alignment within the Hylebos RRP to enhance their habitat and floodplain connectivity and make room for the new highway alignment. Several fish passage barriers will be corrected. This work is currently under construction however is important to consider for assessment of existing conditions in the landscape at the proposed Stage 2 mitigation sites. The construction of and proposed new locations of Surprise Lake Tributary, Hylebos Creek and other small tributaries are detailed in the Stage 1b Mitigation Plan (WSDOT 2021a). The Stage 2 JARPA shows these new channel locations as the existing condition at the time of Stage 2 construction.

2.1 Landscape Setting

2.1.1 Streams

Stage 2 is located in the Hylebos Creek, Wapato Creek, and Puyallup River basins. Surprise Lake Tributary (which drains into Hylebos Creek), Wapato Creek, and several small, unnamed streams are within the Stage 2 area. Surface water and stormwater runoff within the Stage 2 limits eventually drain to Commencement Bay and the Puget Sound via Hylebos Creek, Wapato Creek, or the Puyallup River several miles downstream of the Stage 2 area.

Surprise Lake Tributary is a perennial stream that runs from Surprise Lake to its confluence with Hylebos Creek through agricultural, commercial, and industrial warehouse areas. Surprise Lake Tributary and associated tributaries located in the Stage 2 area have sparse riparian vegetation, a lack of instream woody material, steep stream banks, and are highly channelized.

Wapato Creek is a perennial stream that begins in Edgewood and flows through agricultural, residential, industrial, and commercial land uses before draining to Commencement Bay. Within the Stage 2 area Wapato Creek generally has a narrow riparian buffer, little channel complexity, and lacks instream woody material. However, recent mitigation and restoration efforts have provided a wider buffer and some floodplain connection in some areas.

Several small unnamed streams within the Stage 2 area drain directly to the Puyallup River. These streams also have degraded, straight channels, with no large woody material, and muddy substrate conditions. Riparian conditions vary with some isolated areas containing a wide forested riparian buffer, and other areas narrow buffers dominated by invasive species.

Reaches of Surprise Lake Tributary, Wapato Creek, and several small unnamed streams that flow through mitigation sites are described in Appendix A of this report.

2.1.2 Wetlands

Twenty-six wetlands will be temporarily and/or permanently affected by Stage 2 activities. Most wetlands delineated are depressional or riverine, and one wetland was dominated by depressional, riverine, and slope HGM conditions. Wetlands are described in detail in the Stage 1a, 1b, and Stage 2 Project wetland and stream assessment reports (WSDOT 2019a, 2020b, 2022, 2023). Several wetlands within proposed mitigation sites are described in Appendix A of this report. Affected wetlands include Category II and III emergent, scrub-shrub, and forested wetlands.

2.1.3 Buffers

Wetland and stream buffers overlap in the Stage 2 area and are generally degraded. The Stage 2 area is highly urbanized, and most buffers overlap large areas of impervious surfaces such as parking lots, roads, and warehouses. Buffer vegetation is typically disturbed and consists of a mix of native and nonnative species. Buffers are described in greater detail in the wetland and stream assessment reports prepared for Stage 1a, 1b, and Stage 2 of the Project (WSDOT 2019a, 2020b, 2022, 2023) and Appendix A.

2.2 Land Use History

The region containing the Project area was historically dominated by riverine and estuarine wetlands and coniferous forests. Development, beginning with agriculture, has gradually progressed to more intense land use and urbanization in much of the watershed. This pattern of development is the primary cause of wetland and riparian buffer loss within Project vicinity.

Current land use in the Stage 2 vicinity consists predominantly of highway and arterial street corridors with adjacent agricultural, residential, commercial, and industrial land uses. Areas within the northern and central portion of the study area have been used for agricultural crop production for decades. Vegetation in area have been used for agricultural crop production for decades. Vegetation in unpaved areas consists of a mixture of native and nonnative conifers, deciduous trees, common native shrubs, and mixed grasses as well as agricultural crops. Lack of trees and shrubs along streams severely limits the opportunity for recruitment of woody material. Vegetation is largely disturbed amid a variety of upland, wetland, riparian, and stream habitats.

The Project area is located in a flat valley where soils were historically formed from deposited river alluvium. Excavation and fill associated with development of roads and other land uses have altered native soils in many locations. Historical streams were realigned in conjunction with agricultural land uses, urban development, and road construction. The rerouting of surface water through agricultural and roadside ditches and stormwater infrastructure has isolated streams from their historical floodplains and associated wetlands. Increased impervious area and fill in floodplains has exacerbated flooding problems in the watershed. Much of the length of streams within the Stage 2 area is unnatural. Prior to European development, Surprise Lake Tributary drained to Wapato Creek (WSDOT 2019b). Land development in the Stage 2 area is ongoing, and likely to have continued impacts on vegetation and hydrology (WSDOT 2016a).

2.3 Watershed Context

The headwaters of the Puyallup River originate from glaciers on the north and west sides of Mount Rainier. The Carbon River and the White River are the two main tributaries to the Puyallup River as it flows towards the bay. Surface water in the study area, located in the lower portion of Puyallup River basin (WRIA 10), flows through the Puyallup River basin, Wapato basin, and Hylebos basin before entering Commencement Bay via the Hylebos and Blair Waterways in the Port (Ecology 2021; Pierce County 2021d). Historical logging, agriculture, and development throughout the watershed since have resulted in extensive changes. The lower Puyallup River has been straightened and leveed, reducing or eliminating floodplain connectivity. Small tributaries in the Stage 2 area such as Surprise Lake Tributary and Wapato Creek have also been narrowed, straightened, and disconnected from large areas of floodplain.

Watershed-scale plans produced by several local entities have identified hydrologic, water quality, and habitat issues as concerns within the Project area and in upstream watershed areas (NWIFC 2020; HDR 2014; King County 1990; EarthCorps 2016). Flooding, water quality, and a lack of accessible instream habitat are frequently cited areas of concern. Wapato Creek, the Hylebos Creek watershed, and other Puyallup River tributaries have historically supported abundant salmon runs, but development and urbanization has resulted in significant declines in salmon populations (NWIFC 2020; Kerwin 1999; King County 1990; EarthCorps 2016,). In the lower Puyallup River basin riparian habitat, spawning habitat, and rearing habitat are limiting factors for salmon and trout (Marks et. al. 2022).

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3. Impact Assessment

This impact assessment is based on a preliminary design for Stage 2 and describes existing conditions of the wetlands, streams, and buffers that will be affected by Stage 2 and the expected impacts on their functions. Wetland impacts were minimized to the extent possible during Stage 2 design, but complete avoidance was not feasible due to constraints associated with roadway safety and design guidelines, site access constraints, and proximity to wetlands. Stage 2 will be delivered via a design-build construction contract, and the design-builder may refine the design in a way that further minimizes or changes locations of wetland and stream impacts as design progresses. WSDOT will notify the regulatory agencies of any changes and coordinate closely on required permit modifications.

In addition, WSDOT has established soil stockpile areas within the Stage 2 area in advance of the current SR 167 Stage 1b and future Stage 2 construction. Stockpile activities at Stockpile Site 3, in the city of Fife on tax parcels 0420172008 and 0420083005, have resulted in permanent impacts to wetland buffers, and further buffer impacts are anticipated with the proposed construction of a haul road at the site. The wetland and stream delineations, as well as wetland and stream ratings and required buffer widths; and applicable local, state, and federal laws and regulations are described in a separate *Critical Areas Report and Mitigation Plan*, *SR 167 Completion Project – Stockpile Site 3* (Appendix B). That report quantifies impacts that have occurred to date and future impacts that are anticipated to critical areas and buffers at Stockpile Site 3. This mitigation plan includes a description of compensatory mitigation for those impacts.

3.1 Wetlands

3.1.1 Existing Conditions of Wetlands to be Impacted

Wetlands in the Stage 2 area include PFO, PSS, and PEM vegetation classes, and depressional and riverine HGM classes. They are rated as Category II, III, and IV wetlands and are typically providing a moderate to high level of hydrologic and water quality functions and a low level of wildlife habitat function. PFO and PSS wetlands are dominated by deciduous vegetation including small to large alder (*Alnus rubra*), willow (*Salix* spp.), and cottonwood (*Populus* spp.) trees and woody shrubs including Himalayan blackberry (*Rubus armeniacus*), Douglas spirea (*Spirea douglasii*), and red osier dogwood (*Cornus sericea*). PEM wetlands are characterized by colonial bentgrass (*Agrostis capillaris*), reed canarygrass (*Phalaris arundinacea*), creeping buttercup (*Ranunculus repens*), soft rush (*Juncus effusus*), and velvet grass (*Holcus lanatus*). Wetland areas adjacent to roadways are generally limited to mowed grasses, Himalayan blackberry, reed canarygrass, and patches of forested and shrub species including cottonwood and willows. Areas within the northern and central portions of the study area have been used for agricultural crop production for decades. Vegetation in these areas is sparse and consists of relic agricultural crops and reed canarygrass.

Wetland buffers in the Stage 2 area are in poor condition, characterized by high intensity land uses such as paved roads and sidewalks, commercial agriculture, and people who are experiencing homelessness living in the Right of Way. Nonnative and invasive species are prevalent in wetlands and buffers. The most common invasive species are reed canarygrass and Himalayan blackberry. Dominant native buffer species include Douglas-fir (*Pseudotsuga menziesii*), black cottonwood (*Populus balsamifera*), and bigleaf maple (*Acer macrophyllum*).

Summaries of observed conditions for each wetland that will be impacted are provided in Section 3.3 and discussed in more detail in the Wetland and Stream Assessment Reports (WSAR) for Stage 1a, Stage 1b, and Stage 2 (WSDOT 2021a, 2022b, 2022), the WSAR Stage 2 addendum (WSDOT 2023) and Appendix A, which include a description of conditions, functional summaries, wetland rating forms, field data forms, and photos.

3.1.2 Wetland Impact Assessment

Direct wetland impacts will result from placement of fill and grading during construction, which will result in both permanent and temporary impacts, as well as indirect impacts by isolating small portions of wetlands to the extent they no longer provide much wetland function. Habitat functions will also be reduced in the long term following construction due to road noise and disturbance from the new highway. Impacts resulting from road construction are listed in Table 1 (following Section 3.1.2.2) and Appendix C, and shown graphically in Figure 3 (following Table 1). Wetland areas shown in Figure 3 represent the fully delineated boundary of wetlands at time of delineation, not the existing boundary of the wetland at the time of Stage 2 construction.

3.1.2.1 Permanent Wetland Impacts

Direct Wetland Impacts

Stage 2 construction will result in direct wetland impacts due to placement of fill in wetlands within the Stage 2 alignment (Table 1; Figure 3).

Indirect Wetland Impacts

Wetland Isolation

Highway construction will bisect several wetlands, resulting in isolated portions of wetlands that will retain little wetland function or become cut off from their hydrology source (Table 1; Figure 3). These remaining isolated portions are considered permanent impacts.

Indirect Habitat Impacts

Noise and other disturbance generated by traffic on the new highway will reduce habitat function in adjacent wetlands. These indirect wetland habitat impacts were calculated by measuring the area of a wetland within the distance of the regulatory wetland buffer (based on the wetland rating) from the edge of pavement of the proposed new roadway. Areas between the edge of pavement and edge of permanent wetland impacts were not calculated as habitat impacts as these impacts are being fully mitigated as described below (i.e., there is no overlap of indirect and permanent impacts). Indirect wetland habitat impacts from adjacent existing roadways were also not included in the impact calculations because habitat impacts are already occurring in these areas. Indirect habitat impacts are summarized in Table 1 and depicted in Figure 3.

Wetlands that will be affected by noise and disturbance during operation of the new highway generally have a low to moderate potential to provide habitat functions. Wetlands 4/48/50, 53, 83, 93, 94, 122, and 123, have a low potential to provide wildlife habitat due to low interspersion of habitats and surrounding development. Wetlands 47, 98, and 95 have a moderate potential to provide wildlife habitat due to their larger size, higher interspersion of habitats, and greater plant species richness.

Wetland 98 is situated in the zone of disturbance from the new highway; however, a portion of it was not counted as an indirect habitat impact due to an agreement with the City of Fife to provide onsite wetland enhancement rather than at one of the mitigation sites described in this plan. Wetland enhancement will be provided to the area situated between Wapato Creek and the proposed highway alignment.

Indirect Habitat Impacts Within Mitigation Site Buffers

Indirect habitat impacts to wetlands 4/48/50, 47, 88/90/91, 94, 95, and 123 will occur within the perimeter buffers of several mitigation sites that are adjacent to the new highway alignment. Compensatory mitigation for these impacts will occur in the non-credit-generating buffer areas of the sites by densely planting these areas with native vegetation to offset habitat degradation caused by noise and disturbance resulting from highway traffic. WSDOT will also treat stormwater from the new highway as well as existing impervious surfaces in the Project area, and remove sources of contaminants adjacent to those sites, such as existing roads and agricultural pesticides, to improve buffer function and the function of these wetlands within the perimeter buffer.

Shading

Shading impacts from bridges that traverse wetlands were also evaluated by considering bridge orientation and height. Generally, shading due to bridge spans less than 10 feet high were considered a permanent impact. Spans over 25 feet high were not considered to be an impact because enough light penetration is expected to allow plant establishment. Spans between 10 to 25 feet high was considered to be an indirect shading impact and will be mitigated for at one-half the standard ratio.

3.1.2.2 Temporary Wetland Impacts

Construction will result in both short-term and long-term temporary impacts to wetlands (Table 1; Figure 3). Long-term temporary impacts are due to clearing of trees or impacts lasting longer than 1 year, but less than 2 years. In addition to replanting all temporarily cleared areas WSDOT will provide compensatory mitigation at one-quarter the recommended ratio of permanent impacts for long-term temporary impacts, as described in Section 4.2.2.2.

Table 1. Wetland Impacts Resulting from the SR 167 Stage 2 Project.										
				Wetland Impact Area[b] (acres)						
						Permanent Indirect			Temporary	
Wetland Number	Cowardin Classification	Ecology/ Local Rating[a]	Wetland Size (acres)	Permanent Direct	Percent Impacted	Habitat	Isolation	Shading	Long Term (1–2 years)	Short Term (<1 year)
1	PEM	III	2.30	0.35	15.2%	0.00	0.00	0.00	0.00	2.87
4/48/50	PEM, PSS, PFO	III	50.09	0.63	1.3%	0.21	0.00	0.00	0.00	0.00
15	PEM	III	0.61	0.19	31.2%	<0.01 (74 ft^2)	0.01	0.00	0.00	0.00
47	PEM, PSS, PFO	II	20.46	6.28	30.7%	1.32	0.00	0.00	0.65	0.12
53	PEM	III	9.55	3.65	38.2%	0.04	0.00	0.00	0.00	0.48
54	PEM	II	2.29	0.10	4.4%	0.00	0.00	0.00	0.00	0.31
55	PEM, PSS	III	0.20	0.01	5.0%	0.00	0.00	0.00	0.00	0.00
83	PEM, PSS, PFO	III	19.62	8.28	42.2%	0.90	<0.01 (41 ft^2)	0.00	3.54	0.68
86	PEM	III	0.11	0.11	100.0%	0.00	0.00	0.00	0.00	0.00
88/90/91	PEM, PSS	II	0.49	0.14	28.6%	0.00	0.00	0.00	<0.01 (94 ft^2)	<0.01 (82 ft^2)
92	PEM	III	1.56	1.09	69.9%	0.00	0.00	0.00	0.00	0.02
93	PEM	III	6.81	2.12	31.1%	0.00	0.10	0.00	0.00	0.00
94	PEM, PSS, PFO	II	42.45	0.18	0.4%	0.11	0.00	0.00	0.04	0.00
95	PEM, PSS, PFO	III	2.16	0.70	32.4%	0.22	0.00	0.07	0.01	0.02
98	PEM, PSS, PFO	II	4.25	0.18	4.2%	0.76	0.00	0.00	0.00	0.00
104	PEM	III	0.02	0.00	0.0%	0.00	0.02	0.00	0.00	0.00
105	PEM	III	0.05	0.04	80.0%	0.00	0.01	0.00	0.00	0.00
109	PEM	III	<0.01 (165 ft^2)	0.00	0.0%	0.00	0.00	0.00	0.00	<0.01 (165 ft^2)
122	PEM, PSS	II	1.13	0.10	8.9%	0.11	0.00	0.00	0.18	0.09
123	PEM	III	0.71	0.14	19.7%	0.02	0.00	0.00	0.00	0.14
124	PEM, PSS	III	0.26	0.03	11.5%	0.00	0.00	0.00	0.00	0.00
125	PSS	III	0.11	0.02	18.2%	0.00	0.00	0.00	0.00	0.00
136	PEM	III	3.48	0.00	0.0%	0.00	0.00	0.00	0.00	0.01
138	PEM	III	1.31	0.66	50.4%	0.00	0.00	0.00	0.00	0.00
147	PEM, PSS	III	0.23	0.05	21.7%	0.00	0.00	0.00	0.00	0.00
Total			**NA**	**25.05**	**NA**	**3.69**	**0.14**	**0.07**	**4.42**	**4.74**

[a] Ecology rating according to Hruby (2014), which is consistent with local jurisdiction requirements in Pierce County, the City of Fife, and the City of Puyallup.

[b] Impact numbers in this table are based on the 6/28/22 IAL and will be updated with future versions of this report.

[c] Percentage of wetland impacts is based on the original delineated wetland size and does not reflect wetland impacts made during prior stages of the Project.

Legend
- Jurisdictional boundary
- Permanent Wetland Impact
- Temporary Wetland Impact: Short Term
- Permanent Buffer Impact
- Temporay Buffer Impact
- Wetland
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

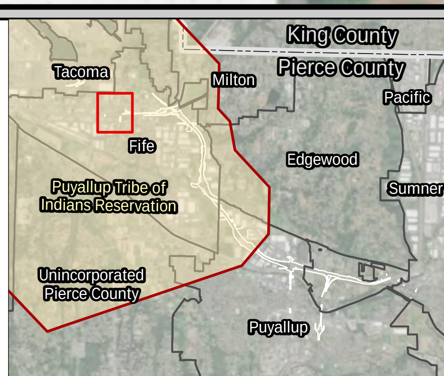

Figure 3-A.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

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Legend
- Jurisdictional boundary
- Permanent Wetland Impact
- Temporary Wetland Impact: Short Term
- Permanent Buffer Impact
- Temporay Buffer Impact
- Direct Impacts (Stage 1a/1b)
- Wetland
- Stream
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

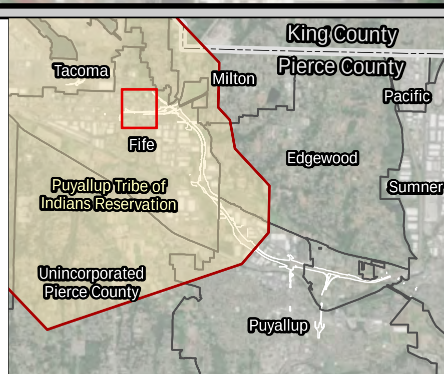

Figure 3-B.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

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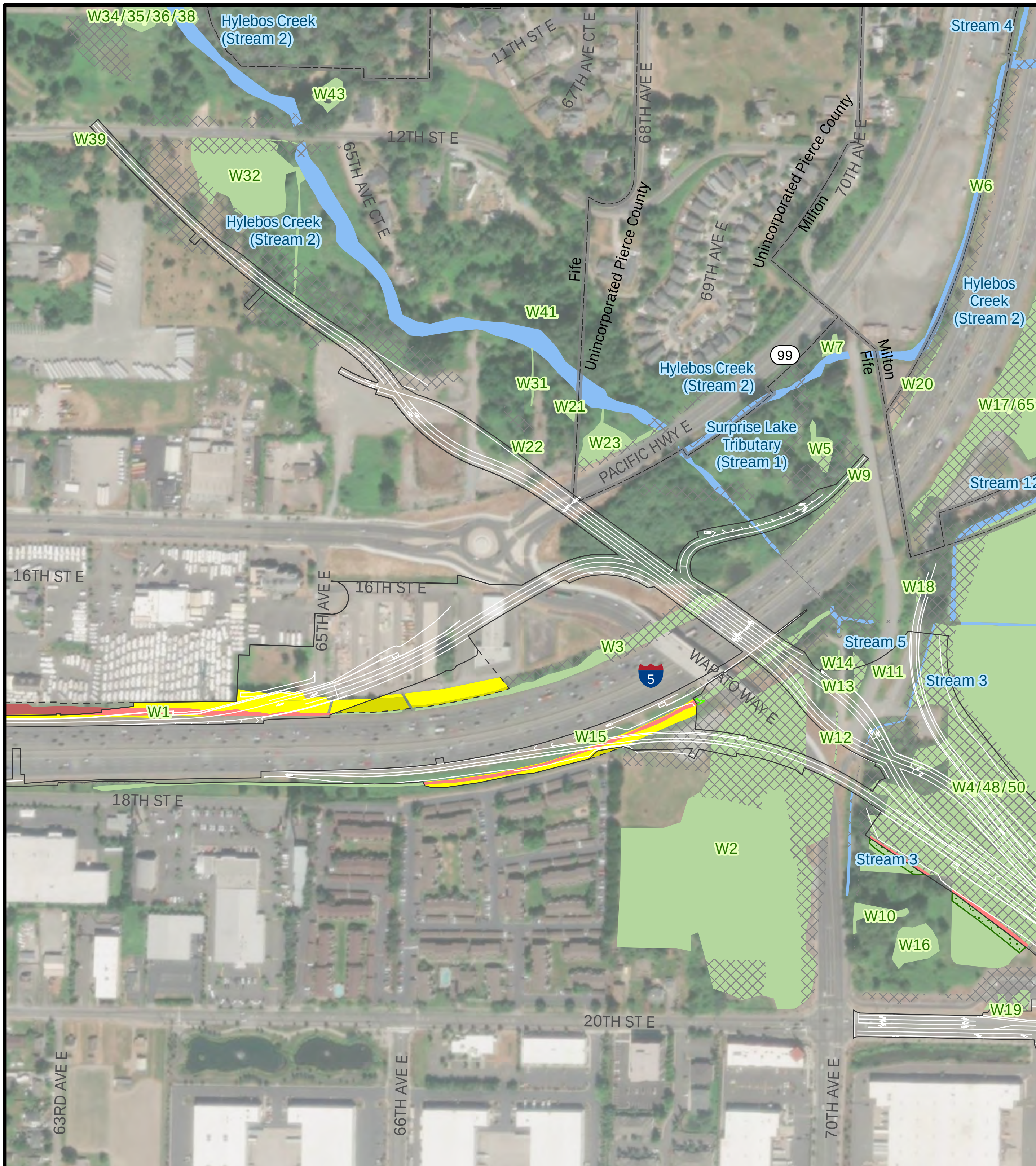

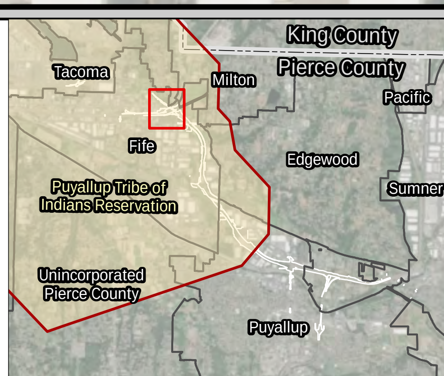

Figure 3-C.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

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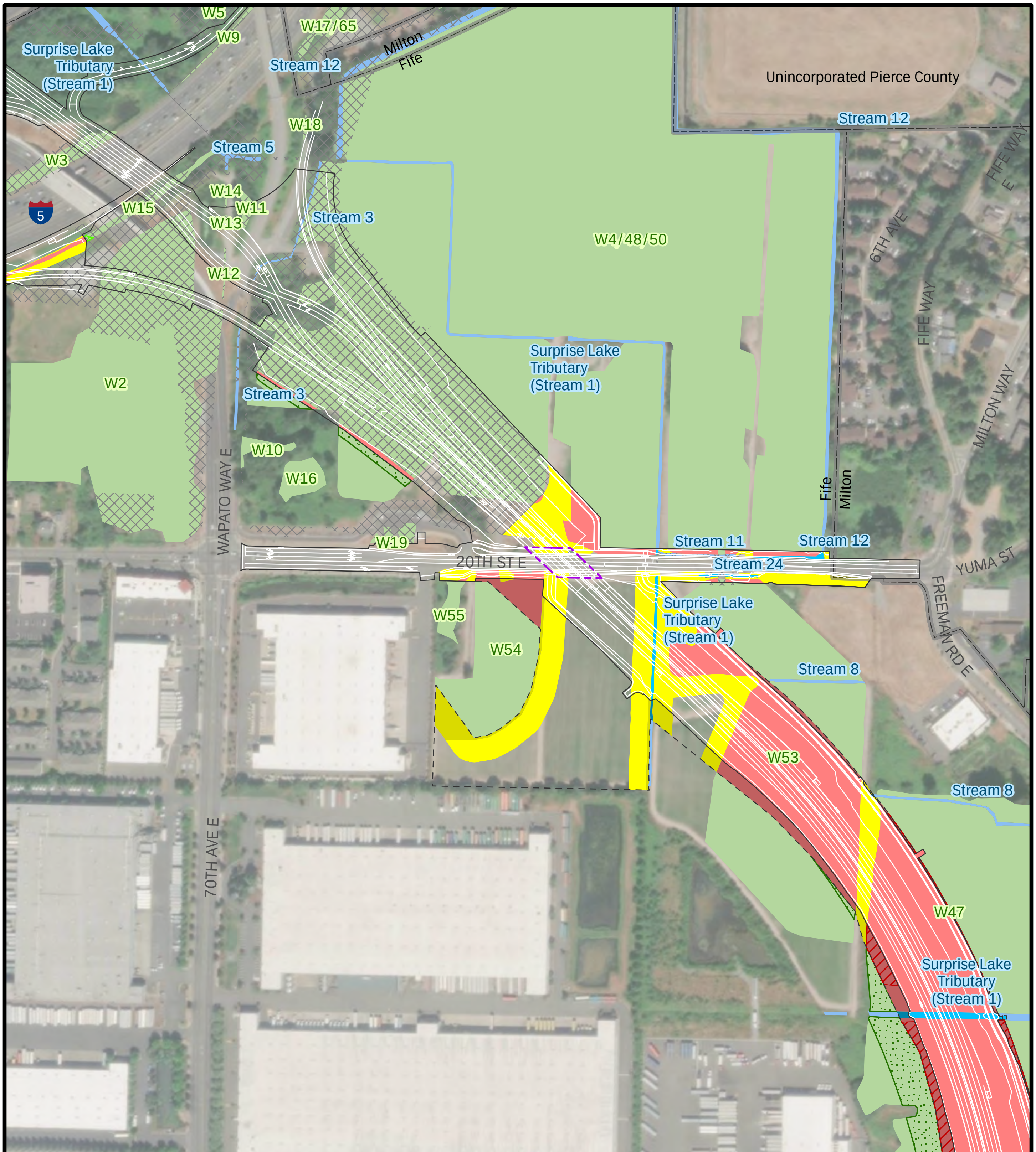

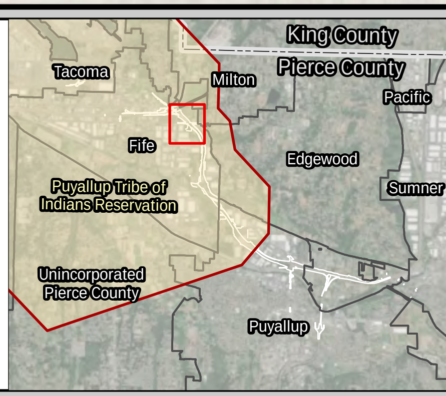

Figure 3-D.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

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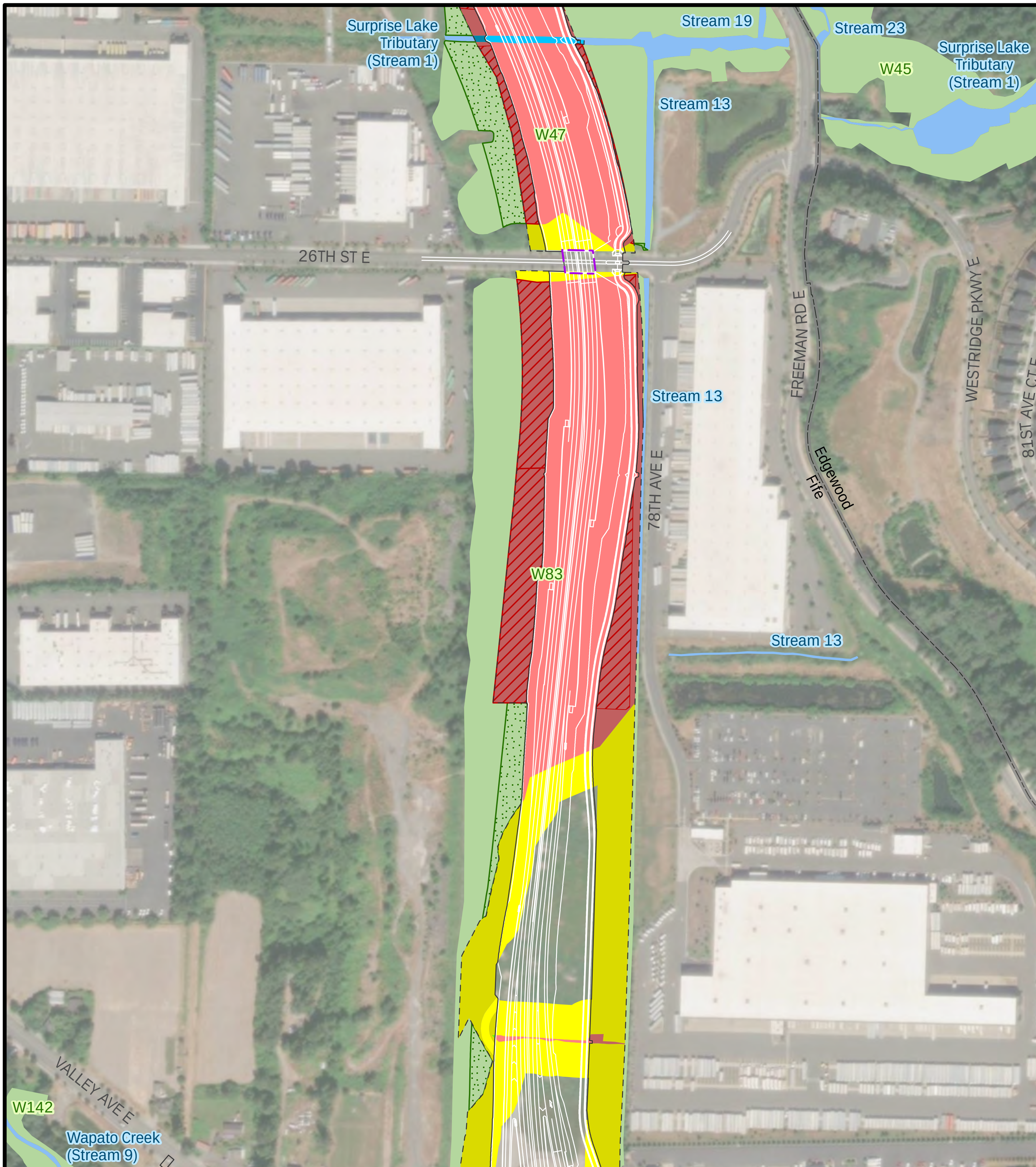

Legend
- Jurisdictional boundary
- Permanent Wetland Impact
- Temporary Wetland Impact: Short Term
- Temporary Wetland Impact: Long Term (1-2 years)
- Permanent Stream Impact
- Temporary Stream Impact
- Permanent Buffer Impact
- Temporay Buffer Impact
- Indirect Wetland Impact: Habitat
- Indirect Wetland Impact: Isolation
- Wetland
- Stream
- Bridge
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

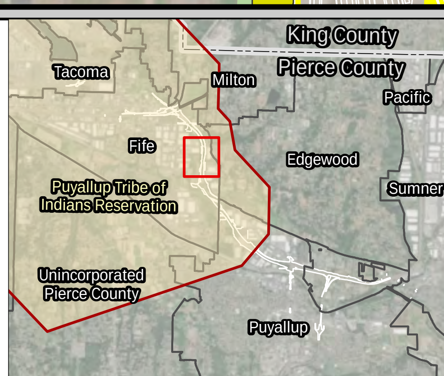

Figure 3-E.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

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Esri Imagery (2023)

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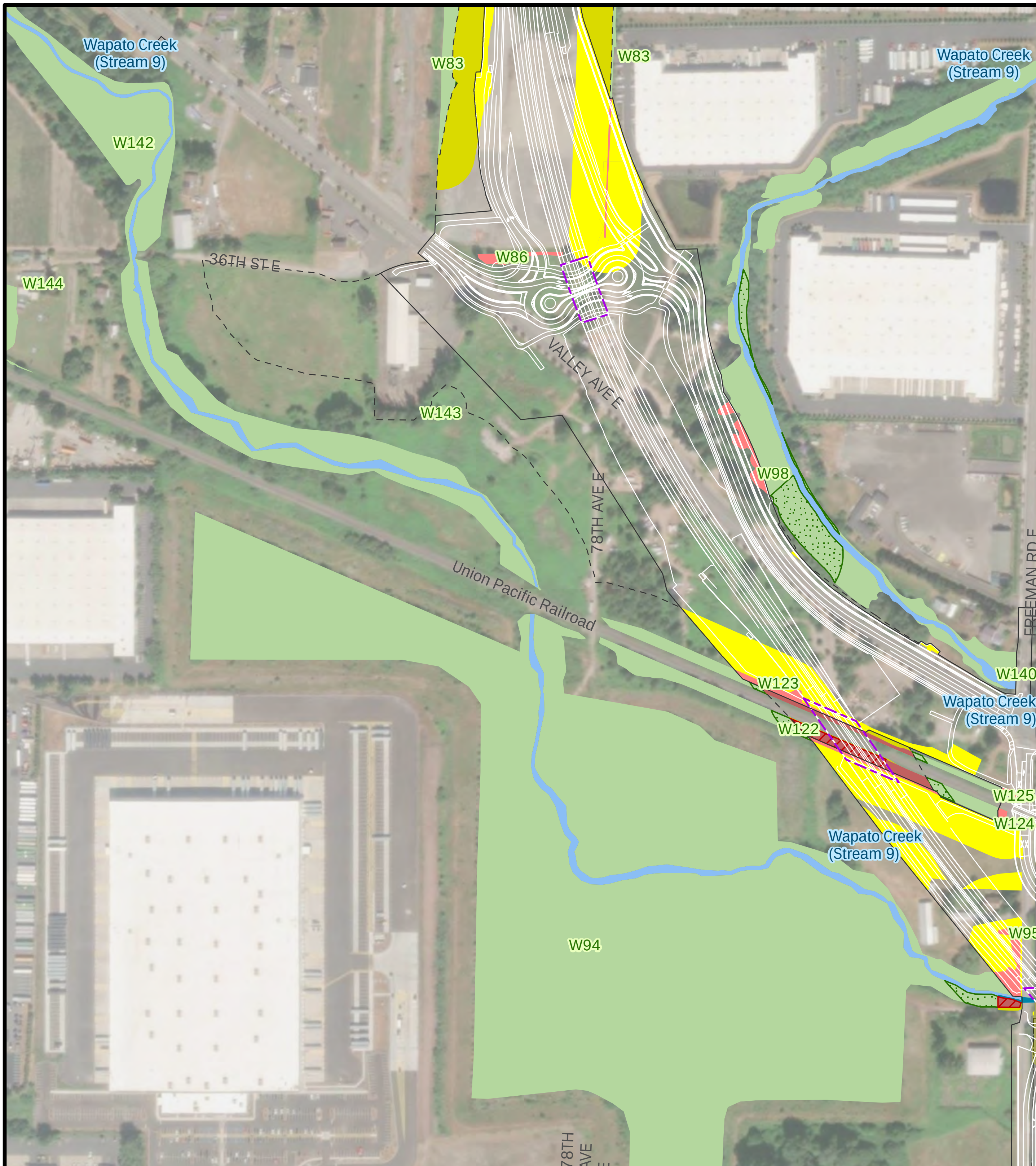

Legend
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- Permanent Wetland Impact
- Temporary Wetland Impact: Short Term
- Temporary Wetland Impact: Long Term (1-2 years)
- Temporary Stream Impact
- Permanent Buffer Impact
- Temporay Buffer Impact
- Indirect Wetland Impact: Habitat
- Wetland
- Stream
- Bridge
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

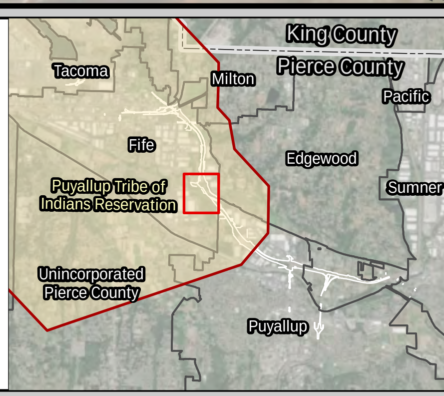

Figure 3-F.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

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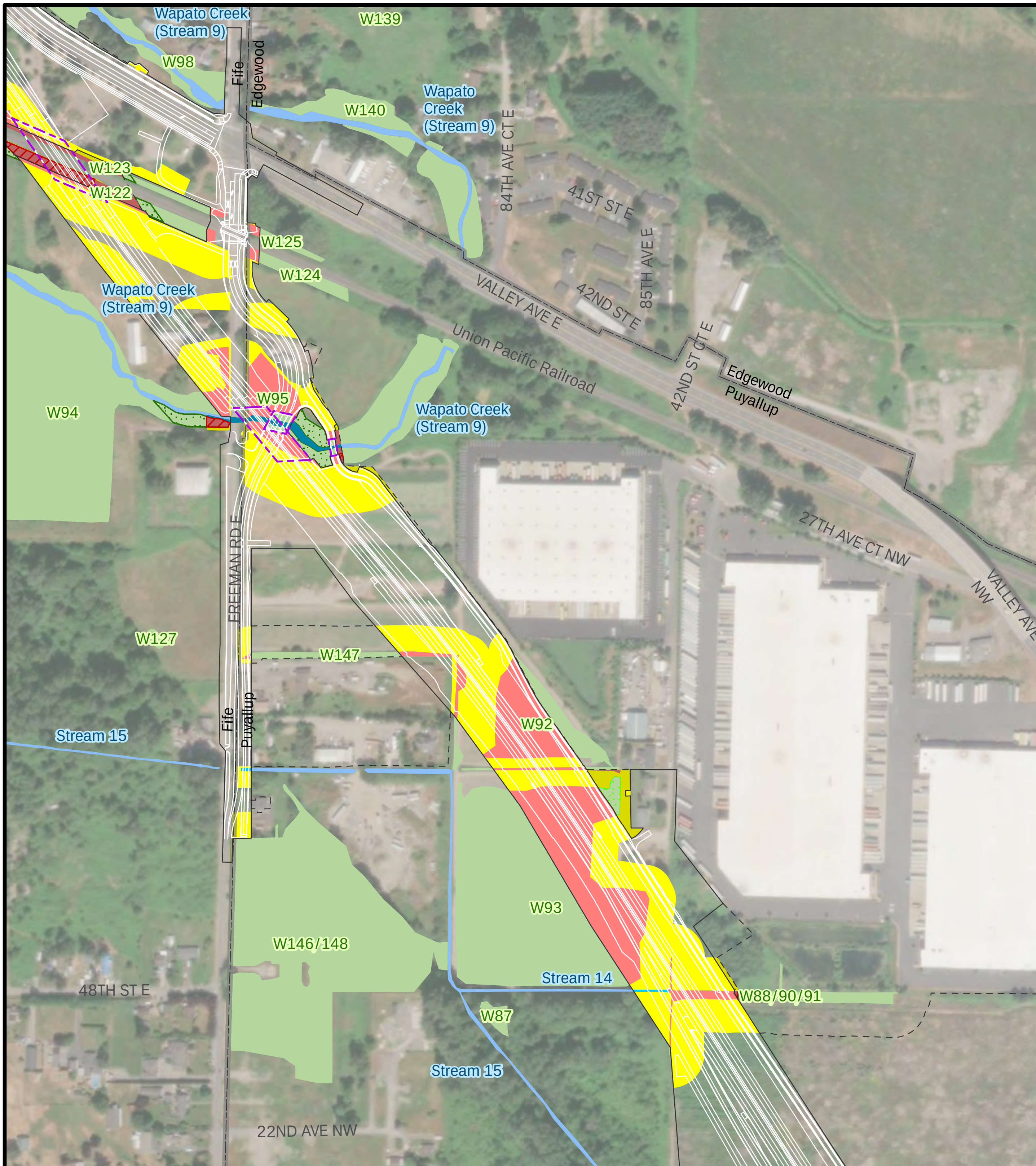

Legend
- Jurisdictional boundary
- Permanent Wetland Impact
- Temporary Wetland Impact: Short Term
- Temporary Wetland Impact: Long Term (1-2 years)
- Permanent Stream Impact
- Temporary Stream Impact
- Permanent Buffer Impact
- Temporay Buffer Impact
- Indirect Wetland Impact: Habitat
- Indirect Wetland Impact: Isolation
- Indirect Wetland Impact: Shading
- Wetland
- Stream
- Bridge
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

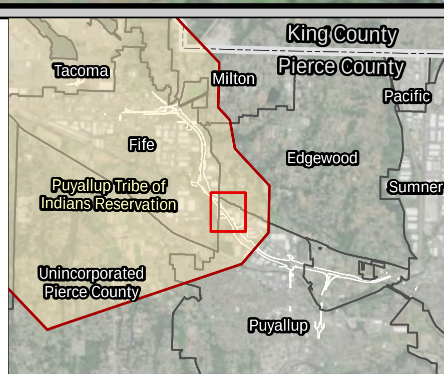

Figure 3-G.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

N

0 205 410 820 Feet

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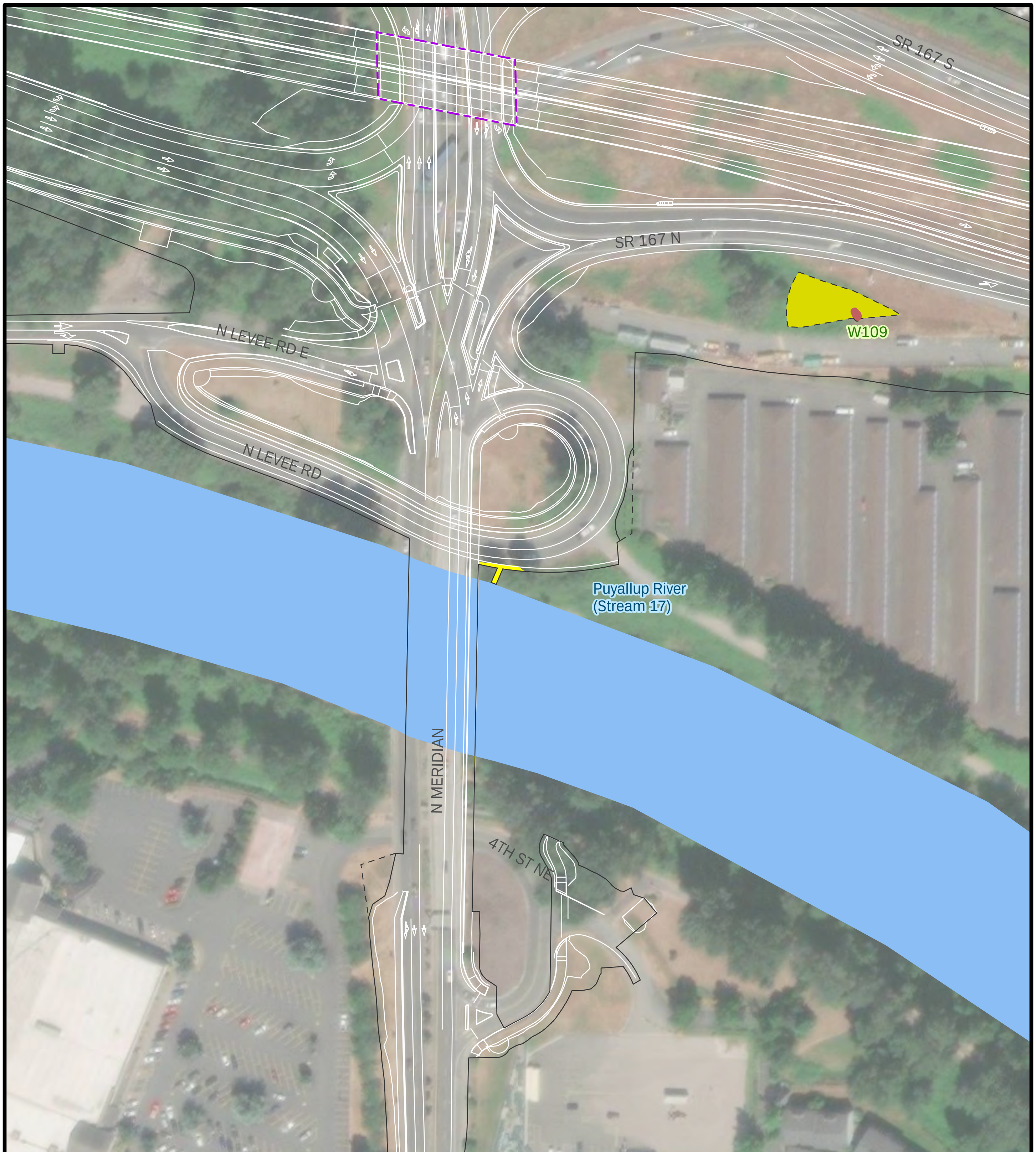

Legend
- Jurisdictional boundary
- Temporary Wetland Impact: Short Term
- Permanent Buffer Impact
- Temporay Buffer Impact
- Wetland
- Stream
- Bridge
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

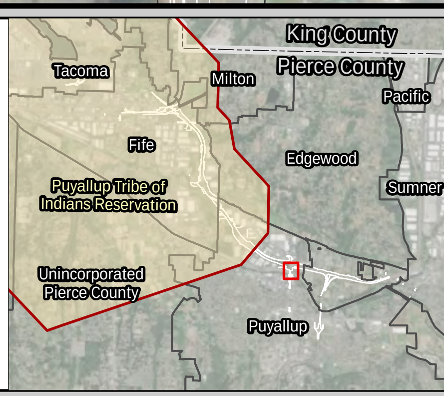

Figure 3-H.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

N

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eet

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Esri Imagery (2023)

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Legend
- Jurisdictional boundary
- Permanent Wetland Impact
- Permanent Buffer Impact
- Temporay Buffer Impact
- Indirect Wetland Impact: Isolation
- Wetland
- Bridge
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

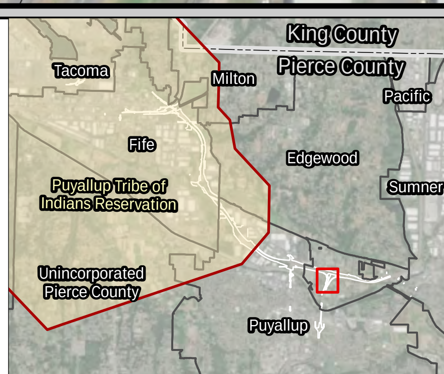

Figure 3-I.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

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0 125 250 500 eet

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Legend
- Jurisdictional boundary
- Permanent Buffer Impact
- Wetland
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

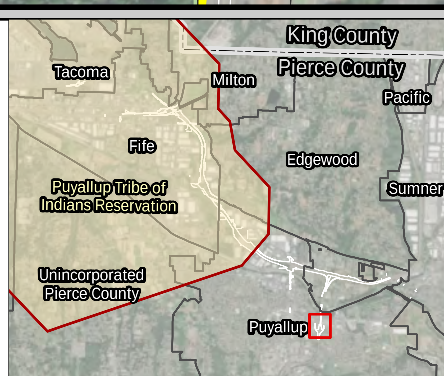

Figure 3-J.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

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eet

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Science + Planning + Design
Esri Imagery (2023)

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Legend
- Jurisdictional boundary
- Permanent Buffer Impact
- Wetland
- Permanent Impact Line
- Temporary Impact Line
- Proposed Road and Shared-Use Path (white line)

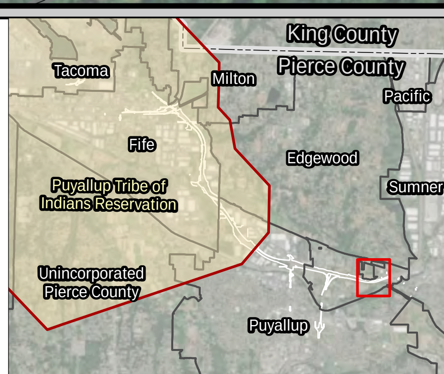

Figure 3-K.
Permanent, Temporary, and Indirect Impacts for the SR 167 Completion Project, Stage 2.

N

0 195 390 780 Feet

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Esri Imagery (2023)

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3.1.2.3 Wetland Impacts by Jurisdiction

Wetland impacts will occur within the boundaries of Fife, Puyallup, and Pierce County (Table 2).

Table 2. Wetland Impacts by Jurisdiction.

		Impact Type					
		Permanent				Temporary	
		Direct	Indirect				
Jurisdiction	**Basin**	**Grading/ Fill**	**Habitat**	**Isolation**	**Shading**	**Long Term (1–2 years)**	**Short Term (<1 year)**
Fife	Hylebos	20.23	2.47	0.01	0.00	4.19	4.47
	Wapato	0.62	1.00	0.00	0.00	0.22	0.23
Puyallup	Puyallup	3.41	0.00	0.10	0.00	0.00	0.02
	Wapato	0.75	0.22	0.00	0.07	0.01	0.02
Pierce County	Puyallup	0.04	0.00	0.03	0.00	0.00	0.00
Total	**NA**	25.05	3.69	0.14	0.07	4.42	4.74

3.2 Impacts on Wetland Functions

Wetland functions were evaluated using the Wetland Functions Characterization Tool for Linear Projects (Null et al. 2000), which evaluates wetlands in a consistent yet rapid manner for routine application on linear highway projects, based on best professional judgement. Functions and values of wetlands with proposed Stage 2 impacts are summarized in Table 3 (following Section 3.3).

In general, most wetlands in the Stage 2 area provide high levels of water quality functions, moderate levels of hydrologic functions, and a low to moderate level of habitat functions. Wetlands generally improve water quality in the Stage 2 area by trapping surface water in depressions, where pollutants are filtered out by vegetation and physical settling. Wetlands trap surface water in depressions during flood events, reducing the flashiness of storm events and the potential for flooding and erosion downstream. Removal of wetland area and associated vegetation reduces the opportunities for water quality improvement in the Stage 2 area. The Stage 2 design includes permanent stormwater treatment facilities and temporary erosion and sediment controls during construction to minimize water quality impacts from Stage 2 prior to stormwater runoff entering proposed mitigation areas.

Wetlands provide hydrological functions in the Stage 2 area by reducing downstream flooding and erosion. Wetlands trap surface water in depressions during flood events, reducing the flashiness of storm events and the potential for flooding and erosion downstream. Dense, persistent wetland vegetation slows surface water down as it moves through the system, reducing hydrological stress on downstream systems. Removal of wetland area and associated vegetation will increase hydrological stress in the area and downstream areas during storm events.

Wetlands provide habitat for wildlife, with a diversity of habitat structure created by variations in vegetative classes, hydroperiods, and special habitat features such as large snags and downed logs. The majority of the wetlands in the study area have a low capacity to provide habitat due to a lack of both structural diversity and connectivity to other functional habitats. Filling of wetland areas resulting from Stage 2 construction and removal of associated vegetation will further decrease available habitat in the Stage 2 area amid highly developed surroundings.

3.3 Wetland Impact Summary Sheets

Impacts to wetlands and associated functions that would result from the Stage 2 are summarized Tables 4 through 28. Slight discrepancies between the numbers in these tables and the numbers in the Stage 1a and Stage 1b Wetland and Stream Reports (WSDOT 2019a, 2020b) result from rounding.

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Table 3. Functions and Values of Existing Wetlands to be Permanently and/or Temporarily Impacted.

Function/Value[a]	W1	W15	W4/48/50	W47	W53	W54	W55	W83	W86	W88/90/91	W92	W93	W94
Sediment Removal	+	+	x	x	+	+	–	x	+	+	+	+	+
Nutrient and Toxicant Removal	+	+	x	x	+	+	+	+	+	+	+	+	+
Flood Flow Alteration	x	+	+	x	+	+	x	+	x	–	+	+	+
Erosion Control and Shoreline Stabilization	–	x	–	–	–	–	–	x	–	–	–	–	–
Production and Export of Organic Matter	–	x	–	x	–	–	–	x	–	x	x	X	X
General Habitat Suitability	x	–	–	x	x	x	–	x	–	–	+	+	X
Habitat for Aquatic Invertebrates	x	+	x	x	x	x	–	x	x	+	+	X	+
Habitat for Amphibians	x	+	x	x	x	x	–	+	x	+	+	+	+
Habitat for Wetland Associated Mammals	x	x	x	x	x	–	–	x	–	–	–	–	–
Habitat for Wetland-Associated Birds	x	x	x	x	x	x	–	x	x	–	+	+	X
General Fish Habitat	–	x	x	x	x	–	–	x	–	–	–	–	+
Native Plant Richness	–	–	–	x	–	–	–	x	–	–	–	–	–
Educational or Scientific Value	–	–	–	–	–	–	–	–	–	–	–	–	–
Uniqueness and Heritage	–	–	–	x	–	–	–	–	–	–	–	–	X

Function/Value	W104	W105	W109	W122	W123	W124	W125	W143	W136	W138	W147
Sediment Removal	–	+	–	x	x	x	x	+	–	–	x
Nutrient and Toxicant Removal	+	+	+	+	+	+	+	+	+	+	+
Flood Flow Alteration	+	+	–	+	+	+	+	x	x	–	+
Erosion Control and Shoreline Stabilization	–	–	–	–	–	–	–		–	–	–
Production and Export of Organic Matter	–	–	–	–	–	x	–	–	–	x	–
General Habitat Suitability	–	–	–	–	–	–	–	–	–	–	–
Habitat for Aquatic Invertebrates	–	–	–	x	x	x	x	–	x	x	x
Habitat for Amphibians	–	–	–	x	x	x	x	–	x	–	x
Habitat for Wetland Associated Mammals	–	–	–	–	–	–	–	–	–	–	–
Habitat for Wetland-Associated Birds	–	–	–	x	x	x	x	–	–	–	x
General Fish Habitat	–	–	–	–	–	x	–	–	–	–	–
Native Plant Richness	–	–	–	–	–	–	–	–	–	–	–

Function/Value	W95	W98	W104	W105	W109	W122	W123	W124	W125	W143	W136	W138	W147
Special Characteristics													
Educational or Scientific Value	–	–	–	–	–	–	–	–	–	–	–	–	–
Uniqueness and Heritage	x	–	–	–	–	–	–	–	–	–	–	–	–

W = Wetland

[a] "–" means that the function is not present; "x" means that the function is present is of lower quality; and "+" means the function is present and is of higher quality.

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Table 4. Wetland 1 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Fife	Category III
	City of Fife Buffer Width	60 feet
	Wetland Size	2.30 acres
	Cowardin Classification	PEM
	HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score 6 Hydrologic Score 8 Habitat Score 4 **Total Score 18**	
Wetland Impact Summary		
Wetland Impacts	Permanent direct 0.35 acre Temporary 2.87 acres (short term)	
Dominant Vegetation Impacted	Wetland 1 contains a palustrine emergent vegetation community dominated by reed canarygrass, creeping buttercup, and velvet grass. The portion of Wetland 1 within the Stage 1A study area is mowed, while some of the areas of the wetland farther west are not.	
Soils Series Impacted	Sultan silt loam.	
Hydrology Impacted	Stormwater runoff and precipitation are the dominant sources of hydrology to this wetland, although some groundwater is also likely.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 1 has a moderate potential to improve water quality at the site due to its depressional HGM class and dense, herbaceous vegetation.	
Hydrologic Functions Impacted	Wetland 1 has a high potential to reduce flooding and stream degradation because it is depressional (although open) and receives stormwater inputs.	
Habitat Functions Impacted	Wetland 1 has a low to moderate potential to provide habitat functions for wildlife because it has only one Cowardin class and a low diversity of plant species.	

Table 5. Wetland 4/48/50 Impact Summary.

<table>
<tr><th colspan="3">Wetland Impacts Summary Sheet</th></tr>
<tr><td colspan="3" rowspan="8"></td><td>Local Jurisdiction</td><td>Fife, WA</td></tr>
<tr><td>WRIA</td><td>10: Puyallup-White</td></tr>
<tr><td>Ecology Rating (Hruby 2014)</td><td>Category III</td></tr>
<tr><td>City of Fife</td><td>Category III</td></tr>
<tr><td>City of Fife and City of Milton Buffer Width</td><td>105 feet</td></tr>
<tr><td>Wetland Size</td><td>50.09 acres</td></tr>
<tr><td>Cowardin Classification</td><td>PEM, PSS, PFO</td></tr>
<tr><td>HGM Classification</td><td>Depressional</td></tr>
<tr><td>Rating of Entire Wetland</td><td colspan="4">Water Quality Score 7
Hydrologic Score 7
Habitat Score 5
Total Score 19</td></tr>
<tr><th colspan="5">Wetland Impact Summary</th></tr>
<tr><td>Wetland Impacts</td><td colspan="4">Permanent direct 0.63 acre
Indirect 0.21 acre (habitat)</td></tr>
<tr><td>Dominant Vegetation Impacted</td><td colspan="4">Wetland 4/48/50 contains cropped agricultural land that was planted with iceberg lettuce and cabbage at the time of delineation in 2018 and was tilled bare ground in 2019. PEM vegetation is dominated by reed canarygrass, field horsetail, and common spikerush (Eleocharis palustris), PSS by Himalayan blackberry; and PFO by red alder, black cottonwood, and willow species.</td></tr>
<tr><td>Soils Series Impacted</td><td colspan="4">Sultan silt loam, Shalcar muck, and Tisch silt</td></tr>
<tr><td>Hydrology Impacted</td><td colspan="4">Groundwater, precipitation, and overbank flooding contribute to the hydrology of this wetland.</td></tr>
<tr><th colspan="5">Wetland Functions Impact Summary</th></tr>
<tr><td>Water Quality Functions Impacted</td><td colspan="4">Wetland 4/48/50 has a moderate potential to improve water quality because it is depressional, receives stormwater discharges and pollutants, and discharges to 303(d) listed waters (Ecology 2020).</td></tr>
</table>

Table 5 (continued). Wetland 4/48/50 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Hydrologic Functions Impacted	Wetland 4/48/50 has a moderate potential to reduce flooding and stream degradation because it receives stormwater discharges and because flooding occurs in the subbasin down-gradient of the unit.
Habitat Functions Impacted	Wetland 4/48/50 has a low potential to provide habitat functions for wildlife because it lacks special habitat features and is used intensively for agriculture.

Table 6. Wetland 15 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Fife Rating	Category III
	City of Fife Buffer Width	105 feet
	Wetland Size	0.61 acre
	Cowardin Classification	PEM
	HGM Classification	Slope/ Depressional
Rating of Entire Wetland	Water Quality Score 6 Hydrologic Score 8 Habitat Score 5 **Total Score 19**	
Wetland Impact Summary		
Wetland Impacts	Permanent direct 0.19 acre Indirect 0.01 acre (isolation),	
Dominant Vegetation Impacted	Wetland 15 contains a palustrine emergent class dominated by reed canarygrass, common duckweed (*Lemna minor*), bittersweet nightshade (*Solanum dulcamara*), slough sedge (*Carex obnupta*), creeping buttercup, fringed willow herb (*Ciliatum arvense*), broad-leaf cattail (*Typha latifolia*), western lady fern (*Athyrium filix-femina*), American brook-lime (*Veronica americana*), white clover (*Trifolium repens*), common spikerush, rushes (*Juncus* and *Scirpus* spp.), morning glory (*Ipomoea* sp.), and iris (*Iris* spp.). A small area (less than 10 percent of the wetland) at the east end comprises scrub shrub vegetation.	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Groundwater, runoff, and precipitation are the dominant sources of hydrology to this wetland. In addition, some hydrology is provided at the east end by Surprise Lake Tributary.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 15 has a moderate potential to improve water quality at the site due to its persistent, ungrazed vegetation, and highly developed surroundings.	

Table 6 (continued). Wetland 15 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Hydrologic Functions Impacted	Wetland 15 has a high potential to reduce flooding and stream degradation due to its depth of ponding, especially near the outlet at Surprise Lake Tributary, occurrence of flooding downstream, and the highly developed surroundings
Habitat Functions Impacted	Wetland 15 has a low potential to provide habitat functions for wildlife because it has only one Cowardin class (PEM) and is in a highly developed area. However, it has varying water depths, a moderate richness of plant species, and several priority habitats nearby.

Table 7. Wetland 47 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category II
	City of Fife Rating	Category II
	City of Fife Buffer Width	165 feet
	Wetland Size	20.46 acres
	Cowardin Classification	PEM, PSS, PFO
	HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	6
	Hydrologic Score	8
	Habitat Score	7
	Total Score	**21**
Wetland Impact Summary		
Wetland Impacts	Permanent direct	6.28 acres
	Indirect	1.32 acres (habitat)
	Temporary	0.65 acre (long term, 1–2 years), 0.12 acre (short term)
Dominant Vegetation Impacted	Wetland 47 contains PEM, PSS, and PFO vegetation communities. The PEM vegetation is dominated by reed canarygrass. The PSS vegetation is dominated by red-osier dogwood, and Sitka willow (*Salix sitchensis*). The PFO community is dominated by black cottonwood.	
Soils Series Impacted	Sultan silt loam, Shalcar muck	
Hydrology Impacted	Surprise Lake Tributary and Stream 08 flow through this wetland and are outlets.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 47 has a moderate potential to improve water quality at the site due to its depressional HGM class; persistent, ungrazed vegetation; and its highly constricted outlet, which increases retention of pollutants	

Table 7 (continued). Wetland 47 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Hydrologic Functions Impacted	Wetland 47 has a high potential to reduce flooding and stream degradation due to its depressional HGM character, depth of ponding, occurrence of flooding downstream, and highly developed surroundings.
Habitat Functions Impacted	Wetland 47 has a high potential to provide habitat functions for wildlife because it has multiple Cowardin classes, four hydroperiods, and a high interspersion of habitats. Trees on the edge of road construction activities may be removed in order to allow for equipment access during construction.

Table 8. Wetland 53 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Fife Rating	Category III
	City of Fife Buffer Width	60 feet
	Wetland Size	9.55 acres
	Cowardin Classification	PEM
	HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	7
	Hydrologic Score	8
	Habitat Score	4
	Total Score	**19**
Wetland Impact Summary		
Wetland Impacts	Permanent direct	3.65 acres
	Indirect	0.04 acre (habitat)
	Temporary	0.48 acre (short term)
Dominant Vegetation Impacted	Wetland 53 contains PEM vegetation covering less than 0.25 acre of the wetland. The majority of Wetland 53 is cropped agricultural land that was tilled bare ground at the time of field visits in 2019 and 2020. PEM vegetation is dominated by reed canarygrass and common spikerush.	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Groundwater is the dominant source of hydrology to the wetland, with additional contribution from precipitation, overbank flooding from Surprise Lake Tributary (Stream 08), and stormwater runoff.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 53 has a moderate potential to improve water quality at the site due to its depressional HGM class with a highly constricted outlet and its potential to receive pollutants from stormwater and conventional agriculture.	
Hydrologic Functions Impacted	Wetland 53 has a high potential to reduce flooding and stream degradation due to its depressional HGM character with a highly constricted outlet, high depth of water storage, and location in a landscape that generates excessive runoff and has a history of flooding problems.	
Habitat Functions Impacted	Wetland 53 has a low potential to provide habitat functions for wildlife because it lacks special habitat features and is used intensively for agriculture.	

Table 9. Wetland 54 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category II
	City of Fife Rating	Category II
	Fife Buffer Width	75 feet
	Wetland Size	2.29 acres
Cowardin Classification	PEM	
HGM Classification	Depressional	
Rating of Entire Wetland	Water Quality Score Hydrologic Score Habitat Score **Total Score**	8 9 3 **20**
Wetland Impact Summary		
Wetland Impacts	Permanent direct Temporary	0.10 acre 0.31 acre (short term)
Dominant Vegetation Impacted	Wetland 54 contains PEM vegetation covering approximately 4 percent of the wetland. The majority of Wetland 54 is cropped agricultural land that was tilled bare ground at the time of field visits in 2019 and 2020. PEM vegetation is dominated by reed canarygrass.	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Groundwater is the dominant source of hydrology to this wetland, with additional contribution from precipitation and stormwater runoff. This wetland does not have an outlet. Surprise Lake Tributary is over 300 feet to the east. A ditch connecting to Surprise Lake Tributary is approximately 40 feet to the east and separated from Wetland 54 by a driveway.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 54 has a high potential to improve water quality at the site due to its depressional HGM class with no outlet, large area of seasonal ponding, and potential to receive pollutants from stormwater and conventional agriculture.	
Hydrologic Functions Impacted	Wetland 54 has a high potential to reduce flooding and stream degradation due to its depressional HGM character with no outlet, high depth of water storage, small contributing basin relative to the size of the wetland, and location in a landscape that generates excessive runoff and has a history of flooding problems.	
Habitat Functions Impacted	Wetland 54 has a low potential to provide habitat functions for wildlife because it lacks special habitat features and is used intensively for agriculture.	

Table 10. Wetland 55 Impact Summary.

<table>
<tr><th colspan="3">Wetland Impacts Summary Sheet</th></tr>
<tr><td rowspan="8"></td><td>Local Jurisdiction</td><td>Fife, WA</td></tr>
<tr><td>WRIA</td><td>10: Puyallup-White</td></tr>
<tr><td>Ecology Rating (Hruby 2014)</td><td>Category III</td></tr>
<tr><td>City of Fife Rating</td><td>Category III</td></tr>
<tr><td>Fife Buffer Width</td><td>60 feet</td></tr>
<tr><td>Wetland Size</td><td>0.20 acre</td></tr>
<tr><td>Cowardin Classification</td><td>PEM, PSS</td></tr>
<tr><td>HGM Classification</td><td>Depressional</td></tr>
<tr><td>Rating of Entire Wetland</td><td colspan="2">Water Quality Score 7
Hydrologic Score 8
Habitat Score 3
Total Score 18</td></tr>
<tr><th colspan="3">Wetland Impact Summary</th></tr>
<tr><td>Wetland Impacts</td><td colspan="2">Permanent direct 0.01 acre</td></tr>
<tr><td>Dominant Vegetation Impacted</td><td colspan="2">PEM: Reed canarygrass
PSS: Scouler’s willow, Himalayan blackberry</td></tr>
<tr><td>Soils Series Impacted</td><td colspan="2">Sultan silt loam</td></tr>
<tr><td>Hydrology Impacted</td><td colspan="2">Stormwater runoff and precipitation are the dominant sources of hydrology.</td></tr>
<tr><th colspan="3">Wetland Functions Impact Summary</th></tr>
<tr><td>Water Quality Functions Impacted</td><td colspan="2">Wetland 55 has a moderate potential to improve water quality at the site due to its depressional HGM class; dense, herbaceous vegetation; and stormwater inputs.</td></tr>
<tr><td>Hydrologic Functions Impacted</td><td colspan="2">Wetland 55 has a high potential to reduce flooding and stream degradation due to its depressional HGM character with no outlet and its location in a landscape that generates excessive runoff and has a history of flooding problems.</td></tr>
<tr><td>Habitat Functions Impacted</td><td colspan="2">Wetland 55 has a low potential to provide habitat functions for wildlife because it has only one hydroperiod and a low interspersion of habitats.</td></tr>
</table>

Table 11. Wetland 83 Impact Summary.		
Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Fife Rating	Category III
	City of Fife Buffer Width	105 feet
	Wetland Size	19.62 acre
	Cowardin Classification	PEM, PSS, PFO
	HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score	6
	Hydrologic Score	7
	Habitat Score	5
	Total Score	**18**
Wetland Impact Summary		
Wetland Impacts	Permanent direct	8.28 acres
	Indirect	0.90 acre (habitat), 3.54 acre (long term), <0.01 (41ft^2) (isolation)
	Temporary	0.68 (short term)
Dominant Vegetation Impacted	Trees: black cottonwood Shrubs: Douglas spirea, Himalayan blackberry, red osier dogwood Herbaceous: small-fruited bulrush (*Scirpus microcarpus*), slough sedge, creeping buttercup, reed canarygrass.	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Groundwater, stormwater, and overbank flooding from Stream 13 are the primary sources of hydrology for this wetland.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 83 has a moderate potential to improve water quality at the site due to its depressional HGM class; dense, herbaceous vegetation; and its potential for receiving stormwater inputs.	

Table 11 (continued). Wetland 83 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Hydrologic Functions Impacted	Wetland 83 has moderate potential to reduce flooding because it is a depressional wetland and is in a highly developed area with potential for flooding.
Habitat Functions Impacted	Wetland 83 has a moderate potential to provide habitat functions for wildlife because it several Cowardin classes and hydroperiods, a richness of plant species, and several special habitat features such as standing snags. Cottonwood trees that occur within 150 feet of the new roadway will be removed to eliminate hazard trees.

Table 12. Wetland 86 Impact Summary.			
Wetland Impacts Summary Sheet			
		**Local Jurisdiction**	Fife, WA
		WRIA	10: Puyallup-White
		Ecology Rating (Hruby 2014)	Category III
		City of Fife Rating	Category III
		City of Fife Buffer Width	60 feet
		Wetland Size	0.11 acre
		Cowardin Classification	PEM
		HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score 6 Hydrologic Score 7 Habitat Score 3 **Total Score 16**		
Wetland Impact Summary			
Wetland Impacts	Permanent direct 0.11 acre (100 percent impacted)		
Dominant Vegetation Impacted	Trees: black cottonwood Shrubs: Himalayan blackberry Herbaceous: reed canarygrass		
Soils Series Impacted	Sultan silt loam		
Hydrology Impacted	Precipitation and runoff from the road are likely the primary sources of hydrology at this wetland.		
Wetland Functions Impact Summary			
Water Quality Functions Impacted	Wetland 86 has moderate potential to improve water quality at the site due to its depressional HGM class and dense, herbaceous vegetation.		
Hydrologic Functions Impacted	Wetland 86 has a moderate potential to reduce flooding because of its depressional HGM class, and because it receives stormwater discharges and runoff.		

Table 12 (continued). Wetland 86 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Habitat Functions Impacted	Wetland 86 has a low potential to provide habitat functions for wildlife because it has a low number of Cowardin classes, a low diversity of plant species, and is located in a highly developed area.

Table 13. Wetland 88/90/91 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Puyallup, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category II
	City of Puyallup Rating	Category II
	City of Puyallup Buffer Width	100 feet
	Wetland Size	0.49 acre
	Cowardin Classification	PSS, PEM
	HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	8
	Hydrologic Score	7
	Habitat Score	5
	Total Score	**20**
Wetland Impact Summary		
Wetland Impacts	Permanent direct	0.14 acre
	Temporary	<0.01 (94 ft^2) (long term), <0.01 (82 ft^2) (short term)
Dominant Vegetation Impacted	Shrubs: red osier dogwood Herbaceous: white clover (*Trifolium repens*), velvet grass, reed canarygrass, spike rush	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Surface flows are the primary source of hydrology for this wetland. This wetland is adjacent to Stream 14.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 88/90/91 has a moderate potential to improve water quality because it is a depressional HGM class, has dense, herbaceous vegetation, and receives pollutant and stormwater discharges.	

Table 13 (continued). Wetland 88/90/91 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Hydrologic Functions Impacted	Wetland 88/90/91 has a moderate potential to reduce flooding and stream degradation because it is a closed depressional system and receives stormwater runoff in a highly developed area.
Habitat Functions Impacted	Wetland 88/90/91 has a low potential to provide habitat functions because it is a highly developed area, has a low number of Cowardin classes, and a low diversity of plant species.

Table 14. Wetland 92 Impact Summary.		
Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Puyallup, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Puyallup Rating	Category III
	City of Puyallup Buffer Width	80 feet
	Wetland Size	1.56 acres
	Cowardin Classification	PEM
	HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score 8 Hydrologic Score 7 Habitat Score 4 **Total Score 19**	
Wetland Impact Summary		
Wetland Impacts	Permanent direct 1.09 acres Temporary 0.02 acre (short term)	
Dominant Vegetation Impacted	Herbaceous: common rush, common horsetail.	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Surface flows and precipitation are the primary sources of hydrology for this wetland. Surface ponding was present in low points within the wetland during field work in late April.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 92 has a high potential to improve water quality at the site due to its depressional HGM class, receives stormwater, and has highly developed surroundings.	
Hydrologic Functions Impacted	Wetland 92 has a moderate potential to reduce flooding and stream degradation due to its depressional HGM character and highly developed surroundings.	

Table 14 (continued). Wetland 92 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Habitat Functions Impacted	Wetland 92 has a low potential to provide habitat functions for wildlife because it has only one Cowardin class, a low diversity of plant species, and is located in a highly developed area.

Table 15. Wetland 93 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Puyallup, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Puyallup Rating	Category III
	City of Puyallup Buffer Width	80 feet
	Wetland Size	6.81 acre
	Cowardin Classification	PEM
	HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	7
	Hydrologic Score	7
	Habitat Score	4
	Total Score	**18**
Wetland Impact Summary		
Wetland Impacts	Permanent direct	2.12 acre
	Indirect	0.10 acre (isolation)
Dominant Vegetation Impacted	Herbaceous: mousetail (*Myosurus minimus*) and fringed willowherb (*Epilobium ciliatum*)	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Precipitation and overbank flooding from Streams 14 and 15 are the primary sources of hydrology for this wetland.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 93 has a moderate potential to improve water quality at the site due to its depressional HGM class with no outlet, receives stormwater, and has highly developed surroundings.	
Hydrologic Functions Impacted	Wetland 93 has a moderate potential to reduce flooding due to its depressional HGM character and highly developed surroundings.	

Table 15 (continued). Wetland 93 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Habitat Functions Impacted	Wetland 93 has a low potential to provide habitat functions for wildlife because it has only one Cowardin class, a low diversity of plant species, and no interspersion of habitats.

Table 16. Wetland 94 Impact Summary.

Wetland Impacts Summary Sheet			
		**Local Jurisdiction**	Fife, WA
		WRIA	10: Puyallup-White
		Ecology Rating (Hruby 2014)	Category II
		City of Fife Rating	Category II
		City of Fife Buffer Width	165 feet
		Wetland Size	42.45 acres
		Cowardin Classification	PEM, PSS, PFO
		HGM Classification	Depressional/ Riverine
Rating of Entire Wetland	Water Quality Score 8 Hydrologic Score 7 Habitat Score 6 **Total Score 21**		
Wetland Impact Summary			
Wetland Impacts	Permanent direct 0.18 acre Indirect 0.11 acre (habitat) Temporary 0.04 acre (long term)		
Dominant Vegetation Impacted	Trees: willows, black cottonwood, Oregon ash (*Fraxinus latifolia)* Shrubs: osoberry (*Oemleria cerasiformis*) Herbaceous: reed canarygrass, creeping buttercup, tall fescue		
Soils Series Impacted	Sultan silt loam		
Hydrology Impacted	Overbank and hyporheic flows from Wapato Creek and Stream 15 are the primary hydrology sources for this wetland.		
Wetland Functions Impact Summary			
Water Quality Functions Impacted	Wetland 94 has a high potential to improve water quality at the site due to the highly developed surroundings and the structure of woody vegetation that can aid in sedimentation of pollutants.		
Hydrologic Functions Impacted	Wetland 94 has a moderate potential to reduce flooding and stream degradation due to the wide available floodplain, and structure of woody vegetation that can slow flood waters.		
Habitat Functions Impacted	Wetland 94 has a moderate potential to provide habitat functions for wildlife because it has several Cowardin classes and hydroperiods, a diverse plant population, several special habitat features such as undercut banks and woody material, and provides habitat for priority species.		

Table 17. Wetland 95 Impact Summary.		
Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Puyallup, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Puyallup Rating	Category III
	City of Puyallup Buffer Width	150 feet
	Wetland Size	2.16 acres
	Cowardin Classification	PEM, PSS, PFO
	HGM Classification	Riverine

Rating of Entire Wetland	Water Quality Score	7
	Hydrologic Score	6
	Habitat Score	6
	Total Score	**19**
Wetland Impact Summary		
Wetland Impacts	Permanent direct	0.70 acre
	Indirect	0.22 acre (habitat), 0.07 acre (shading)
	Temporary	0.01 acre (long term), 0.02 acre (short term)
Dominant Vegetation Impacted	Trees: Oregon ash, Scouler's willow, red alder, black cottonwood Shrubs: Douglas spirea, Sitka willow, Himalayan blackberry Herbaceous: reed canarygrass	
Soils Series Impacted	Puyallup fine sandy loam, Sultan silt loam	
Hydrology Impacted	Overbank and hyporheic flows from the adjacent stream, in addition to precipitation and surface flows, are the primary sources of hydrology for this wetland.	

Table 17 (continued). Wetland 95 Impact Summary.	
Wetland Functions Impact Summary	
Water Quality Functions Impacted	Wetland 95 has a moderate potential to improve water quality at the site due to the highly developed surroundings and the structure of woody vegetation that can aid in sedimentation of pollutants.
Hydrologic Functions Impacted	Wetland 95 has a moderate potential to reduce flooding and stream degradation due to connectivity to the floodplain, and structure of woody vegetation that can slow flood waters.
Habitat Functions Impacted	Wetland 95 has moderate potential to provide habitat functions because it has several Cowardin classes and hydroperiods, several special habitat features such as undercut banks, and provides habitat for priority species.

Table 18. Wetland 98 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category II
	City of Fife Rating	Category II
	City of Fife Buffer Width	165 feet
	Wetland Size	4.25 acres
	Cowardin Classification	PEM, PSS, PFO
	HGM Classification	Riverine

Rating of Entire Wetland	Water Quality Score Hydrologic Score Habitat Score **Total Score**	8 7 6 **21**
Wetland Impact Summary		
Wetland Impacts	Permanent direct Indirect	0.18 acre 0.76 (habitat)
Dominant Vegetation Impacted	Trees: red alder Shrubs: bamboo Herbaceous: reed canarygrass	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Overbank and hyporheic flows from Wapato Creek are the primary source of hydrology for the wetland.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 98 has a high potential to improve water quality at the site due to the highly developed surroundings and the structure of woody vegetation that can aid in sedimentation of pollutants.	
Hydrologic Functions Impacted	Wetland 98 has a moderate potential to reduce flooding and stream degradation due to its highly developed surroundings and the structure of woody vegetation that can slow flood waters.	
Habitat Functions Impacted	Wetland 98 has a moderate potential to provide habitat functions for wildlife because it has several Cowardin classes and hydroperiods, and is located near several priority habitats.	

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Table 19. Wetland 104 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Unincorporated Pierce County, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	Unincorporated Pierce County Rating	Category III
	Unincorporated Pierce County Buffer Width	80 feet
	Wetland Size	0.02 acres
	Cowardin Classification	PEM
	HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	7
	Hydrologic Score	6
	Habitat Score	3
	Total Score	**16**
Wetland Impact Summary		
Wetland Impacts	Indirect	0.02 acre (isolation)
Dominant Vegetation Impacted	Herbaceous: colonial bentgrass	
Soils Series Impacted	Briscot loam	
Hydrology Impacted	Surface flow and precipitation are the primary source of hydrology for the wetland.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 104 has a moderate potential to improve water quality at the site due to the highly developed surroundings, stormwater inputs, and the structure of woody vegetation that can aid in sedimentation of pollutants.	
Hydrologic Functions Impacted	Wetland 104 has a moderate potential to reduce flooding and stream degradation due to its highly developed surroundings, stormwater inputs and the structure of woody vegetation that can slow flood waters.	

Table 19 (continued). Wetland 104 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Habitat Functions Impacted	Wetland 104 has a low potential to provide habitat functions for wildlife because it lacks structural diversity, surrounded by intense land uses, and lacks special habitat features.

Table 20. Wetland 105 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Unincorporated Pierce County, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	Unincorporated Pierce County Rating	Category III
	Unincorporated Pierce County Buffer Width	80 feet
	Wetland Size	0.05 acres
	Cowardin Classification	PEM
	HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	7
	Hydrologic Score	6
	Habitat Score	3
	Total Score	**16**

Wetland Impact Summary		
Wetland Impacts	Permanent direct	0.04 acre
	Indirect	0.01 acre (isolation)
Dominant Vegetation Impacted	Herbaceous: common rush	
Soils Series Impacted	Briscot loam	
Hydrology Impacted	Surface flows and precipitation are the primary source of hydrology for the wetland.	

Wetland Functions Impact Summary	
Water Quality Functions Impacted	Wetland 105 has a moderate potential to improve water quality at the site due to the highly developed surroundings and the structure of woody vegetation that can aid in sedimentation of pollutants.
Hydrologic Functions Impacted	Wetland 105 has a moderate potential to reduce flooding and stream degradation due to its highly developed surroundings and the structure of woody vegetation that can slow flood waters.

Table 20 (continued). Wetland 105 Impact Summary.	
Wetland Functions Impact Summary (continued)	
Habitat Functions Impacted	Wetland 105 has a low potential to provide habitat functions for wildlife because it lacks structural diversity, surrounded by intense land uses, and lacks special habitat features.

Table 21. Wetland 109 Impact Summary.

Wetland Impacts Summary Sheet			
		**Local Jurisdiction**	Puyallup, WA
		WRIA	10: Puyallup-White
		Ecology Rating (Hruby 2014)	Category III
		City of Puyallup Rating	Category III
		City of Puyallup Buffer Width	80 feet
		Wetland Size	<0.01 acre (165 sq. feet)
		Cowardin Classification	PEM
		HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score 7 Hydrologic Score 6 Habitat Score 3 **Total Score 16**		
Wetland Impact Summary			
Wetland Impacts	Temporary <0.01 acre (165 ft^2) (short term)		
Dominant Vegetation Impacted	Shrubs: Himalayan blackberry Herbaceous: colonial bentgrass		
Soils Series Impacted	Briscot loam		
Hydrology Impacted	Surface runoff from surrounding impervious surfaces and precipitation are the primary sources of hydrology for this wetland.		
Wetland Functions Impact Summary			
Water Quality Functions Impacted	Wetland 109 has a moderate potential to improve water quality at the site due to the highly developed surroundings, and vegetation and large area or seasonal ponding that can trap pollutants,		
Hydrologic Functions Impacted	Wetland 109 has a moderate potential to reduce flooding and stream degradation due to its highly developed surroundings and ditch outlet.		
Habitat Functions Impacted	Wetland 109 has a low potential to provide habitat functions for wildlife because it lacks structural diversity, surrounded by intense land uses, and lacks special habitat features.		

Table 22. Wetland 122 Impact Summary.

Wetland Impacts Summary Sheet

Local Jurisdiction	Fife, WA
WRIA	10: Puyallup-White
Ecology Rating (Hruby 2014)[a]	Category II
City of Fife Rating	Category II
City of Fife Buffer Width	105 feet
Wetland Size	1.13 acres
Cowardin Classification	PEM, PSS
HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score 8 Hydrologic Score 8 Habitat Score 5 **Total Score 21**
Wetland Impact Summary	
Wetland Impacts	Permanent direct 0.10 acre Indirect 0.11 acre (habitat) Temporary 0.18 acre (long term), 0.09 acre (short term)
Dominant Vegetation Impacted	Shrub: Himalayan blackberry and willows Herbaceous: reed canarygrass
Soils Series Impacted	Sultan silt loam
Hydrology Impacted	Surface flows and precipitation are the primary hydrology sources for this wetland. Surface water was observed within this area during site investigations. A ditch flows the length of this wetland from east to west, and it has no outlet.
Wetland Functions Impact Summary	
Water Quality Functions Impacted	Wetland 122 has a high potential to improve water quality at the site due to its depressional HGM class with no outlet, persistent, ungrazed vegetation, and large area of seasonal ponding.
Hydrologic Functions Impacted	Wetland 122 has a high potential to reduce flooding and stream degradation due to its depressional HGM character with no outlet, stormwater inputs, and highly developed surroundings.
Habitat Functions Impacted	Wetland 122 has a low potential to provide habitat functions for wildlife because it has a low diversity of plant species, and a low interspersion of habitats, and highly developed surroundings.

[a] Biologists did not have access to this wetland due to its location within the Right of Way of the UPRR. Wetland boundaries were estimated using LiDAR, aerial imagery, and field observations made from adjacent areas.

Table 23. Wetland 123 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)[a]	Category III
	City of Fife Rating	Category III
	City of Fife Buffer Width	105 feet
	Wetland Size	0.71 acre
	Cowardin Classification	PEM
	HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	8
	Hydrologic Score	6
	Habitat Score	5
	Total Score	**19**

Wetland Impact Summary		
Wetland Impacts	Permanent direct	0.14 acre
	Indirect	0.02 acre (habitat)
	Temporary	0.14 acre (short term)
Dominant Vegetation Impacted	Shrub: Himalayan blackberry and willows Herbaceous: reed canarygrass	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Surface flows and precipitation are the primary hydrology sources for this wetland. A ditch flows the length of this wetland from east to west, and it has no outlet.	

Wetland Functions Impact Summary	
Water Quality Functions Impacted	Wetland 123 has a high potential to improve water quality at the site due to its depressional HGM class with no outlet, persistent, ungrazed vegetation, and large area of seasonal ponding.
Hydrologic Functions Impacted	Wetland 123 has a moderate potential to reduce flooding and stream degradation due to its depressional HGM character and highly developed surroundings.
Habitat Functions Impacted	Wetland 123 has a low potential to provide habitat functions for wildlife because it has only one Cowardin class, one hydroperiod, a low diversity of plant species, and highly developed surroundings.

[a] Biologists did not have access to this wetland due to its location within the Right of Way of the UPRR. Wetland boundaries were estimated using LiDAR, aerial imagery, and field observations made from adjacent areas.

Table 24. Wetland 124 Impact Summary.		
Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Puyallup, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)[a]	Category III
	City of Puyallup Rating	Category III
	City of Puyallup Buffer Width	80 feet
	Wetland Size	0.26 acre
	Cowardin Classification	PEM, PSS
	HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score 6 Hydrologic Score 7 Habitat Score 5 **Total Score 18**	
Wetland Impact Summary		
Wetland Impacts	Permanent direct 0.03 acre	
Dominant Vegetation Impacted	Shrubs: Himalayan blackberry and willows Herbaceous: reed canarygrass	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Surface flows and precipitation are the primary source of hydrology for the wetland.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 124 has a moderate potential to improve water quality at the site due to the highly developed surroundings, structure of woody vegetation that can aid in sedimentation of pollutants, stormwater inputs, and area of seasonal ponding, which can trap pollutants.	
Hydrologic Functions Impacted	Wetland 124 has a moderate potential to reduce flooding and stream degradation due to its highly developed surroundings, depth of flood storage, and the structure of woody vegetation that can slow flood waters.	
Habitat Functions Impacted	Wetland 124 has a low potential to provide habitat functions for wildlife because it lacks structural diversity and is surrounded by intense land uses.	

[a] Biologists did not have access to this wetland due to its location within the Right of Way of the UPRR. Wetland boundaries were estimated using LiDAR, aerial imagery, and field observations made from adjacent areas.

Table 25. Wetland 125 Impact Summary.

Wetland Impacts Summary Sheet

Local Jurisdiction	Puyallup, WA
WRIA	10: Puyallup-White
Ecology Rating (Hruby 2014)[a]	Category III
City of Puyallup Rating	Category III
City of Puyallup Buffer Width	80 feet
Wetland Size	0.11 acre
Cowardin Classification	PSS
HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	7
	Hydrologic Score	6
	Habitat Score	4
	Total Score	**17**

Wetland Impact Summary

Wetland Impacts	Permanent direct 0.02 acre
Dominant Vegetation Impacted	Shrubs: Himalayan blackberry and willows Herbaceous: reed canarygrass
Soils Series Impacted	Sultan silt loam
Hydrology Impacted	Surface flows and precipitation are the primary source of hydrology for the wetland.

Wetland Functions Impact Summary

Water Quality Functions Impacted	Wetland 125 has a moderate potential to improve water quality at the site due its lack of an outlet, stormwater inputs, highly developed surroundings. Structure of woody vegetation that can aid in sedimentation of pollutants, and large area of seasonal ponding, which traps pollutants.
Hydrologic Functions Impacted	Wetland 125 has a moderate potential to reduce flooding and stream degradation due to its lack of an outlet, highly developed surroundings and the structure of woody vegetation that can slow flood waters.
Habitat Functions Impacted	Wetland 125 has a low potential to provide habitat functions for wildlife because it lacks structural diversity and is surrounded by intense land uses.

[a] Biologists did not have access to this wetland due to its location within the Right of Way of the UPRR. Wetland boundaries were estimated using LiDAR, aerial imagery, and field observations made from adjacent areas.

Table 26. Wetland 136 Impact Summary.

Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Fife Rating	Category III
	City of Fife Buffer Width	60 feet
	Wetland Size	3.48 acres
	Cowardin Classification	PEM
	HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score	7
	Hydrologic Score	7
	Habitat Score	4
	Total Score	**18**
Wetland Impact Summary		
Wetland Impacts	Temporary	0.01 acre (short term)
Dominant Vegetation Impacted	Herbaceous: reed canarygrass	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Groundwater and surface flows are the primary sources of hydrology for this wetland.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 136 has moderate potential to improve water quality at the site due to its depressional HGM class and dense, herbaceous vegetation.	
Hydrologic Functions Impacted	Wetland 136 has a moderate potential to reduce flooding because of its depressional HGM class, and because it receives stormwater discharges and runoff.	
Habitat Functions Impacted	Wetland 136 has a low potential to provide habitat functions for wildlife because it has a low number of Cowardin classes, a low diversity of plant species, and is located in a highly developed area.	

Table 27. Wetland 138 Impact Summary.		
Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Fife, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Fife Rating	Category III
	City of Fife Buffer Width	60 feet
	Wetland Size	1.31 acres
	Cowardin Classification	PEM
	HGM Classification	Depressional

Rating of Entire Wetland	Water Quality Score	7
	Hydrologic Score	7
	Habitat Score	3
	Total Score	**17**
Wetland Impact Summary		
Wetland Impacts	Permanent direct	0.66 acre
Dominant Vegetation Impacted	Herbaceous: reed canarygrass	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Groundwater and surface flows are the primary sources of hydrology for this wetland.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 138 has moderate potential to improve water quality at the site due to its depressional HGM class and dense, herbaceous vegetation.	
Hydrologic Functions Impacted	Wetland 138 has a moderate potential to reduce flooding because of its depressional HGM class, and because it receives stormwater discharges and runoff.	
Habitat Functions Impacted	Wetland 138 has a low potential to provide habitat functions for wildlife because it has a low number of Cowardin classes, a low diversity of plant species, and is located in a highly developed area.	

Table 28. Wetland 147 Impact Summary.		
Wetland Impacts Summary Sheet		
	**Local Jurisdiction**	Puyallup, WA
	WRIA	10: Puyallup-White
	Ecology Rating (Hruby 2014)	Category III
	City of Puyallup Rating	Category III
	City of Puyallup Buffer Width	60 feet
	Wetland Size	0.23 acres
	Cowardin Classification	PEM, PSS
	HGM Classification	Depressional
Rating of Entire Wetland	Water Quality Score 8 Hydrologic Score 7 Habitat Score 4 **Total Score 19**	
Wetland Impact Summary		
Wetland Impacts	Permanent direct 0.05 acre	
Dominant Vegetation Impacted	Shrub: black plum (*Prunus nigra*) Herbaceous: reed canarygrass	
Soils Series Impacted	Sultan silt loam	
Hydrology Impacted	Precipitation provides the primary hydrologic inputs to this wetland.	
Wetland Functions Impact Summary		
Water Quality Functions Impacted	Wetland 147 has moderate potential to improve water quality at the site due to its depressional HGM class, dense herbaceous vegetation, and lack of an outlet.	
Hydrologic Functions Impacted	Wetland 147 has a moderate potential to reduce flooding because of its depressional HGM class, it receives stormwater discharges and runoff, and lacks an outlet.	
Habitat Functions Impacted	Wetland 147 has a low potential to provide habitat functions for wildlife because it has a low number of Cowardin classes, a low diversity of plant species, and is located in a highly developed area.	

3.4 Streams

Eight streams will be impacted by Stage 2 activities (Table 29, Figure 3). Existing stream conditions are summarized below. Additional description information can be found in the Stage 1a, Stage 1b, and Stage 2 Wetland and Stream Assessment Reports (WSDOT 2019a, WSDOT 2020b, WSDOT 2022).

Streams shown in Figure 3 represent the fully delineated boundary of the stream ordinary high water mark (OHWM) at time of delineation, not the existing location of the stream at the time of Stage 2 construction. Note that Stream 24 was estimated using LiDAR, aerial imagery, NWI data, and field observations made from adjacent areas.

3.4.1 Existing Conditions of Streams to be Impacted

The Stage 2 area is highly urbanized. Streams are influenced by adjacent land uses, which are a mix of agricultural, residential, commercial, industrial, and reclaimed open spaces. In the Hylebos basin, increased impervious surfaces and development in the watershed has restricted the amount of flood storage, leading to an increased frequency and severity of flood events. During the drier, summer months when there is less precipitation, there are low in-stream flows (King County 1990; EarthCorps 2016). Streams with proposed impacts have poor instream channel conditions, which are critical limiting factors to fish and wildlife. Streams are highly channelized, lack intact riparian vegetation, have poor water quality, and substrates are dominated by sand and silt. However, Hylebos Creek and Surprise Lake Tributary provide habitat for salmonids, including listed species. SalmonScape (WDFW 2020a) lists the presence or potential presence of federally threatened Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*), as well as coho salmon (*O. kisutsch*), pink salmon (*O. gorbuscha*), and chum (*O. keta*). Bull trout (*Salvelinus confluentus*) may use the mouth of Hylebos Creek but are not likely to occur further upstream in the Project vicinity (WSDOT 2018). Poor water quality and generally poor habitat conditions have degraded instream conditions which may impact the extent of which salmonids are able to make use of these streams, as well as the presence of fish passage barriers.

Many stream reaches in the Stage 2 area lack a riparian corridor, depending on the level of development and proximity to other infrastructure or agriculture. Large woody material is also lacking, and recruitment potential is low throughout the reaches. Invasive species are common throughout riparian areas, and include reed canarygrass, knotweed (*Reynoutria japonica*), field bindweed (*Convolvulus arvensis*), yellow flag iris (*Iris pseudacorus*), Himalayan blackberry, bittersweet nightshade, common holly (*Ilex aquifolium*), and English ivy (*Hedera helix*).

3.4.2 Stream Impact Assessment

Summaries of observed conditions for each stream and stream buffer that will be impacted by the Stage 2, as well as stream impacts, are provided in Tables 30 through 37.

3.4.2.1 Permanent Stream Impacts

Direct Stream Impacts

Stage 2 construction will result in direct stream impacts due to placement of fill in streams within the Stage 2 alignment (Table 30, Figure 3).

3.4.2.2 Temporary Stream Impacts

Construction will result in short-term temporary impacts to streams (Table 29; Figure 3).

Table 29. SR 167 Completion Project Stage 2 Permanent and Temporary Stream Impacts.

Stream	Jurisdiction in Which Impacts Occur	Permanent Impact		Temporary Impact	
		Acres	Linear Feet	Acres	Linear Feet
Surprise Lake Tributary (Stream 01)	Fife	0.21	696	0.02	92
Stream 08	Fife	<0.01 (38 ft^2)	5	<0.01 (32 ft^2)	4
Wapato Creek (Stream 09)	Puyallup	0.00	0	0.15	443
	Fife	0.00	0	0.00	0
Stream 11	Fife	0.03	216	0.00	0
Stream 12	Fife	<0.01 (190 ft^2)	14	0.00	0
Stream 14	Puyallup	0.02	111	0.00	0
Stream 15	Puyallup	0.01	31	0.00	0
Stream 24	Fife	0.02	157	0.00	0
Total	**NA**	**0.29**	**1,230**	**0.17**	**539**

3.4.3 Stream Impact Summary Sheets

Table 30. Surprise Lake Tributary Information Summary.

Existing Conditions Summary		
	**Stream Name**	01 – Surprise Lake Tributary
	WRIA Name/ Stream No.	10: Puyallup-White 17110019000741
	Local Jurisdictions	Fife, WA
	WDNR Stream Type	Type F
	Local Jurisdiction Stream Ratings[a]	Fife: non-jurisdictional Edgewood: Type Np
	Local Jurisdiction Stream Buffer Widths	Fife: Case-by-case Edgewood: 60 feet
Description	Stream 01 flows southwest from Surprise Lake (off site) and into the study area at the forested parcel east of Freeman Road Southeast. Surprise Lake Tributary will be re-located to the east of the proposed Stage 2 roadway as part of the Hylebos RRP construction in Stage 1b. A new confluence with Hylebos Creek will also be constructed as part of the Hylebos RRP construction in Stage 1b.	
Fish Use	WDFW estimates the presence of Chinook salmon, steelhead, coho, pink, and chum in the creek (WDFW 2022), and coho, steelhead, and three-spined stickleback have been observed in the creek. Two partial fish passage barriers are mapped west of Freeman Road East and one total barrier is documented east of Freeman Road East and will be corrected during construction of the Hylebos RRP (WDFW 2022c, WSDOT 2021a).	
Stream Impact Summary		
Stream Impacts	Permanent 0.21 acre, 696 linear feet Temporary 0.02 acre, 92 linear feet	
Riparian Conditions Impacted	The segment west of Freeman Road Southeast is disturbed and generally poor condition. The buffer consists of herbaceous vegetation dominated by reed canarygrass and Himalayan blackberry.	
Channel and Habitat Conditions Impacted	The impacted portion of Surprise Lake Tributary is confined to a channelized drainage ditch that runs through agricultural fields with no natural bend or meander. Any complexity in the stream is likely from eroded road fill or bank stabilization. Substrate consists of sand, silt, and clay; and the stream has no large woody material or riparian cover. Invasive plant species are prevalent along the streambanks.	

[a] Stream does not meet the requirements for a shoreline of the state and therefore would not come under the jurisdiction of Fife Municipal Code.

Table 31. Stream 08 Summary Information Summary.

Existing Conditions Summary

Stream Name	08
WRIA Name/ Stream No.	10: Puyallup-White/ N/A
Local Jurisdictions	Fife, WA
WDNR Stream Type	N/A
Local Jurisdiction Stream Ratings[a]	Non-jurisdictional
Local Jurisdiction Stream Buffer Widths	Case-by-case

Description	Stream 08 flows west from Freeman Road East on the northern edge of Wetland 47 until it enters a culvert and turns north at 76th Avenue East. The stream daylights approximately 340 feet north and turns west where it is ditched through agricultural fields for a length of approximately 320 feet before it enters another culvert that connects to Surprise Lake Tributary.
Fish Use	Stream 08 has no documented fish use (WDFW 2023a, 2023b). However, there are presumed fish present due to connectivity with Surprise Lake Tributary.
Stream Impact Summary	
Stream Impacts	Permanent <0.01 acre (38 sq. feet), 5 linear feet Temporary <0.01 acre (32 sq. feet), 4 linear feet
Riparian Conditions Impacted	Stream 08 is bordered by reed canarygrass and Himalayan blackberry along its western reach. The eastern portion of the stream is bordered by wetland vegetation consisting of Sitka willow, red-osier dogwood, and reed canarygrass.
Channel and Habitat Conditions Impacted	Instream conditions in Stream 08 are poor with a lack of channel complexity and substrate dominated by mud and silt.

Table 32. Upper Wapato Creek (Stream 09) Summary.

Stream Impacts Summary Sheet

Stream Name	09 – Wapato Creek
WRIA Name/ Stream No.	10: Puyallup-White 17110019020834
Local Jurisdictions	Fife, WA and Puyallup, WA
WDNR Stream Type	Type F
Local Jurisdiction Stream Ratings[a]	Fife: N/A Puyallup: Type II
Local Jurisdiction Stream Buffer Widths	Fife: 150 feet[b] Puyallup: 100 feet

Description	Wapato Creek flows generally northwest from its headwaters located north of the Puyallup city limits in Unincorporated Pierce County. The stream converges with Simons Creek northeast from Valley Ave East and passes through many culverts including several under Freeman Road East, Valley Avenue East, and a railroad. In this region, Wapato Creek passes through several wetlands including Wetlands 98, 95, 94, and 126.
Fish Use	This reach of Wapato Creek is documented for the occurrence and migration of Chinook, coho, fall chum, and steelhead trout, and contains habitat that is accessible to pink salmon (WDFW 2021a, 2021b). The Stage 2 study area contains documented coho breeding and rearing habitat. Wapato Creek contains designated critical habitat for threatened Puget Sound steelhead trout (81 FR 9252).
Stream Impact Summary	
Stream Impacts	Temporary 0.15 acre, 443 linear feet
Riparian Conditions Impacted	Reed canarygrass was a dominant species in buffer areas. Other commonly observed species included Himalayan blackberry, red osier dogwood, red alder, willows, yellow flag iris, and soft rush. Adjacent land uses consist of industrial facilities, active agricultural fields, grazing pasture, the PTOI Freeman Road Mitigation site, the UPRR, Freeman Road East, and Valley Avenue East. The buffer condition is low to moderate and varies concurrently with the adjacent land use.

Table 32 (continued). Upper Wapato Creek (Stream 09) Summary.	
Stream Impact Summary (continued)	
Channel and Habitat Conditions Impacted	In this reach Wapato Creek is perennial with mud and embedded silt as substrate. Little channel complexity was observed; the reach is a glide in most delineated areas. Some instream habitat is provided by downed wood and thermal refugia are provided by riparian cottonwoods.

[b] Buffer widths for streams within the Fife city limits are determined on a case-by-case basis. A 150-foot buffer was applied to Wapato Creek within city boundaries per discussions between WSDOT and the City.

Table 33. Stream 11 Information Summary.

Existing Conditions Summary		
	**Stream Name**	11
	WRIA	10: Puyallup-White
	Local Jurisdictions	Fife, WA
	WDNR Stream Type[a]	N/A
	Local Jurisdiction Stream Ratings	Fife: Non-jurisdictional
	Local Jurisdiction Stream Buffer Widths[b]	Fife: Case-by-case
Description	Stream 11 flows west along the north side of 20th Street East for approximately 500 feet before it discharges into Surprise Lake Tributary. Stream flow appears to be seasonal.	
Fish Use	There are no salmonids documented in Stream 11, however there are presumed fish present in Surprise Lake Tributary. There are no fish passage barriers in Stream 11 within the Stage 2 area.	
Stream Impact Summary		
Stream Impacts	Permanent 0.03 acre, 216 linear feet	
Riparian Conditions Impacted	Riparian vegetation bordering Stream 11 is dominated by reed canarygrass, common horsetail, and Himalayan blackberry. Agricultural vegetation dominates the upland buffer on the north side. Buffer vegetation associated with roadside vegetation on the south side consists of common tansy (*Tanacetum vulgare*) and reed canarygrass. The buffer condition for Stream 11 is of low quality.	
Channel and Habitat Conditions Impacted	Stream 11 is a highly channelized ditch. Substrate consists of sand, silt, and clay; and the stream has no large woody material or riparian cover.	

[a] Stream is not identified in any WDFW, WDNR, or Washington Conservation maps.

[b] Stream does not meet the requirements for a shoreline of the state and therefore would not come under the jurisdiction of Fife Municipal Code.

Table 34. Stream 12 Information Summary.

Existing Conditions Summary		
	**Stream Name**	12
	WRIA	10: Puyallup-White
	Local Jurisdictions	Fife, WA
	WDNR Stream Type[a]	Type N
	Local Jurisdiction Stream Ratings[b]	Fife: Non-jurisdictional
	Local Jurisdiction Stream Buffer Widths[b]	Fife: case-by-case
Description	Stream 12 flows southwest along the Interurban Trail and adjacent to agricultural fields until it connects with Surprise Lake Tributary. Stream flow appears to be perennial.	
Fish Use	No fish have been documented in Stream 12; however, there are presumed fish present in Surprise Lake Tributary and there are no documented fish barriers that would prevent fish from accessing Stream 12.	
Stream Impact Summary		
Stream Impacts	Permanent <0.01 acre (190 ft^2), 14 linear feet	
Riparian Conditions Impacted	Within Stage 1b limits, riparian vegetation bordering Stream 12 is dominated by common horsetail, Himalayan blackberry, and reed canarygrass. Cattail can be found within the stream channel in areas of slower flow. The left bank buffer of Stream 12 consists of agricultural fields. The right bank buffer consists of the Interurban Trail. As such, the stream buffer condition is generally low quality on the left bank and, low to moderate quality on the right bank. Dominant vegetation includes common horsetail and reed canarygrass.	
Channel and Habitat Conditions Impacted	Stream 12 is a highly channelized ditch. Substrate consists of sand, silt, and clay. The stream lacks large woody material or riparian cover.	

[a] WDNR map depicts a Type N stream in this region but is in a different configuration than the currently surveyed stream.

[b] Stream does not meet the requirements for a shoreline of the state and therefore would not come under the jurisdiction of Fife Municipal Code.

Table 35. Stream 14 Summary.

Existing Conditions Summary		
	**Stream Name**	14
	WRIA Name/ Stream No.	10: Puyallup-White/ N/A
	WDFW Site ID	N/A
	Local Jurisdictions	Puyallup, WA
	WDNR Stream Type	N/A
	Local Jurisdiction Stream Ratings[a]	Type III
	Local Jurisdiction Stream Buffer Widths	50 feet
Description	Three ditches that are the outlets from Wetland 88/90/91 flow into Stream 14 at the eastern end of the surveyed stream. Stream 14 shares a direct surface water connection with Wetland 88/90/91 to the east, and is bordered by Wetland 93 to the north, and Wetland 87 to the south.	
Fish Use	WDFW fish passage data indicate Stream 14 and Stream 15 are non-fish bearing due to a downstream stormwater pond (WDFW 2023c). Stream 14 has no documented fish use (WDFW 2023a, 2023b, WDFW and NWIFC 2023).	
Stream Impact Summary		
Stream Impacts	Permanent 0.02 acre, 111 linear feet	
Riparian Conditions Impacted	Stream 14 is located south of a large agricultural field with rotating crops within Stage 2 limits. Reed canarygrass dominates close to the stream channel on the north side. Along the southern border of Stream 14 forested vegetation dominates the buffer including black cottonwood Oregon ash, Himalayan blackberry, red osier dogwood, and reed canarygrass dominate the riparian border of the stream. The buffer to the south contains moderate to high quality forested species and consists of active agricultural fields to the north.	
Channel and Habitat Conditions Impacted	Instream conditions in Stream 14 are poor with a lack of channel complexity and substrate dominated by mud and silt. The forested southern bank of the stream is providing thermal refugia and is a source of wood to the stream.	

Table 36. Stream 15 Summary.			
Existing Conditions Summary			
		**Stream Name**	Stream 15
		WRIA Name/ Stream No.	10: Puyallup-White/ NA
		WDFW Site ID	935151,935270, 935282
		Local Jurisdictions	Puyallup, WA
		WDNR Stream Type	N/A
		Local Jurisdiction Stream Ratings[a]	Type III
		Local Jurisdiction Stream Buffer Widths	50 feet
Description	Stream 15 flows northwest and west through several culverts and adjacent to and Wetland 92.		
Fish Use	WDFW fish passage data (WDFW 2023c) indicates Stream 15 is not fish bearing. Stream 15 has no documented fish use (WDFW 2023a, 2023b, WDFW and NWIFC 2023).		
Stream Impact Summary			
Stream Impacts	Permanent 0.01 acre, 31 linear feet		
Riparian Conditions Impacted	The buffer condition is poor where the stream is bordered by agricultural fields and a construction stockpile site. Vegetation along the stream in these locations is dominated by reed canarygrass and Himalayan blackberry. Buffer condition is fair where the stream passes through a forested area dominated by black cottonwood and snowberry (*Symphoricarpos albus*). During follow-up site visits in 2021, several trees were observed to be cut down within the buffer bordering the agricultural field and north of the forested parcel. WSDOT has not been able to determine who cut these trees. The forested area surrounding Stream 15 has been used recently for encampments by people experiencing homelessness, which likely has increased pollutants in stormwater runoff.		

Table 36 (continued). Stream 15 Summary.	
Stream Impact Summary (continued)	
Channel and Habitat Conditions Impacted	Within the Stage 2 limits Stream 15 primarily has mud/silt substrate with some areas where reed canarygrass and blackberry have grown across the channel. Instream conditions are generally poor with a lack of channel complexity and refugia. The forested area of the reach is providing thermal refugia and contributing some wood to the benefit of instream habitat.

Table 37. Stream 24 Summary.		
Existing Conditions Summary		
	**Stream Name**	Stream 24
	WRIA Name/ Stream No.	10: Puyallup-White/NA
	WDFW Site ID	935669
	Local Jurisdictions	Fife, WA
	WDNR Stream Type	N/A
	Local Jurisdiction Stream Ratings[a]	Type F
	Local Jurisdiction Stream Buffer Widths	Case-by-case
Description	Stream 24 is an excavated channel that conveys flows for approximately 600 feet along the northern edge of agricultural fields before discharging into Surprise Lake Tributary (Stream 01) via a culvert under an agricultural access road.	
Fish Use	No documented fish presence. Stickleback have been observed in January 2022.	
Stream Impact Summary		
Stream Impacts	Permanent 0.02 acre, 157 linear feet	
Riparian Conditions Impacted	Buffer conditions are poor, consisting of 20th Avenue East to the north and an agricultural field to the south.	
Channel and Habitat Conditions Impacted	Stream 24 is seasonally flowing and potentially accessible to fish due to its connection with Surprise Lake Tributary. Stream 24 is representative of a ditch with mud substrate. Instream conditions are poor no channel complexity and refugia.	

3.5 Buffers

3.5.1 Existing Conditions of Buffers to be Impacted

Wetland and stream buffers in the Stage 2 area are generally in poor condition, and consist of commercial agricultural land; paved roads, sidewalks, and trails; and commercial and residential development. For the purposes of impact evaluation, buffers were truncated when they were interrupted by impervious development and at the base of the roadway prisms, as these areas do not function as buffer. In vegetated buffers, the vegetation community is typically a mix of native and nonnative weed species. Typical noxious weed species in the buffer include Himalayan blackberry and reed canarygrass. Native buffer species include Douglas-fir, black cottonwood, red alder, and bigleaf maple. Portions of some wetland buffers also include ornamental trees, such as apple. Wetland buffer conditions are summarized in Table 38. Stream buffers are composed of many segments which frequently overlap with wetland buffers and are therefore captured in the descriptions in Table 38.

Table 38. Existing Buffer Conditions for Wetlands and Streams Impacted by Stage 2.

Wetland	Buffer Width (feet)[a]	Buffer Conditions
1	60	Poor; roads, commercial and industrial development, disturbed vegetation
15	105	Poor; roads, commercial and residential development, disturbed vegetation
4/48/50	105	Poor; roads, residential land use, agricultural fields
47	165	Poor; commercial development, agriculture, road, wetland, and stormwater pond
53	60	Poor; roads, agricultural fields, and invasive vegetation
54	75	Poor; roads, agricultural fields, industrial development
55	60	Poor; roads, industrial and agricultural development, disturbed vegetation
83	105	Poor: roads, mowed roadside, agricultural fields, disturbed vegetation
86	60	Poor: stockpile area, fallow agricultural area, disturbed vegetation
88/90/91	100	Poor; gravel path, disturbed vegetation
92	80	Poor: agricultural areas
93	80	Poor to moderate; agricultural and commercial areas, impervious areas, disturbed forest
94	150	Poor; agricultural grazing
95	150	Moderate; railroad, disturbed vegetation, agricultural row crops

Table 38 (continued). Existing Wetland Buffer Conditions Within Stage 2 Area.		
Wetland	Buffer Width (feet)[a]	Buffer Conditions
98	165	Low to moderate; impervious surfaces, commercial development, roads, disturbed vegetation, Hylebos Creek
103	50	Poor; impervious surfaces, commercial development, mowed vegetation
104	80	Poor; impervious surfaces, commercial development, mowed vegetation
105	80	Poor; impervious surfaces, commercial development, mowed vegetation
109	80	Poor; impervious surfaces, mowed vegetation
111	80	Poor; impervious surfaces, mowed vegetation
122	105	Poor; railroad, roads, agriculture, disturbed vegetation
123	105	Poor; railroad, roads, agriculture, disturbed vegetation
124	80	Poor; railroad, roads, agriculture, disturbed vegetation
125	80	Moderate; railroad, roads, agriculture, disturbed forest/shrubs
126	165	Moderate; railroad, roads, agriculture, disturbed forest/shrubs
136	60	Poor; roads, commercial and industrial development, Wapato Creek
138	60	Poor; roads, disturbed vegetation
146/148	60	Poor; roads, agriculture, disturbed vegetation, residential development
147	60	Poor; roads, agriculture, industrial development

[a] Buffer widths were assigned based on the applicable jurisdiction and the feature with the greatest regulatory required buffer based on FMC 17.17, PMC 21.06, Milton Municipal Code (MMC) 18.16, and PCC 18E.20.

3.5.2 Buffer Impact Assessment

Wetland and stream buffers overlap within the Stage 2 area, and it is not possible to assign discreet buffer areas to each feature; buffer impacts have therefore been combined for analysis. Where buffers of different widths overlap, the regulatory buffer with the greatest extent was used to calculate impacts. The city of Fife does not assign stream buffer widths for streams outside the jurisdiction of the Fife Shoreline Master Program. To calculate stream buffer impacts within the city of Fife, WSDOT used the regulatory buffer widths of adjacent jurisdictions, and applied those to similar stream types. During discussions with the city for Stage 2, the City requested a 150-foot buffer for Wapato Creek within their jurisdiction. The Stage 2 impact assessment and design maintained this assumption, Stage 2 construction will result in permanent and temporary buffer impacts within the jurisdictions of Fife, Puyallup, Milton, and Pierce County (Table 39).

Table 39. SR 167 Completion Project Stage 2 Permanent and Temporary Wetland and Stream Buffer Impacts.			
Jurisdiction	**Basin**	**Permanent Buffer Impact (ac.)[a]**	**Temporary Buffer Impact (ac.)[a]**
Fife	Hylebos	12.08	6.74
	Wapato	4.56	0.08
	Puyallup	0.03	0
Puyallup	Wapato	2.07	0.17
	Puyallup	5.45	0.24
Milton	Hylebos	0.02	0
Pierce County	Wapato	0.00 (<104 ft^2)	0
	Puyallup	0.30	0.66
Total	**NA**	24.51	7.89

[a] Buffer widths were assigned based on the applicable jurisdiction and the feature with the greatest regulatory required buffer based on FMC 17.17, PMC 21.06, MMC 18.16, and PCC 18E.20.

In addition to the buffer impacts in Table 39, impacts from stockpiling activities that began in 2020 have permanently impacted 2.56 acres of buffer within the Stockpile 3 site within the city of Fife. The proposed haul road will permanently impact another 0.17 acre, for a total of 2.73 acres of wetland buffer impacts within the site. Buffer impacts were in an area of poor buffer condition (a fallow agricultural field with sparse herbaceous vegetation).

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4. Mitigation Strategy

Impacts to wetlands, streams, and their buffers will be mitigated through a sequence of actions intended to maintain or improve ecological functions. The Project follows requirements for mitigation sequencing as outlined in the Joint Guidance (Washington State Department of Ecology et al. 2021), the State Environmental Policy Act (Washington Administrative Code [WAC] Chapter 197-11-768), and by the applicable local jurisdictions.

The Project's mitigation strategy involves avoidance and minimization of wetland, stream, and buffer impacts; onsite restoration of short-term temporary impacts; and compensatory mitigation for unavoidable direct and indirect permanent and long-term temporary impacts.

4.1 Impact Avoidance and Minimization

Stage 2 has made all reasonable efforts to avoid, minimize, rectify, reduce, and compensate for impacts on critical areas and buffers in a manner that maintains or improves ecological functions of wetlands, streams, and buffers. The Stage 2 design team used wetland delineation information to avoid and minimize impacts on wetlands and wetland buffers to the maximum extent possible during design. Total wetland avoidance was not possible due to constraints associated with roadway safety and design guidelines. Impacts were minimized primarily through site-specific design techniques, and impacts will be further minimized during construction, as follows:

- Designing a narrower roadway to reduce the overall footprint.
- Locating stormwater treatment facilities outside of wetlands.
- Locating temporary equipment staging areas in uplands or buffers when possible.
- Placing high-visibility fencing to protect sensitive areas during construction.
- Clearing, grubbing, and excavating the minimum necessary to construct Stage 2.
- Installing retaining walls, where feasible, to minimize fill in adjacent wetlands and buffers.
- Performing all construction activities consistent with the most recent versions of the WSDOT Construction Manual, Highway Runoff Manual, Hydraulics Manual, and Standard Specifications for Road, Bridge, and Municipal Construction.

- Performing all construction activities in compliance with water quality standards (Chapter 90.48 Revised Code of Washington [RCW] and Chapter 173-201A WAC) set forth by Ecology.
- Restoring temporarily impacted wetland and buffer areas with native vegetation plant mixes.

The design-builder will prepare a Temporary Erosion and Sediment Control (TESC) Plan for Stage 2. All temporary erosion and sediment control best management practices (BMPs) installed during construction will be inspected on a regular basis and after each storm event to keep BMPs in a functioning condition. This requirement will be met either by removing accumulated sediment or by removing and replacing the BMP impacted. In addition to other temporary BMPs, the design-builder will prepare and implement a project-specific Spill Prevention, Control and Countermeasures (SPCC) Plan that identifies the location(s) where materials, equipment, and fueling operations will be staged, used, and stored at the appropriate distance(s) from nearby waterways and sensitive areas. Construction staging and equipment storage locations will be determined by the design-builder, in accordance with Stage 2 environmental commitments and applicable regulatory requirements. The SPCC Plan will also identify proper handling and disposal procedures if pre-existing contamination (soils or groundwater) is discovered. No onsite construction activities will commence until WSDOT and regulatory agencies have accepted the SPCC Plan. The design-builder will prepare a Water Quality Monitoring Plan to ensure construction activities comply with State water quality standards.

The Stage 2 design team and biologists met several times in winter/spring 2022 to identify areas where impacts could be minimized by narrowing or moving the highway alignment and relocating staging areas and other Stage 2 components. WSDOT and the design-builder will continue to seek avoidance and minimization measures for impacts to wetlands and wetland buffers during final design.

4.1.1 Freeman Road Crossing of Wapato Creek

Where Freeman Road crosses Wapato Creek, WSDOT has implemented additional design measures to minimize impacts and maximize opportunities for riparian restoration, improved fish passage, and floodplain storage:

- Additional retaining walls will be constructed to reduce wetland and stream impacts
- The design allows for a larger RRP area that contributes to improved wetland and stream functions

4.2 Compensatory Mitigation

WSDOT will provide compensatory mitigation to meet federal, state, and local mitigation requirements. Compensatory mitigation will be provided by using remaining rehabilitation credits within the Hylebos RRP, as well as by expanding portions of the Hylebos RRP; and creating or re-establishing, rehabilitating, and enhancing wetlands, streams, and buffers within several new mitigation sites in the Hylebos Creek, Wapato Creek, and Puyallup River basins.

4.2.1 Regulatory Requirements

Wetlands and streams are subject to a variety of federal, state, and local regulations. Federal laws regulating wetlands and streams include Section 404 of the Clean Water Act (CWA), which regulates the placement or removal of soil or other fill, grading, or alteration (hydrologic or vegetative) in waters of the United States, including wetlands and streams (33 USC 1344). In Washington State, the Seattle District of the USACE administers the permitting program under the CWA. Wetland permits include Nationwide (general) permits for projects involving small areas of fill, grading, or alteration, and Individual permits for projects with larger areas of wetland disturbance.

Section 401 of the CWA requires that proposed dredge (removal) and fill activities permitted under Section 404 be reviewed and certified to ensure that such activities meet state water quality standards. For Stage 2, the Section 401 certification will be issued by Ecology and the PTOI. Other Washington laws and programs regulating streams and wetlands include the Water Pollution Control Act, the Shoreline Management Act, and the State Environmental Policy Act, all of which are administered by Ecology. The Washington Department of Commerce oversees the state's Growth Management Act.

Section 402 of the CWA authorizes National Pollutant Discharge System permit program. This program is administered by the United States Environmental Protection Agency (USEPA), which has delegated permit administration to Ecology. Ecology issues Construction Stormwater General Permits for construction projects that disturb more than 1 acre and discharge stormwater to waters of the state.

The WDFW administers the HPA program under the state Hydraulic Code (WAC 220-110), which was specifically designed to protect fish life. An HPA is required for projects that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state.

4.2.1.1 Wetland

Presidential Executive Order 11990 was issued to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. The order directs federal agencies to avoid new construction in wetlands and to involve the public throughout the wetlands protection decision-making process. Wetlands are also protected by Governor's Executive Order 89-10 and WSDOT Policy Statement P2038.01. Executive Order 89-10 establishes an interim goal of no net loss of wetland acreage and function and a long-term goal to increase the quantity and quality of Washington's wetlands resource base. The order directs state agencies to avoid activities that would adversely affect wetlands, to mitigate for unavoidable wetland impacts, and seek voluntary wetlands restoration and re-establishment. WSDOT Policy Statement P2038.01 directs employees to protect and preserve wetlands and to manage mitigation sites and other WSDOT-owned wetlands for long-term stewardship.

Local jurisdictions within the Stage 2 area require that any wetland loss be compensated through wetland re-establishment and/or restoration. The overall goal of compensatory mitigation is no net loss of wetland functions and values. The jurisdictions of Fife, Puyallup, and Pierce County, where Stage 2 construction impacts will occur, specify wetland categories, required wetland buffer widths, development standards, and wetland mitigation requirements for wetlands in their jurisdiction. Any actions or developments near wetlands must be designed and constructed according to mitigation sequencing, which requires project proposals to avoid, minimize, rectify, restore the hazard through engineering methods, compensate, and monitor all adverse impacts (Fife Municipal Code [FMC] 17.17.340, Puyallup Municipal Code [PMC] 21.06.910, and Pierce County Code [PCC] 18E.30).

Required mitigation ratios for wetland impacts are based on wetland category and are summarized in Table 40 (Hruby 2014).

Table 40. Required Ratios for Wetland Mitigation.

Wetland Category	Jurisdiction											
	Ecology[a]			Fife[b]			Puyallup[c]				Pierce County[d]	
	C/R	RH	E/P	C/R	RH	E	C/R	RH	E	P[e]	C/R	E
II	3:1	6:1	12:1	3:1	6:1	12:1	3:1	6:1	12:1	10–20:1	3:1	6:1
III	2:1	4:1	8:1	2:1	4:1	8:1	2:1	4:1	8:1	10–20:1	2:1	4:1

C = Creation, R = Reestablishment, RH = Rehabilitation, E = Enhancement, P = Preservation

[a] Washington State Department of Ecology et al. 2021.

[b] Mitigation ratios as required by FMC 17.17.360.

[c] Mitigation ratios as required by PMC 21.06.970.

[d] Mitigation ratios as required by PCC 18E.30.070; Appendix E.

[e] Preservation is acceptable only when provided in combination with restoration, creation, or enhancement. Ratios range from 10:1 to 20:1 and are determined by the director and must occur in the same drainage basin (PMC 21.06.980(2).

4.2.1.2 Stream and Stream Buffer Mitigation Requirements

The USACE and USEPA both require compensatory mitigation for unavoidable stream impacts. As part of the HPA process, WDFW requires compensatory mitigation for permanent stream impacts to offset the loss of fish habitat function, values, and area. Mitigation is typically provided at a greater than 1:1 ratio, depending on mitigation project benefits and likelihood of success.

The City of Fife does not prescribe stream buffer widths for streams outside the jurisdiction of the Fife Shoreline Master Program. Fife streams are evaluated as Fish and Wildlife Habitat and are examined on a case-by-case basis by the community development director (FMC 17.15.050). Wapato Creek was assigned a 150-foot buffer as determined by the City during Stage 2.

Puyallup establishes stream buffer widths (PMC 21.06.1050(2)) based on the stream type as defined in PMC 21.06.1010(3). Pierce County buffer widths are based on the stream classification as defined in PCC 18E.40-060-1.

Any actions or developments in or near streams or buffers must be designed and constructed according to mitigation sequencing, which requires project proposals to avoid, minimize, and restore, then compensate for all adverse impacts (FMC 17.05.087, PMC 21.06.610, PCC 18E40.050). Mitigation for the impacted streams must account for no net loss of riparian habitat or water body function and must utilize best available science. This includes restoring previously degraded areas with key habitat features and native vegetation that replicates historical native vegetation that would be found on the site. The restoration site plans include measures for removing nonnative, invasive vegetation and establishing native plant communities by means of planting native species.

4.2.1.3 Wetland Buffer

The cities of Fife and Milton wetland buffer widths are based on wetland category and habitat score (FMC 17.17.230; Milton Municipal Code [MMC] 18.16.320). Puyallup and Pierce County buffer widths based on overall wetland category, habitat score, water quality score, and proposed land use (PMC 21.06.930, PCC 18E.20.020). Category I, II, and III wetlands with high habitat or low water quality scores are subject to buffer width adjustments based on the intensity of the proposed land use. Required buffer widths applicable to Stage 2 are summarized in Table 41. Buffer impacts are depicted in Figure 3 and summarized in Table 39 in Section 3.5.2 above.

Table 41. Required Wetland Buffer Widths Applicable to the SR 167 Completion Project Stage 2.

	Buffer Width (feet)	
	Fife, Milton	**Puyallup, Pierce County**
Habitat Score[a]	**Category I Wetland[a]**	
3 to 4 points	75	100[b] or 150[c,d]
5 points	105	
6 to 7 points	165	150[c]
8 to 9 points	225	300[c,d]
Habitat Score[a]	**Category II Wetland[a]**	
3 to 4 points	75	100[c,e]
5 points	105	
6 to 7 points	165	150[c]
8 to 9 points	225	300[c,e]
Habitat Score[a]	**Category III Wetland[a]**	
3 to 4 points	60	80[c]
5 points	105	
6 to 7 points	165	150[c]
8 to 9 points	225	80[c]
Habitat Score[a]	**Category IV Wetland[a]**	
All scores	40	50[c]

[a] Wetland category and habitat scores are based on 2014 wetland rating system (Hruby 2014). Special wetland classifications and wetlands of high conservation value including Natural Heritage Wetlands, Bogs, and Estuarine wetlands are not represented in this table as they are not applicable to Stage 2 wetlands. Buffer widths also assume compliance with required minimization measures pursuant to FMC 17.17.230, MMC 18.16.320, PCC 18E.20.020 and PMC 21.06.930.

[b] Buffer width assumes a High land use intensity per Stage 2 proposal and PMC 21.06.930(2)a. Low to moderate intensity land uses may have different required buffer widths.

[c] Buffer width assumes a High land use intensity per Stage 2 proposal and PCC 18E.20.020. Low to moderate intensity land uses may have different required buffer widths.

[d] Category I Wetlands with habitat scores of 3 to 5 points and water quality scores of 8 to 9 on the 2014 wetland rating system (Hruby 2014) have adjusted buffer widths depending on intensity of land use (PCC 18E.20.020). Stage 2 impacts assume a high land use intensity and therefore a 100-foot buffer width is required.

[e] Category II Wetlands with habitat scores of 3 to 5 points and water quality scores of 8 to 9 on the 2014 wetland rating system (Hruby 2014) have adjusted buffer widths depending on intensity of land use (PCC 18E.20.020). Stage 2 impacts assume a high land use intensity and therefore a 150-foot buffer width is required.

4.2.2 Project Mitigation Proposal

The proposed Stage 2 will permanently impact Category II and III depressional, slope, and riverine wetland, streams, and associated buffers as shown in Figure 3 and Table 1. Clearing and filling wetlands and streams will reduce flood flow alteration, sediment removal, and nutrient/toxicant removal functions, and aquatic habitat in the basin. Additional impacts to wetland functions include erosion control, organic matter production and export, general habitat suitability, and native plant richness. To satisfy the Governor's Executive Order 89-10, Wetland Mitigation in Washington State (Washington State Department of Ecology et al. 2021), and local critical area ordinances, WSDOT will use remaining rehabilitation acreage within the Hylebos RRP; increase the area of several sites within the Hylebos RRP and convert what was previously perimeter buffer to credit-generating area; and construct several additional permittee-responsible onsite, in-kind mitigation sites in the Hylebos Creek, Wapato Creek, and Puyallup River basins (Figure 2). Mitigation sites in the Wapato Creek basin are referred to collectively as the Wapato RRP.

The anticipated rating of restored wetlands within mitigation sites is Category I and Category II. Restored wetlands are expected to have moderate to high water quality, hydrologic, and habitat functions (see rating forms in Appendix D). Wetland and stream restoration will reduce flood flows; increase sediment, nutrient, and toxicant removal; reduce erosion; increase the production and export of organic matter; improve habitat for invertebrates, amphibians, fish, birds, and mammals; and increase native plant richness.

4.2.2.1 Perimeter Buffers

WSDOT coordinated with Ecology, USACE, and the PTOI to establish appropriate perimeters on the mitigation sites. A 100-foot buffer width was established on most sites. Buffers have been further adjusted as follows based on agency feedback.

Hylebos Basin: Upper Surprise Lake Tributary Addition

WSDOT plans to expand this site to the east and north, increasing the riparian corridor to the east and reducing the risk of development on private parcels to the north. Mitigation at this site would be mainly from wetland and upland enhancement and preservation. The site is bordered by steep slopes.

Hylebos Basin: Middle Surprise Lake Tributary Addition

WSDOT proposes to add a 6.58-acre parcel to the east of the Hylebos RRP Middle Surprise Lake Tributary site. The addition would increase the size and value of this mitigation site, rehabilitating wetlands adjacent to Surprise Lake Tributary by increasing floodplain connectivity, removing nonnative invasive species, and extensively planting native species. A portion of this parcel has been set aside as mitigation for the City of Fife's Freeman Road project and would not be included in credit-generating calculations for Stage 2. WSDOT proposes a 50-foot buffer for this site, which is what was established during Stage 1b.

Hylebos Basin: Lower Hylebos Addition

The Lower Hylebos Addition is adjacent to the Hylebos Nature Area and provides connectivity between the site and the forested riparian habitat along Hylebos Creek. WSDOT will provide a mix of wetland creation and enhancement. WSDOT is proposing a 75-foot buffer along the southern edge where it is bordered by a stormwater treatment pond and the shared use path; and a 50-foot buffer where the side abuts residential streets and houses. A 25-foot buffer will border the east and west sides of the Fourth Street East site access. No buffer is proposed along the east boundary where the property borders the Nature Area.

There is a 30-foot-wide sewer easement bisecting the property. The sewer access road will be a 12-ft wide gravel road centered within the 30-foot easement. The remaining width on either side of the access road within the easement will be planted with native vegetation. The road will be gated/locked to restrict unauthorized access. Access to the road is from the parking lot for the Milgard/Hylebos Nature Area northeast of the mitigation site; the easement does not connect to any other trail or other path networks, which will further discourage unauthorized access. The Lower Hylebos Addition mitigation site is directly adjacent to the Milgard/Hylebos Nature Area. Establishing the Lower Hylebos Addition site will increase the contiguous area of preserved land and will contribute to a larger riparian corridor and riparian restoration in the lower Hylebos basin. Consistent with feedback from regulatory agencies, WSDOT will establish a 10-feet wide non-credit generating buffer on either side of the access road.

Wapato RRP: East Wapato RRP

The east Wapato RRP site is on either side of Wapato Creek adjacent to the proposed Stage 2 roadway alignment and would involve similar stream and wetland restoration as other Wapato sites. A 100-foot buffer is proposed where the site abuts the proposed roadway alignment. A 50-foot buffer is proposed where the site borders the railroad and the proposed shared-use path. A 75-foot buffer is proposed on the eastern side of the site. A Pierce County mitigation site borders the property to the east, and there would be no buffer adjacent to that site.

Wapato RRP: West Wapato RRP

The west Wapato RRP site is a narrow piece of land between Wapato Creek and the proposed Stage 2 roadway alignment, where WSDOT would provide a combination of wetland rehabilitation and creation. This site borders the PTOI's mitigation site, so there would be no perimeter buffer on the west and southern boundaries of this site. This is a site that would provide almost no credit-generating area if WSDOT applied a full 100-foot buffer, but because the site provides ecological connectivity and opportunities for wetland and stream rehabilitation, WSDOT proposes a 75-foot buffer adjacent to the new alignment developed areas to the west, and a 50-foot buffer adjacent to the railroad.

Wapato RRP: Northwest Wapato RRP

On this site, WSDOT intends to provide wetland creation and rehabilitation adjacent to Wapato Creek, create side channel habitat, and maintain existing high-quality native vegetation. WSDOT proposes a 100-foot buffer adjacent to the railroad and the new roadway alignment and a 50-foot buffer elsewhere.

Puyallup River Basin: Puyallup North

The Puyallup North site is located on what was previously an agricultural field and would involve primarily wetland re-establishment. Given its relatively large size, WSDOT is proposing a 100-foot buffer in this site except where adjacent to the proposed shared use path. Along the western boundary, the proposed buffer would be 75 feet.

Puyallup River Basin: Puyallup South

This site is also on a previous agricultural field, and would involve re-establishment of historical wetlands. Design of the site includes channel restoration and realignment of a channelized stream on the property. WSDOT is proposing a 100-foot buffer along the northeastern edge at this site, and a 75-foot buffer along the west and south boundary.

Puyallup River Basin: Freeman Road

The Freeman Road site is downstream of the Puyallup sites. Mitigation activities would involve wetland creation and rehabilitation along a newly created and enhanced stream channel. On the southern parcel there is a patch of mature forest containing several large cottonwood trees. A large patch of trees in the interior of the site would be protected and maintained as part of Stage 2 design except where they occur within 150 feet of the parcel boundary to eliminate future hazards near the roadway. Because this site provides excellent opportunities for stream and wetland restoration, but is a narrow site, WSDOT proposes a 100-foot buffer along the proposed roadway alignment, and a 50-foot buffer elsewhere.

4.2.2.2 Mitigation Ratios

Wetland Mitigation Ratios

Wetland mitigation ratios follow the recommended ratios in the updated Joint Guidance unless local code is more stringent, in which case ratios specified in the local code will be applied (Table 40). In addition, the USACE and Ecology recommended the following ratio adjustments:

- For areas of indirect habitat impact that are not within the RRP, mitigation for indirect impact will be reduced by 50 percent, because:
    - Edges of these wetland areas are dominated by reed canarygrass and blackberry that will now be acting as the buffer area;
    - Stage 2 will not result in changes to the hydrology, as these are groundwater- or rain-fed systems;
    - Water quality will be improved because WSDOT will treat currently untreated stormwater runoff before it enters wetlands and streams;
    - Most of the existing wetland buffer functions will not change;

  - For much of the length of Stage 2 a shared use pedestrian/bike trail will extend between the highway and adjacent wetlands. The trail will act in part as buffer, minimizing potential habitat impacts stemming from road noise and disturbance.
  - Onsite enhancement will be provided for Wetland 98 between Wapato Creek and the proposed highway alignment.
- Existing high quality upland areas or enhanced upland habitats within the mitigation sites should be considered as out-of-kind mitigation and may be used for compensatory mitigation in certain situations if they are permanently protected from future uses that are incompatible with the compensation project goals (Washington State Department of Ecology et al. 2021). The USACE suggested the following mitigation ratios for these habitats:
  - 16:1 for impacts to Category II wetlands
  - 13:1 for impacts to Category III wetlands

Stream Mitigation Ratios

WSDOT will apply a 1.25:1 mitigation ratio for stream impacts that occur during Stage 2.

4.2.2.3 Wetland Mitigation

Remaining wetland impacts will be mitigated on six different sites within the of the Hylebos basin: five existing sites will be expanded, and one new site will be established; three sites within the Wapato Creek basin; and three sites within the Puyallup River basin (Figure 2). Mitigation will consist of a combination of wetland re-establishment, rehabilitation, and enhancement: re-establishment for upland areas converted to wetland, rehabilitation for existing wetland areas with restored hydrology and floodplain connectivity; and enhancement for existing wetlands where hydrological conditions will remain unchanged. Rehabilitation is appropriate for most sites because wetland rehabilitation will restore environmental processes of degraded wetlands at both the site and landscape scale.

Prior to development within the basin, most wetlands in the Stage 2 area were likely scrub-shrub and forested riverine wetlands strongly influenced by overbank flooding from adjacent streams. Many of these wetlands are now depressional wetlands that have been disconnected from adjacent streams, which have been extensively narrowed and channelized to move water. Most wetlands within the mitigation sites are Category II and III depressional and riverine wetlands that have moderate potential to provide water quality functions, moderate to high potential to provide hydrologic functions, low potential to provide wildlife habitat functions, and poor buffer conditions (Table 3 and Table 38).

In many cases, rehabilitation will restore the original HGM class of wetland by converting depressional wetlands to riverine wetlands that interact strongly with adjacent streams. Rehabilitation will restore ecological processes and increase wetland functions by implementing several compensation actions identified in the Joint Guidance as more effective due to their ability to provide greater functional performance and because they are more sustainable (Joint Guidance, Table H-1):

- Restoring water processes by allowing for increased overbank flooding
- Restoring riverine wetlands
- Removing water diversions and intensive agriculture

Numerous compensation actions will be implemented as part of the RRP to correct past site alterations. These actions are more effective at restoring ecological function and generally considered rehabilitation (Ecology 2006, 2021; Table 42).

Table 42. Examples of RRP Site Alterations and Actions to Correct Those Alterations.[a]

Site Alterations Due to Past Activities	"More Effective" Actions to Address Alteration or Disturbances on Proposed RRP Sites	Actions Implemented Within the RRP
Hydrologic Alterations		
Tiling	Break all tiles (*generally considered rehabilitation*)	Tiles within agricultural areas will be broken or removed.
Ditching	Plug all ditches (*generally considered rehabilitation*)	Ditches within the RRP will be plugged, and ditch flow incorporated into the new stream channels.

Table 42 (continued). Examples of RRP Site Alterations and Actions to Correct Those Alterations.[a]		
Site Alterations Due to Past Activities	"More Effective" Actions to Address Alteration or Disturbances on Proposed RRP Sites	Actions Implemented Within the RRP
Hydrologic Alterations (continued)		
Channelization	Re-grade stream channel to proper curve amplitude and frequency to ensure overbank flooding into adjoining floodplain	Stream channels will be restored and regraded to emulate historical anastomosing channels that promote overbank flooding and floodplain connectivity.
Stormwater Inputs	Treat and introduce through subsurface flow (i.e., infiltration through buffer)	All stormwater runoff from the new highway will receive enhanced stormwater treatment before discharge to the RRP perimeter buffer, where stormwater will undergo further incidental treatment.
Soil Alterations		
Tilling/Plowing	Stop tilling/plowing	Tilling and plowing within agricultural areas will cease.
Soil Compaction	Scarification and addition of organic material (mulch)	Soils will be extensively mulched.
Vegetation Alteration		
Removal of all Vegetation/Clearing	Revegetate and install necessary erosion control measures (hydroseed, natural materials mulching, natural matting—no plastics) and control invasives preferably without herbicides	Cleared areas will be extensively replanted. Invasive species will be controlled without herbicides to the extent possible. Regular use of herbicide on previous agricultural land will be discontinued.

[a] Adapted from Ecology 2006, Table H-2; and Ecology 2021, Section 5.2.1.2.

Mitigation site establishment will result in wetland re-establishment, rehabilitation, and enhancement, mostly along riparian corridors that provide salmonid habitat and fish and wildlife connectivity. Most restored wetlands are expected to have a Category I rating (refer to rating forms in Appendix D).

A full accounting of mitigation acreage is provided in Section 6.

4.2.2.4 Stream Mitigation

Stage 2 construction will result in permanent fill placed in stream channels (Table 29 and Appendix C). WSDOT proposes to mitigate for permanent stream impacts at a 1.25:1 mitigation ratio to offset temporal impacts associated with lag time between Stage 2 impacts and mitigation site establishment. Mitigation site establishment will greatly increase the total length, area, and complexity of stream channels in the Stage 2 area (Table 51 in Section 5.5). WSDOT proposes to use the excess mitigation for future WSDOT projects at a 1:1 ratio. Table 43 shows the acreage and feet required for mitigation.

Table 43. SR 167 Completion Project Stage 2 Stream Mitigation.

	Acres	Linear Feet
Stream Impact	0.29	1,230
Mitigation Ratio	1.25	1.25
Required Mitigation	0.36	1,538
Mitigation Provided	3.19	10,212
Excess Mitigation	2.83	8,675

4.2.2.5 Buffer Mitigation

Buffer conditions are generally poor. Existing buffers provide low to moderate water quality and hydrologic functions and low habitat functions. Buffer impacts will take place within the jurisdictions of Fife, Puyallup, Milton, and unincorporated Pierce County. All jurisdictions require buffer mitigation as a condition of any permit allowing alteration of wetlands or wetland buffers. The FMC does not specify buffer mitigation ratios, only that "the overall goal of any compensatory project shall be no net loss of wetland functions and values and to strive for a net resource gain in wetland functions and values over present conditions" (FMC 17.17.320). Similar language is used in PMC, PCC, and MMC.

Compensatory mitigation for permanent buffer impacts will be provided through a combination of wetland re-establishment and enhancement and upland buffer enhancement within the perimeter buffer of the RRP. This area is not a credit-generating area for wetland mitigation, but provides important functional lift in restoring riparian habitat adjacent to the credit-generating aquatic resources within the mitigation sites.

Stage 2 construction will also include enhanced stormwater treatment for all new and existing pollutant-generating impervious surfaces in the Stage 2 area. Stormwater treatment will offset some water quality functions provided by buffers that will be cleared, and will contribute to reduced pollutant loads in stormwater runoff and improved water quality in receiving water bodies.

To offset buffer impacts resulting from Stage 2, WSDOT proposes the following mitigation ratios (Table 44):

- 1:0.5 for buffer enhancement
- 1:1 for wetland and stream enhancement
- 1:2 for wetland and stream re-establishment/creation

Table 44. Proposed Buffer Mitigation for the SR 167 Completion Stage 2.

Mitigation Type[a]	Area (acres)	Proposed Mitigation Ratio	Normalized Mitigation Area (acres)
Upland enhancement	19.02	1:0.5	9.51
Wetland enhancement	2.06	1:1	2.06
Wetland re-establishment/rehabilitation	28.82	1:2	57.64
Stockpile 3 Mitigation[b]	2.74	1	2.74
Total	52.64	NA	71.95
Required buffer mitigation area (Table 40)			24.51
Remaining buffer mitigation area			47.44

[a] See Table 49 (at the end of Section 5.3) for an explanation of how mitigation types were calculated. Stream area within the buffer is being tracked separately.

[b] Mitigation for the Stockpile 3 Site will be provided through a combination of wetland and stream re-establishment and enhancement and upland buffer enhancement within the perimeter buffer of the RRP.

RRP implementation will restore more wetland and stream buffer than is required for Stage 2. WSDOT proposes to use the excess area to provide buffer mitigation for future WSDOT projects. Excess credits in buffer areas will be used to meet local agency buffer mitigation requirements.

Mitigation for 2.74 acres of permanent buffer impacts at Stockpile Site 3 will be completed as part of the Hylebos RRP. Compensatory mitigation for permanent buffer impacts at the Stockpile Site 3 will be provided through a combination of wetland and stream re-establishment and enhancement and upland buffer enhancement within the perimeter buffer of the RRP. These activities will result in an increase in wetland and stream functions over the present degraded conditions of buffers.

4.2.2.6 Wapato Creek Buffer Enhancement

Habitat improvements are proposed for the area between the new roadway alignment and Wapato Creek where the new alignment encroaches on the buffer of Wapato Creek (Figure 2). The site has been heavily impacted by persons experiencing homelessness and will be improved through the re-establishment of a native forest and shrub community and removal of invasive species. This area is not proposed for wetland or stream mitigation.

4.2.3 Mitigation of Temporary Impacts

Once construction is complete, temporary impacts on wetlands, streams, and buffers will be mitigated in place. Ground surface contours will be restored, as necessary, in areas disturbed by construction to maintain hydrologic inputs to wetlands. Affected wetlands and buffers will be revegetated with appropriate native plants and seed mixes. Because most wetlands and buffers in the Stage 2 area are low quality, restoration is expected to enhance wetland and buffer functions by removing invasive species, and improving water quality, and habitat functions.

Impacts to woody vegetation, and impacts lasting between 1 and 2 years, are considered long-term temporary impacts. In addition to being restored onsite, WSDOT will provide compensatory mitigation for these impacts at one-quarter the standard ratio, consistent with the Joint Guidance. Temporary impacts to non-woody vegetation (short-term temporary) will be restored in place with native vegetation.

Temporary impacts on streams will be mitigated by planting native emergent and scrub-shrub vegetation in any temporarily cleared or otherwise disturbed areas. Where stream banks remain, they will be regraded to an approximately 2H:1V slope for greater connectivity with floodplain areas and adjacent wetland habitats.

4.2.4 Mitigation by Jurisdiction

WSDOT will provide compensatory mitigation for Stage 2 impacts within the jurisdictions of Edgewood, Fife, Puyallup, and unincorporated Pierce County (Table 45). Overall mitigation area is much greater than the overall impact area, and construction of the RRP is expected to result in a significant increase in wetland, stream, and riparian function, as described in Sections 5.2.2 and 5.2.3.

Table 45. Proposed Mitigation Within Stage 2 Jurisdictions.[a]

Jurisdiction	Basin	Wetland Impact (acres)[b]	Wetland Mitigation[c] (acres)	Stream Impact (acres)	Stream Mitigation (acres)	Buffer Impact (acres)	Buffer Mitigation (acres)
Edgewood	Hylebos	0.00	5.54	0.00	0.62	0.00	10.69
Fife	Hylebos	20.23	10.13	0.26	0.39	12.08	5.34
	Wapato	0.62	12.79	0.00	1.04	4.56	7.57
	Puyallup	0.00	0.00	0.00	0.00	0.03	0.00
Unincorporated Pierce County	Hylebos	0.00	8.73	0.00	0.02	0.00	1.28
	Wapato	0.00	0.00	0.00	0.00	0.00 (<104 ft^2)	0.00
	Puyallup	0.04	0.00	0.00	0.00	0.30	0.00
Puyallup	Wapato	0.75	2.16	0.00	0.17	2.07	2.30
	Puyallup	3.41	30.87	0.03	0.95	5.45	22.71
Milton	Hylebos	0.00	0.01	0.00	0.00	0.02	0.01
Totals by Basin	Hylebos	20.23	24.41	0.26	1.03	12.10	17.32
	Wapato	1.37	14.95	0.00	1.21	6.63	9.87
	Puyallup	3.45	30.87	0.03	0.95	5.78	22.71
Total	**NA**	**25.05**	**70.23**	**0.29**	**3.19**	**24.51**	**49.90**

[a] Refer to Section 4.2.2 for a detailed discussion of mitigation ratios and types.

[b] Includes permanent direct impact and indirect impacts due to isolation, but does not include other impact types. Refer to Section 3.1.2 for a detailed breakdown of impact types.

[c] Mitigation area only includes wetlands within the credit-generating portions of mitigation sites. Upland enhancement will also contribute to mitigation of wetland function. Although perimeters buffers are not credit-generating, extensive wetland and stream mitigation will occur within the non-credit-generating buffer of the mitigation sites. The SR 167 mitigation approach is to achieve no net loss of wetland area or function to comply with local critical areas ordinances and state and federal policies.

[d] The Stage 2 mitigation proposal includes the use of excess rehabilitation credit with the Hylebos RRP as described Section 5.2 and in the Stage 1b mitigation plan and permit modifications. There will be no net loss of wetlands within the city.

[e] Extensive buffer mitigation within the Hylebos basin was provided as part of the SR 167 Stage 1b project.

5. Compensatory Mitigation for Permanent Wetland, Stream, and Buffer Impacts

Compensatory mitigation for unavoidable wetland impacts will be accomplished by using remaining credits within the Hylebos RRP; expanding sites within the Hylebos RRP; and by establishing new mitigation sites within the Hylebos Creek, Wapato Creek, and Puyallup River basins (Figure 2).

5.1 Hylebos Riparian Restoration Program

The Hylebos RRP is a large scale stream and wetland restoration project. The RRP includes a suite of aquatic and riparian improvements that will mitigate Stage 2 impacts to aquatic habitats and associated buffers while enhancing wetland and riparian functions within the corridor (WSDOT 2019b). The RRP encompasses improvements to nearly all of the length of the channels of Hylebos Creek, Surprise Lake Tributary, and several unnamed tributaries within the Stage 2 area. Channels will be realigned to restore them from the existing ditched and channelized alignment to a natural alignment within the RRP to enhance their habitat and floodplain connectivity and make room for the new highway alignment.

The RRP uses a watershed approach to maximize ecosystem restoration. RRP boundaries were chosen to encompass as much stream area as possible, and to provide wetland, stream, and floodplain restoration within the same basin in which impacts occur. RRP implementation is expected to greatly increase riparian habitat area and function within the Hylebos Creek watershed. Much of this information was developed as part of the Hylebos RRP Design Version 2.0 and Stage 1b Mitigation Plan (WSDOT 2019b, 2021a), which contains additional detail on these sites. WSDOT will apply excess rehabilitation credits from the Hylebos RRP to Stage 2.

5.2 New Mitigation Sites

Existing and proposed conditions of the new mitigation sites are summarized in the following sections. Grading, habitat, and planting plans, as well as a plant schedule, are provided in Appendix E.

5.2.1 Site Locations

Figure 2 shows the location of the new mitigation sites in relation to the Stage 2 corridor. The mitigation sites are spread across the jurisdictions of Edgewood, Fife, Puyallup, and Pierce County.

5.2.1.1 Landscape Position

The mitigation areas can be described in three groups, all of which are part of the Puyallup River basin (WRIA 10): Hylebos basin sites (expanded and additional sites), Wapato RRP sites, and Puyallup River basin sites. Summary basin and jurisdiction information is provided in Table 46. Surface water and stormwater runoff within the mitigation areas eventually drain to Commencement Bay and the Puget Sound via Hylebos Creek, Surprise Lake Tributary, Wapato Creek, or the Puyallup River immediately downstream of the Stage 2 area.

Prior to European development, Surprise Lake Tributary drained to Wapato Creek. Wapato Creek and Hylebos Creek likely interacted with overbank flows from the Puyallup River. Rivers and streams in low-energy, low-gradient environments with extensive floodplains, fine-grained sediments, and frequent overbank flooding often develop an anastomosing pattern, in which two or more interconnected, low gradient channels enclose low elevation islands that act as flood basins (WSDOT 2019b).

Table 46. Summary Information of Proposed Mitigation Sites.

Site Group	Site Name	Basin	Jurisdiction
Hylebos Basin Sites	Upper Surprise Lake Tributary Addition[a]	Hylebos (via Surprise Lake Tributary)	Edgewood
	Middle Surprise Lake Tributary Addition[a]	Hylebos (via Surprise Lake Tributary)	Fife
	Lower Surprise Lake Tributary Addition[a]	Hylebos (via Surprise Lake Tributary)	Fife
	Upper Hylebos Addition[a]	Hylebos	Pierce County
	Upper Hylebos North Addition[a]	Hylebos	Pierce County
	Lower Hylebos Addition	Hylebos	Fife
Wapato RRP Sites	East Wapato RRP	Wapato	Puyallup
	West Wapato RRP	Wapato	Fife
	Northwest Wapato RRP	Wapato	Fife
Puyallup River Basin Sites	Puyallup North	Puyallup River	Puyallup
	Puyallup South	Puyallup River	Puyallup
	Freeman Road	Puyallup River	Puyallup

[a] Site is an additional area to a Hylebos RRP (Stage 1b) mitigation site.

5.2.1.2 Ecological Connectivity

All of the Stage 2 mitigation sites are situated adjacent to an existing stream, associated wetland, or ditch, providing some connectivity to other mitigation sites. Many of the mitigation sites are situated adjacent to other existing or planned mitigation sites or other open spaces that provides some terrestrial connectivity within the landscape. Site selection utilizes a watershed approach and represents an overall improvement in stream connectivity by increasing a network of closely linked instream refugia available to aquatic species. The design also improves habitat connectivity for terrestrial and semi-aquatic species by providing linkages to riparian upland and wetland habitat patches within the sites. All sites are described in detail in Sections 5.2.2 through 5.2.4.

Several of the Stage 2 sites are additions to existing Stage 1b Hylebos RRP areas. These include: Upper Surprise Lake Tributary Addition, Middle Surprise Lake Tributary Addition, Lower Surprise Lake Tributary Addition, Upper Hylebos Addition, and Upper Hylebos North Addition. Lower Hylebos Addition is a new site within the Hylebos basin located near the Hylebos RRP and bordering the City of Fife's Hylebos Nature Area. These sites have established aquatic and terrestrial connections, and site expansion will therefore contribute to increased ecological connectivity within the Hylebos and Surprise Lake Tributary watersheds.

Several of the new sites do not provide a direct terrestrial connection to other mitigation areas. These include West Wapato RRP, Freeman Road, Puyallup North, and Puyallup South. However, all of these sites have existing wetlands or streams that provide aquatic connectivity to other existing or planned mitigation areas and will contribute to the restoration of the riparian corridor. One culvert at Freeman Road will be removed and replaced with an improved bridge crossing. Culvert replacement will improve access to habitat for salmon and other aquatic species within the Wapato and Puyallup watersheds.

The completed design will create some corridors of moderate to high quality aquatic and terrestrial connectivity. Two sites located west of the planned roadway (Northwest Wapato RRP and West Wapato RRP) are situated north and east of an existing tribally owned mitigation site and adjacent to other protected areas. Terrestrial connectivity between these two sites is disrupted by the UPRR, but these two sites are hydrologically connected through Wapato Creek and associated wetlands. The Freeman Road and Puyallup South sites are immediately adjacent to each other and bordered by an area of low intensity land use. On its southwest side, Puyallup South is connected to a forested wetland complex located near the Puyallup River.

5.2.1.3 Historical and Current Land Use

Current land use in the mitigation sites consists of highway and arterial street corridors with adjacent commercial, residential, agricultural, and industrial land uses. Vegetation in unpaved areas consists of a mixture of native and nonnative conifers, deciduous trees, common native shrubs, and mixed grasses as well as agricultural crops. Lack of trees and shrubs along streams severely limits the opportunity for recruitment of woody material. Due the history of high-intensity development, soils in many locations within the mitigation sites have characteristics and variability that reflect a history of disturbance (WSDOT 2016a).

The eastern edge of the Stage 2 area has been used for agricultural crop production for decades. The western edge of the Stage 2 area has been shaped by industrial development associated with the Port. Vegetation is largely disturbed amid a variety of upland, wetland, riparian, and stream habitats. These habitats contain a mix of native and nonnative trees, shrubs, and herbaceous vegetation. Hydrology in the Stage 2 area has been altered by the placement of fill material and the rerouting of surface water through agricultural and roadside ditches. Much of the length of streams within the Stage 2 area is unnatural: historical streams were realigned in conjunction with agricultural land uses, urban development, and road construction. Land development in the Stage 2 area is ongoing, and likely to have continued impacts on vegetation and hydrology (WSDOT 2016a).

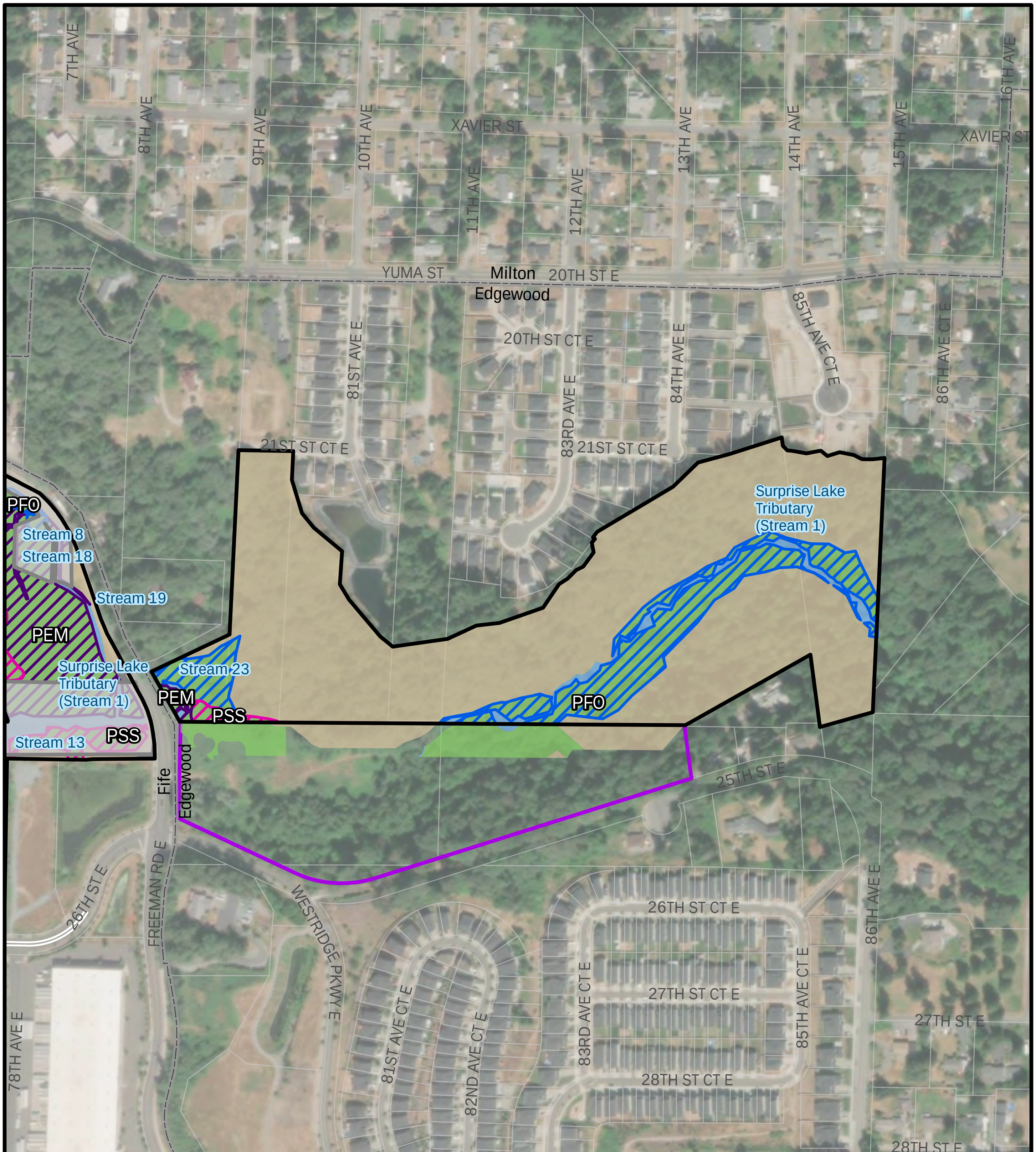
Wetland biologists delineated wetlands and streams within the new mitigation sites (Table 47; Figure 4; Appendix A). Most wetlands within the sites are Category II and III depressional and riverine wetlands that have moderate potential to provide water quality functions, moderate to high potential to provide hydrologic functions, low potential to provide wildlife habitat functions, and poor buffer conditions. Existing conditions at the various sites are summarized below.

5.2.1.4 Floodplain Connectivity

Mitigation site designs aim to improve floodplain interaction by removing historical floodplain fills, lowering stream banks and floodplain elevations, and increasing stream length via minor meandering and channel widening. Grading will improve the existing condition by increasing storage within the mitigation sites and by encouraging regular and more natural hydrologic interaction between streams, wetlands, and the floodplain environment. These modifications will improve habitat by improving water quality, moderating water velocity, increasing aquatic habitat during high flows, and providing natural connectivity between stream and upland environments. Introduction of large woody material will also increase floodplain functions by slowing flood velocities and will provide refugia for aquatic species.

Table 47. Delineated Wetland and Stream Area Within Mitigation Sites (existing conditions).

Mitigation Site	Credit-Generating Area (excluding buffer)					Perimeter Buffer					Total Site Area (acres)
	Wetland (acres)	Stream		Upland (acres)	Total (acres)	Wetland (acres)	Stream		Upland (acres)	Total (acres)	
		Acres	Feet				Acres	Feet			
Upper Surprise Lake Tributary Addition	4.41	0.62	1,667	12.37	17.40	0.91	0.04	160	9.74	10.69	28.09
Middle Surprise Lake Tributary Addition	7.09	0.72	1,609	0.06	7.87	1.23	0.28	931	1.20	2.71	10.58
Lower Surprise Lake Tributary Addition	1.05	0.01	0	0.00	1.06	0.00	0.00	0	0.00	0.00	1.06
Upper Hylebos Addition	3.63	0.00	0	0.47	4.10	0.00	0.00	0	0.00	0.00	4.10
Upper Hylebos North Addition	3.39	0.00	0	2.05	5.44	0.30	0.00	0	0.99	1.29	6.73
Lower Hylebos Addition	1.04	0.00	0	1.32	2.36	1.11	0.00	0	1.52	2.63	4.99
East Wapato RRP	0.92	0.15	513	2.03	3.10	0.59	0.00	0	2.89	3.48	6.58
West Wapato RRP	0.42	0.16	848	0.75	1.33	0.11	0.00	0	1.39	1.50	2.83
Northwest Wapato RRP	2.27	0.45	1,364	10.63	13.35	0.36	0.00	39	5.71	6.07	19.42
Puyallup North	0.03	0.00	0	12.29	12.32	0.31	0.00	0	8.19	8.50	20.82
Puyallup South	0.00	0.01	75	3.68	3.69	0.00	0.17	1,032	4.56	4.73	8.42
Freeman Road	3.31	0.47	2,257	15.43	19.21	2.19	0.07	404	6.04	8.30	27.51
Totals	**27.56**	**2.59**	**8,333**	**61.08**	**91.23**	**7.11**	**0.56**	**2,566**	**42.23**	**49.90**	**141.13**



Legend

- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Non-project mitigation areas
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

CowardinClass

- PEM
- PFO
- PSS

Figure 4-A. Existing Conditions for the SR 167 Completion Project, Stage 2 - Upper Surprise Lake Trib Addition Mitigation Site.

N

0 200 400 800 Feet

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Esri Imagery (2023)

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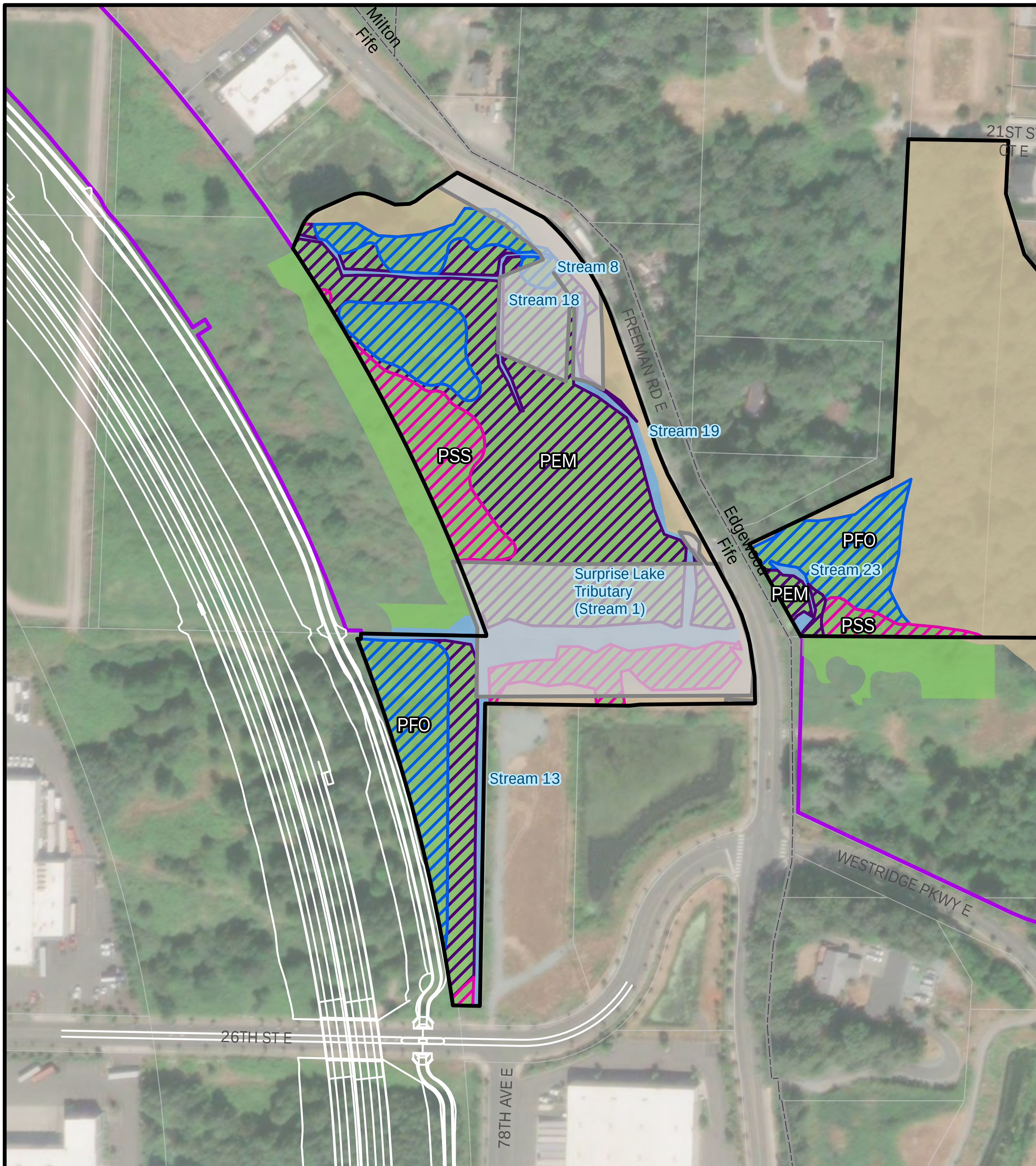

Legend

- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Non-project mitigation areas
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

CowardinClass

- PEM
- PFO
- PSS

Figure 4-B. Existing Conditions for the SR 167 Completion Project, Stage 2 - Middle Surprise Lake Trib Addition Mitigation Site.

N

0 112.5 225 450 eet

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Esri Imagery (2023)

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Legend

- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

CowardinClass

- PEM

Figure 4-C. Existing Conditions for the SR 167 Completion Project, Stage 2 -
Lower Surprise Lake Trib Addition Mitigation Site.

0 30 60 120
eet

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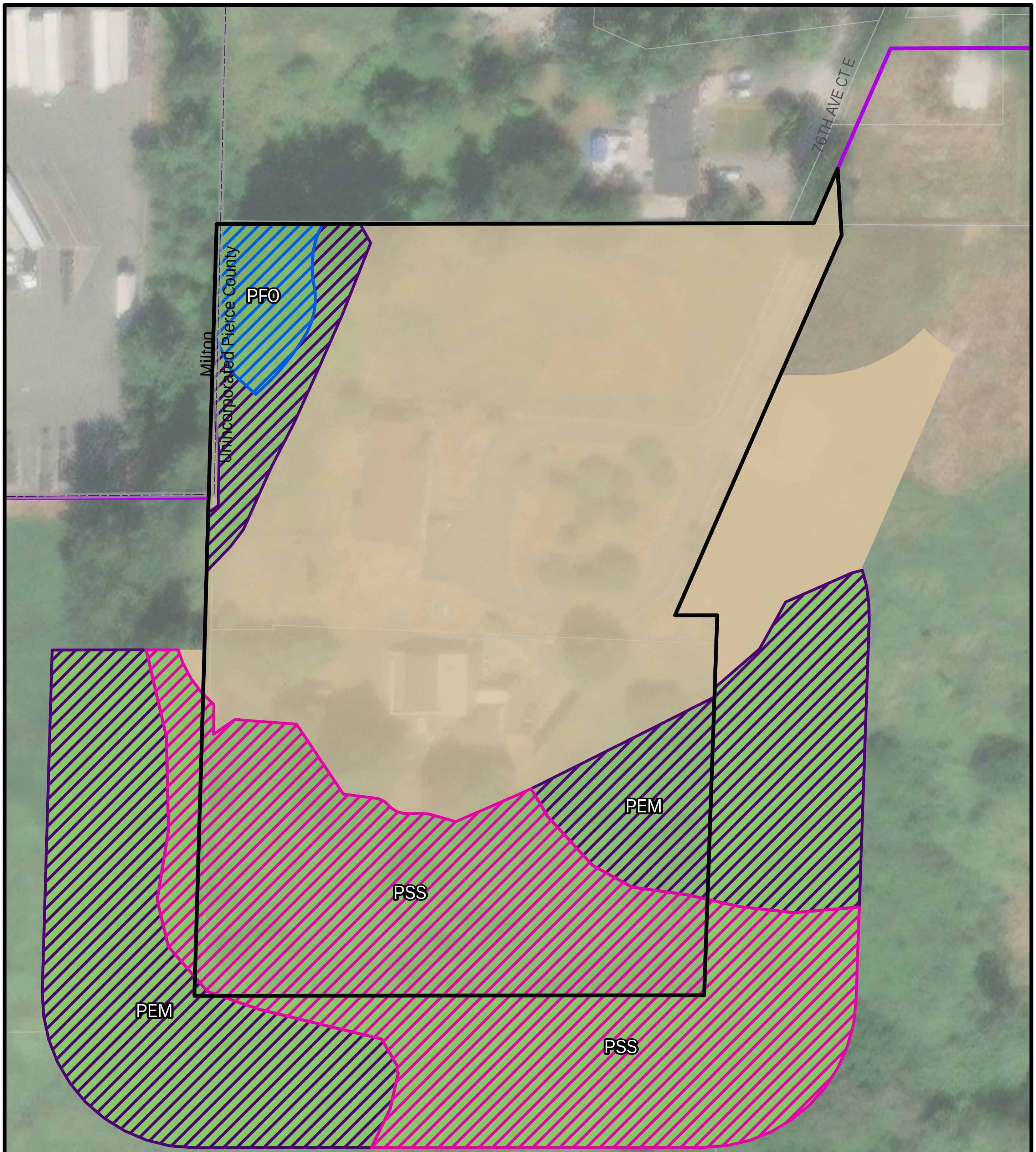

Legend

- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

CowardinClass

- PEM
- PFO
- PSS

Figure 4-D. Existing Conditions for the SR 167 Completion Project, Stage 2 -
Upper Hylebos North Addition Mitigation Site.

0 40 80 160
eet

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Esri Imagery (2023)

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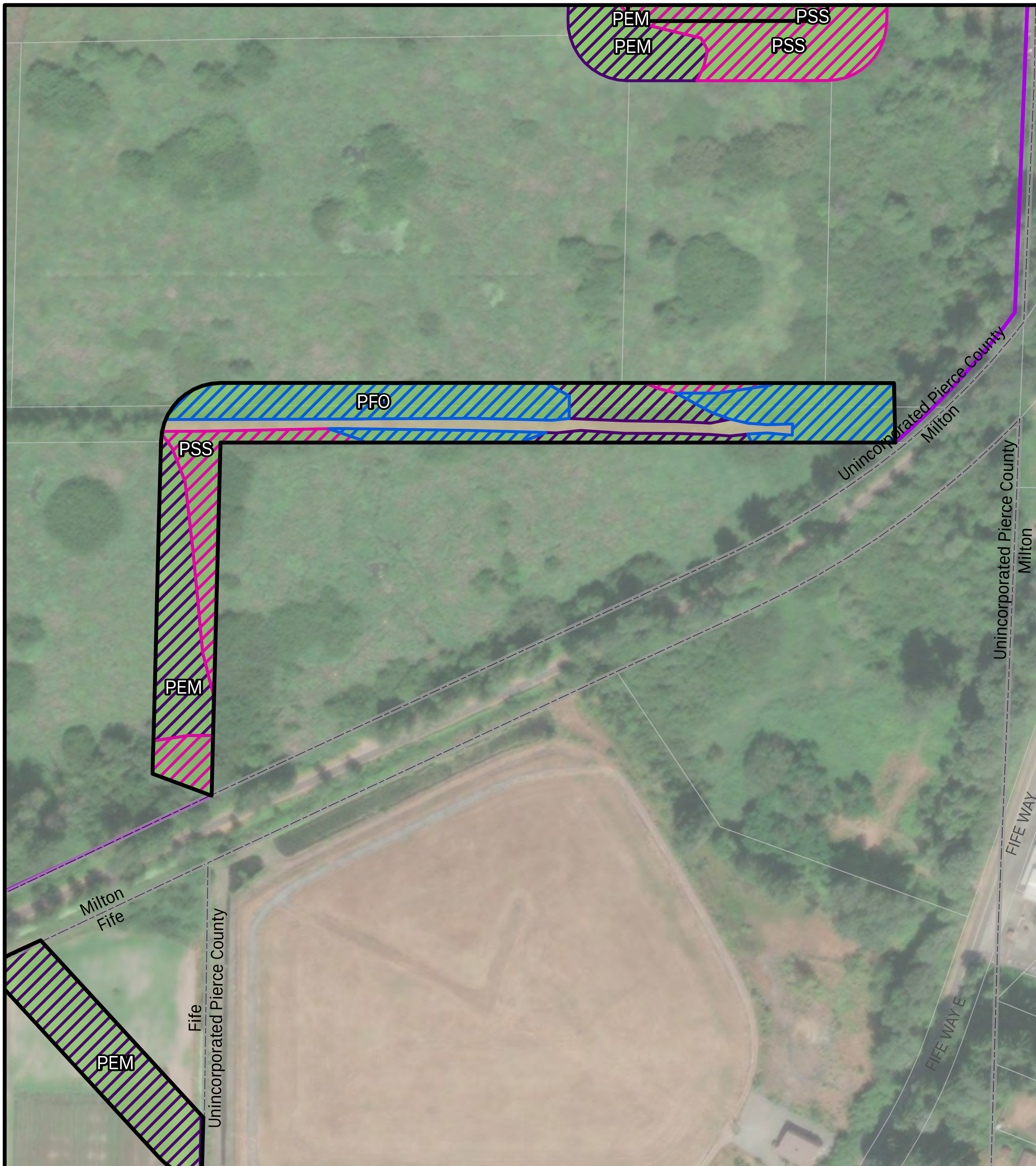

Legend

- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

CowardinClass

- PEM
- PFO
- PSS

Figure 4-E. Existing Conditions for the SR 167 Completion Project, Stage 2 -
Upper Hylebos Addition Mitigation Site.

N

0 115 230 460
eet

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Esri Imagery (2023)

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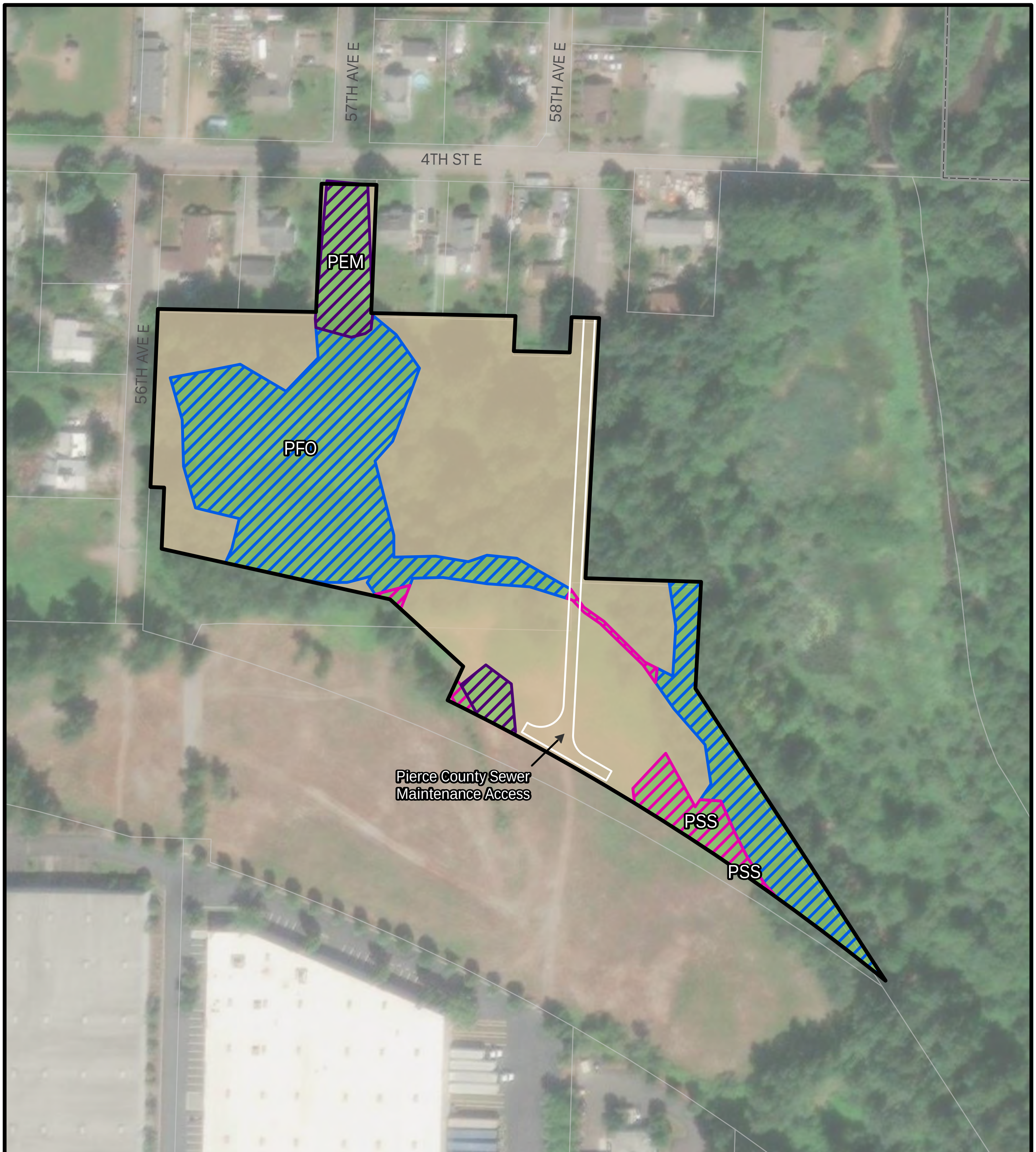
Figure 4-F. Existing Conditions for the SR 167 Completion Project, Stage 2 - Lower Hylebos Addition Mitigation Site.



Legend

- Stage 2 RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

CowardinClass

- PEM
- PFO
- PSS

0 70 140 280 eet

Herrera Science + Planning + Design

Esri Imagery (2023)

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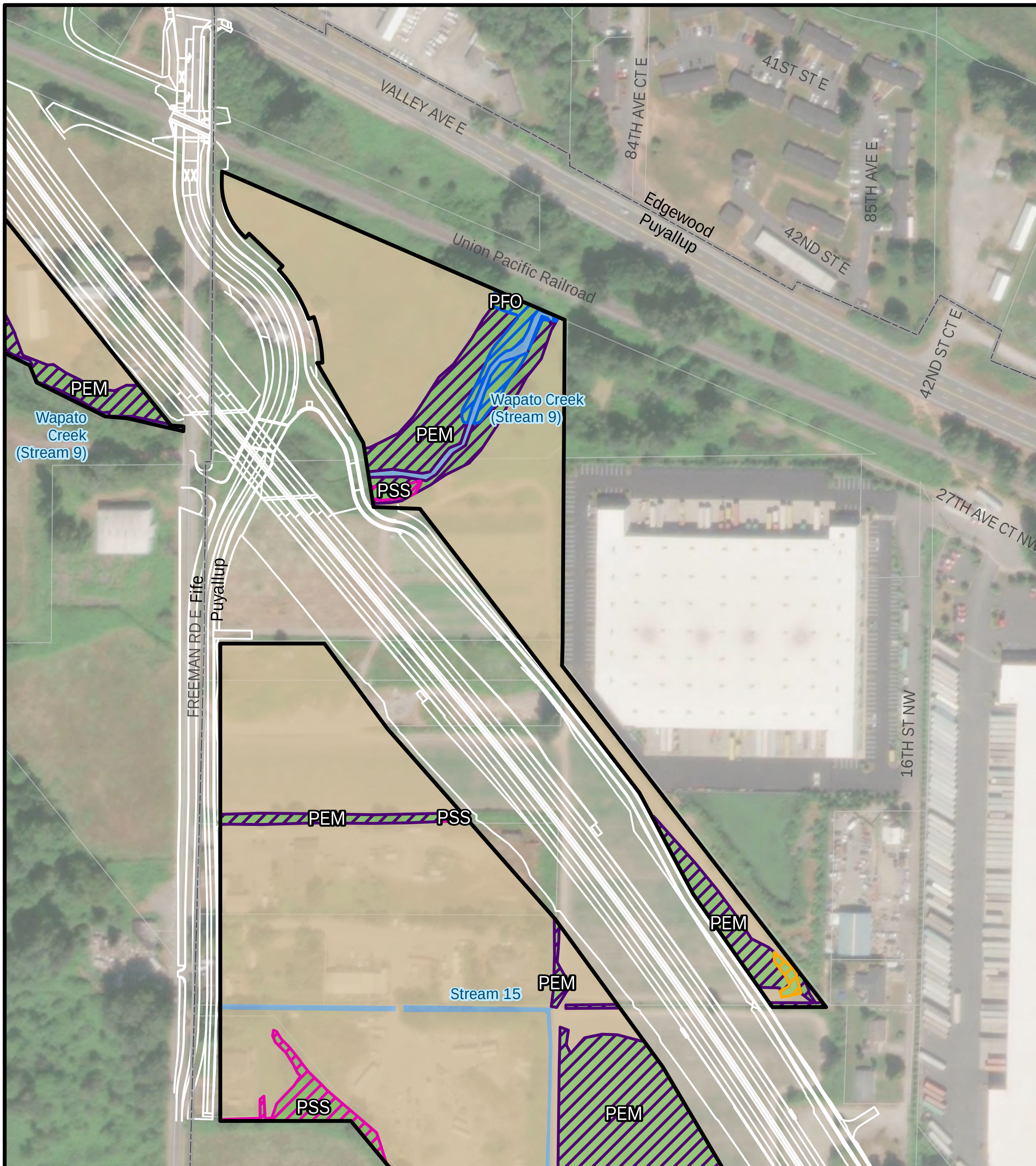

Legend

- Stage 2 RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland
- Bare Ground

CowardinClass

- PEM
- PFO
- PSS

Figure 4-G. Existing Conditions for the SR 167 Completion Project, Stage 2 - East Wapato RRP Mitigation Site.

N

0 125 250 500
eet

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Esri Imagery (2023)

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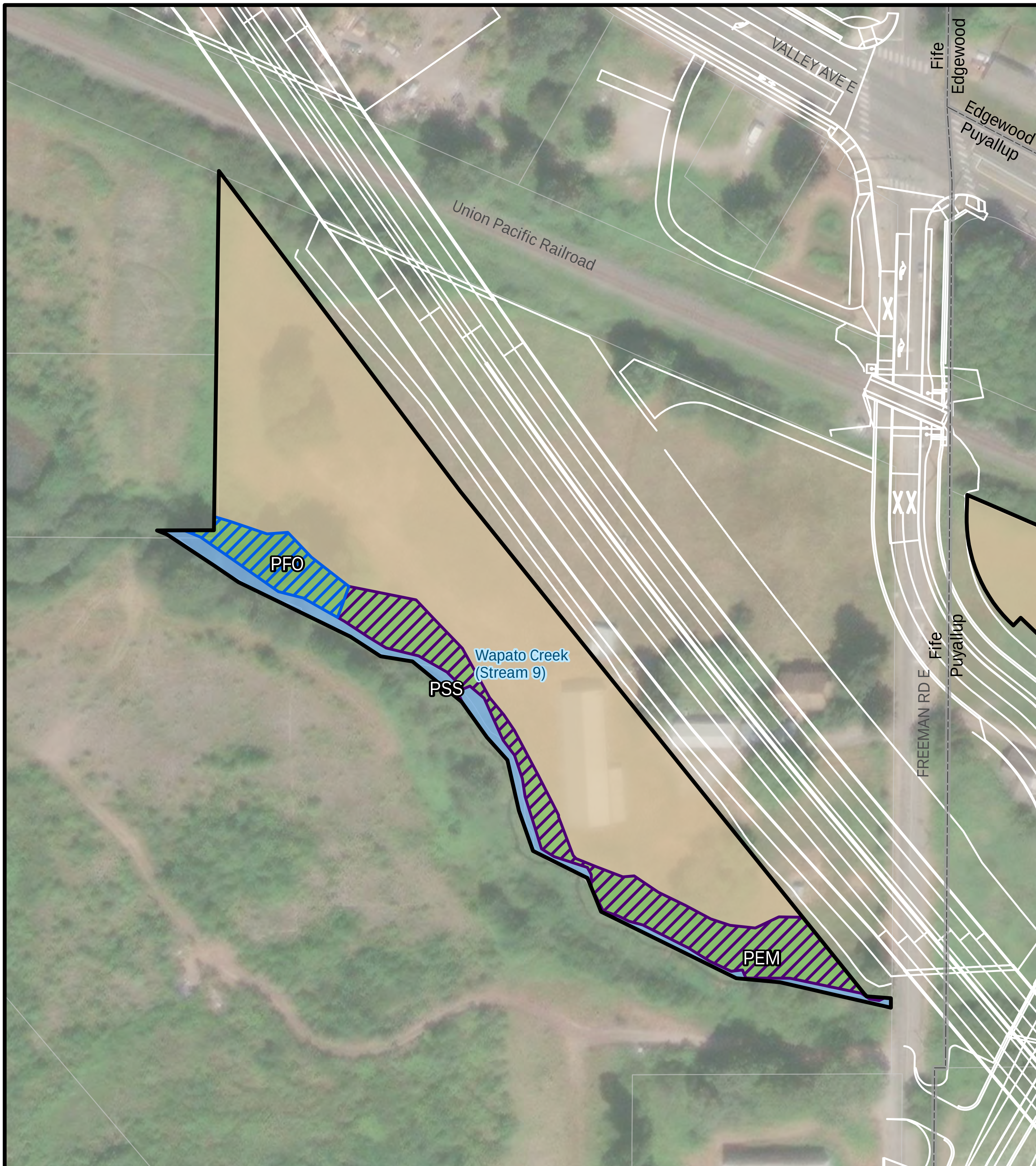

Legend

Stage 2 RRP Boundary	Stream
Jurisdictional boundary	Upland
Parcel boundaries	Wetland
Stage 2 Proposed Road and Shared-Use Path (white line)	CowardinClass
	PEM
	PFO
	PSS

Figure 4-H. Existing Conditions for the SR 167 Completion Project, Stage 2 - West Wapato RRP Mitigation Site.

0 62.5 125 250 eet

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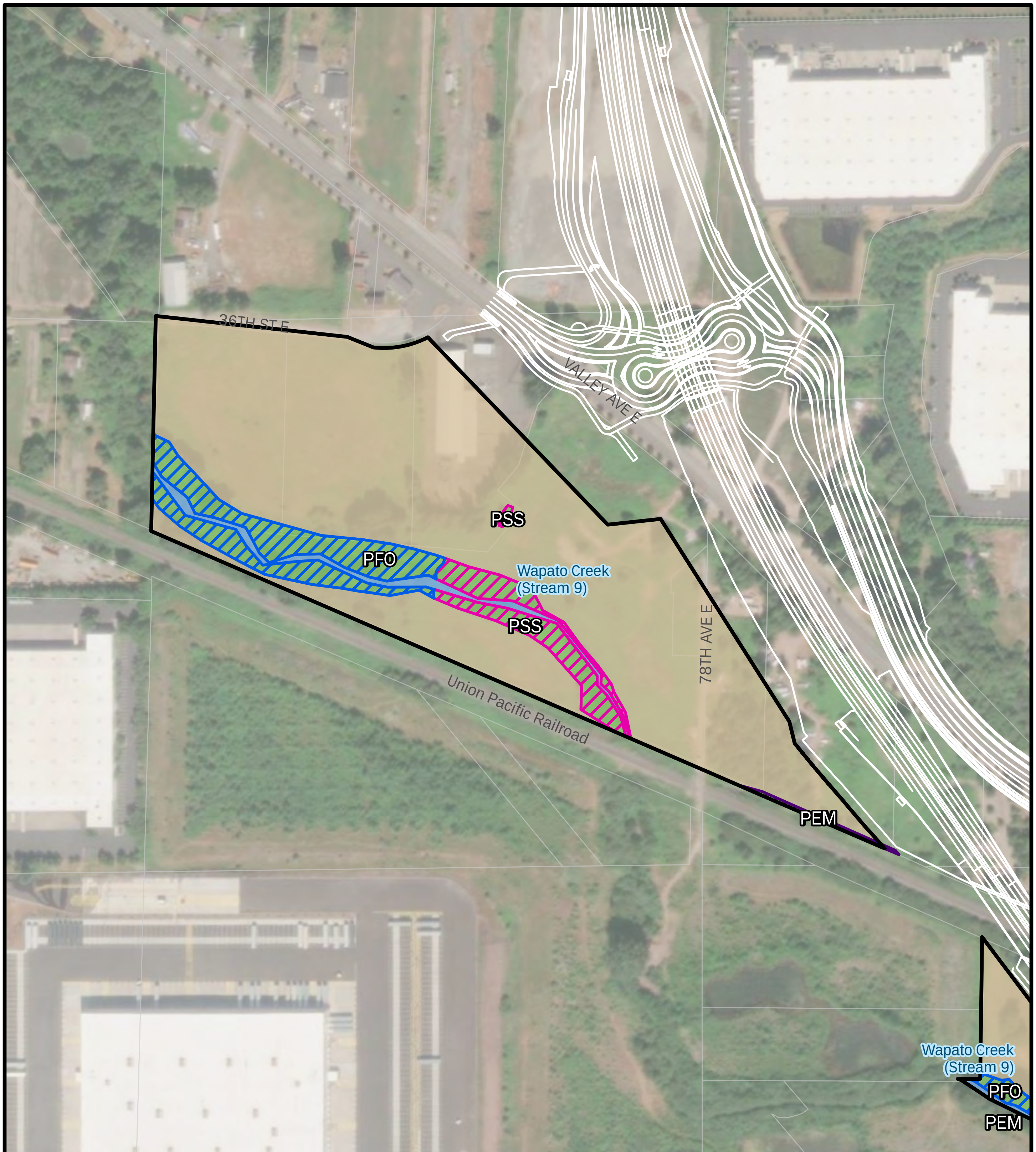

Legend

- Stage 2 RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

CowardinClass

- PEM
- PFO
- PSS

Figure 4-I. Existing Conditions for the SR 167 Completion Project, Stage 2 - Northwest Wapato RRP Mitigation Site.

0 160 320 640 eet

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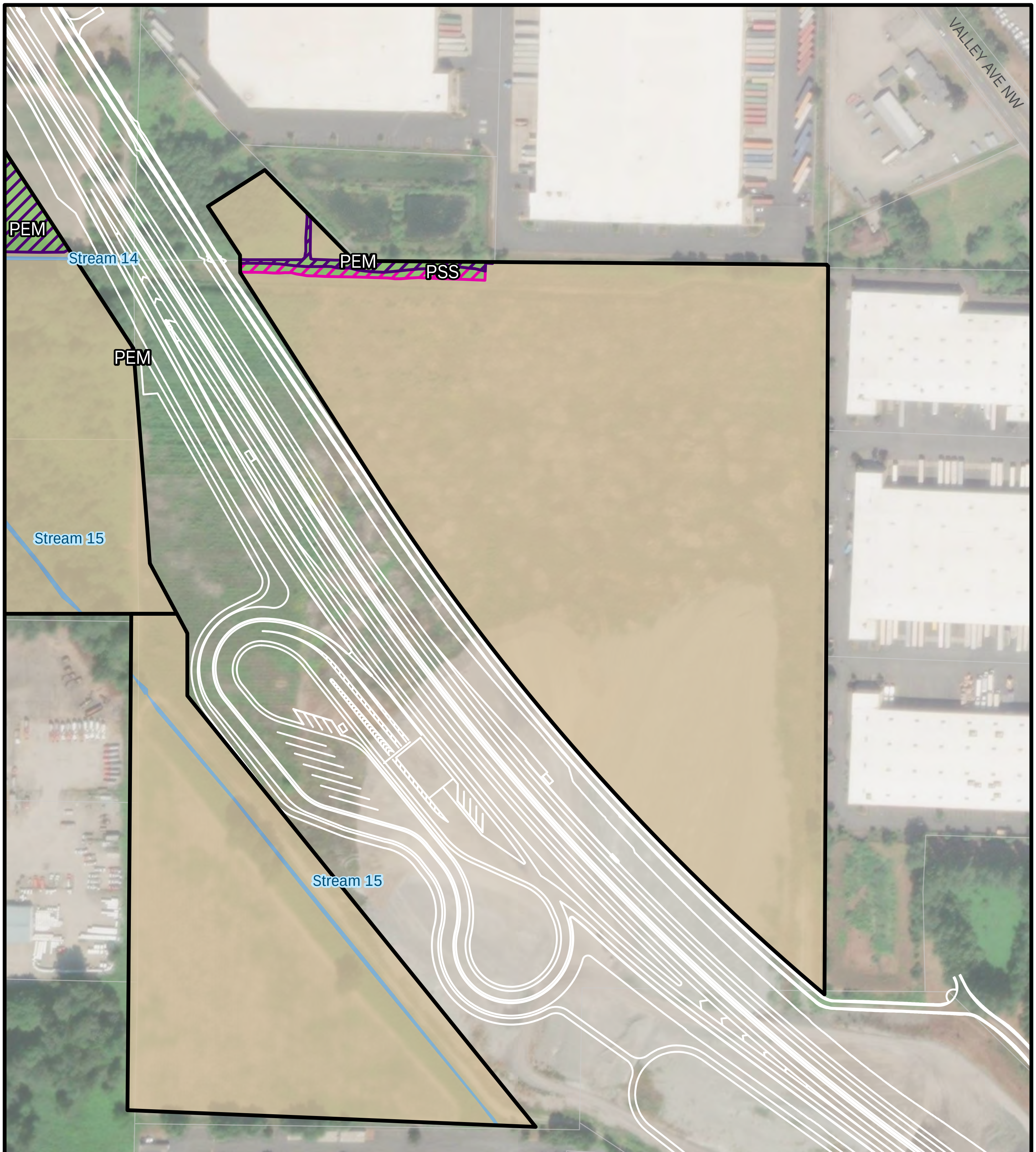

Legend

- Stage 2 RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

CowardinClass

- PEM
- PSS

Figure 4-J. Existing Conditions for the SR 167 Completion Project, Stage 2 - Puyallup North Mitigation Site.

0 130 260 520 eet

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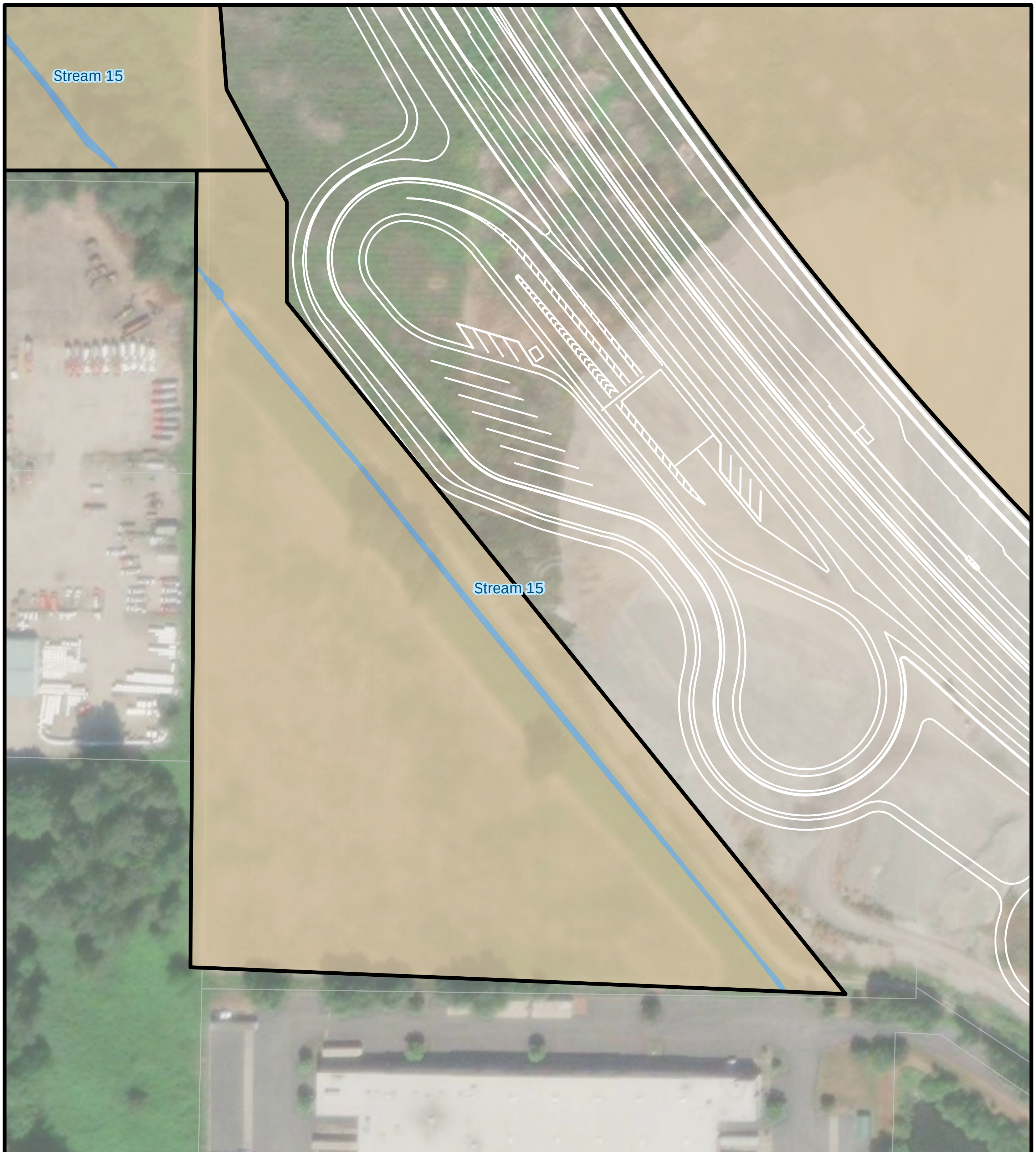

Legend

- Stage 2 RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland

Figure 4-K. Existing Conditions for the SR 167 Completion Project, Stage 2 - Puyallup South Mitigation Site.

0 80 160 320 eet

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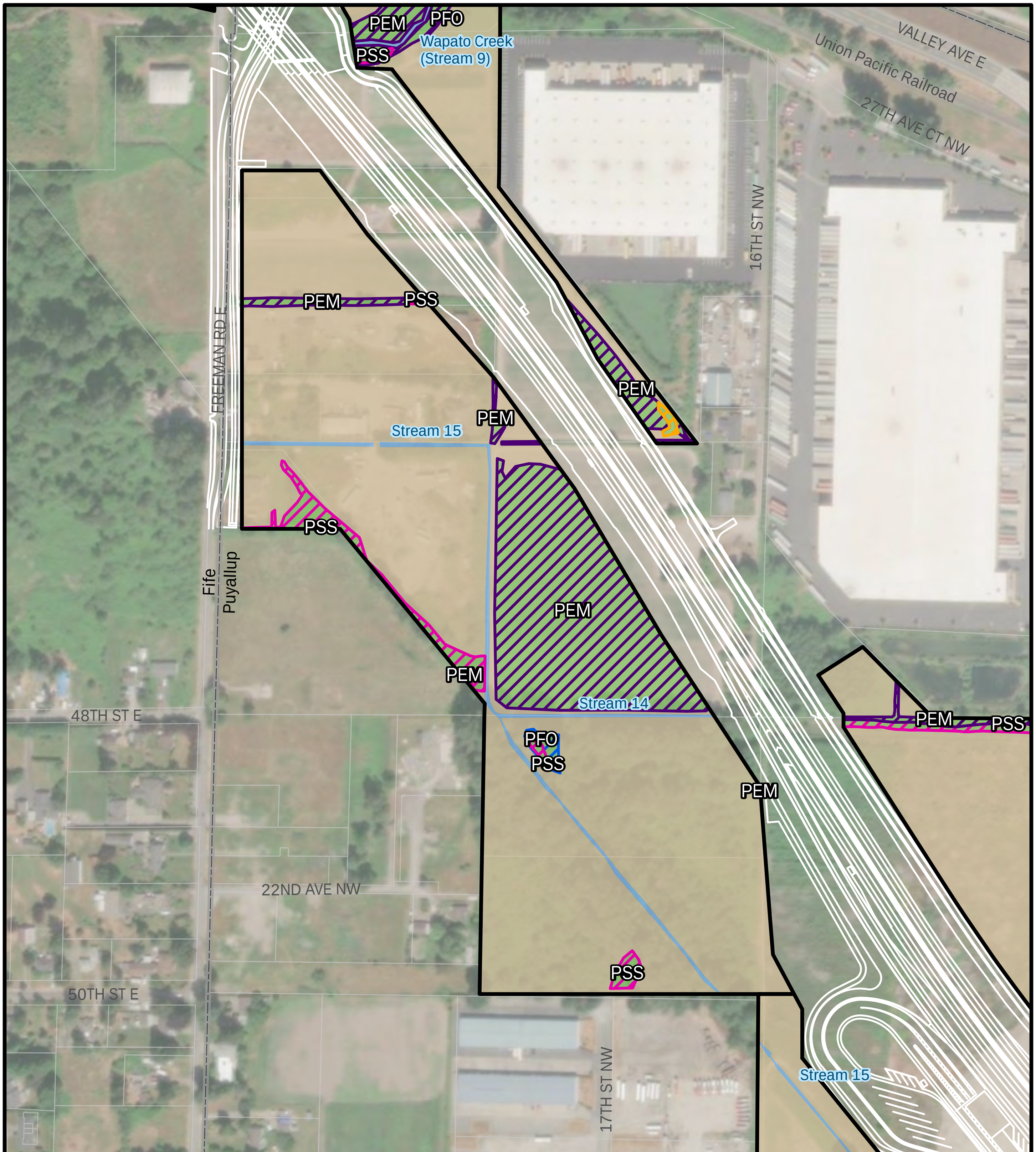

Legend

- Stage 2 RRP Boundary
- Jurisdictional boundary
- Parcel boundaries
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Stream
- Upland
- Wetland
- Bare Ground

CowardinClass

- PEM
- PFO
- PSS

Figure 4-L. Existing Conditions for the SR 167 Completion Project, Stage 2 - Freeman Road Mitigation Site.

0 165 330 660 eet

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Esri Imagery (2023)

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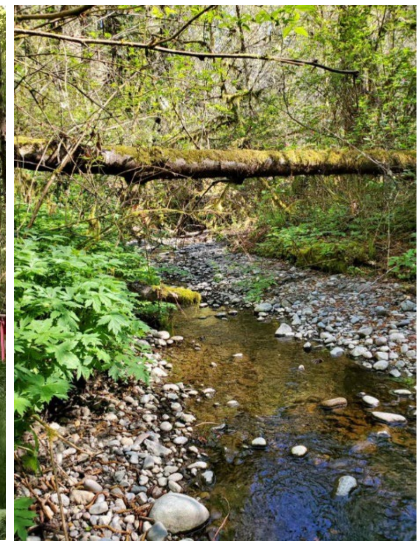
5.2.2 Hylebos Basin Sites

5.2.2.1 Upper Surprise Lake Tributary Addition

Existing Conditions

The Upper Surprise Lake Tributary Addition site borders The Upper Surprise Lake Tributary mitigation site from the Stage 1b RRP. The site includes approximately 20 acres of forested ravine that contains Surprise Lake Tributary.



Uplands

Uplands at the site consist of relatively undisturbed forest vegetation covering the ravine slopes above Surprise Lake Tributary. The upper forest canopy consists of western red cedar (*Thuja plicata*), big leaf maple, Douglas fir, and black cottonwood. The midstory and shrub layer consists of vine maple (*Acer circinatum*), red elderberry (*Sambucus racemosa*), Himalayan blackberry, and western sword fern (*Polystichum munitum*). The forested buffer to the east is in generally good condition with minimal disturbance from past land use.

Wetlands

A Category II depressional wetland (Wetland 45) is located within the site. The wetland is a freshwater PFO habitat. Multiple strata, including canopy, shrubs, herbaceous, ground cover, and a moss layer are present within the wetland and riparian zone. The upper canopy consists primarily of black cottonwood and red alder. The shrub layer is composed of salmonberry (*Rubus spectabilis*), western red cedar saplings, and willows. The herbaceous and ground cover layers consist of lady fern, Pacific bleeding heart (*Dicentra formosa*), Pacific waterleaf (*Hydrophyllum tenuipes*), stinging nettle (*Urtica dioica)*, and creeping buttercup. Small patches of snowberry, red elderberry, and sword fern are growing on hummocks within the wetland. Sporadic patches of Himalayan blackberry are present throughout the wetland and its eastern boundaries.

The wetland has four hydroperiods, including saturated only, occasionally flooded, seasonally flooded, and permanently flooded, and contains a permanently flowing stream. The wetland outlets to Surprise Lake Tributary, which flows through the site and exits the site through a ditch that enters a culvert under Freeman Road East.

Streams

Surprise Lake Tributary forms a defined channel within the ravine and emerges as several alluvial channels on the Stage 1b RRP mitigation site upstream of Freeman Road East. Near the mitigation site, the tributary is intermittent, has a moderately complex meandering channel, with a mix of pool/riffle habitat, and moderate sized cobbles dominating the substrate. The riparian forest provides good thermal refugia and provides a source of woody material to the stream. The stream buffer consists of Wetland 45 and a relatively undisturbed forested riparian zone dominated by red alder and willows. A small, excavated channel identified as Stream 23 is encompassed with the wetland adjacent to Freeman Road East.

Wildlife Habitat and Use

The site is a WDFW biodiversity area and corridor priority habitat (WDFW 2022a). WDFW maps the possible presence of fish in Surprise Lake Tributary. Coho (likely natural spawners) and *O. mykiss* (likely stocked fish from Surprise Lake) have been documented in the creek; however, two partial fish passage barriers (to be corrected during Stage 1b) are documented downstream (WDFW 2022a, 2022b, 2022c). Small to large conifers and deciduous trees dominate the site and provide organic inputs and shade cover for the creek. The wetland and forested areas contain a high level of structural heterogeneity and diversity of structures such as snags and logs, which are accessible to terrestrial wildlife species.

Proposed Conditions

Site design for the Upper Surprise Lake Tributary Addition consists primarily of preservation and enhancement of riverine wetland and forested upland. A small area of riverine wetland will be re-established (Table 48, following Section 5.3.4.3). The site currently contains an alluvial fan and braided channel. No rerouting of the channel is proposed at this site. Proposed conditions for this and other mitigation sites are provided in Figure 5 and Table 49, following Section 5.3.4.3.

Hydrology

The hydrology on the site is not anticipated to change as there is no proposed stream or wetland creation or grading. Groundwater monitoring data from Stage 1b in or near the Hylebos RRP demonstrate the presence of groundwater within 12 inches of the ground surface during the growing season (WSDOT 2021a).

Grading Design

A small portion of the site will be graded. No grading will occur in forested areas to avoid further site disturbance.

Planting Design

Areas dominated by native vegetation will receive intermittent planting of native trees, shrubs and herbaceous species. Some areas will receive additional native trees and shrubs planted within bare areas or after having select invasive species removed. Areas with a greater proportion of invasive species would have large swaths of invasive species removal done on site prior to replanting with native species.

Invasive Species Control Strategy

Restoration areas will receive aggressive clearing of invasive vegetation. Enhancement areas will receive selective invasive species removal through mowing, cutting and bagging all Himalayan blackberry and English ivy offsite in repeated sessions. Creeping buttercup will be removed manually through digging up the rhizomes and plants and removing from site. Removal will be done with hand tools. No heavy equipment will be used on site. All areas receiving invasive species removal will be planted with native species to help reduce regrowth of invasive species.

Habitat Features

The site design will enhance habitat by providing varied strata of canopy. Preservation of forested area will support long-term stream habitat functions through woody material and organic material recruitment. The installation of bat boxes, brush piles, and nest boxes will provide valuable habitat features for species that require a mature forested habitat.

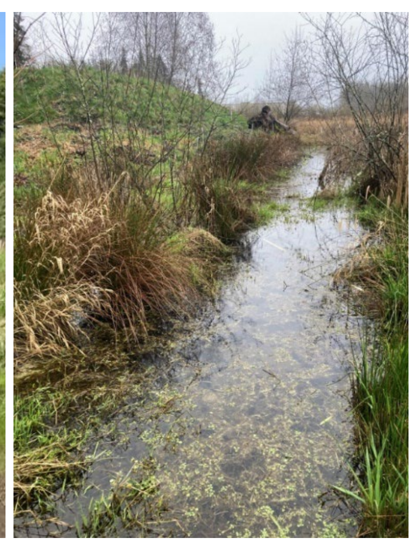
Buffers

The site is bordered by steep slopes. Site design and planting plan will be contiguous with the credit-generating area. Nonnative invasive species will be removed from the buffer and replaced with native plant species.

5.2.2.2 Middle Surprise Lake Tributary Addition

Existing Conditions

The Middle Surprise Lake Tributary Addition site is located west of Freeman Road East, north of 26th Street East and south of 20th Street East, and is situated between the Upper Surprise Lake Tributary and Middle Surprise Lake Tributary mitigation sites from the Stage 1b RRP. The site includes a City of Fife-owned mitigation site that was constructed to address wetland and stream impacts resulting from improvements and upgrades made to Freeman Road East and a nearby development.



Uplands

Upland areas consist of road embankments and disturbed fields adjacent to commercial development and agricultural fields. Upland vegetation is dominated by native and nonnative field grasses, reed canarygrass, and Himalayan blackberry.

Wetlands

A Category II depressional wetland (Wetland 47) is located at the site. The northern and southern portions of Wetland 47 contain a PFO community dominated by black cottonwood and Sitka willow. The wetland interior contains PSS and PEM communities dominated by red-osier dogwood, Douglas spirea, willows, Himalayan blackberry, and reed canarygrass. Reed canarygrass is prolific during the growing season and often fill the channels during dry summer months. The wetland has several hydroperiods as well as a permanently flowing stream. Wetland 47 outlets to Surprise Lake Tributary, which flows west than north through a series of drainage ditches prior to joining Hylebos Creek west of 70th Avenue East and I-5.

Streams

Stream 13 flows north from a culvert under 26th Street East and joins Surprise Lake Tributary in the southern portion of the site. Stream 13 and Surprise Lake Tributary within the site are excavated drainage ditches with no natural turns or meanders. Stream 13 is perennially flowing and provides poor fish habitat as it primarily has a mud/silt bottom, contains no instream wood, and has little channel complexity. Streams 8, 18, and 19 also flow through the site and join Surprise Lake Tributary off site. Stream 19 flows south along Freeman Road East before entering Surprise Lake Tributary near the road crossing. Instream conditions in all three streams are poor with a lack of channel complexity and substrate dominated by mud and silt. Some shade and overhanging vegetation are provided by trees and shrubs in Wetland 47. Within the mitigation site the riparian buffer for all streams is disturbed and in generally poor condition. The buffer consists of herbaceous vegetation dominated by reed canarygrass and Himalayan blackberry.

Wildlife Habitat and Use

WDFW's SalmonScape mapping system shows the possible presence of fish in Stream 13 and Surprise Lake Tributary. The wetland contains a diversity of plant classes, hydroperiods and structures such as snags and logs, which are accessible to terrestrial many wildlife species. Wetland 45 and a WDFW mapped biodiversity area and corridor is located on the east side of Freeman Road East (WDFW 2022a). Proximity to relatively undisturbed forest habitat provides connectivity for many species.

Proposed Conditions

Mitigation design will rehabilitate existing wetland and re-establish riverine wetland. Stream 13 will be routed through the site, creating a natural, less channelized flow. Backwater channels will be graded into the channelized portion of Surprise Lake Tributary, along with Stream 08 to create fish habitat. Large woody material will be placed throughout the site.

Hydrology

This site includes Stream 8, 13, Surprise Lake Tributary, Stream 18, and Stream 19. Channel realignment is proposed for Stream13 which will provide additional sinuosity and wetted area. Proposed backwater channels will add connectivity between the streams and the floodplain to spread water across the mitigation site. Surprise Lake Tributary will remain in its current alignment until it reaches the portion of the Middle Surprise Lake Tributary site designed for Stage 1b, where it will be realigned through the site. WSDOT has installed a series of piezometers in the Project area (Appendix F). Data at collected at the monitoring well closest to the site (H-5p-18) indicate the presence of groundwater within 12 inches of the ground surface during the growing season.

Grading Design

Stream 13, which enters the site from a culvert and exits into Surprise Lake Tributary, will be realigned within the site slightly to the west with increased sinuosity in its planform. Channel geometry for Stream 13 features a 3-foot bottom width grading up to the floodplain at a 3H:1V slope. The floodplain will be slightly lowered in the area adjacent to Stream 13 and the existing ditch conveying Stream 13 will be filled. Two backwater fish channels will be constructed/enhanced from existing backwater ditches. Minimal floodplain grading will be undertaken in order to preserve existing vegetation.

Planting Design

The planting design includes preserving and enhancing pockets of high-quality existing forested wetland and planting new forested wetland scrub shrub and emergent communities. Reed canarygrass and Himalayan blackberry will be removed throughout the site rand replanted with native wetland trees, shrubs and emergent species. Hummocks of forested wetland communities will be interspersed throughout the scrub shrub wetland community along the rerouted channel. Planting will incorporate and blend into the mitigation site currently planted by City of Fife.

Invasive Species Control Strategy

Dense hedgerow planting consisting of fast-growing shrub species is proposed along constructed and existing channels. This strategy is designed to compete with invasive vegetation and prevent aggressive establishment of reed canarygrass within in shallow open channels. Extensive site preparation methods to remove invasive vegetation is also proposed. Mowing and heavy cardboard application will be used in areas where large swaths of reed canarygrass currently exist. Prior to cardboard placement, reed canarygrass will be mowed as low as feasible. Large sections of cardboard will be placed near stream channels at a minimum width of 10 feet from the channel edge along the top of bank. Cardboard will be placed with a minimum of 6 inches overlapping material at the edges. Cardboard will be a minimum of 4 millimeters thick. Trees will be planted within the center of cardboard mats, and willow and dogwood stakes shall be used to anchor mat corners. Multiple layers of cardboard may be used, overtopping one another. This technique may be used in areas where excavation of reed canarygrass along existing channels is infeasible.

Habitat Features

The new stream alignment will provide new stream channel accessible to fish and other aquatic species. Woody material will be placed throughout the wetland and in stream channel and backwater areas and will provide structural diversity. Additional habitat features include nesting box, bat box, perch tree, and brush pile installation.

Buffers

Intended buffer functions are described in the above section.

5.2.2.3 Lower Surprise Lake Tributary Addition

This portion of the Lower surprise Lake Tributary site was initially considered perimeter buffer pending a conservation agreement with B&L Woodwaste to extend the 100-foot buffer onto their property. That agreement was finalized in 2022 and this portion is now being converted to credit-generating area. Site design and performance standards will be the same as what was described in the Stage 1b Mitigation Plan (WSDOT 2021a).

Existing Conditions

The Lower Surprise Lake Tributary Addition site is connected to the Lower Surprise Lake Tributary mitigation site from the Stage 1b RRP and is located adjacent to the south side of the interurban trail and west of the former B&L Woodwaste Site. The site has been effectively drained by drain tiles that route surface water Stream 12 directly east and north of the site. The site is currently used as conventional agricultural field.

Uplands

The site has been regularly disturbed by tiling and does not currently have native vegetation. Uplands surrounding the site are highly disturbed, consisting of the Interurban Trail, agricultural fields, and drainage ditches flowing through open areas dominated by invasive reed canarygrass.

Wetlands

The site is located at the northwest boundary of a Category III depressional wetland (Wetland 4/48/50). Wetland 4/48/50 contains palustrine forest, scrub shrub and emergent vegetation communities, however, the majority of the wetland lacks vegetation due to annually tilling and planting of commercial agricultural crops. A small emergent vegetation community dominated by reed canarygrass is present at the site. The PFO areas of the wetland are dominated by black cottonwood, red alder, and willow species. The PSS shrub and PEM communities are dominated by invasive Himalayan blackberry and reed canarygrass. The site and the northeast corner of the wetland is seasonally flooded. The wetland has three additional hydroperiods, including saturated only, occasionally flooded, and permanently flowing stream. Wetland 4/48/50 outlets to Stream 12 and Surprise Lake Tributary.

Wildlife Habitat and Use

The site lacks plant structure and diversity and is dominated by invasive reed canarygrass. However, Wetland 17/65 is located directly north of the site on the north side of the Interurban Trail. Proximity to the wetland provides connectivity for terrestrial species.

WDFW's SalmonScape mapping system shows the possible presence of fish in Stream 12 and Surprise Lake Tributary, however, one partial fish passage barriers is documented in Surprise Lake Tributary (WDFW 2022a, 2022b, 2022c). Each stream reach adjacent to the site has the in-stream habitat character of a ditch. They have been channelized and repeatedly dredged in the past and present. The low gradient, sand-and-silt substate and lack of riparian overstory have caused a tendency of the channel to become choked with reed canarygrass between dredging intervals. Without pools, LWD, channel complexity, and cover there is essentially no habitat for salmonids.

Proposed Conditions

The Lower Surprise Lake Tributary site design will rehabilitate existing wetland by regrading to link portions of the Hylebos RRP together.

Hydrology

Groundwater monitoring data from Stage 1b in or near the Hylebos RRP demonstrate the presence of groundwater within 12 inches of the ground surface during the growing season (WSDOT 2021a).

Grading Design

Minor floodplain grading will be completed in this site. For greater grading design context see Stage 1b reports.

Planting Design

Planting plans are available in Appendix E.

Invasive Species Control Strategy

Invasive species removal will consist primarily of Himalayan blackberry mowing and removal from site. Eradication of nonnative naturalized upland grasses and forbs from the existing lawn and horse pasture will likely be the most difficult eradication within the site. Control of naturalized grasses will consist of soil ripping and removal of root system mats.

Habitat Features

Creation of new forested, scrub-shrub, and emergent communities will provide varied and complex habitat that will benefit many species. This small site is well connected to the Hylebos RRP and will contribute to good terrestrial habitat connectivity.

Buffers

The perimeter buffer for this site will be established on existing emergent wetland on the B&L Woodwaste property northeast of the site. No additional planting is proposed on B&L Woodwaste property.

5.2.2.4 Upper Hylebos Addition and Upper Hylebos North Addition

Existing Conditions

Two additions are proposed to the Stage 1b RRP Upper Hylebos mitigation site: Upper Hylebos Addition and Upper Hylebos Addition North. The current land use of the areas consists of vacant land buffering the B&L Woodwaste site (Upper Hylebos Addition) and two residential properties (Upper Hylebos Addition North). Land bordering the B&L Woodwaste property was previously considered part of the 100-foot perimeter buffer of the mitigation site pending finalization of a conservation easement with B&L Woodwaste. The easement was signed in 2022 and this portion of the site is now being considered credit-generating.

Uplands

Upland vegetation in the addition areas is dominated by reed canary grass and Himalayan blackberry and provides poor quality habitat and buffer functions.

Wetlands

The mitigation site additions currently share a connection Wetland 17/65 which is a Category I depressional wetland with emergent, scrub-shrub, and forested vegetation classes. Reed canary grass is the dominant species. Upon completion of the Stage 1b RRP construction the site will be a riverine/depressional floodplain wetland associated with Hylebos Creek. The wetland will consist of a diversity of native plant species and accessible wetland hydroperiods.

Stream

Stream 20 is located near the northwest corner of the Upper Hylebos North site and discharges into the Stage 1b mitigation site. Channel conditions are generally poor. The buffer condition is fair where dense trees and shrubs are rooted along steep banks of the industrial parcel and a narrow, steep berm that separates Stream 20 from Wetland 17/65. Vegetation along the stream is dominated by Douglas fir trees and Himalayan blackberry.

Wildlife Habitat and Use

The additional areas are currently providing poor wildlife habitat as there is no floristic diversity and no structural diversity. The connection with the Wetland 17/65 area adds some value due to the overall large accessible area.

WDFW fish passage data indicate no barrier from Stream 20 to Hylebos Creek and could therefore potentially provide habitat for species found in Hylebos Creek. Fish documented in the Hylebos system include: Chinook, coho, chum, and steelhead have all been and odd-year pink salmon are presumed to occur in the stream (WDFW 2019a).

Proposed Conditions

The Upper Hylebos Additions site design will result in the re-establishment of wetlands by converting uplands to wetland, and rehabilitation of existing wetlands, as well as enhancement of a small area of upland within the Upper Hylebos Addition (Figures 5-E and 5-F). The former houses will become a mix of primarily forested wetland, scrub shrub wetland with intermittent emergent wetland patches. Mature black cottonwood and willow along the edge of the RRP will be preserved.

Hydrology

Groundwater monitoring data from Stage 1b in or near the Hylebos RRP demonstrate the presence of groundwater within 12 inches of the ground surface during the growing season (WSDOT 2021a).

Grading Design

Grading within the Upper Hylebos Addition portion of the site will be minimal. The design of the Upper Hylebos North Addition portion consists of lowering the floodplain throughout the majority of the site.

Planting Design

Forested wetland species will be the dominant plant community at this site. Fast-growing species such as red alder, black cottonwood, and red-osier dogwood, native roses (*Rosa* spp.) and willow species in the shrub strata will help create dense shade more quickly to help with weed competition and provide large strata for habitat. The planting plan will also include scrub-shrub and emergent wetland areas.

Invasive Species Control Strategy

Invasive species removal will consist primarily of Himalayan blackberry mowing and removal from site. Eradication of nonnative naturalized upland grasses and forbs from the existing lawn and horse pasture will likely be the most difficult eradication within the site. Control of naturalized grasses will consist of soil ripping and removal of root system mats.

Habitat Features

The combination of preservation of the forested community, and creation of new forested, scrub-shrub, and emergent communities will provide varied and complex habitat that will benefit many species. Bat boxes and nest boxes will be installed on existing mature trees. Perch trees and brush piles will be added to provide habitat complexity.

Buffers

No additional planting is proposed on B&L Woodwaste property. Planted species in the Upper Hylebos Addition North include Oregon ash and Pacific ninebark (*Physocarpus* *capitatus*). Intended buffer functions are described in the above section.

5.2.2.5 Lower Hylebos Addition

Existing Conditions

The Lower Hylebos Addition site is between Fourth Street East, Eighth Street East, 56th Avenue East, Wetland 52, and Hylebos Creek (Figure 4). The southern portion of the site and the street frontage along Fourth Street East has been disturbed by historical land use of the area. The southern portion is currently marred with unsanctioned trails and encampments. A trail that serves the Hylebos Nature Area runs along the western edge of the mitigation site. An existing sewer line and easement transverses the site from north to south.

Uplands

Upland areas in the southern portion of the site have been disturbed by historical land use and are currently dominated by invasive species. The frontage along Fourth Steet East is dominated by nonnative grasses. Upland areas in the northwest corner of the site are dominated by deciduous forest.

Wetlands

A Category II depressional slope wetland (Wetland 46) is located in the north, east and southern portions of the site. Wetland 46 contains forested, scrub-shrub and emergent vegetation communities. The wetland is seasonally flooded and saturated and has an outlet along the eastern edge that drains to Hylebos Creek. Dominant native species include black cottonwood, red alder, paper birch (*Betula papyrifera*), willow species, black twinberry (*Lonicera involucrata*), Douglas spirea, fringed willowherb, soft rush, lady fern, and horsetails (*Equisetum* sp.). Nonnative species are also prevalent in areas and include Himalayan blackberry and reed canarygrass.

Stream

No streams are located on site. Hylebos Creek is located approximately 250 feet east of the mitigation site.

Wildlife Habitat and Use

The wetland and forested area contains a diversity of plant classes and structures such as snags and logs, which are accessible to terrestrial many wildlife species. Hylebos Creek, the riparian buffer, and a large riverine wetland are located immediately off site, which provides habitat connectivity for seasonal and diurnal movements for many species.

Proposed Conditions

The design will preserve and enhance existing forested wetland and will re-establish new depressional wetland area. The design also proposes to preserve and enhance an area of existing upland forest. The site currently has small, often dry ditches that will be filled to the surrounding topography. The 30-foot sewer line easement that runs north-south through the RRP property to Fourth Street East will be maintained to allow for easy access and maintenance by Pierce County.

Hydrology

The existing depressional wetland hydrology will be preserved and supplemented through grading. Groundwater monitoring data from Stage 1b in or near the Hylebos RRP demonstrate the presence of groundwater within 12 inches of the ground surface during the growing season (WSDOT 2021a).

Grading Design

Minor floodplain grading and habitat mound creation will be completed in this site. For greater grading design context see Stage 1b reports.

Planting Design

Large swaths of cottonwood-alder forest will be preserved and underplanted with native shrubs to create a more diverse vegetation layers. The field of reed canarygrass will be graded to create a wetland, linking Wetland 46 with the surrounding upland forest. Planting within the Lower Hylebos will create more diversity and enhance what native species are naturally occurring within the site. Dense scrub-shrub wetland species such as willows, salmonberry and fast-growing sedges will assist in controlling reed canarygrass after it has been removed, while providing cover and habitat for wildlife. Less common species such devil's club (*Oplopanax horridus)* and stink currant (*Ribes bracteosum)* will provide habitat diversity.

Invasive Species Control Strategy

Forested wetland, scrub shrub wetland, and emergent wetland will be interplanted in a matrix to help combat existing invasive species and open canopy. Site preparation methods such as mowing, cardboard application, and dense planting will be used to combat existing reed canary grass and Himalayan blackberry infestations. All canes and roots will be removed entirely from the site.

Habitat Features

The combination of preservation of the forested community, and creation of new forested, scrub-shrub, and emergent communities will provide varied and complex habitat accessible to many species. Nest boxes and bat boxes will be installed on existing mature trees overlooking open riparian areas west of the site. Brush piles and large woody material will be added to the forest understory to benefit small mammals and other species.

Buffers

As with other sites, buffer design will be contiguous with design of the credit-generating area, and will include wetland and upland enhancement. Planted species include Western spirea and prickly currant (*Ribes lacustre*).

5.2.3 Wapato RRP Sites

The Wapato RRP is a large, ecologically connected, restoration that takes a similar watershed approach to the Hylebos RRP and involves several mitigation sites. The Wapato RRP encompasses improvements to large stretches of Wapato Creek and several unnamed tributaries within the Stage 2 area. Channels will be restored from the existing ditched and channelized alignment to a natural alignment within the Wapato RRP to enhance their habitat and floodplain connectivity and make room for the new highway alignment. Mitigation site boundaries were chosen to encompass as much stream area as possible, and to provide wetland, stream, and floodplain restoration in the region. Wapato RRP implementation is expected to greatly increase riparian habitat area and function within the Wapato Creek watershed.

5.2.3.1 East Wapato RRP

Existing Conditions

Wapato Creek and its associated floodplain flows through the middle of the East Wapato RRP site. The eastern side of the site is located on an alpaca farm with associated barns, fences, pastures and a house. Surrounding the mitigation site are railroad to the north, an industrial warehouse to the east, an agricultural field to the south, and Freeman Road East to the west.

Uplands

Upland areas associated with the alpaca farm are characterized by pasture vegetation. Upland areas on the east and southern banks of Wapato Creek include an upland forest, Himalayan blackberry, and an agricultural field with row crops.

Wetlands

Wetland 95 is Category II riverine wetland located along both banks of Wapato Creek. The wetland community contains forested, scrub-shrub, and emergent vegetation distributed across the mitigation site. Dominant forest and shrub species include Oregon ash, willow species, red alder, black cottonwood, Douglas' spiraea, and red osier dogwood. Himalayan blackberry is also prevalent in some areas. The emergent vegetation community is characterized by a reed canarygrass monoculture.

Stream

Wapato Creek and its associated floodplain flows through the middle of the East Wapato RRP site. Throughout the mitigation site, Wapato Creek has soft substates and lacks any woody material. The riparian condition in the middle of the mitigation site lacks riparian cover, woody material, or channel complexity.

Wildlife Habitat and Use

At the mitigation site, Wapato Creek is mapped as spawning habitat for coho salmon and for the occurrence/migration of chum salmon and steelhead trout (WDFW 2022a, 2022b). Scrub-shrub and forest communities shades the stream channel in the northern and western portions of the mitigation site. The forested and scrub-shrub areas of the site contain some cover and woody habitat structures that can be used by amphibians, small mammals, and bird species.

Proposed Conditions

The design proposes to increase stream connectivity and complexity will benefit this site. Creating a channel that links an existing stormwater pond to Wapato Creek will help treat water as it passes to the creek through a created wetland. Wetland 95 will be enhanced and expanded on both sides of Wapato Creek. The completed design will rehabilitate existing wetland and re-establish riverine wetland. The design will route an existing treated stormwater conveyance into the mitigation site and integrate it with the wetland and stream design. This conveyance currently discharges directly to Streams 14 and 15. Integrating it into the East Wapato RRP design will provide additional incidental treatment of the stormwater through natural processes and add will additional habitat value to the site.

Hydrology

This site is influenced by Wapato Creek, which runs through the site from the north and exits at Freeman Road to the east. The proposed plan has potential for adding flows to the mitigation site from one stormwater pond to the South that previously was routed to Stream 15. The proposed plan will increase the footprint of flow within the site.

Data collected at a nearby monitoring well (B-9-05-P) located approximately 0.3 mile southeast of the mitigation site indicates the presence of groundwater within 12 inches of the ground surface during the growing season (Appendix F).

Grading Design

Wapato Creek, which enters the site from a culvert, will maintain its original planform while slightly widening the channel to an approximate 7-foot bottom width grading up to the floodplain at a 3H:1V slope. The bankfull width will be approximately 15 feet. Two small backchannels will also be added. The floodplain will be lowered throughout the site excluding two small areas of existing vegetation, which will be preserved. Construction of this site will require access from the adjacent PTOI mitigation site. WSDOT will request a temporary construction easement from the PTOI for this work.

Planting Design

Planting design for East Wapato will incorporate stream realignment with planting. Forested wetland, scrub-shrub, and emergent planting areas are proposed. The site will be planted with wet-tolerant tree species such as black cottonwood, alder and Oregon ash, conifers such as Sitka spruce (*Picea sitchensis*) and Western redcedar.

Invasive Species Control Strategy

Dense forest plantings as well as a hedgerow planting zone along channels will help lower water temperatures as well as suppress extensive reed-canary grass infestations by quickly shading the creek and side channels with native, fast-growing, and densely planted woody species. Invasive control strategies also include extensive site prep methods and maintenance as discussed in previous sections.

Habitat Features

Creation of new channels will provide new stream channel accessible to fish and aquatic species. Channel alignment through wetland creation areas will increase accessibility for wildlife to structurally diverse vegetation communities. Large woody material will be added throughout the wetland and instream habitats. Perch trees, and nest boxes will be added throughout the wetland as well as a bat box on a mature tree.

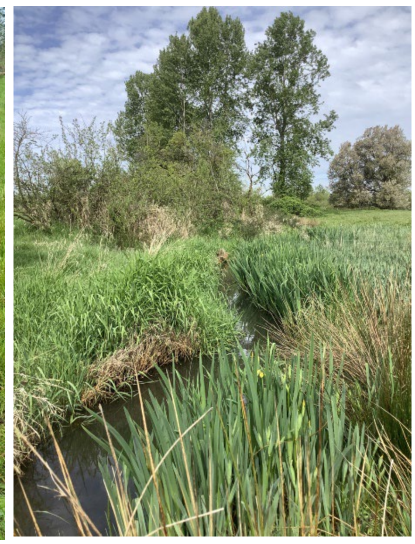
Buffers

A Pierce County mitigation site borders the property to the east, and there would be no buffer adjacent to that site. Planted species include thimbleberry and mock orange. Intended buffer functions are described in the above section.

5.2.3.2 West Wapato RRP

Existing Conditions

The West Wapato RRP site is located on an existing sheep farm with a barn and feed shed, grazing pastures, several fences, and residence. Surrounding the mitigation site are a railroad to the north, Freeman Road East to the east, Wapato Creek, and mitigation site owned by the PTOI to the south and west.



Uplands

Upland areas on the mitigation site are characterized by structures and fencing associated with the farm use of the site. Upland vegetation is dominated by pasture grasses including sweet vernal grass (*Anthoxanthum odoratum*). Himalayan blackberry is also prevalent in the northwestern portion of the site.

Wetlands

Wetland 94 is a Category II riverine wetland associated with overbank flooding and hyporheic flows in Wapato Creek. There are forested and emergent vegetation wetland communities located on site. Dominant forest vegetation includes black cottonwood, willows, and Oregon ash. The emergent area is dominated by nonnative and invasive vegetation including reed canarygrass, creeping buttercup, and tall fescue. A large infestation of yellow flag iris exists along the stream channel at the west side of the site. Fencing does not isolate farm animals from accessing wetland areas.

Stream

At the mitigation site, the instream habitat in Wapato creek is characterized by channelized banks, a mud bottom, with little instream structure or gravels. The riparian condition along the northern bank within the mitigation site is poor and provides little shade or organic material recruitment. The forested area of the site provides some source of wood recruitment and stream shade.

Wildlife Habitat and Use

Wetland 94 extends onto a larger existing mitigation site located south and west of the West Wapato RRP. The existing mitigation site contains a new diverse plant community and habitat that is accessible to many terrestrial and aquatic species. Several areas of Wetland 94 are seasonally flooded and intersect with some areas where thin-stemmed vegetation provides habitat structures for egg-laying amphibians. The forested portion of the West Wapato RRP contains some habitat for terrestrial species including the short-tailed weasel (*Mustela erminea*) which was observed during a site visit. Wapato Creek at the mitigation mapped as spawning habitat for coho salmon and for the occurrence/migration of chum salmon and steelhead trout (WDFW 2022a, 2022b).

Proposed Conditions

This site is a good opportunity for species diversification and restoration along both sides of the new SR 167 roadway. Preservation of existing riparian canopy in the north part of the RRP boundary will be expanded upon by connecting riparian forest along the edge of the highway. Similarly, Wetland 94 will be expanded and restored from its currently degraded conditions. On the eastern side of SR 167, a native pollinator prairie habitat will be established within the narrow swath of land between the highway and a future stormwater pond that will be installed. The design proposes wetland rehabilitation, wetland re-establishment, and areas of buffer in the form of upland forest and pollinator prairie habitat.

Hydrology

Hydrology on this site is primarily influenced by Wapato Creek, which runs east-west through the site and the wetland. The proposed mitigation will lower the right floodplain to create connection to Wapato Creek. A backwater channel is proposed, branching off from Wapato Creek and will spread flow and connect flow to the mitigation site.

Data collected at a nearby monitoring well (B-9-05-P) located approximately 0.3 mile southeast of the mitigation site indicates the presence of groundwater within 12 inches of the ground surface during the growing season (Appendix F).

Grading Design

Wapato Creek will maintain its original planform while slightly widening the channel to an approximate 7-foot bottom width grading up to the floodplain at a 3H:1V slope. The bankfull width will be approximately 15 feet. The floodplain will be lowered throughout the site excluding one small area of existing vegetation on the northern edge, which will be preserved. A backwater fish channel will be created.

Planting Design

The design primarily includes forested wetland and scrub-shrub and planting areas. Expansion of the wetland area on the eastern side of Wapato Creek will create a link between the riparian forest buffer that separates the creek from SR 167. Forested wetland with smaller patches of scrub-shrub wetland will help to shade the creek and provide cooler conditions. A small patch of existing upland forest will be enhanced and preserved.

The pollinator prairie planting area will provide an additional small area of benefit by making use of a Right of Way area that must be planted with low growing vegetation, that would otherwise likely be seeded with nonnative grasses.

Invasive Species Control Strategy

After grading all fragments of yellow-flag iris will be collected and disposed of offsite. This will help to prevent spreading the infestation throughout the site and other downstream areas. Extensive site preparation and maintenance methods, as discussed in previous sections, that targets reed canarygrass and Himalayan blackberry will help ensure site success.

Habitat Features

Wetland creation and the backwater channel will provide habitat accessible to aquatic species. A forested buffer along the east side of the site will provide habitat for terrestrial species and visual screening of the proposed roadway for wildlife utilizing the interior of the site. Nest boxes, bat box, brush piles, perch trees and large woody material will be installed throughout the wetland and instream habitats.

Northeast of the RRP site and new roadway alignment, a native prairie habitat is proposed. This area will provide a habitat type needed by many species, including pollinators, that was once common and now rarely occurring in the region. Numerous upland forbs and graminoids provide habitat food sources for pollinators. This habitat will provide habitat diversity thereby contributing to overall ecosystem health.

Buffers

This site borders the PTOI mitigation site, which includes the left bank of Wapato Creek, so there is no perimeter buffer on the west and southern boundaries of this site. Intended buffer functions are described in the above section.

5.2.3.3 Northwest Wapato RRP

Existing Conditions

The Northwest Wapato RRP site is located south of Valley Avenue East, west of Freeman Road East, and adjacent to the northern boundary of the UPRR and consists of wetlands, Wapato Creek, and upland areas. The site currently consists of vacant land with a commercial privately owned business and warehouse. Wapato Creek and a narrow riparian corridor transverse the site from southeast to northwest.

Uplands

Upland vegetation in the interior of the site is dominated by nonnative species likely resulting from historical land use and past site disturbance. Dominant plant species include Himalayan blackberry, reed canarygrass, and Canada thistle. Some large cottonwood and poplar trees surround the commercial business. The riparian buffer of Wapato Creek is dominated by forested and wetland vegetation. Aside from this riparian, upland areas lack floristic diversity or any habitat structures that are valuable to wildlife.

Wetlands

Wapato Creek and the associated Wetland 142 flows from the southeast to the northwest corner of the site. The wetland is a Category II riverine wetland associated with overbank and hyporheic flows from Wapato Creek. The vegetation is composed of forested, scrub-shrub, and emergent communities dominated by Himalayan blackberry, willows, reed canarygrass, and yellow-flag iris. A small Category III depressional wetland (Wetland 143), likely a relic stormwater pond, is located near the existing warehouse.

Stream

At the mitigation site, Wapato Creek has similar instream and channel conditions documented at the other RRP mitigation sites. Overhanging willows and riparian forest are providing good canopy in interior of the site.

Wildlife Habitat and Use

At the mitigation site, Wapato Creek is mapped as spawning habitat for coho salmon and for the occurrence/migration of chum salmon and steelhead trout (WDFW 2022a, 2022b). Wapato creek and existing wetlands on the site may contain cover and woody habitat structures that can be used by amphibians, small mammals, and bird species.

Proposed Conditions

The design will rehabilitate existing wetland, re-establish riverine and depressional wetland, and preserve and enhance existing forested buffer. The design will rehabilitate the existing Wapato Creek channel by removing reed canarygrass from the channel and incorporating sinuosity, backwater channels, and instream habitat structures into the design. Patches of existing mature tree canopy will be preserved and additional riparian buffer will be planted along the edge of the RRP boundary, adjacent to 78th Avenue East.

Hydrology

The proposed plan will add a high flow channel that branches from Wapato Creek and returns to Wapato Creek before the mitigation site boundary. Wetlands will be created adjacent to the high flow channel. This high flow channel will help spread flow across the floodplain. Additionally, the three proposed backwater channels will also spread flow across the site. The mitigation site will have an increased footprint for flow.

Data collected at nearby monitoring wells (B-9-05-P and H-5p-18 WT) located approximately 0.6 mile southeast and northeast of the mitigation site indicate the presence of groundwater within 12 inches of the ground surface during the growing season (Appendix F).

Grading Design

Wapato Creek, which enters the site from a culvert, will maintain its original planform while slightly widening the channel to an approximate 6-foot bottom width grading up to the floodplain at a 3H:1V slope. The floodplain will be lowered throughout the site excluding two small areas of existing vegetation, which will be preserved. A high flow channel, with a 2-foot bottom width and 3H:1V side slopes, 1 foot above the bed of Wapato Creek and two backwater fish channels will be created.

Planting Design

Planting areas consist of forested, scrub-shrub, and emergent wetland areas; hedgerow; and upland riparian forest buffer. Existing forested areas along the stream channel will be preserved and enhanced with understory planting. The hedgerow plant palette consists of willows and dogwood species along with Nootka rose (*Rosa nutkana*), twinberry honeysuckle, Pacific ninebark and Western spirea.

Invasive Species Control Strategy

Planting design will incorporate hedgerow planting, the purpose of which is to quickly shade the creek and side channels with native woody species, which will prevent establishment of reed canarygrass and other invasives. Additional invasive control strategies include site prep methods and maintenance as discussed in previous sections. Intensive removal of yellow-flag iris will occur before planting, with concentrated efforts to collect all plant fragments to help prevent spreading the infestation throughout the site and other downstream areas.

Habitat Features

The combination of preservation of the forested community, and creation of new wetland communities will provide varied and complex habitat that will benefit many species. Creation of new high flow channel and backwater channels will provide new habitat accessible to fish. Woody material will be added throughout stream channels and wetland habitat, which will provide structure for terrestrial and aquatic species. A forested buffer will habitat for terrestrial species and some screening from the proposed roadway. Nest boxes, bat box,, brush piles, and perch trees will be installed.

Buffers

Intended buffer functions are described in the above section.

5.2.4 Puyallup River Basin Sites

5.2.4.1 Puyallup North

Existing Conditions

The Puyallup North site is located on a vacant industrial zoned parcel. The northern portion of the site is fallow agricultural field. The southern portion of the site is currently used as a construction stockpile site. Wetland 88/90/91 and associated ditch are located at the northwestern portion of the site, which becomes Stream 14.


Uplands

Upland vegetation is dominated by nonnative and invasive species including thistle (*Cirsium* spp.), willowherb (*Epilobium* spp.) Himalayan blackberry and butterfly bush (*Buddleja davidii*).

Wetlands

Wetland 88/90/91 is a Category II depressional wetland, primarily fed by surface waters from an associated ditch. The wetland is dominated by scrub-shrub and emergent communities consisting of red-osier dogwood, white clover (*Trifolium repens*), velvet grass, reed canarygrass, and spike rush (*Eleocharis palustris*). Wetland 88/90/91 supports moderate water quality and hydrologic functions.

Stream

Stream 14, located off site in the Freeman Road site, is an intermittently flowing stream that flows west from Wetland 88/90/91, bisecting the Stage 2 corridor south of Wetland 93 and flowing into Stream 15. Three ditches that are the outlets from Wetland 88/90/91 flow into Stream 14 at the eastern end of the surveyed stream length. These ditches convey water adjacent to an industrial warehouse (north and east), and a large fallow agricultural field (east and south). Instream conditions in Stream 14 are poor with a lack of channel complexity and substrate dominated by mud and silt. The forested southern bank of the stream is providing thermal refugia and is a source of wood to the stream. Streams 14 and 15 were confirmed by WDFW during project site visits to be a seasonal non-fish-bearing streams.

Wildlife Habitat and Use

The northern portion of the site is free from current human disturbance, however, is dominated by nonnative vegetation low in habitat value. The mitigation site is surrounded by high-intensity industrial and agricultural land uses. To the west, the mitigation site is connected to a patch of upland forest habitat. The wetland and ditch are connected to Streams 14 and 15 and Wetlands 93 and 87 providing some hydrologic connectivity for aquatic and semi-aquatic species. The presence of snags and logs, instream, and riparian habitats near the mitigation site increase its overall value as potential habitat.

Proposed Conditions

The design includes establishing scrub-shrub and forested wetland habitat, re-establishing new depressional wetland areas, and providing a small area of wetland rehabilitation. Changes to Stream 14 will be minimal: existing flow conditions will be maintained and no fish-passable crossings will be created under SR 167.

Hydrology

The proposed wetland hydrology on this site will be influenced by the grading design. Wetland hydrology will primarily be provided by the grading down to the water table.

Data collected at a nearby monitoring well (B-9-05-P) located approximately 0.1 mile west of the mitigation site indicates the presence of groundwater within 12 inches of the ground surface during the growing season (Appendix F).

Grading Design

The grading in this site consists of floodplain lowering. Grading will maintain existing Stream 14 flows.

Planting Design

Planting areas will consist of forested, scrub-shrub, and emergent forested areas. Planting design will incorporate large, fast-growing trees such as Oregon ash, black hawthorn (*Crataegus douglasii*) and black cottonwood, large riparian shrubs such as Western bog laurel (*Kalmia microphylla* var. *occidentalis*) and willow shrubs, and emergent species such as slender rush (*Juncus tenuis*) and dagger-leaf rush (*Juncus ensifolius*).

Invasive Species Control Strategy

Planting fast growing woody species will help out-compete occurrences of invasive plants. Site preparation and maintenance as discussed in previous sections will help prevent establishment of new invasives.

Habitat Features

The creation of new forested, scrub-shrub, and emergent communities will provide varied and complex habitat that will benefit many species. Woody material will be added throughout the wetland. Nest boxes will be added to this site.

Buffers

Planted species include dull Oregon grape (*Mahonia nervosa*) and osoberry. Intended buffer functions are described in the above section.

5.2.4.2 Puyallup South

Existing Conditions

The Puyallup South site is located on an agricultural field and is surrounded by industrial, agricultural, and residential areas.

Wetlands

No wetlands have been identified on site.

Uplands

The site is actively used as an agricultural field planted with row crops. The edges of the site have a thin buffer of nonnative vegetation including reed canarygrass and Himalayan blackberry.

Stream

Stream 15 (described in the Freeman Road site), located off site, flows southwest along the eastern edge of the site and originates from a stormwater detention pond. A ditch runs along the western edge of the site.

Wildlife Habitat and Use

The Puyallup South site is actively farmed and does not contain quality habitat attractive to most wildlife species. The southwestern edge of the mitigation site is contiguous with an undeveloped area dominated by upland forest, wetland forest, and a ponded area. This region likely contains some high quality habitat for wildlife and is mapped by WDFW for waterfowl concentrations (WDFW 2022a). The Puyallup River abuts this undeveloped area but is poorly connected to the river because it is bisected by North Levee Road. Stream 15, located off site, provides hydrologic and aquatic connectivity to the site to other wetlands and eventually the Puyallup River. Stream 15 was confirmed by WDFW and PTOI during project site visits to be a seasonal non-fish-bearing stream.

Proposed Conditions

Stream 15 will be meandered through the site, creating a more dynamic flow and habitat. As no wetlands exist currently, a wetland will be created around the stream realignment. Two large bioretention ponds and a stormwater treatment area will be created between the RRP boundary and the SR 167 highway realignment. The design will re-establish a large area of wetland. Large trees will be retained on this site as feasible.

Hydrology

The proposed stream channel will have added sinuosity and increased stream length and will connect Stream 15 to the floodplain. The proposed wetland hydrology on this site will be influenced by the grading design.

Data collected at a nearby monitoring well (B-9-05-P) located approximately 300 feet west of the mitigation site indicates the presence of groundwater within 12 inches of the ground surface during the growing season (Appendix F).

Grading Design

Stream 15, which enters the site from a stormwater pond outlet culvert, will be realigned within the site slightly to the west with increased sinuosity in its planform. Channel geometry for Stream 15 features a 6-foot bottom width grading up to the floodplain at a 3H:1V slope. The floodplain will be slightly lowered to connect to existing groundwater.in the area adjacent to Stream 15 and the existing ditch conveying Stream 15 will be filled.

Planting Design

The design will have forested, scrub-shrub, and emergent wetland planting areas. A small area of existing forested will be enhanced with understory planting in the southern portion of the site. See Appendix E for a full list of species.

Invasive Species Control Strategy

Planting within the wetland creation area will be primarily forested wetland species to create a closed canopy quickly. The hedgerow planting technique may be implemented here to assist shading the stream quickly and preventing invasive species from seeding and infesting the area. Site prep and maintenance methods described in above sections will also be implemented at this site.

Habitat Features

New wetland area will provide varied and complex habitat that will benefit many species. Channel restoration will improve instream habitat for aquatic species. Large woody material will be added throughout the wetland and instream habitat as well as beaver dam analogs. Nest boxes will be attached to existing mature trees.

Buffers

Planted species include red-osier dogwood and vine maple. Intended buffer functions are described in the above section.

5.2.4.3 **Freeman Road**

Existing Conditions

The north portion of the Freeman Road Site consists of vacant land with a remnant driveways and building pads, a private storage facility, an agricultural field, a young forest, wetlands and tributaries draining to the Puyallup River. The site is surrounded by agricultural, industrial, and residential land uses.

Uplands

The north half of the site is characterized by disturbed nonnative vegetation. Dominant species include Himalayan blackberry, Canada thistle, and pasture grasses. Some small trees and shrubs are also present on the eastern edge of the site.

Wetlands

Several disturbed wetlands have been identified on site: Wetland 87, Wetland 89, Wetland 92, Wetland 93, Wetland 146/148, and Wetland 147. Also identified on site are Streams 14 and 15 which are ditched, intermittently flowing streams that discharge to the Puyallup River. Wetland 89 is a Category II, scrub-shrub wetland dominated by Oregon ash, red osier dogwood, and Himalayan blackberry. Wetlands 87, 92 and 93 are Category III depressional wetlands with scrub-shrub and emergent vegetation. Dominant species includes red alder, black cottonwood, red osier dogwood, soft rush, common horsetail, mousetail, and fringed willowherb.

Stream

Streams 14 and 15 flow through the interior of the mitigation site. Stream 14 is described above in the Puyallup North Site. Stream 15 originates in a stormwater pond north of North Levee Road East and east of Freeman Road East. Within the Stage 2 limits, Stream 15 primarily has mud/silt substrate with some areas where reed canarygrass and blackberry have grown across the channel. Instream conditions are generally poor with a lack of channel complexity and refugia. The forested area of the reach is providing thermal refugia and contributing some wood to the benefit of instream habitat.

Wildlife Habitat and Use

Freeman Road North and an agricultural field and with row crops separates the mitigation site from Wapato Creek and associated wetland habitats. Due to its disturbed nature and active farming the site does not contain quality habitat attractive to most wildlife species. The southern portion of the site contains some valuable habitat as wetland and stream hydrology intersect with forested habitat.

Proposed Conditions

The Freeman Road site will provide landscape connectivity, restoring many disjointed agricultural field and channelized ditches and streams and linking them into a large wetland complex. Channels will be naturalized and meander through the sites instead of creating boundaries. Wetlands 93, 87, 89, 92, 146/148 and 147 will all be linked through a mosaic of forested wetland, scrub shrub wetland, and emergent wetland. Ditches that border previous parcels will be filled to the new grade depth to unify within the landscape. The design will rehabilitate wetland and re-establish new wetland area.

Hydrology

The hydrology on this site is dominated by the wetlands and streams on the site. . Streams 14 and a portion of 15 will be meandered through the site, increasing the stream length and wetted area on the mitigation site. Flow from these streams will be dispersed into the northern half of the site. Wetland creation is proposed on the sites and will increase the hydrologic connection on the site.

Data collected at a monitoring well (B-9-05-P) located within the southern portion of the mitigation site indicates the presence of groundwater within 12 inches of the ground surface during the growing season (Appendix F). Grading Design

In the southern half of the site, Stream 14 and Stream 15 will be realigned within the site with increased sinuosity in their planform. Channel geometry for both Stream 14 and Stream 15 features a 6-foot bottom width grading up to the floodplain at a 3H:1V slope. The floodplain will be lowered throughout the site. and the existing ditches conveying Stream 14 and Stream 15 will be filled. Minimal floodplain grading will be undertaken in the southeast corner of the site in order to preserve existing vegetation in this specific area.

Planting Design

Planting design will create a contiguous and ecologically rich landscape out of piecemeal parcels of land with various uses and little to no ecological function. The existing riparian corridor will be expanded to create a healthy wildlife corridor and support native plant communities.

Invasive Species Control Strategy

Primary invasive species are Scotch broom (*Cytisus scoparius*), English holly (*Ilex aquifolium*), Himalayan blackberry, reed canarygrass, English ivy, and tansy ragwort (*Senecio jacobaea*). Removal of woody species will require cutting and removal woody stems offsite prior to seed development. As much of the root systems will need to be removed to help deter regrowth. Upland species such as tansy ragwort will not require specific removal, they will be removed during site regrading, and wetland conditions will not sustain their populations. Large swaths of reed canarygrass will receive cardboard treatments similar to those at other sites. The hedgerow planting treatment will be applied to areas of this site to prevent reed canarygrass encroachment into shallow channels.

Habitat Features

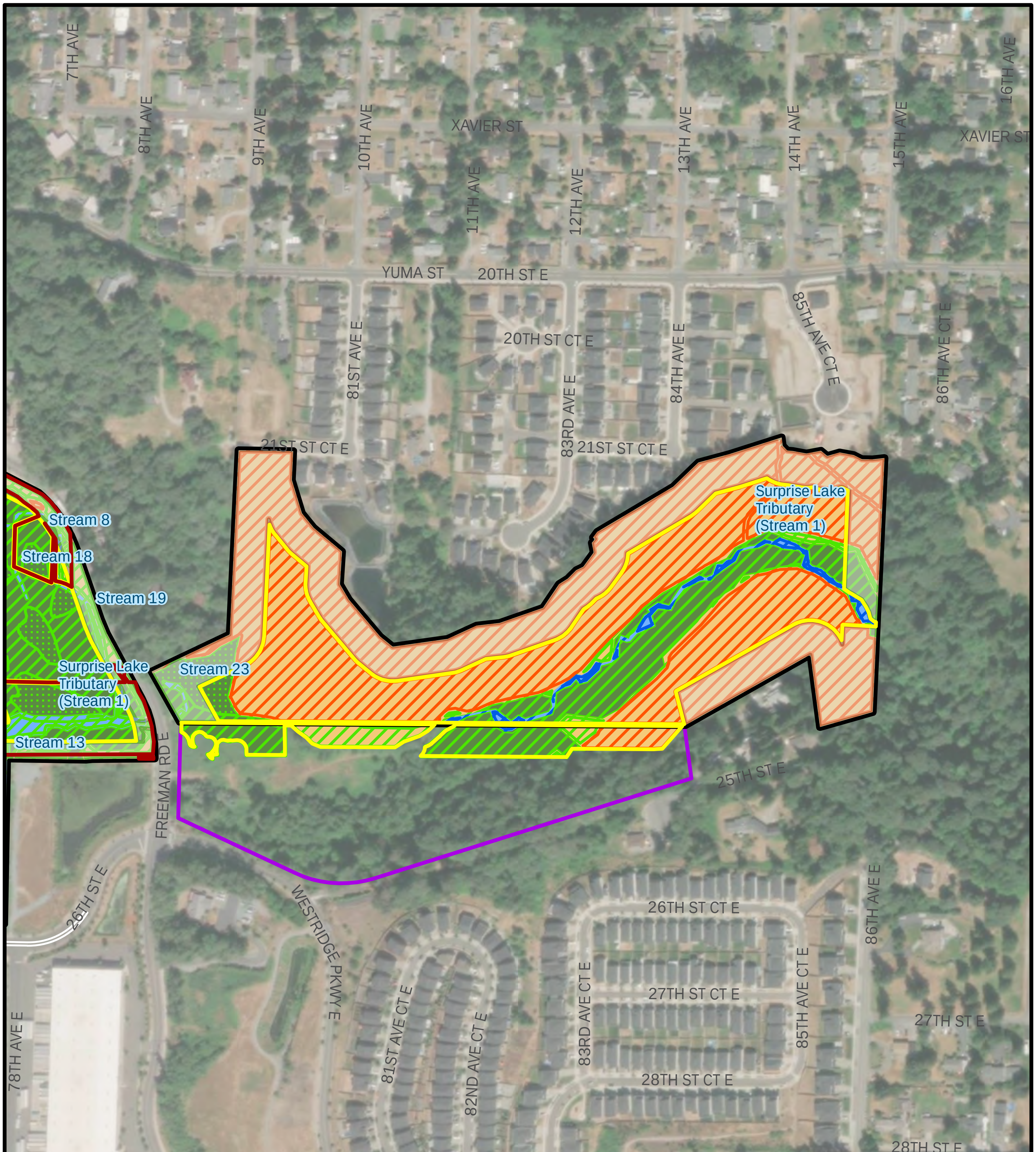
New wetland area will provide varied and complex habitat that will benefit many species. Channel restoration will improve instream habitat for aquatic species. Preservation of forested area in the southern portion of the site will support long-term stream habitat functions through woody material and organic material recruitment. Large woody material will be added to all areas within the mitigation site. Turtle mounds, beaver dam analogs, a bat box, nesting boxes, brush piles, and perch trees will also be added.

Buffers

The Freeman Road site provides excellent opportunities for stream and wetland restoration but is a narrow site. Planted species include dune willow and Wood's rose. Intended buffer functions are described in the above section.

Table 48. Anticipated Wetland and Stream Area Within the Stage 2 Mitigation Sites (proposed conditions).

Mitigation Site	Credit-Generating Area (excluding buffer)					Perimeter Buffer					Total Site Area (acres)
	Wetland (acres)	Stream		Upland (acres)	Total (acres)	Wetland (acres)	Stream		Upland (acres)	Total (acres)	
		Acres	Feet				Acres	Feet			
Upper Surprise Lake Trib	5.53	0.62	1,666	11.25	17.40	1.02	0.00	0	9.67	10.69	28.09
Middle Surprise Lake Tributary Addition	7.46	0.39	710	0.02	7.87	2.67	0.00	0	0.04	2.71	10.58
Lower Surprise Lake Tributary Addition	1.06	0.00	0	0.00	1.06	0.00	0.00	0	0.00	0.00	1.06
Upper Hylebos Addition	3.64	0.00	0	0.46	4.10	0.00	0.00	0	0.00	0.00	4.10
Upper Hylebos North Addition	5.09	0.02	108	0.33	5.44	0.89	0.00	0	0.40	1.29	6.73
Lower Hylebos Addition	1.62	0.00	0	0.74	2.36	2.06	0.00	0	0.57	2.63	4.99
East Wapato	2.60	0.35	1,424	0.15	3.10	2.41	0.00	0	1.07	3.48	6.58
West Wapato	0.94	0.16	850	0.23	1.33	0.86	0.00	0	0.64	1.50	2.83
Northwest Wapato	11.85	0.88	2,534	0.62	13.35	2.85	0.00	0	3.22	6.07	19.42
Puyallup North	12.14	0.04	217	0.14	12.32	5.73	0.00	0	2.77	8.50	20.82
Puyallup South	3.30	0.39	1,411	0.00	3.69	4.73	0.00	0	0.00	4.73	8.42
Freeman Road	15.00	0.34	1,292	3.87	19.21	7.66	0.00	0	0.64	8.30	27.51
Totals	**70.23**	**3.19**	**10,212**	**17.81**	**91.23**	**30.88**	**0.00**	**0**	**19.02**	**49.90**	**141.13**



Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Non-project mitigation areas
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--A. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Upper Surprise Lake Trib Addition Mitigation Site.

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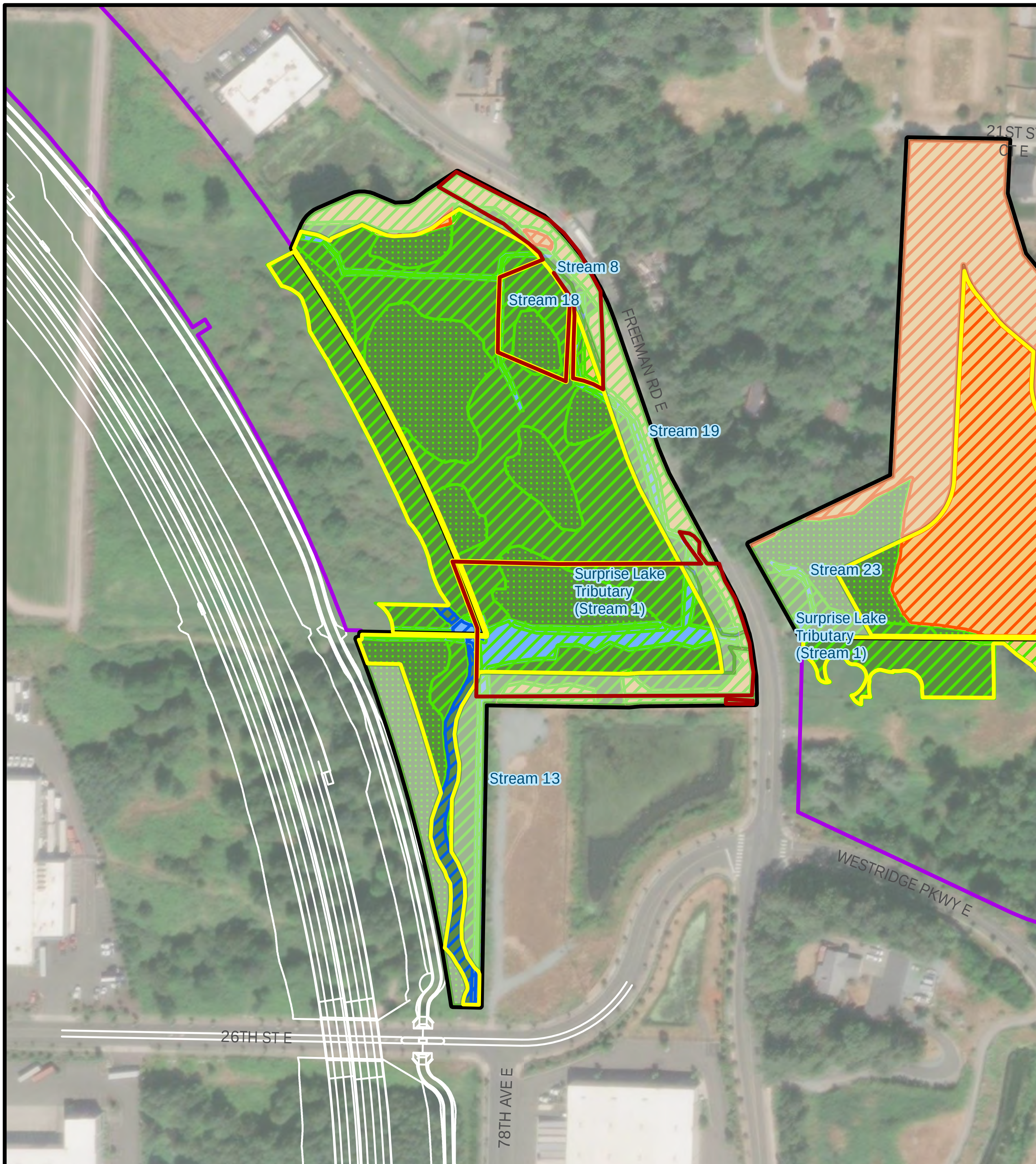

Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Non-project mitigation areas
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--B. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Middle Surprise Lake Trib Addition Mitigation Site.

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Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--C. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Lower Surprise Lake Trib Addition Mitigation Site.

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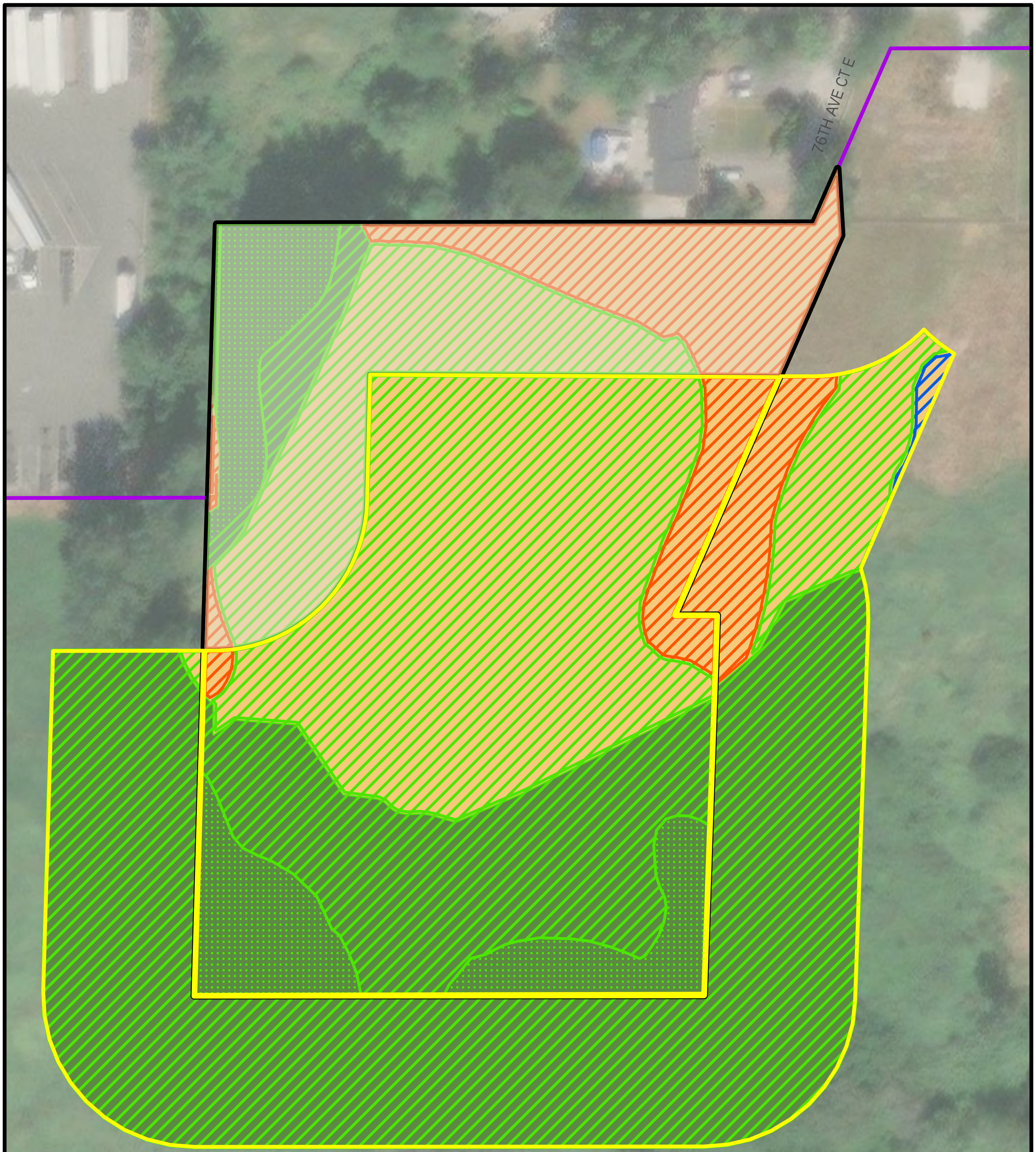

Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--D. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Upper Hylebos North Addition Mitigation Site.

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Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 1b RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--E. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Upper Hylebos Addition Mitigation Site.

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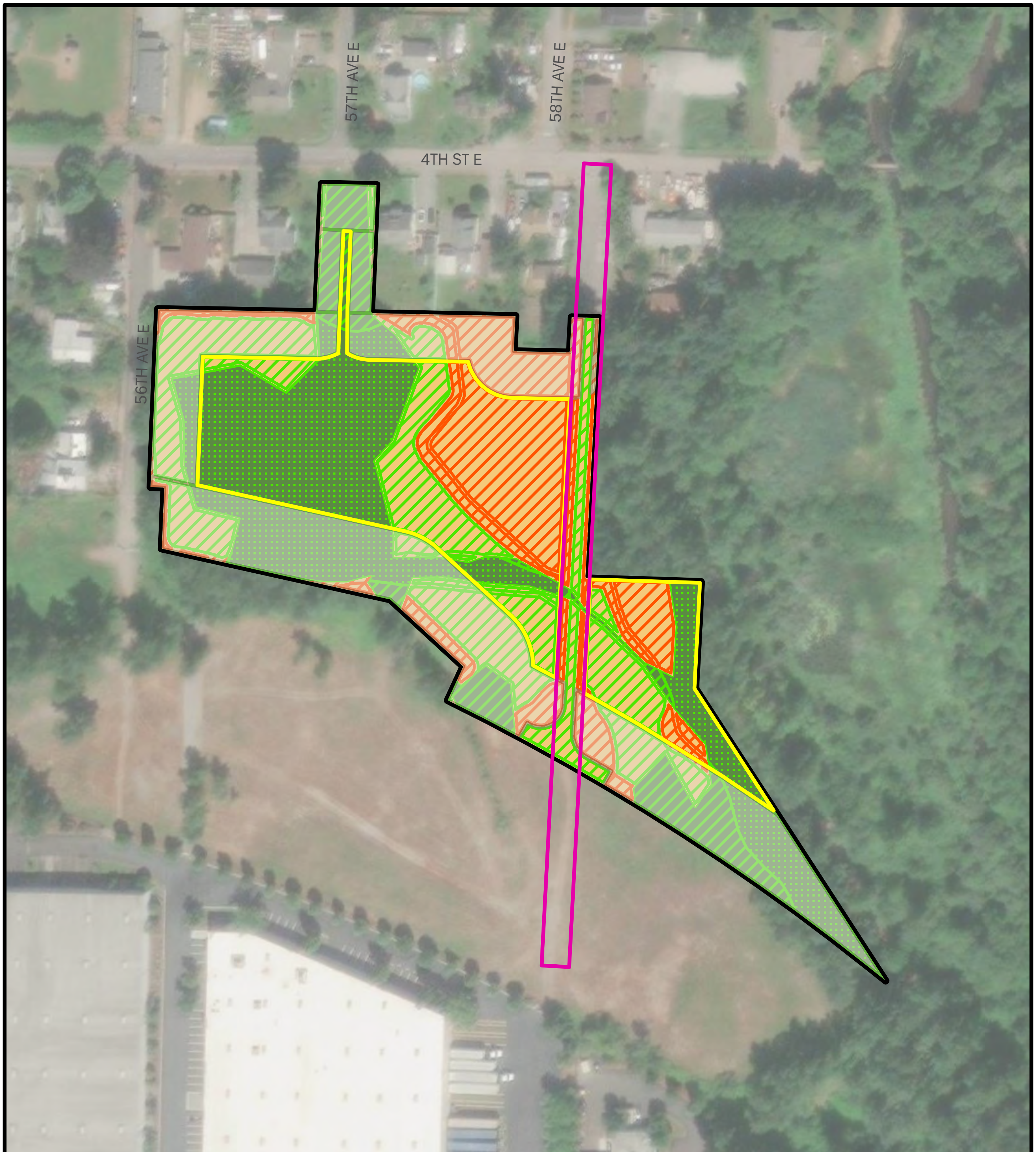

Legend
- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Sewer Easement
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--F. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Lower Hylebos Addition Mitigation Site.

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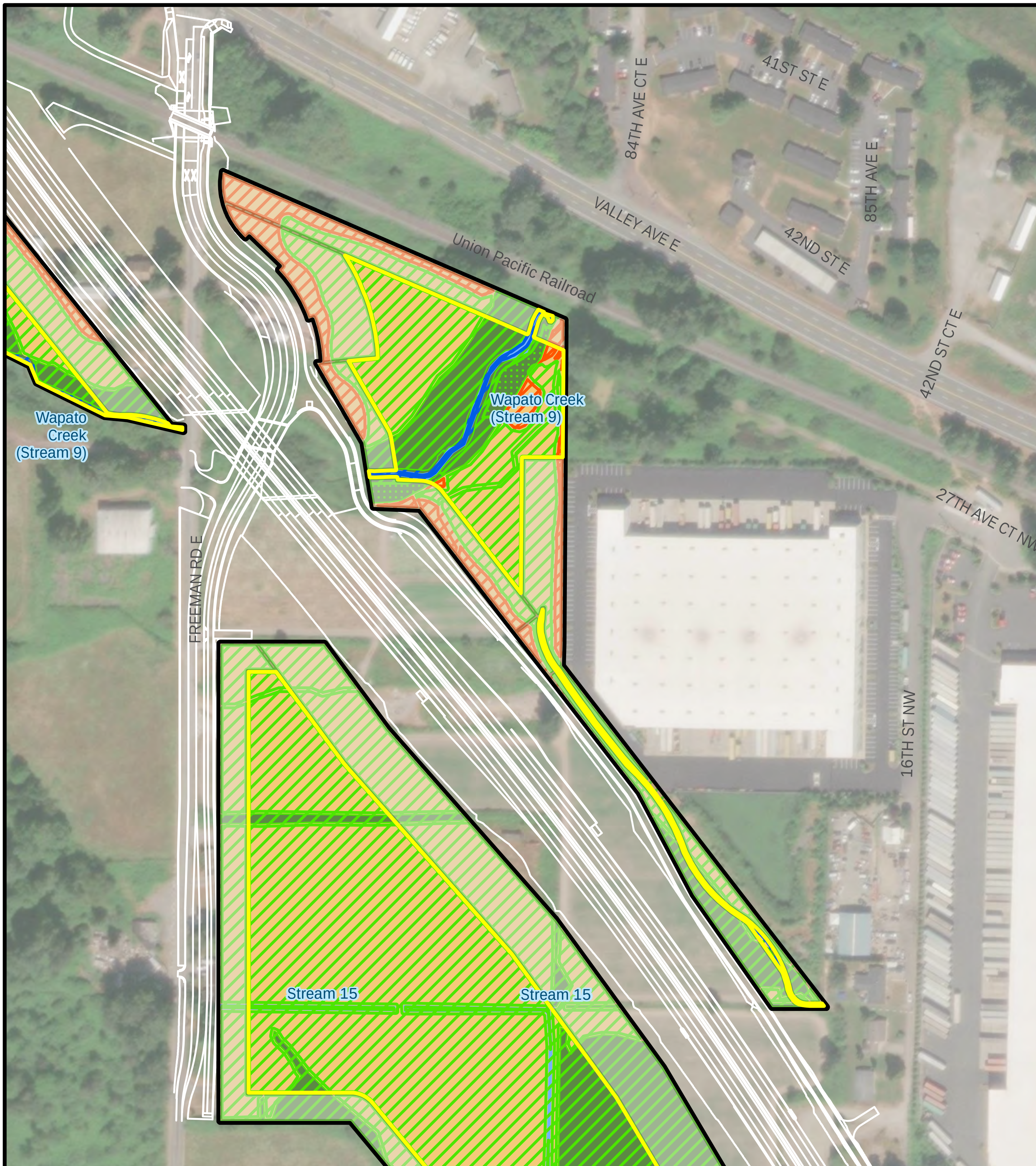

Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--G. Proposed Conditions for the SR 167 Completion Project, Stage 2 - East Wapato RRP Mitigation Site.

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Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--H. Proposed Conditions for the SR 167 Completion Project, Stage 2 - West Wapato RRP Mitigation Site.

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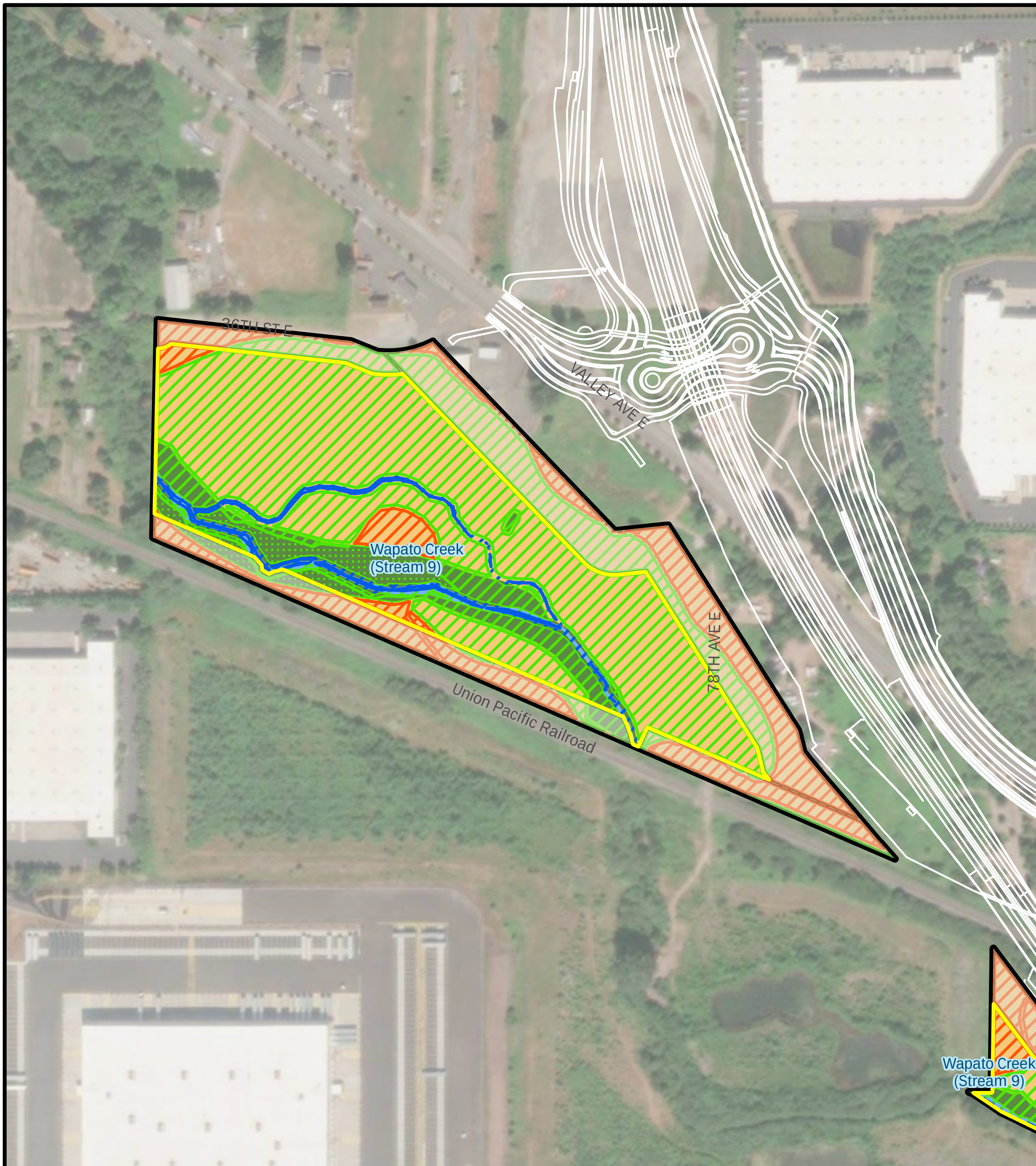

Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--I. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Northwest Wapato RRP Mitigation Site.

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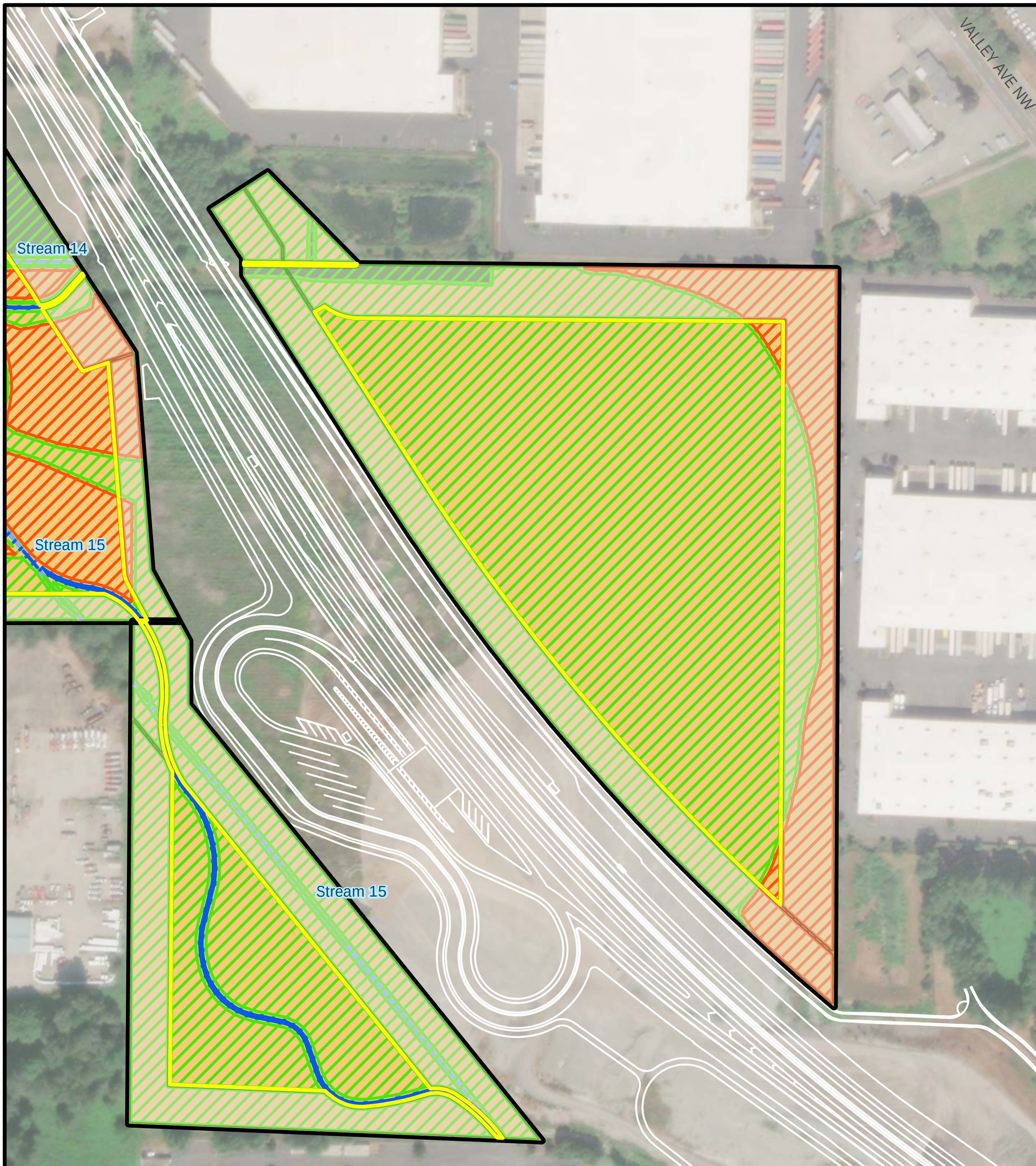

Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--J. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Puyallup North Mitigation Site.

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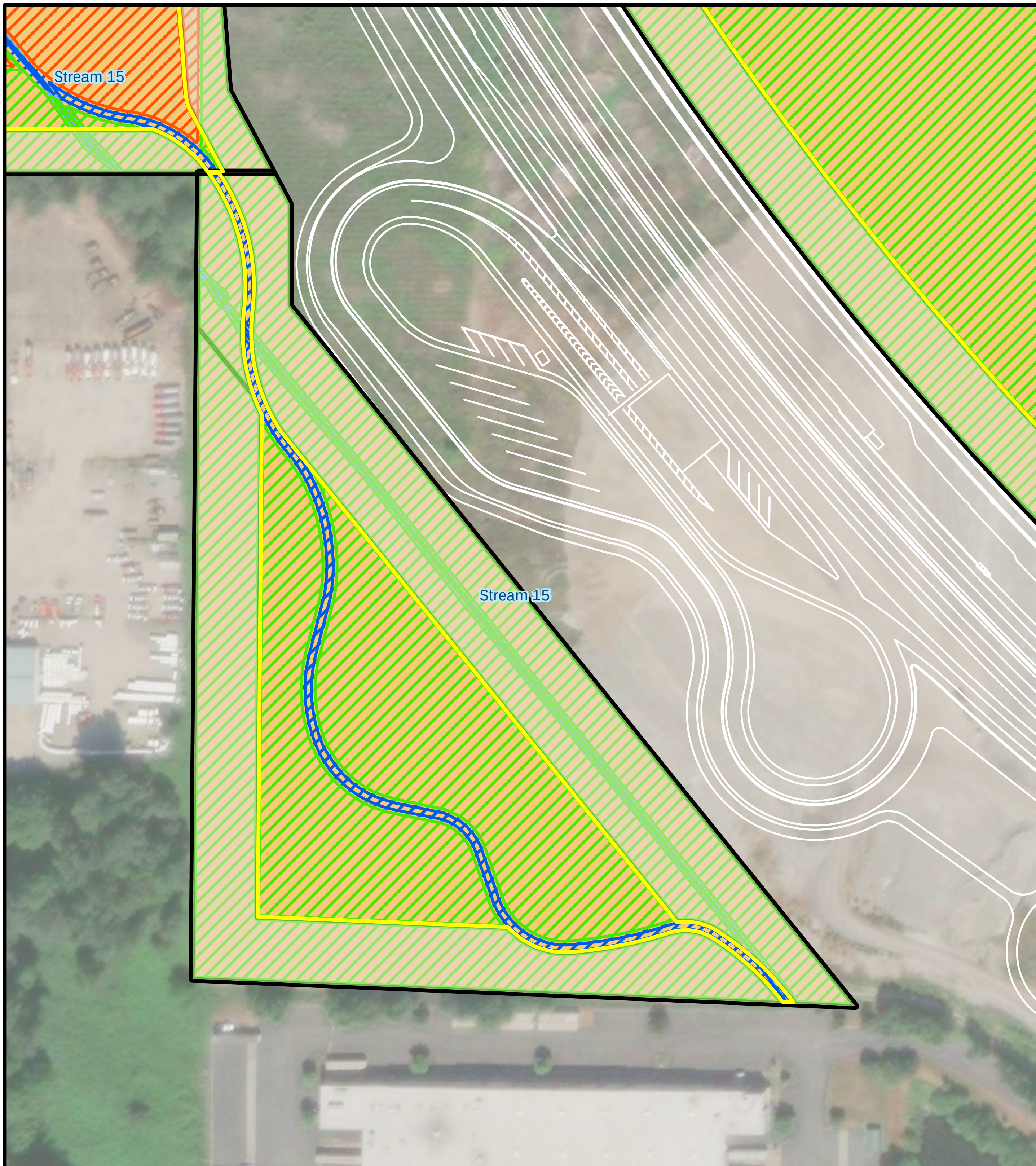

Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--K. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Puyallup South Mitigation Site.

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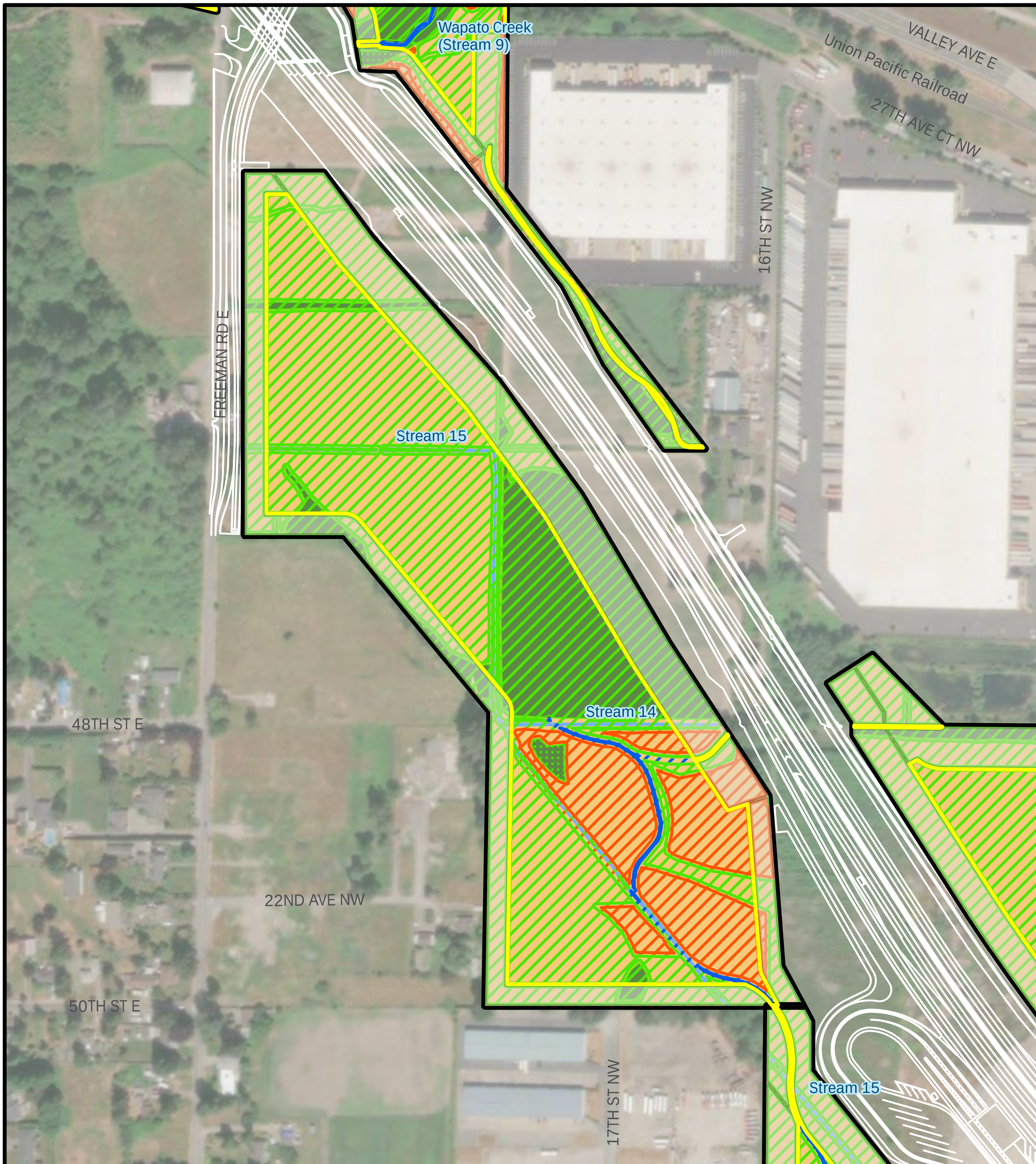

Legend

- Credit-Generating Area
- Mitigation Buffer
- Stage 2 RRP Boundary
- Stage 2 Proposed Road and Shared-Use Path (white line)
- Wetland Reestablishment (Upland to Wetland)
- Stream Creation (Upland to Stream)
- Upland Enhancement (Upland to Upland)
- Stream Enhancement (Stream to Stream)
- Wetland Rehabilitation (Stream to Wetland)
- Stream Creation (Wetland to Stream)
- Wetland Rehabilitation (Wetland to Wetland)
- Wetland Enhancement (Wetland to Wetland)

Figure 5--L. Proposed Conditions for the SR 167 Completion Project, Stage 2 - Freeman Road Mitigation Site.

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Table 49. Anticipated Land Conversion Areas Within the Credit-Generating and Perimeter Buffer Portions of the Mitigation Sites.

		Credit-Generating Area				Perimeter Buffer			
			Conversion Type				Conversion Type		
Land Cover Type	Mitigation Site	Existing Area	Upland to Wetland (wetland re-est.)	Upland to Stream (stream creation)	Upland Enhancement	Existing Area	Upland to Wetland (wetland re-est.)	Upland to Stream (stream creation)	Upland Enhancement
Upland	Upper Surprise Lake Tributary Addition	12.37	1.12	0.00	11.25	9.74	0.07	0.00	9.67
	Middle Surprise Lake Tributary Addition	0.06	0.04	0.00	0.02	1.20	1.16	0.00	0.04
	Lower Surprise Lake Tributary Addition	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Upper Hylebos Addition	0.47	0.00	0.00	0.47	0.00	0.00	0.00	0.00
	Upper Hylebos North Addition	2.05	1.70	0.02	0.33	0.99	0.58	0.00	0.41
	Lower Hylebos Addition	1.32	0.58	0.00	0.74	1.52	0.95	0.00	0.57
	East Wapato	2.03	1.75	0.13	0.15	2.89	1.82	0.00	1.07
	West Wapato	0.75	0.52	0.00	0.23	1.39	0.75	0.00	0.64
	Northwest Wapato	10.63	9.72	0.28	0.63	5.71	2.49	0.00	3.22
	Puyallup North	12.29	12.14	0.01	0.14	8.19	5.43	0.00	2.76
	Puyallup South	3.68	3.30	0.38	0.00	4.56	4.56	0.00	0.00
	Freeman Road	15.43	11.27	0.29	3.87	6.04	5.40	0.00	0.64
	Total	**61.08**	**42.14**	**1.11**	**17.83**	**42.23**	**23.21**	**0.00**	**19.02**
Land Cover Type	**Mitigation Site**	**Existing Area**	**Wetland to Stream (stream creation)**	**Wetland Enhancement**	**Wetland Rehabilitation**	**Existing Area**	**Wetland to Stream (stream creation)**	**Wetland Enhancement**	**Wetland Rehabilitation**
Wetland	Upper Surprise Lake Tributary Addition	4.41	0.01	0.26	4.14	0.91	0.00	0.51	0.40
	Middle Surprise Lake Tributary Addition	7.09	0.33	2.49	4.27	1.23	0.00	0.43	0.80
	Lower Surprise Lake Tributary Addition	1.05	0.00	0.00	1.05	0.00	0.00	0.00	0.00
	Upper Hylebos Addition	3.63	0.00	0.00	3.63	0.00	0.00	0.00	0.00
	Upper Hylebos North Addition	3.39	0.00	0.39	3.00	0.30	0.00	0.21	0.09
	Lower Hylebos Addition	1.04	0.00	0.98	0.06	1.11	0.00	0.65	0.46
	East Wapato	0.92	0.08	0.13	0.71	0.59	0.00	0.08	0.51
	West Wapato	0.42	0.03	0.00	0.39	0.11	0.00	0.00	0.11
	Northwest Wapato	2.27	0.22	0.85	1.20	0.36	0.00	0.18	0.18
	Puyallup North	0.03	0.03	0.00	0.00	0.31	0.00	0.00	0.31
	Puyallup South	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Freeman Road	3.31	0.00	0.12	3.19	2.19	0.00	0.00	2.19
	Total	**27.56**	**0.70**	**5.22**	**21.64**	**7.11**	**0.00**	**2.06**	**5.05**

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Table 49 (continued). Anticipated Land Conversion Areas Within the Credit-Generating and Perimeter Buffer Portions of the Mitigation Sites.							
		Credit-Generating Area			Perimeter Buffer		
			Conversion Type			Conversion Type	
Land Cover Type	Mitigation Site	Existing Area	Stream to Wetland (wetland rehabilitation)	Stream Enhancement	Existing Area	Stream to Wetland (wetland rehabilitation)	Stream Enhancement
Stream	Upper Surprise Lake Tributary Addition	0.62	0.01	0.61	0.04	0.04	0.00
	Middle Surprise Lake Tributary Addition	0.72	0.66	0.06	0.28	0.28	0.00
	Lower Surprise Lake Tributary Addition	0.01	0.01	0.00	0.00	0.00	0.00
	Upper Hylebos Addition	0.00	0.00	0.00	0.00	0.00	0.00
	Upper Hylebos North Addition	0.00	0.00	0.00	0.00	0.00	0.00
	Lower Hylebos Addition	0.00	0.00	0.00	0.00	0.00	0.00
	East Wapato	0.15	0.01	0.14	0.00	0.00	0.00
	West Wapato	0.16	0.03	0.13	0.00	0.00	0.00
	Northwest Wapato	0.45	0.07	0.38	0.00	0.00	0.00
	Puyallup North	0.00	0.00	0.00	0.00	0.00	0.00
	Puyallup South	0.01	0.00	0.01	0.17	0.17	0.00
	Freeman Road	0.47	0.42	0.05	0.07	0.07	0.00
	Total	**2.59**	**1.21**	**1.38**	**0.56**	**0.56**	**0.00**

Credit-Generating Area (acres) (including stream): 91.23

- **Total wetland re-establishment area = 42.14**
- **Total wetland rehabilitation area = 22.85**
- **Total wetland enhancement area = 5.22**
- **Total upland enhancement area = 17.83**

Perimeter Buffer Area (acres): 49.90

- **Total wetland re-establishment area = 23.21**
- **Total wetland rehabilitation area = 5.61**
- **Total wetland enhancement = 2.06**
- **Total upland enhancement = 19.02**

Stream area (acres) = 1.11 + 0.70 + 1.38 = 3.19 acres

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5.3 Implementation Schedule

Mitigation sites will be constructed concurrent with Stage 2 construction. Construction of the mitigation sites is expected to begin summer of 2025 and be completed in approximately 4 years.

5.4 Summary of Ecological Benefits

Mitigation site implementation is expected to restore wetlands and environmental processes within the Hylebos Creek (including Surprise Lake Tributary), Wapato Creek, and Puyallup River basins through re-establishment and rehabilitation, the preferred approaches for wetland mitigation (Washington State Department of Ecology et al. 2021). Wetland rehabilitation within the mitigation sites will increase wetland area and function within the basins. Table 50 lists the characteristics of the wetland and buffer areas of the impacted versus mitigation sites. Almost all wetlands within the mitigation sites are expected to rate as Category II wetlands.

Table 50. Comparison of Typical Wetland Functions Provided.

Function/Value	Impacted Wetland	Mitigation Site
Flood Flow Alteration	Moderate quality	High quality
Sediment Removal	Moderate quality	High quality
Nutrient and Toxicant Removal	High quality	High quality
Erosion Control and Shoreline Stabilization	Not present	High quality
Production and Export of Organic Matter	Not present	High quality
General Habitat Suitability	Low quality	High quality
Habitat for Aquatic Invertebrates	Low quality	High quality
Habitat for Amphibians	Not present	High quality
Habitat for Wetland-Associated Mammals	Not present	High quality
Habitat for Wetland-Associated Birds	Low quality	High quality
General Fish Habitat	Not present	High quality
Native Plant Richness	Not present	High quality
Educational or Scientific Value	Not present	Low quality
Uniqueness and Heritage	Not present	Not present

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6. Mitigation Site Credit Proposal

WSDOT proposes to restore wetland, stream, and buffer area in the mitigation sites through a combination of wetland re-establishment, wetland rehabilitation, wetland enhancement, stream creation/enhancement, and upland enhancement. WSDOT will provide all required mitigation for impacts resulting from Stage 2 construction and operation as shown in Table 51. WSDOT proposes to use any excess area as mitigation for future WSDOT projects pending agency review and approval at a later time. (Please note that minor discrepancies in the numbers in Table 51 are a result of rounding issues, and not mathematical errors. For instance, in the first row of the table 17.83 acres of upland enhancement will account for 1.1144 acres of impacts, which is rounded to 1.11.)

6.1 Factors that Support Likelihood of Successful Restoration

Stage 2 mitigation uses a watershed approach to maximize ecosystem restoration and is a component of a larger suite of aquatic and riparian improvements that will mitigate Stage 2 impacts to aquatic and wetland habitats and associated buffers while enhancing wetland and riparian functions within the corridor (WSDOT 2019b, WSDOT 2021a).

6.2 Functional Lift

Existing freshwater wetlands throughout the Project corridor are not functioning at their historical capacity, nor do they have a high habitat value. WSDOT is proposing to restore the site in a way that ensures maximum functional lift will be delivered rapidly.

Mitigation site establishment will restore wetlands and environmental processes primarily through re-establishment and rehabilitation, the preferred methods of wetland compensation (Washington State Department of Ecology et al. 2021). Restoration will increase wetland area and function within the Hylebos (including Surprise Lake Tributary), Wapato Creek, and Puyallup River basins. A comparison of the characteristic functions in impacted wetlands versus the functions provided through RRP mitigation is described in Table 51 in Section 5.5. In general, the majority of the existing wetlands in the RRP are rated as Category III. They provide moderate flood and water quality functions and low habitat functions. Once mitigation sites have been established most are expected to be rated as Category I wetlands (Appendix D).

Table 51 Proposed Wetland Impacts and Mitigation for the SR 167 Stage 2.[a]							
Stage 2 Wetland Impacts			**Applied Mitigation Ratio**	**Stage 2 Mitigation Area Needed**			
Wetland Category	**Impact Type**	**Impact Area**		**Upland Enhancement Area**	**Wetland Re-Establishment Area**	**Wetland Enhancement Area**	**Wetland Rehabilitation Area**
II	Permanent (includes indirect isolation)	1.11	16:1 Upland Enhancement	17.83	0.00	0.00	0.00
		0.65	1:1 Re-establishment and 8:1 Enhancement	0.00	0.65	5.22	0.00
		5.21	1:1 Re-establishment and 4:1 Rehabilitation	0.00	5.21	0.00	20.84
III		14.55	1:1 Re-establishment and 2:1 Rehabilitation	0.00	14.55	0.000	29.09
		3.67	Re-establishment only (2:1)	0.00	7.33	0.00	0.00
II	Long-term temporary	0.87	Re-establishment only (0.75:1)	0.00	0.65	0.00	0.00
III		3.55	Re-establishment only (0.5:1)	0.00	1.78	0.00	0.00
II	Indirect habitat	2.30	Re-establishment only (0.75:1)	0.00	1.73	0.00	0.00
III		1.39	Re-establishment only (0.5:1)	0.00	0.70	0.00	0.00
II	Shading	0.07	Re-establishment only (1.5:1)	0.00	0.11	0.00	0.00
Totals Summary							
Total Stage 2 Impacts	**33.400**	**Total mitigation area needed (as shown in rows above) (A)**		**17.83**	**32.71**	**5.22**	**49.93**
Stage 2 Mitigation Site Credit Generating Area[b] (B)				17.83	42.14	5.22	22.85
Application of Stage 1b Hylebos RRP Excess Mitigation (C)				0.00	0.00	0.00	27.08[c]
Total Available Mitigation for Stage 2 (B+C)				**17.83**	**42.14**	**5.22**	**49.93**
Anticipated Excess Mitigation (B+C)-A				**0.00**	**9.43**	**0.00**	**0.00**

[a] Proposed mitigation assumes that mitigation sites will be constructed within 0 to 2 years of road construction.

[b] Refer to Table 49 (at the end of Section 5.2) for an explanation of how these numbers were calculated. These values exclude 51.67 acres of perimeter buffer.

[c] Refer to the SR 167 Completion Project Stage 1b permit modifications for details on excess mitigation area in the Hylebos RRP.

6.3 Proposed Ratios to Establish Mitigation Value

WSDOT anticipates that the mitigation value provided by any excess mitigation area in the mitigation sites will be used to offset unavoidable impacts for future WSDOT projects in the vicinity. Advance mitigation can reduce temporal loss of wetland functions, and sites need to meet performance standards before advance mitigation credits can be released (thereby reducing the risk of individual site failure). Advance mitigation therefore allows the opportunity to apply reduced mitigation ratios as described in the 2021 Joint Guidance. The Joint Guidance describes different options for crediting and using advance mitigation. Because most of the area within the RRP will be re-established wetland, WSDOT proposes using the re-establishment/creation ratios recommended in the 2021 Joint Guidance. These ratios may be used when the advance mitigation site would result in a Category I or II wetland and involves either re-establishment or creation. These recommended ratios are provided in Table 52, below.

Table 52. Proposed Mitigation Ratios for the Advance Mitigation in the RRP.[a]

Year of Submitted Monitoring Report	Category I Wetland Impact	Category II Wetland Impact	Category III Wetland Impact
0, 1, 2	**Case by case**	3:1	2:1
3, 4	**Case by case**	2.5:1	1.7:1
5, 6	**Case by case**	2.1:1	1.5:1
7, 8, 9	**Case by case**	1.6:1	1.2:1
10 and beyond	**Case by case**	1.2:1	1:1

[a] Reproduced from Washington State Department of Ecology et al. (2021), Table 4-1.

Ratio reductions will not be authorized until at least 2 years (24 months) after completion of compensation site construction and planting. Ratio reductions will also occur only if approved by the permitting agencies.

6.4 Tracking Mitigation Value

WSDOT will establish a tracking ledger that will clearly show the value and area of the site used and the area remaining after each use of the site. The following details identify general process expectations for use and tracking of the mitigation value.

1. Proposed ratios for use of site value will be included in mitigation plans submitted for projects.

2. Each approved use of site value will be documented in the tracking ledger.

3. Copies of all permits, monitoring reports and correspondence related to compliance with permit conditions shall be kept in the SR 167 files.

4. Copies of permits authorizing use of SR 167 mitigation value for WSDOT project use and any correspondence required to document the agreed use of site mitigation value and use of that value shall be kept in the SR 167 project files.

7. Goals, Objectives, and Performance Standards

WSDOT will restore wetland and upland buffer in temporarily cleared areas, the Wapato Creek buffer enhancement site, and the compensatory mitigation sites. This section describes goals, objectives, and performance standards for those areas. The planting plan for temporarily impacted areas is still being developed; performance standards for those areas are therefore likely to change, contingent upon agency approval.

7.1 Restoration of Temporary Impacts

Temporary impacts occurring outside of mitigation sites will be restored on site once construction is complete. Table 53 provides the goals, objectives, and performance standards for the restoration of temporarily impacted areas. Additional compensatory mitigation will be provided within mitigation sites for long-term temporary impacts as described in Section 4.2.3. Performance standards for mitigation sites are listed in Section 7.3.

7.2 City of Fife/Wapato Creek Buffer Enhancement

Habitat improvements are proposed for the area between the new roadway alignment and Wapato Creek where the new alignment encroaches on the buffer of Wapato Creek as described in Section 4.2.2.6 (Figure 5; Appendix E). Wetland and upland buffer vegetation enhancement is proposed at this location. This site is not a compensatory mitigation site; however, WSDOT has developed performance standards to ensure successful achievement of enhancement goals (Table 54).

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Table 53. Objectives and Performance Standards for the Restoration of Temporary Impacted Areas.			
Goal	**Objective**	**Monitoring Year**	**Performance Standard**
Restore habitat and water quality functions in temporarily impacted wetland	Restore native trees and shrubs in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
		Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
		Year 5	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 35 percent.
	Control invasive species in all restored wetland areas	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager, and an eradication program will be initiated within 30 days of the report.
		Years 1 through 5	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
Restore habitat and water quality functions in upland buffer	Enhance native understory in under planted areas Enhance native understory in under planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
		Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
		Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.
	Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager, and an eradication program will be initiated within 30 days of the report.
			Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
		Years 1 through 5	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.

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Table 54. Objectives and Performance Standards for the Wapato Creek Buffer Enhancement.			
Goal	**Objective**	**Monitoring Year**	**Performance Standard**
Enhance habitat and water quality functions in temporarily impacted wetland	Establish native trees and shrubs in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
		Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
		Year 5	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 35 percent.
		Year 7	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 50 percent.
		Year 10	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 75 percent.
	Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager, and an eradication program will be initiated within 30 days of the report.
		Years 1 through 9	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover
		Year 10	Non-designated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
Improve habitat functions in upland areas	Control invasive species in upland buffer	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager, and an eradication program will be initiated within 30 days of the report.
		Years 1 through 9	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
		Year 10	Non-designated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
	Enhance native understory in under planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
		Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
		Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

7.3 Compensatory Mitigation Sites

The overall goals of the mitigation approach are to restore stream, riparian, and wetland function within the lower Hylebos (including Surprise Lake Tributary), Wapato, and Puyallup River basins by:

- Widening and realigning streams to create more natural, meandering channels that reconnect the active channel with the surrounding floodplain
- Restore floodplain wetlands
- Establish a diverse suite of native vegetation within the wetlands
- Compensate for losses and degradation to wetland area and function that occurred as a result of Stage 2 impacts.

The specific goals of the mitigation sites are to:

- Create or restore at least 10,212 linear feet of stream channel
- Re-establish at least 42.14 acres of wetland
- Rehabilitate at least 22.85 acres of wetland
- Enhance at least 5.22 acres of wetland
- Improve water quality, hydrologic, and habitat functions of wetlands within the mitigation sites
- Preserve and enhance at least 17.83 acres of upland vegetation
- Create at least 49.90 acres of functioning buffer

Mitigation plan objectives have been designed to achieve the mitigation goals. WSDOT has developed performance standards that describe measurable attributes that can be used to evaluate success in meeting the goals and objectives of the compensatory mitigation sites. Performance standards will guide site management activities during the monitoring period and serve as benchmarks measured during the final year of monitoring that to help evaluate compliance with regulatory requirements. Sites may be subject to contingency measures should a site fail to meet performance standards during the compliance monitoring period (see Section 8.3).

Sites contiguous with the Hylebos RRP will use the existing objectives and performance standards created for the Stage 1b Mitigation Plan. Additional areas for the Stage 2 sites are provided in Table 55.

Table 55. Credit-Generating Areas Added to Existing Hylebos RRP Sites.		
Stage 2 Mitigation Site	**Stage 1b Mitigation Site**	**Stage 2 Mitigation Site**
Upper Surprise Lake Tributary Addition	Upper Surprise Lake Tributary (Goal 1.1 – 1.6)	Channel Restoration – 1,666 linear feet Wetland Re-Establishment – 1.12 acres Wetland Enhancement – 0.26 acres Wetland Rehabilitation – 2.75 acre Upland Enhancement – 0.80 acres
Middle Surprise Lake Tributary Addition	Middle Surprise Lake Tributary (Goal 2.1 – 2.4)	Channel Restoration – 710 linear feet Wetland Re-Establishment – 0.04 acres Wetland Enhancement – 2.49 acres Wetland Rehabilitation – 4.10 acres Upland Enhancement – 0.02 acre
Lower Surprise Lake Tributary Addition	Lower Surprise Lake Tributary (Goal 3.1 – 3.4)	Wetland Rehabilitation – 1.05 acres
Upper Hylebos Addition and Upper Hylebos North Addition	Upper Hylebos (Goal 4.1 – 4.5)	Channel Restoration – 108 linear feet Wetland Re-Establishment – 1.70 acres Wetland Enhancement – 0.39 acre Wetland Rehabilitation – 6.63acres Upland Enhancement – 0.62 acre

Goals, objectives, and performance standards for the new Hylebos basin, Wapato RRP, and Puyallup mitigation sites are listed in Table 56. Tables 48 and 49 list mitigation acreage that WSDOT expects to achieve at each of the mitigation sites. WSDOT proposes to use any excess area as mitigation for future WSDOT projects pending agency review and approval. Site numbering begins at “8” to avoid overlap with the Stage 1b Mitigation Plan (WSDOT 2021a).

Table 56a. Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Lower Hylebos Addition.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
8. Lower Hylebos Addition	8.1. Re-establish and enhance wetland	8.1.1 Re-establish, rehabilitate and enhance a minimum of 1.62acre of wetland • Re-establish: 0.58 acre • Rehabilitate: 0.06 acre • Enhance: 0.98 acre	Years 5 and 10	The wetland area at the mitigation site will be delineated using current methods to ensure that the mitigation site contains the anticipated acreage.
		8.1.2. Establish wetland hydrology within re-established wetlands	Years 1, 3, 5, 7, 10	The soils in the wetlands will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least 30 consecutive days during the growing season in years when rainfall meets or exceeds the 30-year average.
	8.2. Improve water quality, hydrologic, and habitat functions in re-established and enhanced wetland	8.2.1 Establish native trees and shrubs in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
			Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
			Year 5	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 35 percent.
			Year 7	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 50 percent.
			Year 10	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 75 percent.
			Year 10	A minimum of 10 species of native shrubs and trees will be present in the wetland by the end of the monitoring period.
		8.2.2 Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.-
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		8.2.3 Install fish and wildlife habitat structures	Year 0	Install a minimum of: • 5 brush piles • 9 perch trees • 5 nest boxes • 1 bat boxes on an existing mature tree
	8.3. Improve habitat functions in upland areas	8.3.1 Enhance a minimum of 0.74 acres of upland within the upland area	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.

Table 56a (continued). Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Lower Hylebos Addition.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
8 (continued). Lower Hylebos Addition	8.3 (continued). Improve habitat functions in upland areas	8.3.2 Enhance native understory in under planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.
	8.4 Enhance functioning buffer within non-credit generating perimeter buffer	8.4.1 Control invasive species	All Years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation
		8.4.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

Table 56b. Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – East Wapato RRP.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
9. East Wapato RRP	9.1. Restore stream channel	9.1.1 Restore a minimum of 1,424 linear feet of stream channel	Year 10	Combined length of stream channels (as measured in the thalweg) will meet or exceed 1,424 linear feet.
	9.2. Re-establish and rehabilitate wetland	9.2.1 Re-establish and rehabilitate, a minimum of 2.47 acres of wetland • Re-establish: 1.75 acres • Rehabilitate: 0.72 acre	Years 5 and 10	The wetland area at the mitigation site will be delineated using current methods to ensure that the mitigation site contains the anticipated acreage.
		9.2.2 Establish wetland hydrology within re-established wetlands	Years 1, 3, 5, 7, 10	The soils in the wetlands will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least 30 consecutive days during the growing season in years when rainfall meets or exceeds the 30-year average.
	9.3. Improve water quality, hydrologic, and habitat functions in re-established and rehabilitated wetlands	9.3.1 Establish native woody vegetation in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
			Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
			Year 5	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 35 percent.
			Year 7	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 50 percent.
			Year 10	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 75 percent.
			Year 10	A minimum of 10 species of native shrubs and trees will be present in the wetland by the end of the monitoring period.
		9.3.2 Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		9.3.3 Install fish and wildlife habitat structures	Year 0	Install a minimum of: • 154 instream logs • 6 brush piles • 7 perch trees • 3 nest boxes • 1 bat box on an existing mature tree
	9.4. Improve habitat functions in upland areas	9.4.1 Enhance a minimum of 0.15 acres of upland area	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		9.4.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.

Table 56b (continued). Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – East Wapato RRP.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
9 (continued). East Wapato RRP	9.4 (continued). Improve habitat functions in upland areas	9.4.2 (continued) Enhance native vegetation in planted areas	Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.
	9.5 Enhance functioning buffer within non-credit generating perimeter buffer	9.5.1 Control invasive species	All Years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
				Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation
		9.5.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

Table 56c. Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – West Wapato RRP.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
10. West Wapato RRP	10.1. Restore stream channel	10.1.1 Restore a minimum of 850 linear feet of stream channel	Year 10	Combined length of stream channels (as measured in the thalweg) will meet or exceed 850 linear feet.
	10.2. Re-establish and rehabilitate wetland	10.2.1 Re-establish and rehabilitate a minimum of 0.94 acre of wetland • Reestablish 0.52 acre • Rehabilitate 0.42 acre	Years 5 and 10	The wetland area at the mitigation site will be delineated using current methods to ensure that the mitigation site contains the anticipated acreage.
		10.2.2 Establish wetland hydrology within re-established wetlands	Years 1, 3, 5, 7, 10	The soils in the wetlands will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least 30 consecutive days during the growing season in years when rainfall meets or exceeds the 30-year average.
	10.3. Improve water quality, hydrologic, and habitat functions in re-established and rehabilitated wetlands	10.3.1 Establish native woody vegetation in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
			Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
			Year 5	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 35 percent.
			Year 7	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 50 percent.
			Year 10	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 75 percent.
			Year 10	A minimum of 10 species of native shrubs and trees will be present in the wetland by the end of the monitoring period.
		10.3.2 Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		10.3.3 Install fish and wildlife habitat structures	Year 0	Install a minimum of: • 72 instream logs • 5 perch trees • 4 brush piles • 2 nest boxes • 1 bat box on an existing mature tree
	10.4. Improve habitat functions in upland areas	10.4.1 Enhance a minimum of 0.23 acres of upland area	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		10.4.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.

Table 56c (continued). Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – West Wapato RRP.

Mitigation Site	Goal	Objective	Monitoring Year	Performance Standards
10. West Wapato RRP	10.4 (continued). Improve habitat functions in upland areas	10.4.2 (continued) Enhance native vegetation in planted areas	Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.
	10.5 Enhance functioning buffer within non-credit generating perimeter buffer	10.5.1 Control invasive species	All Years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
				Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation
		10.5.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

Table 56d. Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Northwest Wapato RRP.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
11. Northwest Wapato RRP	11.1. Restore stream channel	11.1.1 Restore a minimum of 2,534 linear feet of stream channel	Year 10	Combined length of stream channels (as measured in the thalweg) will meet or exceed 2,534linear feet.
	11.2. Re-establish and rehabilitate wetland	11.2.1 Re-establish, rehabilitate, and enhance a minimum of 12.19acres of wetland • Reestablish 9.72 acre • Rehabilitate 1.27 acres • Enhance 1.20 acres	Years 5 and 10	The wetland area at the mitigation site will be delineated using current methods to ensure that the mitigation site contains the anticipated acreage.
		11.2.2 Establish wetland hydrology within re-established wetlands	Years 1, 3, 5, 7, 10	The soils in the wetlands will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least 30 consecutive days during the growing season in years when rainfall meets or exceeds the 30-year average.
	11.3. Improve water quality, hydrologic, and habitat functions in re-established and rehabilitated wetlands	11.3.1 Establish native woody vegetation in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
			Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
			Year 5	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 35 percent.
			Year 7	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 50 percent.
			Year 10	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 75 percent.
			Year 10	A minimum of 10 species of native shrubs and trees will be present in the wetland by the end of the monitoring period.
		11.3.2 Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		11.3.3 Install fish and wildlife habitat structures	Year 0	Install a minimum of: • 123 instream logs • 9 perch trees • 9 brush piles • 4 nest boxes
	11.4. Improve habitat functions in upland areas	11.4.1 Enhance a minimum of 0.63 acres of upland area	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		11.4.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.

Table 56d (continued). Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Northwest Wapato RRP.

Mitigation Site	Goal	Objective	Monitoring Year	Performance Standards
11 (continued). Northwest Wapato RRP	11.4 (continued). Improve habitat functions in upland areas	11.4.2 (continued) Enhance native vegetation in planted areas	Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.
	11.5 Enhance functioning buffer within non-credit generating perimeter buffer	11.5.1 Control invasive species	All Years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
				Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation
		11.5.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

Table 56e. Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Puyallup North.

Mitigation Site	Goal	Objective	Monitoring Year	Performance Standards
12. Puyallup North	12.1. Re-establish wetland	12.1.1 Re-establish a minimum of 12.14 acres of wetland	Years 5 and 10	The wetland area at the mitigation site will be delineated using current methods to ensure that the mitigation site contains the anticipated acreage.
		12.1.2 Establish wetland hydrology within re-established wetlands	Years 1, 3, 5, 7, 10	The soils in the wetlands will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least 30 consecutive days during the growing season in years when rainfall meets or exceeds the 30-year average.
	12.2. Improve water quality, hydrologic, and habitat functions in re-established wetlands	12.2.1 Establish native woody vegetation in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
			Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
			Year 5	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 35 percent.
			Year 7	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 50 percent.
			Year 10	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 75 percent.
			Year 10	A minimum of 10 species of native shrubs and trees will be present in the wetland by the end of the monitoring period.
		12.2.2 Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
				Nondesignated Class B and Class C noxious weeds will not exceed 20 percent cover.
			Years 1 through 9	Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover. -
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		12.2.3 Install fish and wildlife habitat structures	Year 0	Install a minimum of: • 11 perch trees • 9 brush piles • 2 nest boxes
	12.3. Improve habitat functions in upland areas	12.3.1 Enhance a minimum of 0.14 acres of upland area	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
				Nondesignated Class B and Class C noxious weeds will not exceed 20 percent cover.
			Years 1 through 9	- Nondesignated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		12.3.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

Table 56e (continued). Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Puyallup North.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
12. Puyallup North	12.4. Enhance functioning buffer withing non-credit generating p	12.4.1 Control invasive species	All Years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
		12.4.2 Enhance native vegetation in planted areas	Years 1 through 9	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Nondesignated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation
			Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

Table 56f. Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Puyallup South.

Mitigation Site	Goal	Objective	Monitoring Year	Performance Standards
13. Puyallup South	13.1. Restore stream channel	13.1.1 Restore a minimum of 1,411 linear feet of stream channel	Year 10	Combined length of stream channels (as measured in the thalweg) will meet or exceed 1,411 linear feet.
	13.2. Re-establish wetland	13.2.1 Re-establish a minimum of 3.30 acres of wetland	Years 5 and 10	The wetland area at the mitigation site will be delineated using current methods to ensure that the mitigation site contains the anticipated acreage.
		13.2.2 Establish wetland hydrology within re-established wetlands	Years 1, 3, 5, 7, 10	The soils in the wetlands will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least 30 consecutive days during the growing season in years when rainfall meets or exceeds the 30-year average.
	13.3. Improve water quality, hydrologic, and habitat functions in re-established wetlands	13.3.1 Establish native woody vegetation in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
			Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
			Year 5	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 35 percent.
			Year 7	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 50 percent.
			Year 10	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 75 percent.
			Year 10	A minimum of 10 species of native shrubs and trees will be present in the wetland by the end of the monitoring period.
		13.3.2 Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
				- Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Non-designated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		13.3.3 Install fish and wildlife habitat structures	Year 0	Install a minimum of: • 3 perch trees • 3 brush piles • 2 nest boxes • 1 bat box on an existing mature tree
	13.4 Enhance functioning buffer within non-credit generating perimeter buffer	13.4.1 Control invasive species	All Years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
				Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation
		13.4.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

Table 56g. Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Freeman Road.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
14. Freeman Road	14.1. Restore stream channel	14.1.1 Restore a minimum of 1,292 linear feet of stream channel	Year 10	Combined length of stream channels (as measured in the thalweg) will meet or exceed 1,292 linear feet.
	14.2. Re-establish and rehabilitate wetland	14.2.1 Re-establish and rehabilitate a minimum of 15.00acres of wetland • Reestablish 11.27 acres • Rehabilitate 3.61 acres • Enhance 0.12 acre	Years 5 and 10	The wetland area at the mitigation site will be delineated using current methods to ensure that the mitigation site contains the anticipated acreage.
		14.2.2 Establish wetland hydrology within re-established wetlands	Years 1, 3, 5, 7, 10	The soils in the wetlands will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least 30 consecutive days during the growing season in years when rainfall meets or exceeds the 30-year average.
	14.3. Improve water quality, hydrologic, and habitat functions in re-established and rehabilitated wetlands	14.3.1 Establish native woody vegetation in wetland	Year 1	Stem density in planted scrub shrub and forested areas will meet or exceed 1,600 stems per acre. Planting density should exceed this metric to account for die-off.
			Year 3	Cover of native saplings, trees, and shrubs in planted forested and scrub-shrub wetland will be at least 20 percent.
			Year 5	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 35 percent.
			Year 7	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 50 percent.
			Year 10	Cover of native woody vegetation in planted forested and scrub-shrub wetland will be at least 75 percent.
			Year 10	A minimum of 10 species of native shrubs and trees will be present in the wetland by the end of the monitoring period.
		14.3.2 Control invasive species	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Non-designated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.
		14.3.3 Install fish and wildlife habitat structures	Year 0	Install a minimum of: • 8 perch trees • 10 brush piles • 5 nest boxes • 2 bat boxes on an existing mature tree
	14.4. Improve habitat functions in upland areas	14.4.1 Enhance a minimum of 3.87 acres of upland area	All years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
			Years 1 through 9	Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Non-designated Class B and Class C noxious weeds excluding reed canarygrass will not exceed 20 percent cover. Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation.

Table 56g. Objectives and Performance Standards for the SR 167 RRP Wetland and Stream Mitigation – Freeman Road.				
Mitigation Site	**Goal**	**Objective**	**Monitoring Year**	**Performance Standards**
14. Freeman Road	14.4 (continued) Enhance functioning buffer within non-credit generating perimeter buffer	14.4.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.
		14.4.1 Control invasive species	All Years	Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
				Non-designated Class B and Class C noxious weeds including reed canarygrass will not exceed 20 percent cover.
			Year 10	Reed canarygrass will only exist as an understory component that does not outcompete native woody vegetation
		14.4.2 Enhance native vegetation in planted areas	Year 0	The contractor will provide GPS locations of any underplanted areas.
			Year 1	Planted vegetation will achieve 100 percent survival 1 year after the site is planted. If all dead woody plantings are replaced, the performance measure will be met.
			Years 2 and 3	Planted vegetation will exhibit 80 percent survival within 2 to 3 years after installation.

8. Monitoring, Maintenance, and Long-Term Protection

8.1 Monitoring

WSDOT staff will monitor the mitigation site for 10 years after installation, or until performance standards are met, as determined by regulatory agencies. If all the performance standards are achieved in less than 10 years, WSDOT may terminate monitoring with approval of the review agencies. Quantitative monitoring will be completed and documented 1, 3, 5, 7, and 10 years after initial acceptance of the mitigation construction. WSDOT HQ Wetlands Program will also complete informal (qualitative) assessments of the mitigation sites in Years 2, 4, 6, 8, and 9 for adaptive management purposes only. Monitoring will determine if the performance measures or performance standards have been met. Monitoring reports will be submitted for review and comment to the USACE, Ecology, and PTOI by April following the quantitative monitoring. WSDOT has established a comprehensive set of monitoring methods that are based primarily on Elzinga et al. (1998). The actual methods used to monitor each site are documented in annual monitoring reports prepared by WSDOT's Wetland Assessment and Monitoring Program, which is based in the Environmental Services Office in Olympia, Washington. Some variation of the methods occurs as techniques are improved, or standards change.

Shallow groundwater monitoring wells will be installed at mitigation sites to measure groundwater levels during the growing season and demonstrate that sites are meeting hydrology performance standards. Wells will be installed and monitored in accordance with procedures described in USACE technical guidance (USACE 2005).

8.2 Maintenance

WSDOT will maintain mitigation sites to ensure plant establishment and survival. Plant establishment maintenance will include, but is not limited to, supplemental irrigation during summer months; removal and control of invasive, nonnative vegetation; replenishing of wood chip mulch as necessary; and replacing plants that have died. Before plants are replaced, the design-builder will consult with the Stage 2 biologist assigned by WSDOT to determine why certain species are not surviving and, if necessary, which native plant substitutions are appropriate. WSDOT will coordinate with the design-builder during this time to ensure the site is on track to meet all the applicable performance standards. WSDOT will be responsible for plant survival and site maintenance 1 year after Physical Completion of the Stage 2 project.

8.3 Contingency Plan

WSDOT anticipates the mitigation goals will be accomplished with the construction and installation of the mitigation design as shown on the grading and planting plans. Contingency actions, however, may be needed to correct unforeseen problems. Any same-species replacements made after permit issuance can be mentioned in the next monitoring report. Any substantive changes to the mitigation plan will be coordinated with the relevant regulatory agencies.

As necessary, contingency measures (i.e., adaptive management options) will be implemented to meet performance measures and performance standards. The following describes potential situations that may occur and the potential contingencies that might be implemented to correct the problem. Since not all site conditions can be anticipated, the contingencies discussed below do not represent an exhaustive list of potential problems or remedies. Routine site inspections and follow-up actions to correct site conditions will be prescribed as necessary.

8.3.1 Vegetation

Problems related to vegetation include plant mortality, and poor growth resulting in low plant cover. These problems could be the result of insufficient site management, particularly watering in the first few growing seasons, animal browse, competition from invasive species, incorrect plant selection, altered site conditions, nursery supply issues, and vandalism. Contingencies for plant mortality and poor plant cover may include:

- Plant replacement: Additional planting may be required to meet plant survival and plant cover requirements. Plant species will be evaluated in relation to site conditions to determine if plant substitutions will be required.
- Weed control: Control of nonnative invasive species may be required to meet survival and plant cover requirements. Nonnative knotweeds shall not be present at the stream sites. If nonnative knotweeds are observed on site, they will initiate eradication measures. Weed control methods could include mechanical or hand control, mulching, or herbicide application.
- Herbivore control: If plant survival or vegetation cover standards are not met because of animal browse, the wildlife responsible will be identified and appropriate control measures will be attempted. This could include plant protection, fence installation, or the use of repellents.

- Vandalism and human disturbance: To prevent vegetation disturbance from human disturbance, fence installation, sensitive area signage, and dense thorny vegetation may be installed.

8.3.2 Habitat Structures

Habitat structures will be monitored by visual inspection during site visits to determine potential wildlife use presence/absence.

8.4 Buffers and Conservation Easements

Perimeter buffers have been applied to each of the mitigation sites to protect wetland functions and values. WSDOT coordinated with Ecology, USACE, and the PTOI to establish appropriate perimeters on the mitigation sites as described in Section 4.2.1 of this report. WSDOT has established conservation easements with the B&L Woodwaste property to maintain perimeter buffers for the Lower Surprise Lake Tributary Addition and Upper Hylebos Addition mitigation sites on B&L Woodwaste property in perpetuity.

8.5 Legal Mechanism for Long-Term Protection

The mitigation sites are established and will be managed to ensure the long-term sustainability of the resources. Prior to mitigation site construction, WSDOT will provide certified Right of Way or sundry site plans that identify the mitigation sites with a recording that references the USACE permit number. This recording on the certified Right of Way or sundry site plan will be made to protect the mitigation sites from future development. If the mitigation site is owned or transferred at any time to another party, a long-term protective legal mechanism will be developed that meets the requirements of the federal rule on compensatory mitigation and the requirements of the USACE permit authorizing the mitigation sites. The USACE will be notified of any proposed change in ownership. WSDOT will coordinate review of any transfer and provide opportunity for USACE review of the long-term protective legal mechanism.

Covenants will be included in the property transfer that guarantee protection of the sites in perpetuity.

8.6 Long-Term Management Plan

WSDOT will install signs every 100 feet along the boundaries of mitigation sites, including buffers, to mark the area as wetland mitigation. Fencing may also be installed if required by local permits. WSDOT has developed a long-term management (LTM) plan to ensure mitigation sites are managed to protect the ecological functions of the sites (Appendix G). The LTM plan specifies requirements of the long-term management period, annual inspections, and qualitative assessments. LTM inspection reports will be submitted to the USACE, Ecology, and PTOI in years 1, 4, 7, and 10 following mitigation site compliance monitoring.

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Appendix A

Mitigation Site
Wetland and Stream Assessment Report

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DRAFT SUPPLEMENTAL WETLAND AND STREAM ASSESSMENT REPORT

SR 167 Completion Project – Stage 2

SR 167/I-5 to SR 161 – New Expressway Project

Pierce County, Washington

Work Order: XL-5105
WIN: C16706T
PIN: 316706T

Prepared By
WSDOT SR 167 Completion Project
Puget Sound Gateway Program

April 14, 2023

WSDOT

DRAFT SUPPLEMENTAL WETLAND AND STREAM ASSESSMENT REPORT

SR 167 Completion Project – Stage 2

SR 167/I-5 to SR 161 – New Expressway Project

April 14, 2023

Prepared By:

Christina Merten, PWS, Senior Ecologist
206-441-9080
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121

Project Engineer:

Courtney Soderquist, Project Engineer, SR 167 Completion Project
360-701-4735
Olympic Region

Other Contributors and Role:

Riley Plumb, WPIT, Herrera Environmental Consultants, Project Biologist

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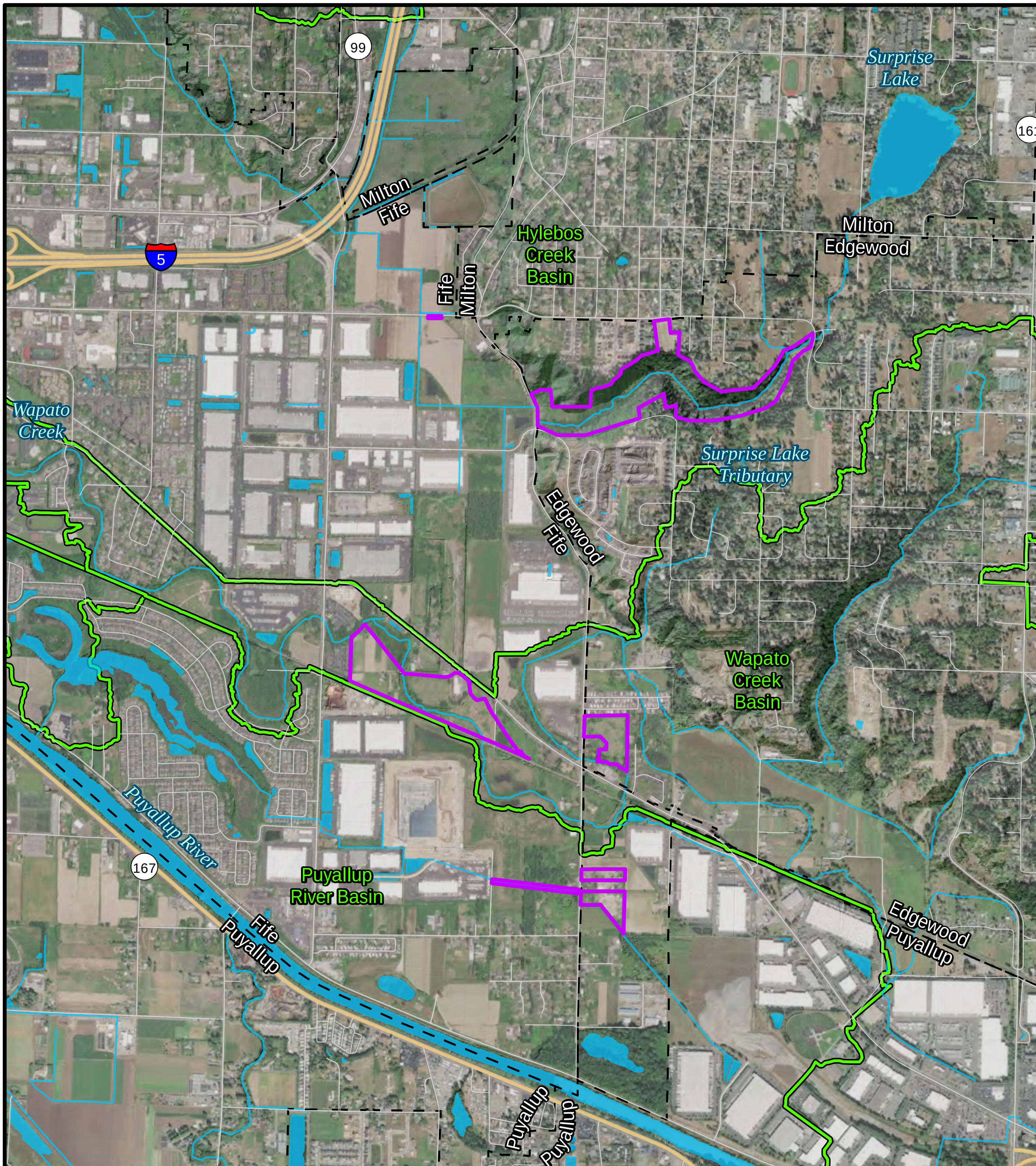
1. Introduction

The wetland and stream delineations described in this report were performed for the Washington State Department of Transportation (WSDOT) in support of the State Route (SR) 167 Completion Project Phase 1 (hereafter referred to as the Project).

The Project will be constructed in three stages, through sequential design-build contracts. The Stage 2 portion of the Project, known as the SR 167/I-5 to SR 161 – New Expressway Project (hereafter referred to as Stage 2) is the third construction contract of the Project's Phase 1 Improvements.

1.1. Project Location and Study Area

Portions of the Stage 2 area were delineated between March 2021 and March 2022. For more information on previously delineated features, see the Stage 2 Wetland and Stream Assessment Report (WSAR) (WSDOT 2022). This report builds on the Stage 2 WSAR by identifying and describing wetlands and streams in the portions of the study area investigated between April and December 2022 and within areas relevant to the Stage 2 proposed mitigation areas (Figure 1). The study area addressed in this report includes areas in the cities of Fife, Puyallup, and Edgewood. It is located in the Hylebos Creek (Stream 02), Wapato Creek (Stream 09), and Puyallup River (Stream 17) basins and is within the regulatory jurisdictions of the Puyallup Tribe of Indians and the cities of Fife, Puyallup, and Edgewood. See the Stage 2 WSAR for a complete description of the study area and Stage 2 location. Wetlands and streams delineated in the study area described in this report are shown on Figure 2.



Legend

- Study area
- Basin boundary
- City Limits
- Highway
- Roads
- Stream

Figure 1.
Study Area and Vicinity Map.

0 0.15 0.3 0.6 Mile

HERRERA

Esri Imagery (2022)

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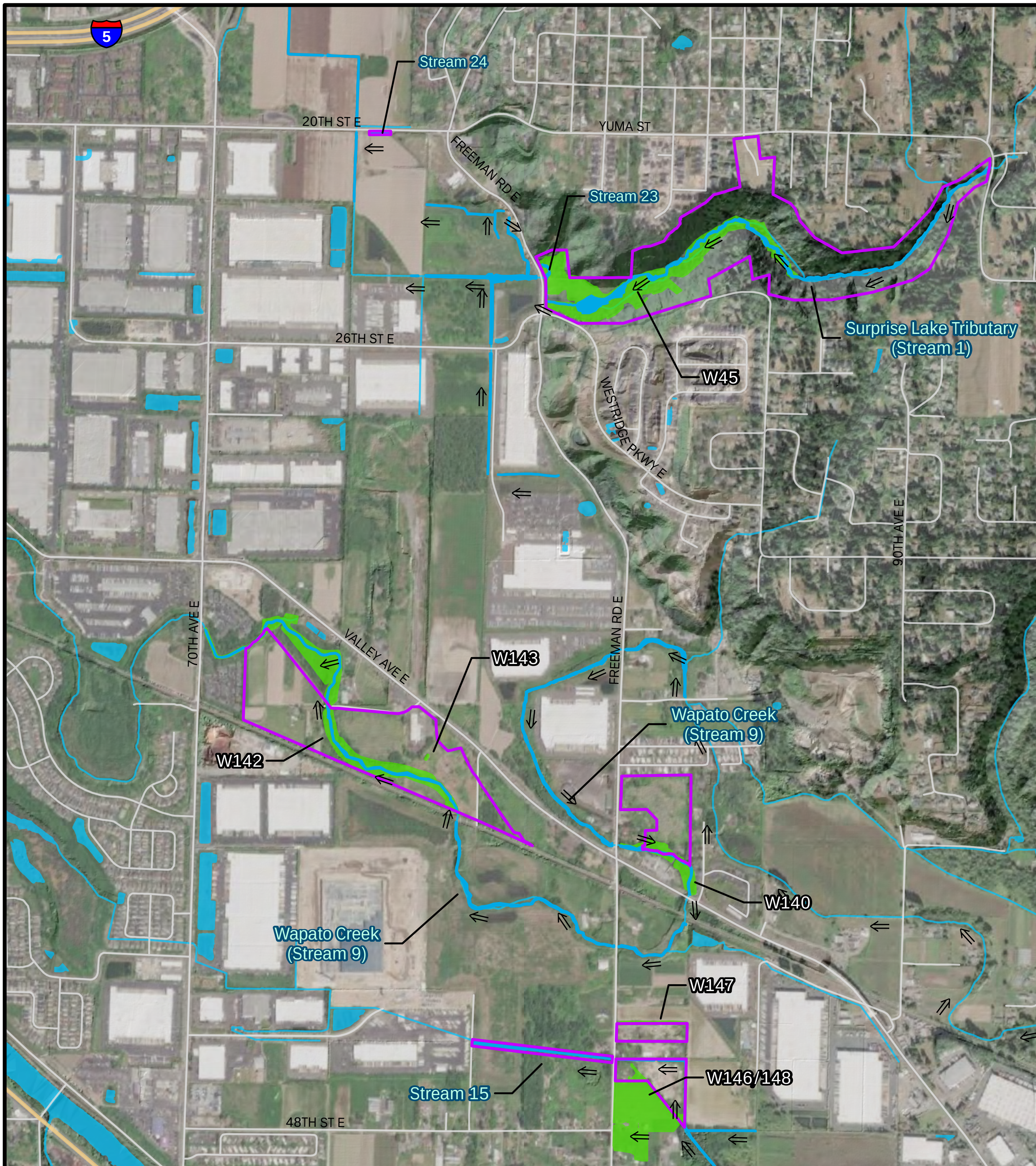

Legend

- Study area
- Stream area
- Wetland area
- Stream
- Flow Direction

Figure 2.
Wetland and Stream Locations in the Study Area.

0 0.1 0.2 0.4 Mile

HERRERA

Esri Imagery (2022)

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2. Methods

Methods used to delineate and rate wetlands, streams, and buffers comply with WSDOT, federal, state, and local guidance. More information about the methodology used in the wetland and stream delineations performed for Stage 2 is available in Section 3 and Appendix A of the Stage 2 WSAR (WSDOT 2022).

2.1. Review of Available Information

A literature review was performed to ascertain the historical and current presence of wetlands and streams within and near the study area. Sources of information are listed below.

- Soil descriptions for the study area (NRCS 2023d, 2023b, 2023c)
- Soil survey maps for the study area (NRCS 2023d)
- Climate and precipitation data (NRCS 2023a; NOAA 2023)
- National Wetlands Inventory (NWI) map of wetland areas in the study area (USFWS 2023a)
- Aerial photographs of the study area (ESRI Imagery 2022)
- Pierce County public geographic information system (GIS) (tax parcels, road locations, mapped streams, and watersheds) (Pierce County 2021a, 2021b, 2021d)
- Hydrographic data (stream locations) for Pierce County (Pierce County 2021c)
- Washington State Priority Habitat and Species (PHS) database (WDFW 2023a)
- SalmonScape computer mapping system (WDFW 2023b)
- Washington State Fish Passage map (WDFW 2023c)
- WSDOT Stormwater Features Inventory (SFI) mapping (WSDOT 2023a)
- Google Earth historical aerial mapping (Google Earth Pro 2023)

2.2. Site Reconnaissance and Desktop Analysis

Portions of the study area applicable to this report are located on parcels with limited or restricted access due to private ownership. To determine where wetland and/or stream conditions are likely present in these areas, wetland biologists conducted a site reconnaissance and desktop analysis using available public-domain information on the subject properties. Total wetland and stream sizes and boundaries of offsite and inaccessible features were estimated based on the desktop analysis.

2.3. Wetland Delineation, Classification, and Functions

Wetland biologists evaluated field conditions by traversing the study area and noting wetlands, streams, and other aquatic features in April, May, June, November, and December of 2022. Biologists conducted the wetland delineations in the study area in accordance with the *Regional Supplement to the U.S. Army Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region* (Environmental Laboratory 2010), which is consistent with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

Wetlands delineated in the study area were classified according to the U.S. Fish and Wildlife Service (USFWS) classification system (FGDC 2013). The wetlands were also classified according to the hydrogeomorphic system (Brinson 1993).

Wetlands were evaluated using the Washington State Wetland Rating System for Western Washington: 2014 Update (referred to as the Ecology rating system; Hruby 2014) because it is approved by Ecology for evaluating wetlands in Washington, and because it is required by the City of Fife (FMC 17.17.020) and the City of Edgewood (EMC 14.40.020).

Wetlands were evaluated using the Wetland Functions Characterization Tool for Linear Projects (hereafter referred to as the best professional judgement [BPJ] Tool) (Null et al. 2000).

2.4. Stream Delineation and Classification

Biologists delineated the ordinary high water marks (OHWMs) of stream channels within the study area between April and June 2022 using the definition provided in the WAC, Section 222-16-010, which has been adopted by the City of Fife and the City of Edgewood. Streams were classified in the cities of Fife (FMC 17.15.060) and Edgewood (EMC 14.50.020) per the Washington State Department of Natural resources (DNR) water typing system based on WAC 222-16-030.

2.5. Buffers

City of Fife (Fife 2022), City of Edgewood (Edgewood 2022a) and the City of Puyallup (Puyallup 2023) buffers were applied to the wetlands and streams in the study area.

Wetland buffer widths range from 60 to 165 feet depending on wetland rating, habitat scores, and intensity of land use impacts. Buffers were applied based on high intensity land use, except where noted.

Stream buffer widths range from 60 to 100 feet per local code, depending on stream classification and fish use.

Where wetland and stream buffers overlap, the buffers are combined; and no distinction is made between wetland and stream buffer areas.

2.6. Ditch Identification

If a ditch was excavated in uplands and does not carry a stream or tributary that is a water of the United States, the ditch bottom was surveyed in the field or estimated using desktop analysis methods described in the *Site Reconnaissance and Desktop Analysis* section above. The ditch bottom is shown on figures in this report with a jurisdictional ditch centerline. Ditches in the study area were named according to the biologist team (SISU or HEC) that identified the ditch and the order in which they were documented during field investigations (e.g., D-HEC-5, D-HEC-6, etc.).

2.7. Species and Habitats of Interest

WSDOT consulted with the National Marine Fisheries Service (NMFS) and USFWS to address potential Stage 2 impacts to federally listed Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss*), and bull trout (*Salvelinus confluentus*) (WSDOT 2018, 2020a, 2020b).

3. Existing Conditions

3.1. Landscape Setting

The study area is in the lower extent of WRIA 10: Puyallup-White in the Hylebos Creek-Frontal Commencement Bay and Puyallup River watersheds (12-digit Hydrologic Unit Codes 171100190205 and 171100140502) (Ecology 2023; USDA 2018). Surface water in the study area flows through the Puyallup River basin, Wapato Creek basin, and Hylebos Creek basin before entering Commencement Bay via the Hylebos and Blair Waterways in the Port of Tacoma area (Ecology 2023; Pierce County 2021d).

The study area contains dense industrial, commercial, and residential developments as well as agricultural land use (WSDOT 2016). The vegetation and hydrology in the study area have been impacted by the surrounding land use activities. Vegetation is largely disturbed amid a variety of upland, wetland, riparian, and stream habitats. These habitats contain a mix of native and nonnative trees, shrubs, and herbaceous vegetation. Hydrology in the study area has been altered by fill material placement and surface water rerouting through agricultural and roadside ditches. Land development in the Stage 2 corridor is ongoing, and likely to have continued impacts on vegetation and hydrology in the study area (WSDOT 2016).

3.2. Climate and Growing Season

Climate data were obtained from the Natural Resources Conservation Service (NRCS) WETS database (NRCS 2023a). The historical average measurements were based on data collected in Tacoma, Washington (WETS Station Tacoma No. 1) for the period of record 1981 to 2010. The station is approximately 2 miles west of the study area.

According to WETS (NRCS 2023a), the growing season, measured at 32°F or greater, in the vicinity of the study area demonstrates a 70 percent probability of occurring between April 16 and October 24 (191 days).

3.2.1. Precipitation

Precipitation was evaluated for a 3-month period prior to field investigations, which occurred in April, May, June, November, and December of 2022. Table 1 shows this information.

Table 1. Monthly Precipitation Data for Tacoma, Washington.

Month	Long-Term Rainfall Records[a]		Rainfall[a]	Condition Dry, Wet, Normal[b]	Results of Precedent Precipitation Analysis: Drier than Normal, Normal, Wetter than Normal
	3 Yrs. in 10 Less Than	3 Yrs. in 10 More Than			
December 2022	4.20	6.50	8.67	Wet	Drier than Normal
November 2022	4.59	7.79	5.67	Normal	Drier than Normal
October 2022	2.22	4.33	2.03	Dry	Drier than Normal
September 2022	0.59	1.47	0.06	Dry	Normal
August 2022	0.31	0.95	0.57	Normal	Normal
May 2022	1.15	2.50	3.66	Wet	Normal
April 2022	1.98	3.54	2.98	Normal	Normal
March 2022	3.18	4.78	3.25	Normal	Normal
February 2022	2.29	4.40	3.11	Normal	Wetter than Normal
January 2022	4.22	7.22	9.39	Wet	Wetter than Normal

[a] NRCS 2023a.

[b] Conditions are considered normal if they fall within the low and high range around the average.

When considering the 3 months preceding each month in which field investigations occurred, wetter than normal precipitation characteristics were present in January and February. Normal conditions were present in March, April, and May. Drier than normal conditions were present during the late November and early December site visits. Methodology and calculations for climatic conditions for the preceding months are available in Appendix A-1 of the Stage 2 WSAR.

Spring fieldwork began on April 29, 2022, and ended on June 3, 2022. Late fall fieldwork began on November 30, 2022, and ended on December 7, 2022. Due to the extended timeframe over which fieldwork was conducted, to determine if light, moderate, or heavy precipitation occurred in the 10 days prior to field work, each day from April 19, 2022 to June 3, 2022, and from November 20, 2022 to December 7, 2022 was evaluated for average precipitation (Tables 2-A through 2-E) (NOAA 2023).

Table 2-A. Climatological Data for TACOMA NO. 1, WA: April 19–April 30, 2022.

Date	Temperature				HDD	CDD	Precip.	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2022-04-19	56	41	48.5	-3.7	16	0	0.05		
2022-04-20	54	39	46.5	-5.9	18	0	0.10		
2022-04-21	56	44	50.0	-2.6	15	0	0.18		
2022-04-22	60	43	51.5	-1.3	13	0	0.01		
2022-04-23	62	43	52.5	-0.5	12	0	0.00		
2022-04-24	71	41	56.0	2.8	9	0	0.00		
2022-04-25	59	49	54.0	0.6	11	0	0.08		
2022-04-26	55	43	49.0	-4.6	16	0	0.13		
2022-04-27	56	41	48.5	-5.3	16	0	0.01		
2022-04-28	58	43	50.5	-3.5	14	0	T		
2022-04-29	62	45	53.5	-0.8	11	0	0.03		
2022-04-30	62	48	55.0	0.5	10	0	0.04		
Sum	**1,683**	**1,218**	**–**	**–**	**492**	**0**	**2.98**		**–**
Average	**56.1**	**40.6**	**48.4**	**–3.4**	**–**	**–**	**–**	**–**	
Normal	**59.8**	**43.7**	**51.8**	**–**	**398**	**0**	**3.39**		

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).	
Maximum Temperature: 4 p.m.	CDD = Cooling degree days (degrees that a day's average temperature is above 65°Fahrenheit)
Minimum Temperature: 4 p.m.	HDD = Heating degree days (degrees that a day's average temperature is below 65°Fahrenheit)
Precipitation: 4 p.m.	Precip. = Precipitation
	M = Missing Data T = Trace

For the month:
red = highest temperature

Table 2-B. Climatological Data for TACOMA NO. 1, WA: May 2022.

Date	Temperature				HDD	CDD	Precip.		
	Maximum	Minimum	Average	Departure					
2022-05-01	62	48	55.0	0.3	10	0	0.00		
2022-05-02	58	48	53.0	-1.9	12	0	0.37		
2022-05-03	55	48	51.5	-3.7	13	0	T		
2022-05-04	67	46	56.5	1.1	8	0	0.00		
2022-05-05	60	45	52.5	-3.1	12	0	0.05		
2022-05-06	55	45	50.0	-5.9	15	0	0.49		
2022-05-07	54	47	50.5	-5.6	14	0	0.66		
2022-05-08	54	41	47.5	-8.8	17	0	0.00		
2022-05-09	58	42	50.0	-6.5	15	0	0.03		
2022-05-10	62	42	52.0	-4.8	13	0	0.00		
2022-05-11	61	42	51.5	-5.5	13	0	0.00		
2022-05-12	55	47	51.0	-6.2	14	0	0.15		

Table 2-B (continued). Climatological Data for TACOMA NO. 1, WA: May 2022.

Date	Temperature				HDD	CDD	Precip.		
	Maximum	Minimum	Average	Departure					
2022-05-13	56	42	49.0	-8.4	16	0	0.00		
2022-05-14	67	47	57.0	-0.6	8	0	0.04		
2022-05-15	62	51	56.5	-1.3	8	0	0.52		
2022-05-16	61	52	56.5	-1.5	8	0	0.02		
2022-05-17	62	44	53.0	-5.2	12	0	0.00		
2022-05-18	58	44	51.0	-7.4	14	0	0.18		
2022-05-19	58	45	51.5	-7.0	13	0	0.00		
2022-05-20	63	44	53.5	-5.2	11	0	0.00		
2022-05-21	67	44	55.5	-3.4	9	0	0.00		
2022-05-22	73	44	58.5	-0.5	6	0	0.00		
2022-05-23	69	53	61.0	1.8	4	0	0.00		
2022-05-24	67	52	59.5	0.2	5	0	0.01		
2022-05-25	70	53	61.5	2.0	3	0	0.01		
2022-05-26	66	53	59.5	-0.1	5	0	0.14		
2022-05-27	62	52	57.0	-2.8	8	0	0.80		
2022-05-28	56	49	52.5	-7.4	12	0	0.12		
2022-05-29	61	49	55.0	-5.0	10	0	0.06		
2022-05-30	61	46	53.5	-6.6	11	0	0.01		
2022-05-31	67	47	57.0	-3.3	8	0	0.00		
Sum	**1,907**	**1,452**	**–**	**–**	**327**	**0**	**3.66**		
Average	**61.5**	**46.8**	**54.2**	**-3.6**	**–**	**–**	**–**		
Normal	**66.5**	**49.1**	**57.8**	**–**	**229**	**6**	**2.00**		

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).	
Maximum Temperature: 4 p.m.	CDD = Cooling degree days (degrees that a day's average temperature is above 65°Fahrenheit)
Minimum Temperature: 4 p.m.	HDD = Heating degree days (degrees that a day's average temperature is below 65°Fahrenheit)
Precipitation: 4 p.m.	Precip. = Precipitation
	M = Missing Data T = Trace

For the month:

red = highest temperature **blue = lowest temperature** **green = most precipitation in 1 day**

Table 2-C. Climatological Data for TACOMA NO. 1, WA: June 1–June 3, 2022.

Date	Temperature				HDD	CDD	Precip.	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2022-06-01	70	55	62.5	2.1	2	0	0.00		
2022-06-02	72	54	63.0	2.5	2	0	0.08		
2022-06-03	65	56	60.5	-0.1	4	0	0.60		
Sum	**207**	**165**	**–**	**–**	**8**	**0**	**0.68**		**–**
Average	**69.0**	**55.0**	**62.0**	**–**	**–**	**–**	**–**	**–**	
Normal	**71.1**	**53.4**	**62.2**	**–**	**106**	**24**	**1.42**		

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).	
Maximum Temperature: 3 p.m.	CDD = Cooling degree days (degrees that a day's average temperature is above 65°Fahrenheit)
Minimum Temperature: 3 p.m.	HDD = Heating degree days (degrees that a day's average temperature is below 65°Fahrenheit)
Precipitation: 3 p.m.	Precip. = Precipitation
	M = Missing Data T = Trace
Normal values are for the entire month.	

Table 2-D. Climatological Data for TACOMA NO. 1, WA: November 20–November 30, 2022.

Date	Temperature				HDD	CDD	Precip.	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2022-11-20	49	29	39	-6.5	0	26	0	M	
2022-11-21	49	35	42	-3.3	2	23	0	M	
2022-11-22	51	41	46	0.9	6	19	0.99	M	
2022-11-23	52	44	48	3.1	8	17	0	M	
2022-11-24	53	33	43	-1.7	3	22	0.01	M	
2022-11-25	46	39	42.5	-2	3	22	0.72	M	
2022-11-26	47	32	39.5	-4.8	0	25	0.03	M	
2022-11-27	48	39	43.5	-0.6	4	21	0.08	M	
2022-11-28	40	38	39	-4.9	0	26	0.02	M	
2022-11-29	42	32	37	-6.8	0	28	0.41	M	
2022-11-30	43	32	37.5	-6.1	0	27	1.20	M	
Sum	**520**	**394**	**–**	**–**	**256**	**0**	**3.46**		**–**
Average	**47.3**	**35.8**	**41.5**	**–**	**–**	**–**	**–**	**–**	
Normal	**52.4**	**40.5**	**46.5**	**–**	**556**	**0**	**6.5**		

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).	
Maximum Temperature: 4 p.m.	CDD = Cooling degree days (degrees that a day's average temperature is above 65°Fahrenheit)
Minimum Temperature: 4 p.m.	HDD = Heating degree days (degrees that a day's average temperature is below 65°Fahrenheit)
Precipitation: 4 p.m.	Precip. = Precipitation
	M = Missing Data T = Trace
For the month:	
green = most precipitation in 1 day	
Normal values are for the entire month.	

Table 2-E. Climatological Data for TACOMA NO. 1, WA: December 1–December 5, 2022.

Date	Temperature				HDD	CDD	Precip.	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2022-12-1	38	31	34.5	-8.9	30	0	0.1	M	
2022-12-2	40	28	34	-9.3	31	0	0.06	M	
2022-12-3	46	28	37	-6.1	28	0	0.45	M	
2022-12-4	41	28	34.5	-8.5	30	0	0.54	M	
2022-12-5	40	28	34	-8.8	31	0	0.06	M	
2022-12-6	44	37	40.5	-2.2	24	0	0.11	M	
2022-12-7	47	38	42.5	-0.1	22	0	0.05	M	
Sum	**205**	**143**	**–**	**–**	**150**	**0**	**1.21**		**–**
Average	**41.0**	**28.6**	**34.8**	**–**	**–**	**–**	**–**	**–**	
Normal	**47.3**	**36.9**	**42.1**	**–**	**710**	**0**	**6.02**		

Observations for each day cover the 24 hours ending at the time given below (Local Standard Time).	CDD = Cooling degree days (degrees that a day's average temperature is above 65°Fahrenheit)
Maximum Temperature: 4 p.m.	HDD = Heating degree days (degrees that a day's average temperature is below 65°Fahrenheit)
Minimum Temperature: 4 p.m.	Precip. = Precipitation
Precipitation: 4 p.m.	M = Missing Data T = Trace
Normal values are for the entire month.	

3.3. Wetlands

Six wetlands covering 24.46 acres were identified within the study area analyzed for this report. The wetlands include palustrine emergent (PEM), palustrine scrub shrub (PSS), and palustrine forested (PFO) vegetation classes, and depressional and riverine HGM classes. They are rated as Category II and III wetlands dominated by a variety of woody and herbaceous plant species (Table 3). Wetlands were identified in the cities of Fife and Edgewood. No wetlands were identified within shoreline management jurisdictions. Wetlands are named based on the order in which they were delineated during field investigations (e.g., Wetland 142, Wetland 143, etc.). Wetlands and streams delineated in the study area are shown in Figures 3a through 3g. These figures also show the location of wetland and upland soil pits. Portions of Wetlands 45, 140, and 142 (W45, W140, and W142) boundaries were identified by desktop analysis. Detailed descriptions of each wetland are included in Tables 4 through 9, following Section 3.3.4.

Table 3. Wetlands in the Study Area.

Wetland[a]	Wetland Classification				Wetland Size (acre)	Buffer Width (feet)
	Cowardin[b]	HGM[c]	Ecology[d]	Local Jurisdiction		
45	PEM, PSS, PFO	Depressional	II	II	9.65[e]	165[f]
140	PEM, PFO	Riverine	II	II	1.34[e]	165[f]
142	PSS, PFO	Riverine	II	II	6.27[e]	165[g]
143	PSS	Depressional	III	III	0.02	60[g]
146/148	PEM, PSS	Depressional	III	III	6.95	60[g]
147	PEM, PSS	Depressional	III	III	0.23	60[g]
Total					24.46	NA

[a] Wetland identifier.

[b] Federal Geographic Data Committee (FGDC 2013) or NWI Class based on vegetation: PEM = palustrine emergent, PSS = palustrine scrub-shrub PFO = palustrine forested, (Cowardin et al. 1979).

[c] Hydrogeomorphic classification of wetland based on source and direction of hydrologic conditions and local geomorphology.

[d] Ecology rating (Hruby 2014), which is consistent with the local jurisdiction requirements of the City of Fife and the City of Edgewood.

[e] Wetland extends outside of the Stage 2 study area.

[f] Wetland buffer width according to the City of Edgewood Wetlands Ordinance (Edgewood Municipal Code [EMC] 14.40.030).

[g] Wetland buffer width according to the City of Fife Wetlands Ordinance (Fife Municipal Code [FMC] 17.17.230).

Appendix A includes wetland delineation data sheets. See the Wetland Functions section of this report for additional information on wetland functions and Appendices B and C for wetland rating forms and detailed functional assessment summaries, respectively.

Legend

- Study area
- City limit
- Parcel
- Estimated OHWM
- Flow Direction

Figure 3-A.
Wetlands, Streams and Ditches in the Study Area.

0 15 30 60
Feet

HERRERA

Esri, Aerial (2022)

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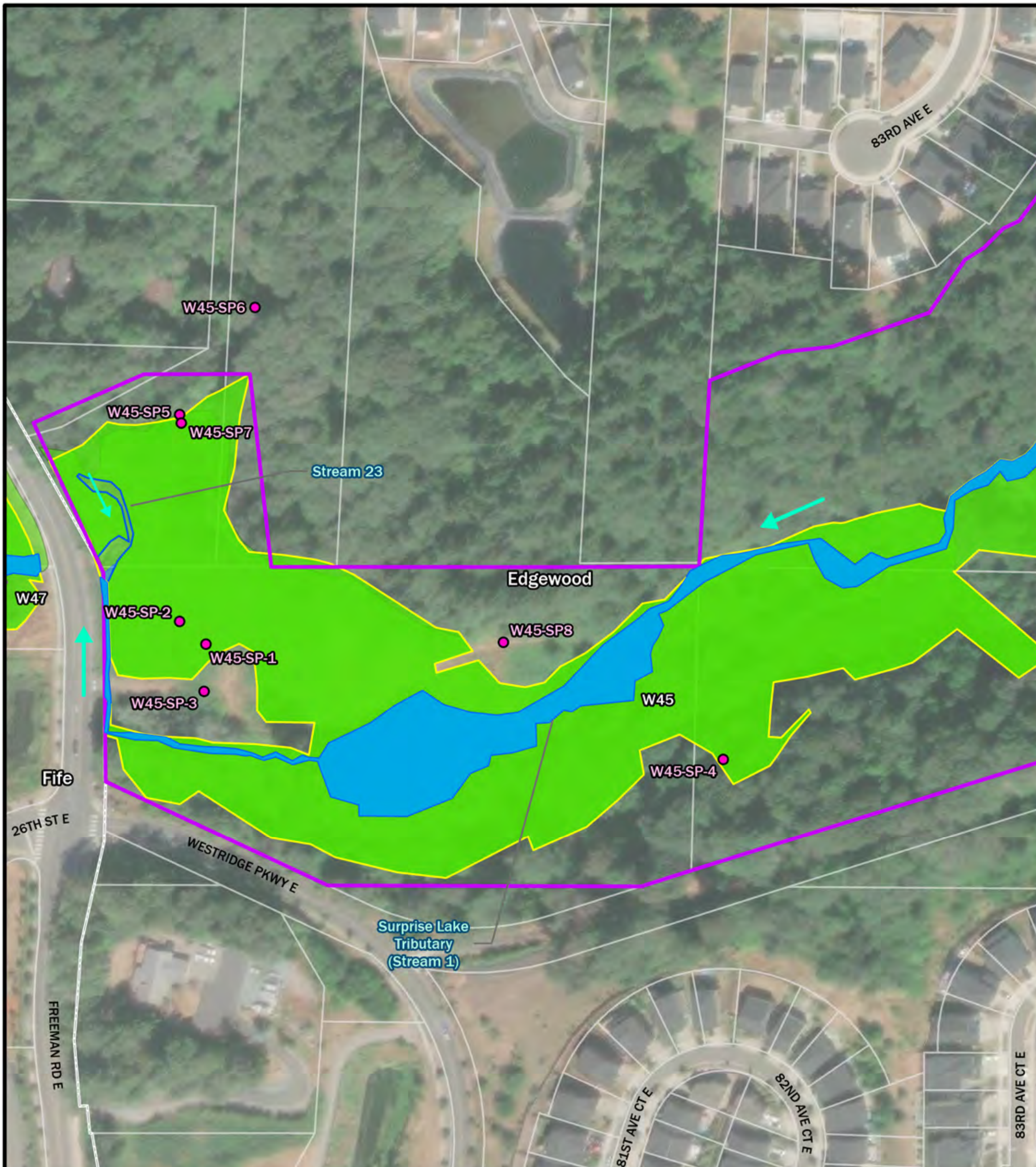

Legend
- Study area
- Wetland area
- City limit
- Parcel
- Soil pit
- Delineated OHWM
- Delineated wetland boundary
- Flow Direction

Figure 3-B.
Wetlands, Streams and Ditches in the Study Area.

N

0 90 180 360 Feet

HERRERA

Esri, Aerial (2022)

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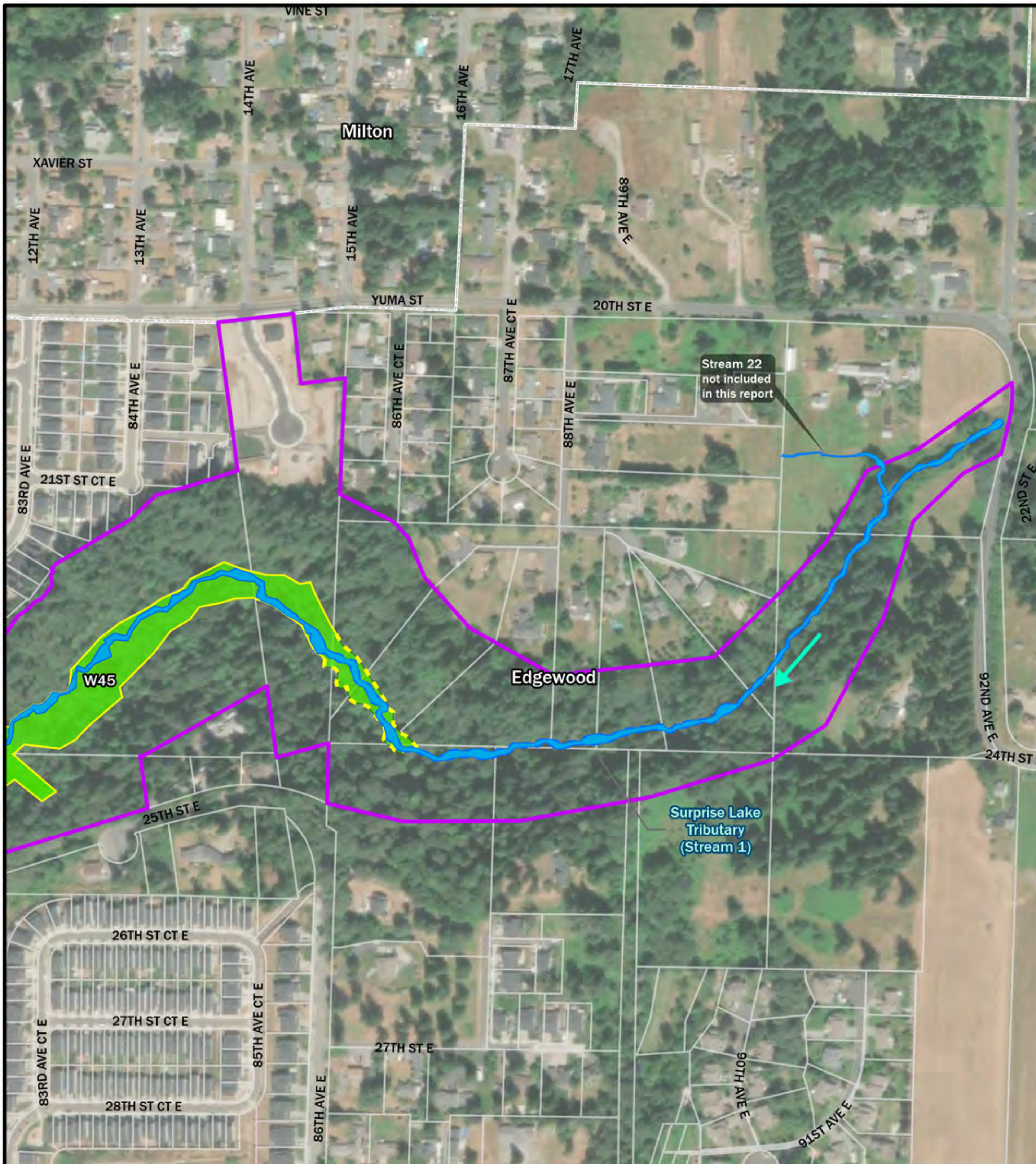

Legend

- Study area
- Wetland area
- City limit
- Parcel
- Delineated OHWM
- Estimated OHWM
- Delineated wetland boundary
- Estimated wetland boundary
- Flow Direction

Figure 3-C.
Wetlands, Streams and Ditches in the Study Area.

0 205 410 820 Feet

HERRERA

Esri, Aerial (2022)

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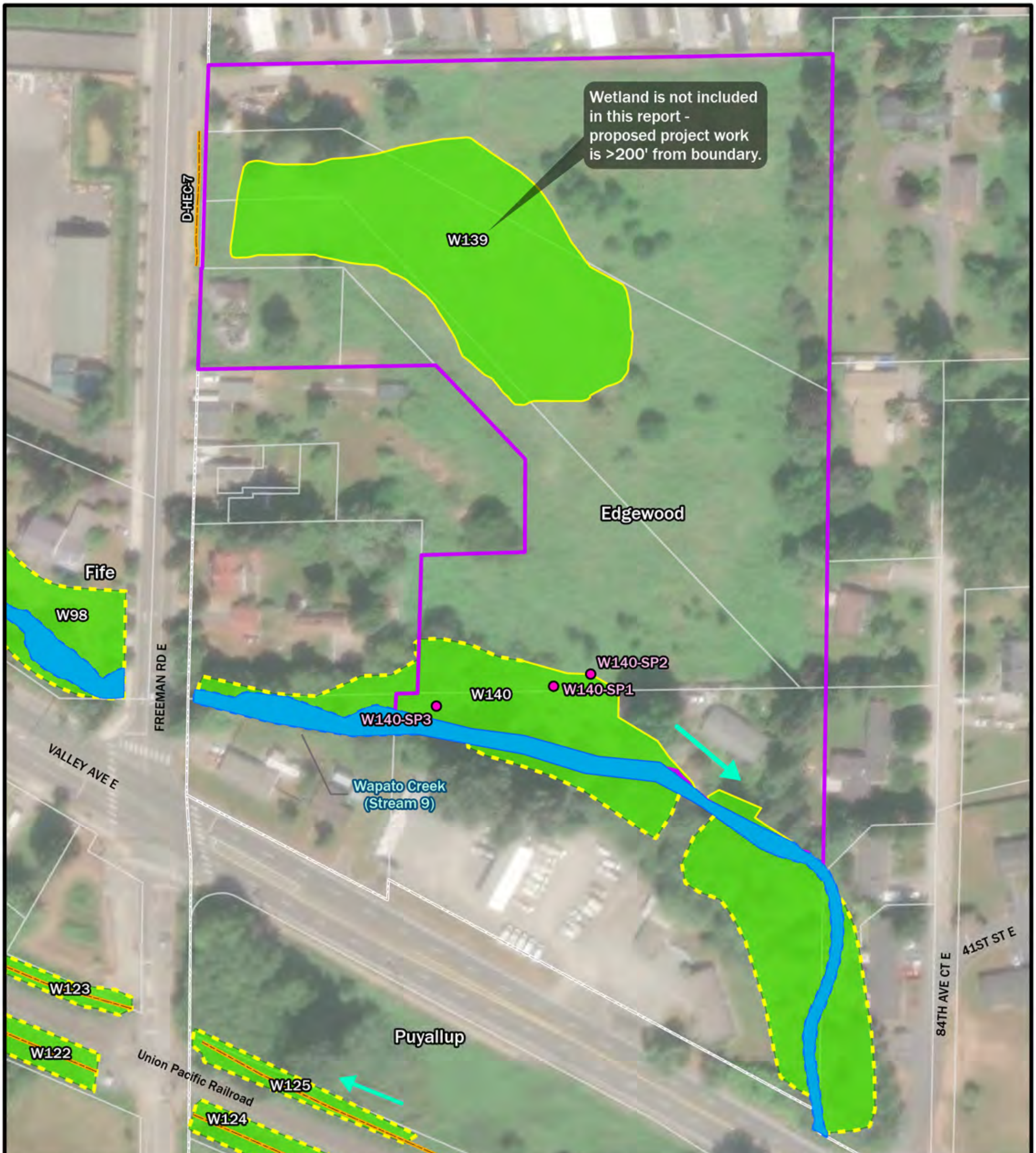

Figure 3-D.
Wetlands, Streams and Ditches in the Study Area.

HERRERA

Esri, Aerial (2022)

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Legend
- Study area
- Wetland area
- City limit
- Parcel
- Soil pit
- Delineated OHWM
- Estimated OHWM
- Delineated wetland boundary
- Estimated wetland boundary
- Surveyed ditches
- Estimated ditch centerline
- Flow Direction

Figure 3-E.
Wetlands, Streams and Ditches in the Study Area.

N

0 90 180 360 Feet

HERRERA

Esri, Aerial (2022)

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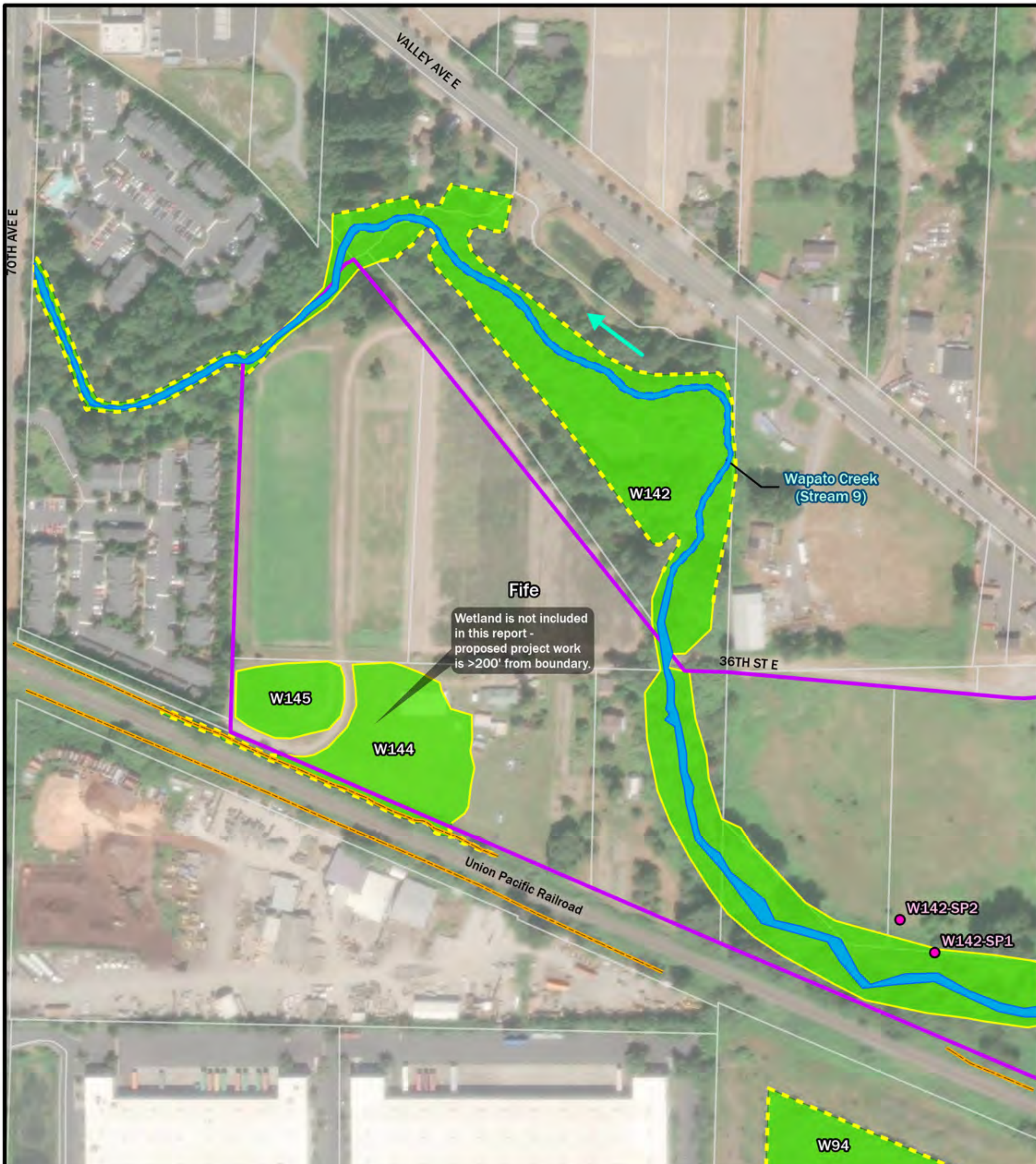

Legend

- Study area
- Wetland area
- City limit
- Parcel
- Soil pit
- Delineated OHWM
- Estimated OHWM
- Delineated wetland boundary
- Estimated wetland boundary
- Estimated ditch centerline
- Flow Direction

Figure 3-F.
Wetlands, Streams and Ditches in the Study Area.

N

0 125 250 500 Feet

HERRERA

Esri, Aerial (2022)

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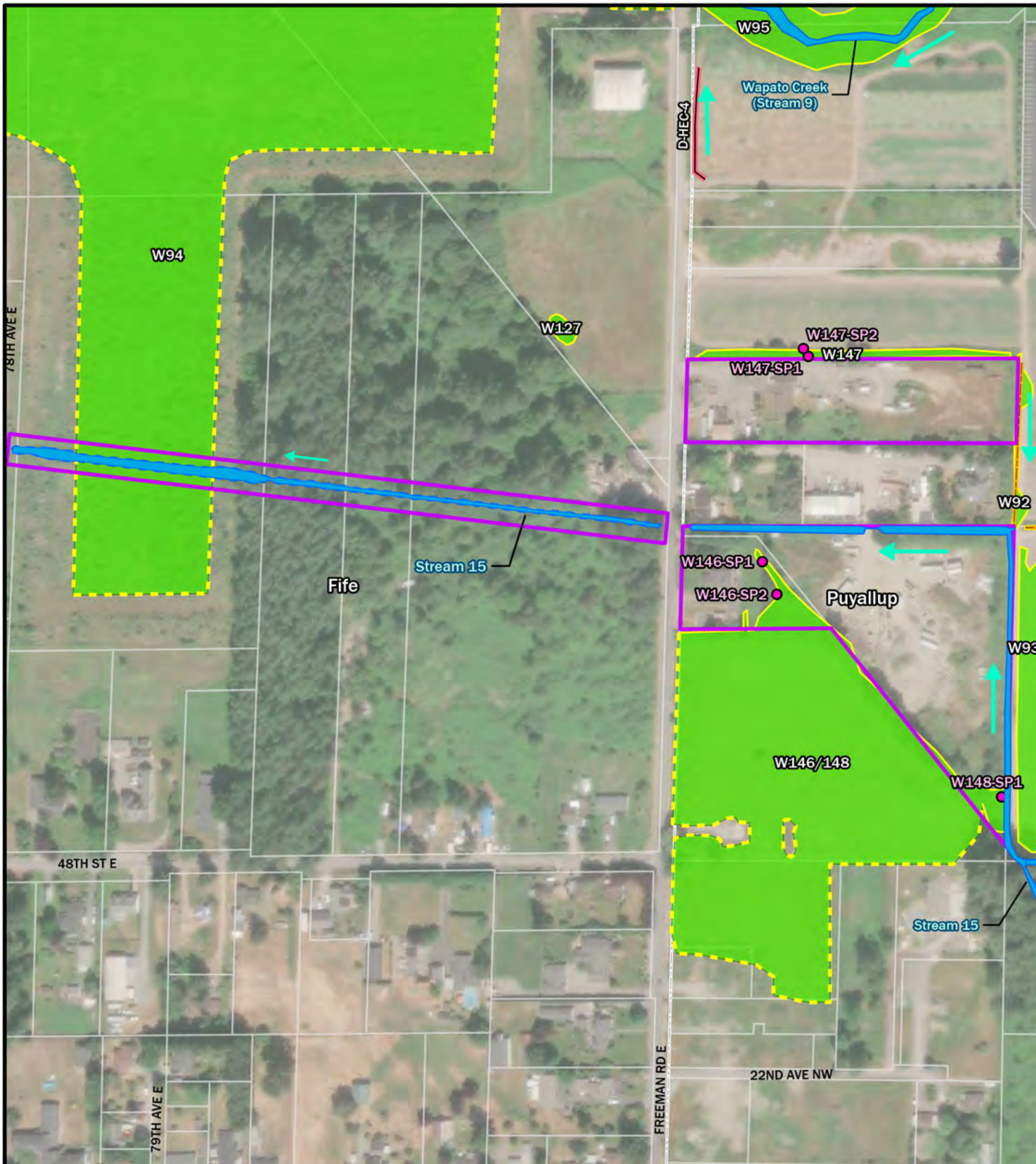

Legend

- Study area
- Wetland area
- City limit
- Parcel
- Soil pit
- Delineated OHWM
- Estimated OHWM
- Delineated wetland boundary
- Estimated wetland boundary
- Surveyed ditches
- Estimated ditch centerline
- Flow Direction

Figure 3-G.
Wetlands, Streams and Ditches in the Study Area.

N

0 137.5 275 550 Feet

HERRERA

Esri, Aerial (2022)

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3.3.1. Previously Mapped Wetlands and Streams

NWI (USFWS 2023), City of Edgewood (Edgewood 2022b), and Pierce County GIS (2021e) indicate the presence of multiple wetlands in and within the vicinity of the portion of the study area covered by this report (Figure 4). NWI also maps Surprise Lake Tributary (Stream 01) and Wapato Creek (Stream 09) as riverine habitat where they flow through the study area. The locations of Stage 2 wetlands delineated by biologists between March 2021 and March 2022 are shown in Figures 2-A through 2-C in the Stage 2 WSAR (WSDOT 2022).

3.3.2. Vegetation

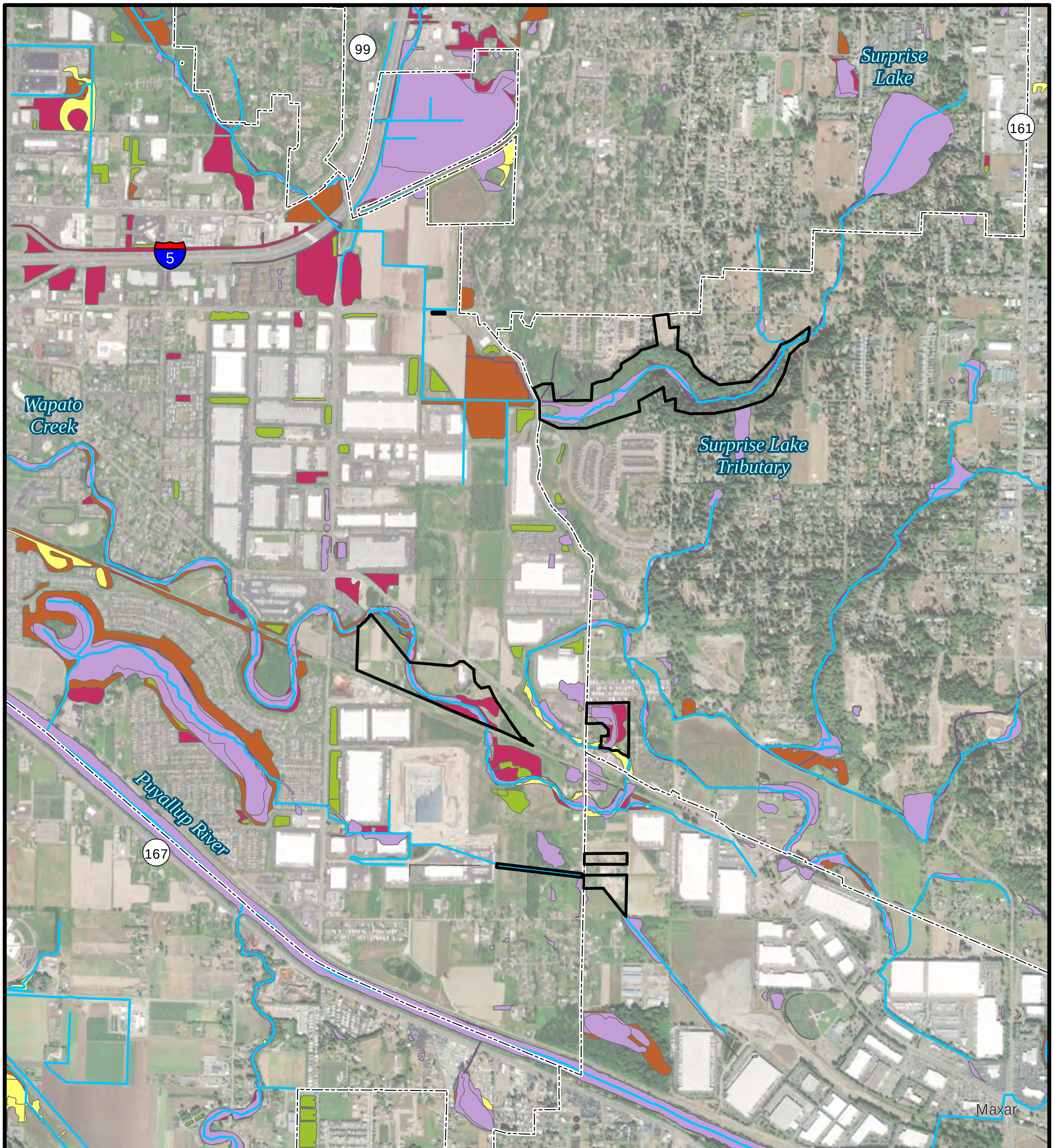
Wetland vegetation in the study area consists of a mix of native and nonnative trees, shrubs, and herbaceous vegetation. Palustrine emergent wetlands are characterized by blue grasses (*Poa* spp.), reed canarygrass (*Phalaris arundinacea*), creeping buttercup (*Ranunculus repens*), common rush (*Juncus effusus*), and velvet grass (*Holcus lanatus*). Palustrine forested and scrub shrub wetlands are dominated by deciduous vegetation including small to large alder (*Alnus rubra*), willow (*Salix* spp.), and cottonwood (*Populus* spp.) trees and woody shrubs including Himalayan blackberry (*Rubus armeniacus*), hardhack (*Spirea douglasii*), and red osier dogwood (*Cornus sericea*). Portions of the study area adjacent to roadways are generally limited to mowed grasses, Himalayan blackberry, reed canarygrass, and patches of forested and shrub species including cottonwood and willows. Areas within the northern and central portions of the study area have been used for agricultural crop production for decades. Vegetation in these areas is sparse and consists of relic agricultural crops and reed canarygrass.

3.3.3. Soils

Eight types of soil are mapped within the study area (Figure 5): Sultan silt loam, Briscot loam, Puyallup fine sandy loam, Xerorthents fill, Kitsap silt loam, Puget silty clay loam, Shalcar muck and Alderwood gravelly sandy loam (NRCS 2023c). Sultan silt loam is the dominant soil within the study area, followed by Briscot loam and Puyallup fine sandy loam. Xerorthents fill, Kitsap silt loam, Puget silty clay, Shalcar muck, and Alderwood gravelly sandy loam account for less than 10 percent of mapped soils in the study area. Sultan silt loam is a very deep, moderately well-drained, and hydric soil formed in recent alluvium on floodplains at or near seal level. Briscot loam is a very deep, poorly drained, and hydric soil formed in recent alluvium on floodplains. Puyallup fine sandy loam consists of very deep, well drained hydric soils formed in recent alluvium on floodplains and low terraces. Xerorthents consists of urban fill material, which is not considered hydric. Kitsap silt loam is a very deep, moderately drained and non-hydric soil consisting of glacial lacustrine deposits formed on terraces and escarpments. Puget silty clay loam is a very deep, poorly drained hydric soil formed in recent alluvium on floodplains and low reiver terraces. Shalcar muck is a very poorly drained hydric soil that consists of organic deposits over alluvium or glacial outwash parent material. Alderwood gravely sandy loam is a moderately well drained and hydric soil composed of glacial outwash over dense glaciomarine deposits on hills and ridges (NRCS 2023b).

3.3.4. Hydrology

The Wapato and Hylebos watersheds are rain-dominated systems that produce increased stream flows between October and March in response to rainstorms in the wet season of the year (EarthCorps 2016). The combination of increased impervious surfaces and other forms of land development has increased surface runoff, which accounts for a significant source of hydrology to most wetlands in the study area and shorter flow duration in roadside ditches and some tributary streams. Other sources of hydrology include a seasonal high water table and precipitation. Three wetlands receive overbank flooding from adjacent streams: Wetland 45 from Surprise Lake Tributary and Wetland 140 and Wetland 142 from Wapato Creek (Figure 2).



Legend

- Study area
- City limit
- Stream (Pierce County)
- City of Edgewood Wetlands
- Pierce County Wetlands

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

Figure 4.
Previously Mapped Wetlands and Streams Within the Vicinity of the Study Area.

N

0 0.15 0.3 0.6 Mile

HERRERA

Esri Imagery (2022), Pierce County, City of Edgewood, City of Puyallup

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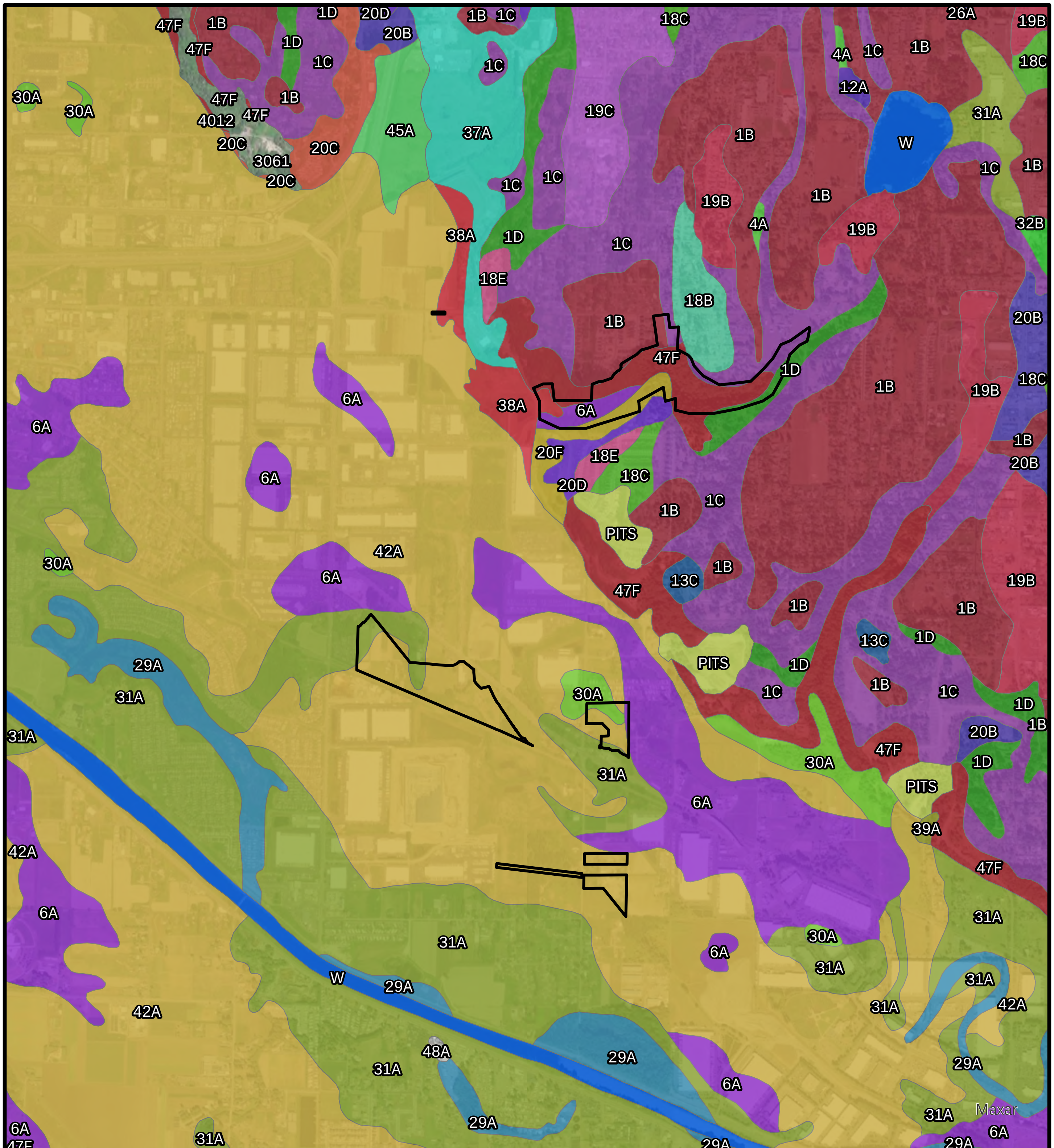

Legend

Study area

Soil type

- 12A - Dupont muck
- 13C - Everett very gravelly sandy loam, 8 to 15 percent slopes
- 18B - Indianola loamy sand, 0 to 5 percent slopes
- 18C - Indianola loamy sand, 5 to 15 percent slopes
- 18E - Indianola loamy sand, 15 to 30 percent slopes
- 19B - Kapowsin gravelly ashy loam, 0 to 6 percent slopes
- 19C - Kapowsin gravelly ashy loam, 6 to 15 percent slopes
- 1B - Alderwood gravelly sandy loam, 0 to 8 percent slopes
- 1C - Alderwood gravelly sandy loam, 8 to 15 percent slopes
- 1D - Alderwood gravelly sandy loam, 15 to 30 percent slopes
- 20B - Kitsap silt loam, 2 to 8 percent slopes
- 20C - Kitsap silt loam, 8 to 15 percent slopes
- 20D - Kitsap silt loam, 15 to 30 percent slopes
- 20F - Kitsap silt loam, 30 to 65 percent slopes
- 26A - Norma fine sandy loam
- 29A - Pilchuck fine sand
- 30A - Puget silty clay loam
- 31A - Puyallup fine sandy loam
- 32B - Ragnar sandy loam, 0 to 6 percent slopes
- 37A - Semiahmoo muck
- 38A - Shalcar muck
- 39A - Snohomish silty clay loam
- 42A - Sultan silt loam
- 45A - Tisch silt
- 47F - Xerochrepts, 45 to 70 percent slopes
- 4A - Bellingham silty clay loam
- 6A - Briscot loam
- PITS - Pits
- W - Water

Figure 5.
Mapped Soils Within the Vicinity of the Study Area.

N

0 0.125 0.25 0.5 Mile

HERRERA

Esri Imagery (2022)

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Table 4. Wetland 45 Summary.

Wetland 45 Information Summary	
Location	East of Freeman Road East and north of 25th Street East, straddling Surprise Lake Tributary (Stream 01)
Date(s) Evaluated	4/23/2019, 4/25/2019, 5/11/2021, 5/13/2021, 6/2/2022, 6/3/2022

Local Jurisdiction	City of Edgewood
Ecology Rating (2014)	Category II
Local Rating	Category II
City of Edgewood Buffer Width	165 feet
Wetland Size	9.65 acres
Cowardin Class	PEM, PSS, PFO
HGM Class	Depressional/Riverine/Slope
Wetland Data Sheet(s)	Appendix A: W45-SP1, W45-SP2, W45-SP4, W45-SP7
Upland Data Sheet(s)	Appendix A: W45-SP3, W45-SP5, W45-SP6, W45-SP8

Wetland Delineation	
Dominant Vegetation	Trees: red alder (Alnus rubra) Shrubs: Himalayan blackberry, red elderberry (*Sambucus racemosa*), salmonberry (Rubus spectabilis) Herbaceous: reed canarygrass creeping buttercup
Soils	Soil pits SP1, SP2, SP4, SP7, and SP8 dug in Wetland 45 contained hydric soils. Indicators included histosol (A1), hydrogen sulfide (A4), histic epipedon (A2), depleted matrix (F3), redox dark surface (F6), and Depleted Below Dark Surface (A11).
Hydrology	Groundwater, precipitation, constricted outlet due to an undersized culvert at Freeman Road East, and overbank flooding from Surprise Lake Tributary (Stream 01) contribute to the hydrology of this wetland. Surprise Lake Tributary and Stream 23 flow through the wetland. Stream 01 is its outlet. Soils were saturated to within 9 inches of the surface, and the water table was observed within 6 inches of the surface in the PEM and PFO areas. Indicators high water table (A2), saturation (A3), and hydrogen sulfide (C1) were met.
Rationale for Delineation	All three wetland indicators were met.
Wetland Rating and Functions	
Rationale for Local Rating	The EMC classifies wetlands based on the Washington State Wetland Rating System and on habitat score (EMC 14.40.020.D). Wetland 45 rates as a Category II with a habitat score of 7.
Functions	Water quality and hydrologic functions are moderate, and habitat functions are of high quality. Function summaries are provided in Table 10 and Appendix C.
Wetland Buffers	
Buffer Condition	The wetland buffer condition is high to poor, consisting of undeveloped forested areas to the north and east, but disturbed by Freeman Road East to the west and residential development to the south. The buffer has also been disturbed by the presence of encampments of people experiencing homelessness.

[a] Wetland size is estimated due to restricted property access.

Table 5. Wetland 140 Summary.

Wetland 140 Information Summary	
Location	Stradling Wapato Creek (Stream 09) between 84th Avenue Court East and Freeman Road East, north of Valley Avenue East and south of 38th Street East
Date(s) Evaluated	4/29/2022
	
Local Jurisdiction	City of Edgewood
Ecology Rating (2014)	Category II
Local Rating	Category II
City of Edgewood Buffer Width	165 feet
Wetland Size	1.34 acres
Cowardin Class	PEM, PFO
HGM Class	Riverine
Wetland Data Sheet(s)	Appendix A: W140-SP1, W140-SP3
Upland Data Sheet(s)	Appendix A: W140-SP2
Wetland Delineation	
Dominant Vegetation	Trees: Oregon ash (*Fraxinus latifolia*), Pacific willow (*Salix lucida* ssp. *lasiandra*) Herbaceous: reed canarygrass
Soils	Soil pits SP1 and SP3 dug in Wetland 140 contained hydric soils. Indicators included depleted matrix (F3).
Hydrology	Overbank flows and hyporheic connection to Wapato Creek (Stream 09) provide the primary hydrologic inputs to this wetland. Primary indicators saturation (A3) and high water table (A2) were present.
Rationale for Delineation	All three wetland parameters were met.
Wetland Rating and Functions	
Rationale for Local Rating	The EMC classifies wetlands based on the Washington State Wetland Rating System and on habitat score (EMC 14.40.020.D). Wetland 140 rates as a Category II.
Functions	The wetland has moderate hydrologic functions, high water quality functions, and moderate habitat functions. Function summaries are provided Table 10 and Appendix C.
Wetland Buffers	
Buffer Condition	Single family residences are located north, east, and west of the wetland. Commercial development, including a parking lot, is located south of the wetland. An agricultural field is also located to the north. The buffer is generally in poor condition.

[a] Wetland size is estimated due to restricted property access.

Table 6. Wetland 142 Summary.

Wetland 142 Information Summary	
Location	West of Freeman Road East, south of Valley Avenue East and north of the UPRR, straddling Wapato Creek (Stream 09)
Date(s) Evaluated	5/10/22, 5/25/22
	
Local Jurisdiction	City of Fife
Ecology Rating (2014)	Category II
Local Rating	Category II
City of Fife Buffer Width	165 feet
Wetland Size	6.27 acres
Cowardin Class	PSS, PFO
HGM Class	Riverine
Wetland Data Sheet(s)	Appendix A: W142-SP1, W142-SP3, W142-SP4, W142-SP5
Upland Data Sheet(s)	Appendix A; W142-SP2
Wetland Delineation	
Dominant Vegetation	Trees: Scouler's willow (*Salix scouleriana*), black cottonwood (*Populus balsamifera*) Shrub: Himalayan blackberry, snowberry (*Symphoricarpos albus*), Sitka willow (*Salix sitchensis*), hardhack
Soils	Except for SP2, all soil pits dug in Wetland 142 contained hydric soils. Indicators included depleted matrix (F3) and redox dark surface (F6).
Hydrology	Overbank flows and hyporheic connection to Wapato Creek (Stream 09) provide the primary hydrologic inputs to this wetland. Primary indicators oxidized rhizospheres on living roots (C3) and saturation (A3) were met.
Rationale for Delineation	All three wetland parameters were met.
Wetland Rating and Functions	
Rationale for Local Rating	The FMC classifies wetlands based on the Washington State Wetland Rating System and on habitat score (FMC 17.17.010). Wetland 142 rates as a Category II.
Functions	The wetland has moderate hydrologic, water quality, and habitat functions. Function summaries are provided Table 10 and Appendix C. The eastern portion of this wetland is impacted by presence of encampments of people experiencing homelessness
Wetland Buffers	
Buffer Condition	Agricultural areas, disturbed fields, and industrial buildings surround the wetland. Valley Avenue East is to the north and UPRR is adjacent to the wetland's southern boundary. The buffer is generally in poor condition and impacted by encampments of people experiencing homelessness.

[a] Wetland size is estimated due to restricted property access.

Table 7. Wetland 143 Summary.

Wetland 143 Information Summary			
Location	South of 36th Street East, west of Valley Avenue East and 78th Avenue East, north of Wetland 142, Wapato Creek (Stream 09) and UPRR		
Date(s) Evaluated	5/25/22		
		**Local Jurisdiction**	City of Fife
		Ecology Rating (2014)	Category III
		Local Rating	Category III
		City of Fife Buffer Width	60 feet
		Wetland Size	0.02 acre
		Cowardin Class	PSS
		HGM Class	Depressional
		Wetland Data Sheet(s)	Appendix A: W143-SP1
		Upland Data Sheet(s)	Appendix A: W143-SP2
Wetland Delineation			
Dominant Vegetation	Shrub: Sitka willow, black cottonwood saplings Herbaceous: creeping buttercup, common rush		
Soils	Soil pit SP1 dug in Wetland 143 contained hydric soils. Indicators included redox dark surface (F6).		
Hydrology	The wetland is an unmaintained stormwater feature associated with adjacent development. No outlet to the feature was located. Stormwater and precipitation provide the primary hydrologic inputs to this wetland. Primary indicator oxidized rhizospheres on living roots (C3) was met.		
Rationale for Delineation	All three wetland parameters were met.		
Wetland Rating and Functions			
Rationale for Local Rating	The FMC classifies wetlands based on the Washington State Wetland Rating System and on habitat score (FMC 17.17.010). Wetland 142 rates as a Category III.		
Functions	The wetland has moderate hydrologic functions, high water quality functions and low habitat functions. Function summaries are provided Table 10 and Appendix C.		
Wetland Buffers			
Buffer Condition	Disturbed fields and industrial development surround the wetland. Valley Avenue East and 36th Street East are to the north. The buffer is generally in poor condition.		

Table 8. Wetland 146/148 Summary.

Wetland 146/148 Information Summary			
Location	South of 44th Street East, east of Freeman Road East, north of 22nd Avenue Northwest, and south and west of Stream 15		
Date(s) Evaluated	11/30/22, 12/7/22		
		**Local Jurisdiction**	City of Puyallup
		Ecology Rating (2014)	Category III
		Local Rating	Category III
		City of Puyallup Buffer Width	60 feet
		Wetland Size	6.95 acre
		Cowardin Class	PEM, PSS
		HGM Class	Depressional
		Wetland Data Sheet(s)	Appendix A: W146-SP1, W146-SP3
		Upland Data Sheet(s)	Appendix A: W146-SP2
Wetland Delineation			
Dominant Vegetation	Shrub: red-osier dogwood, Himalayan blackberry Herbaceous: Reed canarygrass		
Soils	Soil pits SP1 and SP3 dug in Wetland 146/148 contained hydric soils. Indicators included depleted matrix (F3).		
Hydrology	The wetland outlets to Stream 15. Stormwater and precipitation provide the primary hydrologic inputs to this wetland. Primary indicators high water table (A2) and saturation (A3) were met.		
Rationale for Delineation	All three wetland parameters were met.		
Wetland Rating and Functions			
Rationale for Local Rating	The PMC classifies wetlands based on the Washington State Wetland Rating System, land use intensity, and on habitat score (PMC 21.06.930). Wetland 146/148 rates as a Category III.		
Functions	The wetland has moderate hydrologic functions, high water quality functions and low habitat functions. Function summaries are provided Table 10 and Appendix C.		
Wetland Buffers			
Buffer Condition	Disturbed fields, industrial development, and some residential development surround the wetland. Freeman Road East is to the west. Stream 15 is to the north and east of the wetland. The buffer is generally in poor condition.		

Table 9. Wetland 147 Summary.

<table>
<tr><th colspan="4">Wetland 147 Information Summary</th></tr>
<tr><td>Location</td><td colspan="3">South of Wapato Creek, east of Freeman Road East, north of Stream 15, and west of Wetland 92</td></tr>
<tr><td>Date(s) Evaluated</td><td colspan="3">11/30/22, 12/5/22</td></tr>
<tr><td colspan="2" rowspan="9"></td><td>Local Jurisdiction</td><td>City of Puyallup</td></tr>
<tr><td>Ecology Rating (2014)</td><td>Category III</td></tr>
<tr><td>Local Rating</td><td>Category III</td></tr>
<tr><td>City of Puyallup Buffer Width</td><td>60 feet</td></tr>
<tr><td>Wetland Size</td><td>0.23 acre</td></tr>
<tr><td>Cowardin Class</td><td>PEM, PSS</td></tr>
<tr><td>HGM Class</td><td>Depressional</td></tr>
<tr><td>Wetland Data Sheet(s)</td><td>Appendix A: W147-SP1</td></tr>
<tr><td>Upland Data Sheet(s)</td><td>Appendix A: W147-SP2</td></tr>
<tr><th colspan="4">Wetland Delineation</th></tr>
<tr><td>Dominant Vegetation</td><td colspan="3">Shrub: black plum (Prunus nigra)
Herbaceous: reed canarygrass</td></tr>
<tr><td>Soils</td><td colspan="3">Soil pit SP1 dug in Wetland 147 contained hydric soils. Indicators included depleted below dark surface (A11) and depleted matrix (F3).</td></tr>
<tr><td>Hydrology</td><td colspan="3">The wetland is located in a ditch. No outlet to the feature was located. Precipitation provides the primary hydrologic inputs to this wetland. Primary indicators high water table (A2) and saturation (A3) was met.</td></tr>
<tr><td>Rationale for Delineation</td><td colspan="3">All three wetland parameters were met.</td></tr>
<tr><th colspan="4">Wetland Rating and Functions</th></tr>
<tr><td>Rationale for Local Rating</td><td colspan="3">The PMC classifies wetlands based on the Washington State Wetland Rating System, land use intensity, and on habitat score (PMC 21.06.930). Wetland 147 rates as a Category III.</td></tr>
<tr><td>Functions</td><td colspan="3">The wetland has moderate hydrologic functions, high water quality functions and low habitat functions. Function summaries are provided Table 10 and Appendix C.</td></tr>
<tr><th colspan="4">Wetland Buffers</th></tr>
<tr><td>Buffer Condition</td><td colspan="3">Disturbed fields and industrial development surround the wetland. Freeman Road East is to the west. Wetland 92 and Stream 15 are to the east and south. The buffer is generally in poor condition.</td></tr>
</table>

3.3.5. Wetland Functions

Wetland functions were evaluated using the BPJ Tool (Null et al. 2000) and the *Washington State Wetland Rating System for Western Washington: 2014 Update* (Hruby 2014). In general, most of the wetlands analyzed for this report in the study area provide moderate to high levels of water quality functions, moderate levels of hydrologic functions, and low to moderate levels of habitat functions (Table 10; Appendices B and C). Functions provided by the wetlands in the study area are summarized in Table 10 and further described for each wetland in the sections below. Wetlands have been grouped according to similar functional traits. See the Stage 2 WSAR (WSDOT 2022) for additional information about the methodology used to determine wetland functions.

Table 10. Functions and Values of Wetlands in the Study Area.

Function/Value[a]	Wetland					
	W45	W140	W142	W143	W146/148	W147
Sediment Removal	x	x	x	+	x	x
Nutrient and Toxicant Removal	x	x	x	+	x	+
Flood Flow Alteration	+	+	x	x	+	+
Erosion Control and Shoreline Stabilization	x	x	–	–	x	–
Production and Export of Organic Matter	x	x	x	–	x	–
General Habitat Suitability	+	+	x	–	x	–
Habitat for Aquatic Invertebrates	x	x	x	–	–	x
Habitat for Amphibians	x	x	x	–	–	x
Habitat for Wetland Associated Mammals	x	x	x	–	–	–
Habitat for Wetland–Associated Birds	x	x	x	–	x	x
General Fish Habitat	x	x	x	–	–	–
Native Plant Richness	x	x	x	–	–	–
Educational or Scientific Value	x	x	–	–	–	–
Uniqueness and Heritage	–	–	x	–	–	–

a “–” means that the function is not present; “x” means that the function is present is of lower quality; and “+” means the function is present and is one of the principal wetland functions.

Wetland 45

W45 has been studied since 2019 and is a depressional system with riverine and slope elements. Surprise Lake Tributary (Stream 01) flows through the wetland in a ravine, contributing water from overbank flooding. Stream 23 is a tributary to Surprise Lake Tributary (Stream 01) that flows through the northwest portion of W45. Water also enters the wetland from seeps along the ravine walls. The wetland has a moderate potential to improve water quality due to its depressional HGM class, dense vegetation, and highly constricted outlet due to an undersized culvert under Freeman Road East. These features increase the retention time of surface water in the wetland, allowing for the absorption and filtration of pollutants from surface contribute pollutants to surface water, increasing the wetland's potential to improve water quality in the area. Surprise Lake Tributary has a Section 303(d) listing for mercury where it flows through the site, making the wetland's water quality functions valuable to human society.

W45 has a moderate potential to reduce flooding and stream degradation. The wetland has a highly constricted outlet and a high capacity to store surface water during flood events. Due to the wetland's dense vegetation, water stored during storm events does not flow through quickly, and downstream flooding is reduced. The wetland receives stormwater discharges, and its contributing basin has a high amount of intensive human land use, increasing the wetland's potential to reduce flooding and stream degradation by providing water storage. The hydrological functionality is highly valuable to society because of flooding problems down-gradient of the wetland.

W45 has a moderate potential to provide habitat functions for wildlife because of its high diversity and interspersion of plant classes and hydroperiods, special habitat features, and presence of priority habitats recognized by WDFW. Since 2019 there has been an increase in presence of encampments of people experiencing homelessness within the western portions of this wetland and its buffer. The predominance of high intensity land use in the surrounding area reduces W45's accessibility to undisturbed areas and its potential to provide habitat connectivity for wildlife.

Wetlands 140 and 142

W140 and W42 are wetlands that are partially or completely riverine in character and are adjacent to Wapato Creek (Stream 09). These wetlands have a moderate to high potential to support water quality functions as a result of surface depressions and plant cover that traps and filters sediments during flood events. The roads, agriculture, and industrial development in the surrounding landscape contribute pollutants to surface water, increasing the wetlands potential to improve water quality in the area. Wapato Creek has a Section 303(d) listing for bacteria, making water quality improvements provided by these wetlands valuable to society.

W140 has high hydrologic functions, and W142 has moderate hydrologic functions. Wapato Creek (Stream 09) is connected to the floodplain within W140, and the presence of woody vegetation slows water velocities during flooding. W142 contains dense woody vegetation, but the wetland is partially disconnected from its floodplain due to downcut segments of Wapato Creek. Flooding has been identified as a problem downgradient of the wetlands, making the flood reduction functions more valuable to society.

These wetlands have a moderate potential to provide habitat based on the presence of multiple interspersed Cowardin classes, hydroperiods, and habitat features. However, this potential is limited by surrounding development and the lack of adjacent undisturbed habitat. The eastern portion of W142 is impacted from encampments of people experiencing homelessness. The occurrence of priority habitats in or near the wetlands and threatened salmon species in Wapato Creek add to the value these wetlands provide to society.

Wetlands 143, 146/148, and 147

W143 has moderate water quality functions due to its depressional HGM class with no outlet, persistent vegetation cover, and stormwater discharge to the wetland. W146/148 has high water quality functions due to its depressional HGM class, persistent vegetation cover, and potential contaminant inputs, including stormwater, an industrial truck yard containing demolition material (i.e., road asphalt, concrete, and derelict equipment), and potential septic inputs. W147 has high water quality functions due to its depressional HGM class with no outlet, persistent vegetation cover, stormwater inputs, and close proximity of land uses that generate pollutants (conventional agricultural field, single family homes, septic systems, and industrial yard). W143 is in the Hylebos Creek Frontal Commencement Bay basin (HUC 12), and Wetlands 146/148 and 147 are in the Puyallup River basin (HUC 12), which has aquatic resources on the Section 303(d) list and established TMDLs, making the water quality functions of these wetlands more valuable to human society.

W143 has high hydrologic functions due to its depressional HGM class, lack of an outlet, and ability to retain higher volumes of water during storm events than under normal conditions. W146/148 has moderate hydrologic functions due to is depressional HGM class, intermittently flowing outlet (Stream 15), and moderately sized contributing basin. W147 also has moderate hydrologic functions due to is depressional HGM class and lack of outlet. Both W146/148 and W147 receive stormwater discharges and excess runoff due to the industrial and highly urbanized land uses. Flooding has been identified as a problem downgradient of all three wetlands, making the flood reduction functions more valuable to society.

W143, W146/148, and W147 provide very little habitat due to the lack of vegetation structure and diversity, hydroperiods, and connectivity to other habitats.

3.3.6. Wetland Buffers

Buffers in the study area are typically in poor condition. Wetland buffers consist of commercial agricultural land; paved roads, sidewalks, and trails; and commercial and residential development. For W45 and W142, portions of the buffers are impacted from encampments of people experiencing homelessness. For W146/148 and W147 there is an industrial truck yard containing demolition material. In vegetated wetland buffers, the vegetation community is typically a mix of native and nonnative weed species. Required wetland buffer widths are identified in the wetland tables in this report. All buffer widths shown also assume the existence of a functional buffer community of native vegetation. If the buffer is inadequately vegetated or vegetated with nonfunctional invasive species, the buffer would be widened if not planted to create the appropriate native plant community. More information and photos of typical wetland buffers are provided in the Stage 2 WSAR.

3.4. Streams

Five streams were identified within the study area described in this report: Stream 01 (Surprise Lake Tributary), Stream 09 (Wapato Creek), Stream 15, Stream 23, and Stream 24 (Figures 3a through 3g; Table 11). These stream numbers adhere to a numbering system used for the Project delineations. Biologists delineated several reaches of Stream 01, Stream 09, and Stream 15 during pervious field work conducted between March 2021 and March 2022. Those segments and overall stream systems are described in the Stage 2 WSAR. The information below applies to stream reaches that were delineated between April and June 2022. A summary of each stream and the reaches studied for this report is provided in Tables 12 through 16 at the end of Section 3.4.3.

Table 11. Streams Within the Study Area.

Stream Name	DNR Water Type[a]	City Buffer Width (feet)
Surprise Lake Tributary (Stream 01)	F, N[b]	60[c]
Upper Wapato Creek (Stream 09)	F	100[c], case-by-case[d]
Stream 15	N/A[e]	case-by-case[d], 50[f]
Stream 23	N/A	60[c]
Stream 24	N/A	case-by-case[d]

[a] DNR Water Type F = fish bearing or with physical criteria to support potential fish use; Type N = non-fish bearing (DNR 2023).

[b] DNR mapping (DNR 2023) does not provide flow information (Type Np = non-fish bearing perennial; Type Ns = non-fish bearing seasonal) for the upper reach of Stream 01.

[c] City of Edgewood buffers applied (Edgewood 2022a).

[d] City of Fife buffers applied (Fife 2022).

[e] During field visits on 04/01/2022 and 04/07/2022, WDFW and PTOI representatives indicated that this stream should be considered an Ns water type.

[f] City of Puyallup buffers applied (Puyallup 2023).

3.4.1. Surprise Lake Tributary – Stream 01

Surprise Lake Tributary (Stream 01) was originally identified in 2018 as part of Stage 1a (WSDOT 2019) and Stage 1b (WSDOT 2020a). Delineation of the stream was resumed for segments that cross the Stage 2 study area. Within the Stage 2 study area, Surprise Lake Tributary is in the Hylebos Creek-Frontal Commencement Bay watershed. The reaches studied for this report start where the stream flows into the study area in a forested parcel east of Freeman Road East (Figure 3-B). The stream flows through Wetland 45 and is joined by Stream 23 before crossing under Freeman Road East and exiting the study area through a culvert under the road. Surprise Lake Tributary (Stream 01) reaches studied for this report are perennially flowing. WDFW (2023b) data show the presence of fish in Surprise Lake Tributary (Stream 01) where it flows through W45. However, three partial fish passage barriers are mapped west of Freeman Road East (WDFW # 935153, 105 S012016a, 935157) and two total barriers are documented east of Freeman Road East (WDFW # 921657, 921658) (WDFW 2023c).

3.4.2. Wapato Creek – Stream 09

The historical headwaters of Wapato Creek (Stream 09) are in Sumner and flow west, north of SR 167, toward North Meridian Avenue in Puyallup. East of North Meridian Avenue, the stream enters a diversion system constructed in 1977 that routes all flow from upstream of this location through a piped conveyance system to a discharge point (WDFW ID 105 R121519a) in the Puyallup River (Stream 17). This diversion system is further explained in Appendix B of the Stage 2 WSAR and is contained entirely underground through a portion of the Stage 2 study area.

The reaches of Wapato Creek (Stream 09) described in this report originate in Edgewood down-gradient of the diversion system in the Hylebos Creek-Frontal Commencement Bay watershed. The stream enters the study area near the border of Fife and Edgewood on the eastside of Freeman Road East, and flows east then south under the bridge crossing of Valley Avenue East where it exits the study area (Figure 3-D) The stream passes through a culvert under the UPRR and flows west for approximately 800 feet, crosses under Freeman Road East through two culverts, then flows northwest through the Puyallup Tribal Terminal Freeman Road East Mitigation Site. Wapato Creek (Stream 09) turns north and exits the Puyallup Tribal Mitigation Site through a culvert under UPRR. The stream re-enters the study area and continues in a northwesterly direction for approximately 1,670 feet before passing under a bridge crossing at 36th Street East where it exits the study area for approximately 1,000 feet. The stream then re-enters the study area and flows southwest for approximately 200 feet before exiting the study area. The reaches of Wapato Creek (Stream 09) described in this report are perennially flowing and have documented occurrence and migration of coho (*O. kisutch*), fall chum (*O. keta*), and steelhead trout, and contains habitat that is accessible to Chinook and pink salmon (*O. gorbuscha*) (WDFW 2023a, 2023b).

3.4.3. Streams 15, 23, and 24 – Unnamed Tributaries

Stream 15 is an unnamed tributary to Oxbow Lake and, ultimately, the Puyallup River (Stream 17) that originates in a stormwater pond north of North Levee Road East and east of Freeman Road East. Analysis of Stream 15 was done via desktop for this report for the portion that flows west from WDFW culvert 935151, west of Wetland 92. Stream 15 flows west for approximately 650 feet and crosses under Freeman Road East through WDFW culvert 935282. West of Freeman Road East, the stream flows for approximately 1,300 feet through a forested parcel and W94 at the Puyallup Tribal Terminal Freeman Road East Mitigation Site before exiting the study area. The stream is estimated to be seasonally flowing in this reach.

Stream 23 is an unnamed tributary to Surprise Lake Tributary (Stream 01) that originates from a hillside seep within Wetland 45 on the east side of Freeman Avenue East. The stream is an excavated channel that conveys flows for approximately 60 feet through dense reed canarygrass before joining Surprise Lake Tributary (Stream 01). Stream 23 is seasonally flowing and is potentially accessible to fish due to a surface connection to Surprise Lake Tributary (Stream 01). See the description of Surprise Lake Tributary (Stream 01) in the Stage 2 WSAR for potential fish use in both streams.

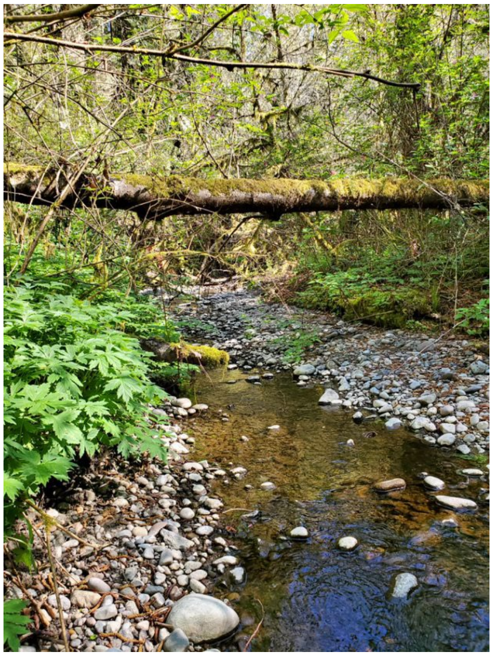
Stream 24 is an unnamed tributary to Surprise Lake Tributary (Stream 01) that is located west of 76th Avenue East on the south side of 20th Street East in the Hylebos Creek-Frontal Commencement Bay watershed. The stream is an excavated channel that conveys flows for approximately 600 feet along the northern edge of agricultural fields before discharging to

Surprise Lake Tributary (Stream 01) via a culvert under an agricultural access road. Stream 24 is seasonally flowing and potentially accessible to fish due to its connection with Surprise Lake Tributary (Stream 01). WDFW documented three-spine stickleback (*Gasterosteus aculeatus*) and sculpin (unknown species) in this system in January 2022 (WDFW 2023c).

Although the streams identified in the Stage 2 study area pass through multiple jurisdictions, the jurisdictions listed in Tables 12 through 16 are only those within the Stage 2 study area related to this report. Local jurisdiction information is based on the following:

- City of Fife Municipal Code (FMC 17.15)
- City of Edgewood Municipal Code (EMC 14.50)
- City of Puyallup Municipal Code (PMC 21.06)

Table 12. Surprise Lake Tributary (Stream 01) Summary.

Surprise Lake Tributary (Stream 01) Information Summary		
	**Stream Name**	Stream 01 – Surprise Lake Tributary
	Long./Lat. ID Number	Start: 47.236288/-122.315317 End: 47.235376/-122.323797
	WRIA Name/ Stream No.	10: Puyallup-White 17110019000741
	WDFW Site ID	Outside of study area: 935153, 105 S012016a, 935157, 921657, 921658 Inside of study area: 935670, 921656,105 S012017a
	Local Jurisdiction	Edgewood
	DNR Water Type	Type F, Type N
	Local Stream Rating	Edgewood: Type Np
	Buffer Width	Edgewood: 60 feet
	Documented Fish Use[a]	Potential presence: Chinook, chum, coho, and pink salmon Observed: coho salmon, *O. mykiss*
Location of Stream Relative to Project Corridor	Surprise Lake Tributary begins within the Edgewood city limits and flows southwest into the study area at the forested parcel on the east side of Freeman Road East.	
Connectivity	Surprise Lake Tributary (Stream 01) flows southwest from Surprise Lake (off site) and into the study area after crossing under Freeman Road East through a culvert. Stream 01 continues to flow west and meets Stream 13 approximately 400 feet west of Freeman Road East. It then flows west and north through agricultural fields before it crosses under I-5 in a culvert and then in an open channel before entering Hylebos Creek immediately south of SR 99. Several small streams converge with Stream 01 including Streams 08, 11, 12, 03 (Stage 1a and Stage 1b), and Streams 13, 19, 23, and 24 (Stage 2). Stream 01 flows through or adjacent to multiple wetlands delineated during Stage 1a and Stage 1b, including Wetlands 45, 47, 53, 4/48/50, 18, 11, and 15.	
Fish Habitat	WDFW (2023b) data show the presence of fish in Surprise Lake Tributary (Stream 01) where it flows through W45. However, three partial fish passage barriers are mapped west of Freeman Road East (WDFW # 935153, 105 S012016a, 935157) and two total barriers are documented east of Freeman Road East (WDFW # 921657, 921658) (WDFW 2023c).	
Riparian/Buffer Condition	The segment of stream east of Freeman Road East consists of Wetland 45 and a relatively undisturbed forested riparian zone dominated by red alder and willows. The forested buffer is in generally good condition with minimal disturbance due to past land use and the presence of encampments of people experiencing homelessness.	

[a] Documented fish species known to occur in the stream from available data sources (WDFW 2023b).

Table 13. Upper Wapato Creek (Stream 09) Summary.

Upper Wapato Creek (Stream 09) Information Summary		
	**Stream Name**	Stream 09 – Wapato Creek
	Long./Lat. ID Number	Start: 47.220852/-122.320488 End: 47.219834/-122.317989 Start: 47.221639/-122.326637 End: 47.225738/-122.366266
	WRIA Name/ Stream No.	10: Puyallup-White 17110019020834
	WDFW Site ID	Outside Study Area: 105 R120920a, 935102, 105 R120921a, 935141, 105 R120918a, 935100 Inside Study Area: 935101
	Local Jurisdiction	Edgewood, Fife
	DNR Water Type	Type F
	Local Stream Rating	Edgewood: Type F Fife: N/A
	Buffer Width	Edgewood: 100 feet Fife: Case-by-case
	Documented Fish Use[a]	Documented: chum, coho, steelhead Potential presence: Chinook, pink

Location of Stream Relative to Project Corridor	Wapato Creek (Stream 09) enters the study area through a culvert at the intersection of Freeman Road East and Valley Avenue East. The stream flows southeast for a length of approximately 700 feet and exits the study area under the bridge crossing of Valley Avenue East (Figure 2). The stream continues south through a culvert under the UPRR, and flows west for approximately 800 feet, crosses under Freeman Road East through two culverts, then flows northwest through the Puyallup Tribal Terminal Freeman Road East Mitigation Site. Wapato Creek (Stream 09) turns north and re-enters the study area through a culvert under UPRR. The stream continues in a northwesterly direction, passes under a bridge crossing at 36th Street East where it exits the study area for approximately 1,000 feet. The stream then re-enters the study area and flows southwest for approximately 200 feet before exiting the study area.
Connectivity	Wapato Creek (Stream 09) converges with Simons Creek within the Edgewood city limits, east of Freeman Road East. The stream turns south at Freeman Road East near the border of the cities of Fife and Edgewood. Wapato Creek (Stream 09) continues south then turns west and is presumably met with overland flow from a ditch (no surface water channel was observed connecting the ditch to the stream channel) draining an agricultural field along Freeman Road East. The stream passes through many culverts in this area including several under Freeman Road East, Valley Avenue East, and the UPRR. In this area, Wapato Creek (Stream 09) passes through several wetlands including Wetlands 140 and 142 described in this report. Wapato Creek (Stream 09) continues northwest through the cities of Fife, Puyallup, and Tacoma for a distance of approximately 4 miles until its outlet to Blair Waterway at Commencement Bay. The stream is freshwater until it approaches the crossing under SR 509 where it becomes tidally influenced.
Fish Habitat	The reaches of Wapato Creek (Stream 09) described in this report have documented occurrence and migration of coho, fall chum, and steelhead trout, and contain habitat that is accessible to Chinook and pink salmon (WDFW 2023a, 2023b).
Riparian/ Buffer Condition	Reed canarygrass is a dominant species in buffer areas. Other commonly observed species included Himalayan blackberry, red osier dogwood, red alder, willows, yellow flag iris, and soft rush. Adjacent land uses consist of industrial facilities, active agricultural fields, the UPRR, Freeman Road East, and Valley Avenue East. The buffer condition is low to moderate and varies concurrently with the adjacent land use.

[a] Documented fish species known to occur in the stream from available data sources (WDFW 2023a, 2023b).

Table 14. Stream 15 Summary.

Stream 15 Information Summary		
	**Stream Name**	Stream 15
	Long./Lat. ID Number	Start: 47.215462/-122.317816 End: 47.21579/-122.32589
	WRIA Name/Stream No.	10: Puyallup-White/NA
	WDFW Site ID	935151, 935282
	Local Jurisdiction	Puyallup, Fife
	DNR Water Type	N/A
	Local Stream Rating	Puyallup: Type III Fife: N/A
	Buffer Width	Puyallup: 50 feet Fife: case-by-case
	Documented Fish Use[a]	Potential presence: resident trout as reported by WDFW downstream of study area. April 1 field visit determined this is unlikely for the Stage 2 reach.
Location of Stream Relative to Project Corridor	Stream 15 enters the study area at WDFW culvert 935151, west of Wetland 92. The stream flows west for approximately 650 feet and crosses under Freeman Road East through WDFW culvert 935282. West of Freeman Road East, the stream flows for approximately 1,300 feet through a forested parcel and W94 at the Puyallup Tribal Terminal Freeman Road East Mitigation Site before exiting the study area.	
Connectivity	The stream is located within the regulated floodplain of the Puyallup River (Stream 17). Stream 15 originates in a stormwater pond north of North Levee Road East and east of Freeman Road East. It flows approximately 200 feet in a culvert under a distribution center access road and empties into an open channel. The stream flows northwest for a length of approximately 1,020 feet in a channel adjacent to agricultural fields and a WSDOT stockpile site. At this location, ditches flowing from the north and south connect to the stream. It then flows through culverts under an agricultural field access road and a berm. The stream continues in a bermed channel for a length of approximately 870 feet through a forested area adjacent to Wetlands 87 and 89 described in the Stage 2 WSAR (WSDOT 20220. It is then joined by Stream 14, at which point it turns north and flows for a length of approximately 660 feet in a channel along the western edge of Wetland 93, where it connects to Wetland 92 and turns west to enter the study area described in this report. Stream 15 flows west for approximately 650 feet and crosses under Freeman Road East through WDFW culvert 935282. West of Freeman Road East, the stream flows for approximately 1,300 feet through a forested parcel and W94 at the Puyallup Tribal Terminal Freeman Road East Mitigation Site before exiting the study area. Stream 15 outlets to Oxbow Lake and ultimately discharges into the Puyallup River (Stream 17). Stream flow appears to be seasonal where it flows through the study area described in this report.	
Fish Habitat	Stream 15 has no documented fish use (WDFW 2023a, 2023b), and WDFW fish passage data indicate no fish use associated with culvert 935282 at the crossing of Freeman Road East (WDFW 2023c). Within the study area limits described in this report, Stream 15 primarily has mud/silt substrate with some areas where reed canarygrass and blackberry have grown across the channel. Instream conditions are generally poor with a lack of channel complexity and refugia.	
Riparian/ Buffer Condition	The buffer condition is poor where the stream is bordered by residential and industrial development. Vegetation along the stream in these locations is dominated by reed canarygrass and Himalayan blackberry. Based on desktop analysis and review of riparian conditions elsewhere within the Stage 2 corridor, buffer condition is fair where the stream passes through a forested area dominated by black cottonwood, Himalayan blackberry, and snowberry The buffer condition appears to be relatively undisturbed where the stream passes through the Puyallup Tribal Terminal Freeman Road East Mitigation Site.	

[a] Documented fish species known to occur in the stream from available data sources (WDFW 2023a, 2023b).

Table 15. Stream 23 Summary.

<table>
<tr><th colspan="3">Stream 23 Information Summary</th></tr>
<tr><td rowspan="9"></td><td>Stream Name</td><td>Stream 23</td></tr>
<tr><td>Long./Lat. ID Number</td><td>Start: 47.235600/-122.323207
End: 47.235405/-122.323757</td></tr>
<tr><td>WRIA Name/Stream No.</td><td>10: Puyallup-White/NA</td></tr>
<tr><td>WDFW Site ID</td><td>N/A</td></tr>
<tr><td>Local Jurisdiction</td><td>Edgewood</td></tr>
<tr><td>DNR Water Type</td><td>N/A</td></tr>
<tr><td>Local Stream Rating</td><td>Edgewood: Type Ns</td></tr>
<tr><td>Buffer Width</td><td>Edgewood: 35 feet</td></tr>
<tr><td>Documented Fish Use[a]</td><td>None</td></tr>
<tr><td>Location of Stream Relative to Project Corridor</td><td colspan="2">Stream 23 enters the study area within the northwest portion of Wetland 45 on the east side of Freeman Avenue East.</td></tr>
<tr><td>Connectivity</td><td colspan="2">Stream 23 originates from surface flows within Wetland 45. It is an excavated channel that conveys flows for approximately 60 feet through dense reed canarygrass before joining Surprise Lake Tributary (Stream 01) at a culvert under Freeman Road East.</td></tr>
<tr><td>Fish Habitat</td><td colspan="2">Stream 23 is seasonally flowing and is potentially accessible to fish due to a surface connection to Surprise Lake Tributary (Stream 01). See the description of Surprise Lake Tributary (Stream 01) for potential fish use in both streams.</td></tr>
<tr><td>Riparian/Buffer Condition</td><td colspan="2">Stream 23 is entirely encompassed in Wetland 45. The buffer condition is moderate, consisting of a field of reed canarygrass bordered by forest to the east and Freeman Road East to the west.</td></tr>
</table>

[a] Documented fish species from available data sources (WDFW 2023a, 2023b).

Table 16. Stream 24 Summary.

Stream 24 Information Summary		
	**Stream Name**	Stream 24
	Long./Lat. ID Number	Start: 47.238953/-122.328495 End: 47.238961/-122.331022
	WRIA Name/Stream No.	10: Puyallup-White/NA
	935669	935669
	Local Jurisdiction	Fife
	DNR Water Type	N/A
	Local Stream Rating	N/A
	Buffer Width	Case-by-case
	Documented Fish Use[a]	No documented fish presence
Location of Stream Relative to Project Corridor	Stream 24 is an unnamed tributary to Surprise Lake Tributary (Stream 01) that is located west of 76th Avenue East on the south side of 20th Street East in the Hylebos Creek-Frontal Commencement Bay watershed.	
Connectivity	Stream 24 is an excavated channel that conveys flows for approximately 600 feet along the northern edge of agricultural fields before discharging into Surprise Lake Tributary (Stream 01) via a culvert under an agricultural access road.	
Fish Habitat	Stream 24 is seasonally flowing and potentially accessible to fish due to its connection with Surprise Lake Tributary (Stream 01). WDFW documented three-spine stickleback and sculpin in this system in January 2022 (WDFW 2023c).	
Riparian/Buffer Condition	Within the study area, buffer condition is poor, consisting of a narrow strip of reed canarygrass bordered by agricultural development and roadways.	

[a] Documented fish species known to occur in the stream from available data sources (WDFW 2023a, 2023b).

3.5. Species and Habitats of Interest

According to USFWS iPaC data (USFWS 2021) and NMFS protected species listings (NOAA Fisheries 2023), nine federal or state listed species may occur within 0.5 mile of the study area. WDFW PHS data document multiple priority habitats within 1 mile of the study area, including waterfowl concentrations, wetlands, freshwater ponds, and biodiversity areas and corridors, and roosting concentrations of big brown bat (WDFW 2023a). See the Stage 2 WSAR for a complete description of species and habitats of interest in the vicinity of the study area.

4. Limitations

This wetland and stream assessment report documents the investigation, best professional judgment, and conclusions of WSDOT based on the site conditions encountered at the time of this study. The wetland and stream delineation was performed in compliance with accepted standards for professional wetland biologists and applicable federal, state, and local laws and ordinances, and WSDOT policies and guidance. The information contained in this report is correct and complete to the best of our knowledge. This report should be considered a preliminary jurisdictional determination of wetlands and other waters until it has been reviewed and approved in writing by the appropriate jurisdictional authorities. The final determination of the wetland boundary, classification, and required setback and buffer will be made by local, state, and federal jurisdictions.

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Appendix A. Wetland Delineation Data Sheets

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

Project/Site: SR 167, Stage 1B **City/County:** Edgewood, Pierce County **Sampling Date:** 28-Oct-19

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W45-SP1**

Investigator(s): C. Merten, J. LeClerc **Section, Township, Range:** **S** 8 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Floodplain terrace **Local relief (concave, convex, none):** convex **Slope:** 1.0 **%** / 0.6 **°**

Subregion (LRR): LRR A **Lat.:** 47.23510 **Long.:** -122.32321 **Datum:** NAD1983

Soil Map Unit Name: Shalcar muck **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (•) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (•) No ( )	**Is the Sampled Area within a Wetland?** Yes (•) No ( )
Hydric Soil Present?	Yes (•) No ( )	
Wetland Hydrology Present?	Yes (•) No ( )	

Remarks:
Cloudy, rain scattered during the day. PSS pit. All three wetland parameters met.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3m)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	**= Total Cover**		
Sapling/Shrub Stratum (Plot size: 2m)				
1. Rubus armeniacus	70	☑	66.7%	FAC
2. Sambucus racemosa	25	☑	23.8%	FACU
3. Rubus spectabilis	10	☐	9.5%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	105	**= Total Cover**		
Herb Stratum (Plot size: 1m)				
1. Phalaris arundinacea	40	☑	90.9%	FACW
2. Urtica dioica	2	☐	4.5%	FAC
3. Convolvulus arvensis	2	☐	4.5%	UPL
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	44	**= Total Cover**		
Woody Vine Stratum (Plot size: 2m)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	**= 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:	3	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	66.7%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	82	x 3 =	246
FACU species	25	x 4 =	100
UPL species	2	x 5 =	10
Column Totals:	149 (A)		436 (B)

Prevalence Index = B/A = 2.926

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (•) No ( )

Remarks:
This Pit counts for PSS class. Dominance test and prevalence index indicators met.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W45-SP1

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR	2/2	100						loamy sand	cobble
9-11	10YR	5/1	85	7.5YR	4/6	15	C	M	sand	
11-27	10YR	2/1	100						organic	wood fiber/muck/peat
27-30+	10YR	4/1	100						Silty Clay Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

Redox concentration layer at base of sand horizon. Wood debris in peat muck layer. Used auger to reach to 30".

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [ ] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-neutral Test (D5)
- [ ] Raised Ant Mounds (D6) (LRR A)
- [ ] Frost Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	( )	(●)	
Water Table Present?	( )	(●)	13
Saturation Present? (includes capillary fringe)	(●)	( )	9

Wetland Hydrology Present? Yes (●) No ( )

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

Remarks:

Saturation at 9 inches, water table at 13 inches. A3 indicator met.

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

Project/Site: SR 167, Stage 1B **City/County:** Edgewood, Pierce County **Sampling Date:** 23-Apr-19

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W45-SP2**

Investigator(s): C. Merten, J. LeClerc **Section, Township, Range:** **S** 8 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): floodplain terrace **Local relief (concave, convex, none):** none **Slope:** 0.0 **%** / 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.23518 **Long.:** -122.32336 **Datum:** NAD 1983

Soil Map Unit Name: Shalcar muck **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:
Middle of reed canarygrass field. PEM test pit. All three wetland parameters met.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover		Indicator Status
Tree Stratum (Plot size: 3m)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2m)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 1m)				
1. Phalaris arundinacea	100	☑	100.0%	FACW
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size: 2m)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A = 2.000

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Rapid test, dominance test, and prevalence index indicators were met.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W45-SP2

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-17	10YR	4/1	100						Muck	
17-20	10YR	3/1	85	10YR	4/1	15	D	M	muck loam	
20-24	Gley1	5/10Y	100	7.5YR	4/6	40	C	M	Silty Clay Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

A1 and A2 indicators present.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [x] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] 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): 6
Saturation Present? (includes capillary fringe)	Yes (●)	No ( )	Depth (inches): 4

Wetland Hydrology Present? Yes (●) No ( )

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

Remarks:

Water table present at 6 inches. Saturation present at 4 inches. A2 and A3 indicators met.

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

Project/Site: SR 167, Stage 1B **City/County:** Edgewood, Pierce County **Sampling Date:** 23-Apr-19

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W45-SP3**

Investigator(s): C. Merten, J. LeClerc **Section, Township, Range:** **S** 8 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): floodplain terrace **Local relief (concave, convex, none):** concave **Slope:** 2.0 **% /** 1.1 **°**

Subregion (LRR): LRR A **Lat.:** 47.23492 **Long.:** -122.32322 **Datum:** NAD1983

Soil Map Unit Name: Shalcar muck **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:
By aerial imagelry look like we are between old h ouse and barn features. Upland pit. All three wetland parameters met.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3m)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Phalaris arundinacea	80	☑ 52.6%	FACW
2. Ranunculus repens	35	☑ 23.0%	FAC
3. Cirsium vulgare	10	☐ 6.6%	FACU
4. Poa pratensis	8	☐ 5.3%	FAC
5. Cirsium arvense	5	☐ 3.3%	FAC
6. Dactylis glomerata	5	☐ 3.3%	FACU
7. Convolvulus arvensis	5	☐ 3.3%	UPL
8. Plantago lanceolata	3	☐ 2.0%	FACU
9. Rumex occidentalis	1	☐ 0.7%	FACW
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	152	= Total Cover	
Woody Vine Stratum (Plot size: 2m)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	81	x 2 =	162
FAC species	48	x 3 =	144
FACU species	18	x 4 =	72
UPL species	5	x 5 =	25
Column Totals:	152 (A)		403 (B)

Prevalence Index = B/A = 2.651

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Dominance test and prevalence index indicators were met.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W45-SP3

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR	2/2	100						Silt Loam	gravel
7-9	10YR	3/2	100						loamy sand	w/ cobble gravel
9-12	10YR	2/2	100						gravel silt loam	gravel
12-15	10YR	3/1	80	5YR	3/4	20	C	M	Silty Clay Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

Good light for coloring soil. No hydic soil indicators met.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [ ] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] 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): 13
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 11

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Hole remained openfor >30 minutes. Water table present at 13 inches, saturation at 11 inches. A3 and D5 indicators met.

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

Project/Site: SR 167, Stage 1B **City/County:** Edgewood, Pierce County **Sampling Date:** 25-Apr-19

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W45-SP4**

Investigator(s): A. Hoenig, J. LeCerc **Section, Township, Range:** S 8 T 20N R 4E

Landform (hillslope, terrace, etc.): Terrace **Local relief (concave, convex, none):** concave **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR A **Lat.:** 47.23472 **Long.:** -122.32042 **Datum:** NAD1983

Soil Map Unit Name: Kitsap silt loam, 15-30% slopes **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:
PFO. All three wetland parameters met.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3m)				
1. Alnus rubra	90	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	90	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2m)				
1. Cornus alba	5	☑	50.0%	FACW
2. Rubus spectabilis	5	☑	50.0%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	10	= Total Cover		
Herb Stratum (Plot size: 1m)				
1. Ranunculus repens	50	☑	71.4%	FAC
2. Athyrium filix-femina	20	☑	28.6%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size: 1m)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 40

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	165	x 3 =	495
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	170 (A)		505 (B)

Prevalence Index = B/A = 2.971

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
#3 in herb stratum is not Poa, no flower, presumed FAC. Dominance test and prevalence index indicators present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W45-SP4

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR	3/1	97	7.5YR	4/4	3	C	M	Sandy Clay Loam	
5-16	10YR	5/1	68	7.5YR	4/6	30	C	M	Sandy Clay Loam	fine sand
5-16				2.5YR	2.5/3	20	C	M	Sandy Clay Loam	

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

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

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [x] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Muck Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except in MLRA 1)
- [ ] Loamy Gleyed Matrix (F2)
- [x] 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)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

A11, F3, and F6 indicators present.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [x] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [x] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] 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 (●)	Depth (inches):	
Water Table Present?	Yes (●)	No ( )	Depth (inches):	5
Saturation Present? (includes capillary fringe)	Yes (●)	No ( )	Depth (inches):	0

Wetland Hydrology Present? Yes (●) No ( )

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

Remarks:

Top 5" saturated, water started seeping in at 16" and to 11", expected to fill to 5". Sandy layer is very compact. Primary indicators A2 and A3 present. Secondary indicators B10 and D5 also present.

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

Project/Site: SR 167 Stage 2 **City/County:** Edgewood/Pierce **Sampling Date:** 02-Jun-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W45-SP5**

Investigator(s): N. Bartish, D. Rapoza **Section, Township, Range:** **S** 8 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** none **Slope:** 3.0 **%** / 1.7 **°**

Subregion (LRR): LRR A **Lat.:** 47.23593 **Long.:** -122.32338 **Datum:** D North Ame

Soil Map Unit Name: Xerochrepts, 45-70% slopes **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ○	**Is the Sampled Area within a Wetland?** Yes ○ No (●)
Hydric Soil Present?	Yes ○ No (●)	
Wetland Hydrology Present?	Yes ○ No (●)	

Remarks:
Climatic conditions are normal for this time of year. Hydrophytic vegetation is present. No hydric soil or wetland hydrology at test pit, therefore sampled area is determined to not be within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1. Alnus rubra	40	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	40	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Sambucus racemosa	30	☑	30.0%	FACU
2. Ilex aquifolium	30	☑	30.0%	FACU
3. Rubus spectabilis	40	☑	40.0%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	100	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Athyrium filix-femina	20	☑	80.0%	FAC
2. Hydrophyllum tenuipes	5	☑	20.0%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	25	= Total Cover		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 70

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	66.7%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	105	x 3 =	315
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	165 (A)		555 (B)

Prevalence Index = B/A = 3.364

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ○

Remarks:
Site meets the hydrophytic vegetation indicator for the dominance test. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W45-SP5

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR	2/2	100						Loam	Organic material

[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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicators met at sampling plot.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks:

No evidence of wetland hydrology.

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

Project/Site: SR 167 Stage 2 **City/County:** Edgewood/Pierce **Sampling Date:** 02-Jun-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W45-SP6**

Investigator(s): D. Garcia, L. Dominguez **Section, Township, Range:** **S** 8 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Headwater draw **Local relief (concave, convex, none):** concave **Slope:** 4.0 **%** / 2.3 **°**

Subregion (LRR): LRR A **Lat.:** 47.23633 **Long.:** -122.32299 **Datum:** D North Ame

Soil Map Unit Name: Xerochrepts, 45-70% slopes **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:
Climatic conditions are normal for this time of year. Hydrophytic vegetation is present. No hydric soil or wetland hydrology in site, therefore sampled area is determined to not be within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	**= Total Cover**		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Rubus spectabilis	50	☑	50.0%	FAC
2. Sambucus racemosa	20	☑	20.0%	FACU
3. Rubus armeniacus	30	☑	30.0%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	100	**= Total Cover**		
Herb Stratum (Plot size: 1 m rad)				
1. Urtica dioica	2	☐	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	2	**= Total Cover**		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	**= Total Cover**		

% Bare Ground in Herb Stratum: 98

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	66.7%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	82	x 3 =	246
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	102 (A)		326 (B)

Prevalence Index = B/A = 3.196

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Hydrophytic vegetation indicator for dominance test is met at plot. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W45-SP6

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100					Silt Loam	Some gravel in soil

[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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

No evidence of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks:

No evidence of wetland hydrology at sampling plot. About 100 feet south of pit is an energy dissipation structure that outlets drainage from upland development. The channel is stormwater dependent for flow and quickly dissipates into the larger wetland body south of the sampling plot.

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

Project/Site: SR 167 Stage 2 **City/County:** Edgewood/Pierce **Sampling Date:** 03-Jun-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W45-SP7**

Investigator(s): R. Plumb, D. Garcia **Section, Township, Range:** **S** 8 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** none **Slope:** 0.0 **%** / 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.23590 **Long.:** -122.32337 **Datum:** D North Ame

Soil Map Unit Name: Xerochrepts, 45-70% slopes **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:
Climatic conditions are normal for this time of year. Site contains hydrophytic vegetation, hydric soil and wetland hydrology. The sampled area is within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover		Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1. Alnus rubra	85	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	85	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Ilex aquifolium	20	☑	20.0%	FACU
2. Rubus spectabilis	70	☑	70.0%	FAC
3. Oemleria cerasiformis	10	☐	10.0%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	100	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Lysichiton americanum	50	☑	80.6%	OBL
2. Athyrium filix-femina	10	☐	16.1%	FAC
3. Hedera helix	2	☐	3.2%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	62	= Total Cover		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= 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:	4	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	75.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	0	x 2 =	0
FAC species	165	x 3 =	495
FACU species	32	x 4 =	128
UPL species	0	x 5 =	0
Column Totals:	247 (A)		673 (B)

Prevalence Index = B/A = 2.725

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Hydrophytic vegetation indicators for dominance test and prevalence index are met at sampling plot. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W45-SP7

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR	2/1	100						Muck	

[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.)

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

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (•) No ( )

Remarks:

Hydrology indicators histosol (A1) and hydrogen sulfide (A4) are met at site. Hydric soil is present. Abundance of decomposed and partially decomposed organic material present in the upper 16 inches.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [x] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [x] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-neutral Test (D5)
- [ ] Raised Ant Mounds (D6) (LRR A)
- [ ] Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ( )	No (•)	Depth (inches):
Water Table Present?	Yes (•)	No ( )	Depth (inches): 9
Saturation Present? (includes capillary fringe)	Yes (•)	No ( )	Depth (inches): 0

Wetland Hydrology Present? Yes (•) No ( )

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

Remarks:

Primary hydrology indicators for high water table (A2) and saturation (A3) are present at pit. Water table present at 9 inches depth. Soil is saturated to the surface.

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

Project/Site: SR 167 Stage 2 **City/County:** Edgewood/Pierce **Sampling Date:** 03-Jun-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W45-SP8**

Investigator(s): N. Bartish, L. Dominguez **Section, Township, Range: S** 8 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** none **Slope:** 1.0 **%** / 0.6 **°**

Subregion (LRR): LRR A **Lat.:** 47.23513 **Long.:** -122.32161 **Datum:** D North Ame

Soil Map Unit Name: Briscot loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes ( ) No (●)	

Remarks:
Climatic conditions are normal for this time of year. Hydrophytic vegetation is domoinated by FAC speces. Hydrophytic vegetation and hydric soils are both present, but sampled area is lacking wetland hydrology. Sampled area is not located within a wetland.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 3 m rad)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1. Pinus contorta	20	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	20	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Rubus armeniacus	30	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	30	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Schedonorus arundinaceus	60	☑	46.2%	FAC
2. Plantago lanceolata	40	☑	30.8%	FACU
3. Vicia sativa	30	☑	23.1%	UPL
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	130	= Total Cover		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= 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:	5	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	60.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	110	x 3 =	330
FACU species	40	x 4 =	160
UPL species	30	x 5 =	150
Column Totals:	180 (A)		640 (B)

Prevalence Index = B/A = 3.556

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Site meets the dominance test. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W45-SP8

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR	2/2	100						Fine Sandy Loam	
5-17	10YR	4/2	75	7.5YR	4/6	25	C	M	Fine 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicator for depleted matrix (F3) is met. Hydric soil is present at site.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks:

No evidence of wetland hydrology despite recent heavy precipitation.

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

Project/Site: SR 167 Stage 2 **City/County:** Pierce County **Sampling Date:** 29-Apr-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W140 SP1**

Investigator(s): S. Wall, D. Garcia **Section, Township, Range: S** 17 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** flat **Slope:** 0.0 **%** / 0.0 **°**

Subregion (LRR): A **Lat.:** 47.2209 **Long.:** -122.3191 **Datum:** WGS84

Soil Map Unit Name: Puyallup fine sandy loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:
All 3 wetland parameters are met. Plot is at the edge of the PEM portion of the wetland, west of the mowed lawn area surrounding the home.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m)			
1. Fraxinus latifolia	25	☑ 100.0%	FACW
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2 m)			
1. Cornus sericea	10	☑ 40.0%	FACW
2. Rubus armeniacus	10	☑ 40.0%	FAC
3. Salix lasiandra	5	☑ 20.0%	FACW
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	25	= Total Cover	
Herb Stratum (Plot size: 1 m)			
1. Phalaris arundinacea	100	☑ 100.0%	FACW
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	100	= Total Cover	
Woody Vine Stratum (Plot size: 2m)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	140	x 2 =	280
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	150 (A)		310 (B)

Prevalence Index = B/A = 2.067

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Plot is at the edge of the PEM part of the wetland. Trees and shrubs rooted outside of the plot but overhanging. Vegetation meets the dominance test and prevalence index.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W140 SP1

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR	2/1	100						Loam	
6-16	10YR	4/1	95	7.5YR	4/6	5	C	M	Silt 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 Muck Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except in MLRA 1)
- [ ] Loamy Gleyed Matrix (F2)
- [x] 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)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

Soil meets hydric soil indicator F3.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [x] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] 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): 6
Saturation Present? (includes capillary fringe)	Yes (●)	No ( )	Depth (inches): 0

Wetland Hydrology Present? Yes (●) No ( )

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

Remarks:

Hydric soil indicators A2 and A3 are present.

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

Project/Site: SR 167 Stage 2 **City/County:** Pierce County **Sampling Date:** 29-Apr-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** W140 SP2

Investigator(s): S. Wall, D. Garcia **Section, Township, Range:** S 17 T 20N R 4E

Landform (hillslope, terrace, etc.): Hillslope **Local relief (concave, convex, none):** convex **Slope:** 10.0 % / 5.7 °

Subregion (LRR): A **Lat.:** 47.220 **Long.:** -122.319 **Datum:**

Soil Map Unit Name: Puyallup fine sandy loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☑ No ☐

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:
Plot is on a slope at the north edge of the parcel. No wetland parameters are met.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m r)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m)				
1. Cornus sericea	5	☐	14.3%	FACW
2. Diplacus aurantiacus	10	☑	28.6%	FACU
3. Calluna vulgaris	5	☐	14.3%	FAC
4. Rubus armeniacus	15	☑	42.9%	FAC
5.	0	☐	0.0%	
	35	= Total Cover		
Herb Stratum (Plot size: 1 m)				
1. Hypochaeris radicata	75	☑	73.5%	FACU
2. Vicia americana	5	☐	4.9%	FAC
3. Equisetum arvense	10	☐	9.8%	FAC
4. Trifolium repens	5	☐	4.9%	FAC
5. Cirsium vulgare	2	☐	2.0%	FACU
6. Geranium dissectum	5	☐	4.9%	UPL
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	102	= Total Cover		
Woody Vine Stratum (Plot size: 2 m)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	33.3%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	40	x 3 =	120
FACU species	87	x 4 =	348
UPL species	5	x 5 =	25
Column Totals:	137 (A)		503 (B)

Prevalence Index = B/A = 3.672

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:
Vegetation does not meet any hydrophytic vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W140 SP2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc²	Texture	Remarks
0-20	10YR 3/2						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ⦿

Remarks:

No hydic soil indicators met.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ⦿	Depth (inches):
Water Table Present?	Yes ○	No ⦿	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ⦿	Depth (inches):

Wetland Hydrology Present? Yes ○ No ⦿

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

Remarks:

No evidence of wetland hydrology

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

Project/Site: SR 167 Stage 2 **City/County:** Pierce County **Sampling Date:** 29-Apr-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W140 SP3**

Investigator(s): S. Wall, D. Garcia **Section, Township, Range:** **S** 17 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** flat **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): A **Lat.:** 47.2208 **Long.:** -122.3194 **Datum:**

Soil Map Unit Name: Puyallup fine sandy loam **NWI classification:** PFO

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

All three wetland indicators present. Riverine wetland in floodplain of Wapato Creek, forested Cowardin class.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover		Indicator Status
Tree Stratum (Plot size: 3 m r)				
1. Salix lasiandra	30	☑	100.0%	FACW
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	30	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m)				
1. Cornus sericea	10	☑	50.0%	FACW
2. Rubus armeniacus	5	☑	25.0%	FAC
3. Rosa nutkana	5	☑	25.0%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	20	= Total Cover		
Herb Stratum (Plot size: 1 m)				
1. Phalaris arundinacea	100	☑	100.0%	FACW
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size: 2 m)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	140	x 2 =	280	
FAC species	10	x 3 =	30	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	150	(A)	310	(B)

Prevalence Index = B/A = 2.067

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Vegetation meets the domiinance test and prevalence index.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W140 SP3

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR	5/1	80	7.5YR	5/8	20	C	M	Silt 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 Muck Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except in MLRA 1)
- [ ] Loamy Gleyed Matrix (F2)
- [x] 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)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

Soil meets indicator F3 depleted matrix

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [x] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] 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): 4
Saturation Present? (includes capillary fringe)	Yes (●)	No ( )	Depth (inches): 0

Wetland Hydrology Present? Yes (●) No ( )

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

Remarks:

high water table (A2) and saturation to the surface (A3)

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 10-May-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W142-SP1**

Investigator(s): D. Rapoza, D. Garcia **Section, Township, Range:** **S** 17 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): floodplain bench **Local relief (concave, convex, none):** concave **Slope:** 3.0 **%** / 1.7 **°**

Subregion (LRR): LRR A **Lat.:** 47.22287 **Long.:** -122.32958 **Datum:** D North Ame

Soil Map Unit Name: Sultan silt loam **NWI classification:** PFO1C

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:
Climatic conditions are normal for this time of year. Hydrophytic vegetation, hydric soil, and wetland hydrology are all present at sampling site. Site is located within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1. Salix scoulerana	30	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	30	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Salix sitchensis	30	☑	60.0%	FACW
2. Rubus armeniacus	15	☑	30.0%	FAC
3. Spiraea douglasii	5	☐	10.0%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	50	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Impatiens capensis	80	☑	94.1%	FACW
2. Phalaris arundinacea	5	☐	5.9%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	85	= Total Cover		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 15

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	120	x 2 =	240
FAC species	45	x 3 =	135
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	165 (A)		375 (B)

Prevalence Index = B/A = 2.273

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Newly emerged leaves on Salix, did not have many hairs. Catkins not present. Sample plot meets indicators for rapid test, dominance test and prevalence index. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W142-SP1

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR	3/2	98	7.5YR	5/6	2	C	M	Silt Loam	
9-11	2.5Y	4/1	50	5YR	5/8	50	C	M	Silt Loam	
11-16	2.5 Y	4/1	95	5YR	5/8	5	C	M	Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicator for depleted matrix (F3) is met. Hydric soil is present at site.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Primary hydrology indicator for saturation (A3) is met. Water table is present below 12 inches. Standing water 10 feet south of soil pit. Wapato Creek is 25 feet south of pit. Wetland hydrology is present at sampled area.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 10-May-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W142-SP2**

Investigator(s): D. Rapoza, D. Garcia **Section, Township, Range:** S 17 T 20N R 4E

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** none **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR A **Lat.:** 47.22303 **Long.:** -122.32984 **Datum:** D North Ame

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Hydric Soil Present?	Yes ( ) No (●)	
Wetland Hydrology Present?	Yes ( ) No (●)	

Remarks:
Climatic conditions are normal for this time of year. Site does contains hydrophytic vegetation. Site does not contain hydric soil, or wetland hydrology. Sampled area is not within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Corylus cornuta	15	☑	30.0%	FACU
2. Rubus armeniacus	15	☑	30.0%	FAC
3. Fraxinus latifolia	20	☑	40.0%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	50	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Dactylis glomerata	30	☑	25.6%	FACU
2. Taraxacum officinale	5	☐	4.3%	FACU
3. Equisetum arvense	40	☑	34.2%	FAC
4. Holcus lanatus	40	☑	34.2%	FAC
5. Vicia americana	2	☐	1.7%	FAC
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	117	= Total Cover		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	66.7%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	97	x 3 =	291
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	167 (A)		531 (B)

Prevalence Index = B/A = 3.180

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Fraxinus latifolia saplings less than 2 feet tall spread througout field. Vegetation meets dominance test.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W142-SP2

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR	3/2	100						Silt Loam	
12-14	10YR	3/2	95	7.5YR	4/6	5	C	M	Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicators met.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks:

Soil damp but not saturated. No evidence of wetland hydrology at pit.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 10-May-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W142-SP3**

Investigator(s): D. Rapoza, D. Garcia **Section, Township, Range:** **S** 17 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** convex **Slope:** 2.0 **%** / 1.1 **°**

Subregion (LRR): LRR A **Lat.:** 47.22252 **Long.:** -122.32841 **Datum:** D North Ame

Soil Map Unit Name: Sultan silt loam **NWI classification:** PEM1C

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (•) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (•) No ( )	**Is the Sampled Area within a Wetland?**	Yes (•) No ( )
Hydric Soil Present?	Yes (•) No ( )		
Wetland Hydrology Present?	Yes (•) No ( )		

Remarks:

Climatic conditions are normal for this time of year. Hydrophytic vegetation, hydric soil, and wetland hydrology are all present at sampling site. Site is located within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Salix lasiandra	10	☑	33.3%	FACW
2. Cornus alba var. occidentalis	10	☑	33.3%	FACW
3. Rubus armeniacus	10	☑	33.3%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	30	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Phalaris arundinacea	95	☑	95.0%	FACW
2. Impatiens capensis	5	☐	5.0%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	120	x 2 =	240
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	130 (A)		270 (B)

Prevalence Index = B/A = 2.077

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (•) No ( )

Remarks:

Hydrophytic vegetation indicators for rapdi test, dominance test and prevalence index are met at sampling plot. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W142-SP3

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR	2.5/2	98	5YR	4/4	2	C	M	Silt Loam	
6-15	10YR	4/1	70	5YR	4/6	30	C	M	Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicator for depleted matrix (F3) is met. Hydric soil is present at site.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Primary hydrology indicator for oxidized rhizospheres (C3) is met at soil pit. Secondary indicators for geomorphic position (D2) and FAC-neutral test (D5) are met. Wetland hydrology is present at soil pit.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 25-May-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** W142-SP4

Investigator(s): D. Rapoza, R. Plumb **Section, Township, Range:** S 17 T 20N R 4E

Landform (hillslope, terrace, etc.): Floodplain bench **Local relief (concave, convex, none):** none **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR A **Lat.:** 47.22242 **Long.:** -122.32745 **Datum:** D North Ame

Soil Map Unit Name: Sultan silt loam **NWI classification:** PEM1C

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:

Climatic conditions are normal for this time of year. Wetland pit located within PEM Cowardin class. Hydrophytic vegetation, hydric soil, and wetland hydrology are all present at pit. Sampled area is within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Salix sitchensis	40	☑	88.9%	FACW
2. Rubus armeniacus	5	☐	11.1%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	45	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Iris pseudacorus	30	☑	30.0%	OBL
2. Phalaris arundinacea	35	☑	35.0%	FACW
3. Impatiens capensis	35	☑	35.0%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	110	x 2 =	220
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	145 (A)		265 (B)

Prevalence Index = B/A = 1.828

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

Hydrophytic vegetation indicators for rapid test, dominance test, and prevalence index are all present at sampled plot. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W142-SP4

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR	3/3	100						Silt Loam	w/ muck
6-8	10YR	3/3	40						Silt Loam	
6-8	10YR	2/2	50	5YR	4/6	10	C	M/PL	Silt Loam	
8-16	10YR	2/2	98	5YR	4/6	2	C	M/PL	Silt 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 Muck Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except in MLRA 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)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

Hydric soil indicator for redox dark surface (F6) is met. Mixed matrix present from 6-8 inches. Hydric soil is present at pit.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [ ] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [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 (●)	Depth (inches):
Water Table Present?	Yes (●)	No ( )	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes (●)	No ( )	Depth (inches): 0

Wetland Hydrology Present? Yes (●) No ( )

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

Remarks:

Primary hydrology indicator for saturation (A3) is met. Water table is present below 12 inches. Secondary indicators for geomorphic position (D2) and FAC-neutral test (D5) are met. Wetland hydrology is present at site.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 25-May-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W142-SP5**

Investigator(s): R. Plumb, D. Rapoza **Section, Township, Range:** S 17 T 20N R 4E

Landform (hillslope, terrace, etc.): Ditch **Local relief (concave, convex, none):** concave **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR A **Lat.:** 47.22160 **Long.:** -122.32657 **Datum:** D North Ame

Soil Map Unit Name: Sultan silt loam **NWI classification:** PEM1C

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (•) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (•) No ( )	**Is the Sampled Area within a Wetland?** Yes (•) No ( )
Hydric Soil Present?	Yes (•) No ( )	
Wetland Hydrology Present?	Yes (•) No ( )	

Remarks:
Climatic conditions are normal for this time of year. Hydrophytic vegetation, hydric soil, and wetland hydrology are all present at sampling site. Site is located within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Rubus armeniacus	20	☑	50.0%	FAC
2. Symphoricarpos albus	20	☑	50.0%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	40	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Phalaris arundinacea	95	☑	95.0%	FACW
2. Cucumis melo	5	☐	5.0%	UPL
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	66.7%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	95	x 2 =	190
FAC species	20	x 3 =	60
FACU species	20	x 4 =	80
UPL species	5	x 5 =	25
Column Totals:	140 (A)		355 (B)

Prevalence Index = B/A = 2.536

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (•) No ( )

Remarks:
Hydrophytic vegetation indicators for dominance test and prevalence index is met at plot. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W142-SP5

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR	3/2	70	10YR	4/4	30	C	M	Silt Loam	
6-18	10YR	2/2	60	10YR	4/4	40	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 Muck Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except in MLRA 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)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

Hydric soil indicator for redox dark surface (F6) is met. Hydric soil is present at site.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [ ] High Water Table (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 Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [x] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [x] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-neutral Test (D5)
- [ ] Raised Ant Mounds (D6) (LRR A)
- [ ] Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ( )	No (●)	Depth (inches):
Water Table Present?	Yes ( )	No (●)	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes (●)	No ( )	Depth (inches): 11

Wetland Hydrology Present? Yes (●) No ( )

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

Remarks:

Primary hydrology indicators for oxidized rhizospheres (C3) and saturation (A3) are met at soil pit. Secondary indicators for drainage patterns (B10) and geomorphic position (D2) are met. Wetland hydrology is present at soil pit.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 25-May-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W143-SP1**

Investigator(s): R. Plumb, D. Rapoza **Section, Township, Range: S** 17 **T** 20N **R** 4E

Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** none **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.22306 **Long.:** -122.32780 **Datum:** D North Ame

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:
Climatic conditions are normal for this time of year. Hydrophytic vegetation, hydric soil, and wetland hydrology are all present at sampling site. Site is located within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1. Populus balsamifera	75	☑	60.0%	FAC
2. Salix sitchensis	40	☑	32.0%	FACW
3. Rubus armeniacus	10	☐	8.0%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	125	= Total Cover		
Herb Stratum (Plot size: 1 m rad)				
1. Juncus effusus	15	☑	37.5%	FACW
2. Ranunculus repens	25	☑	62.5%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	40	= Total Cover		
Woody Vine Stratum (Plot size: 1 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	55	x 2 =	110
FAC species	110	x 3 =	330
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	165 (A)		440 (B)

Prevalence Index = B/A = 2.667

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Hydrophytic vegetation indicators dominance test and prevalence index are met. Hydrophytic vegetation is present at site.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W143-SP1

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR	2/1	98	7.5YR	5/8	2	C	M	Silt Loam	
7-12	10YR	3/1	70	7.5YR	5/8	30	C	M	Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicator for redox dark surface (F6) is met. Hydric soil is present at site.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres on 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 (minimum of two required)

- ☑ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☑ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Primary hydrology indicator for oxidized rhizospheres (C3) is met at soil pit. Secondary indicators water-stained leaves (B9), drainage patterns (B10), and FAC-neutral test (D5) are met. Wetland hydrology is present at site.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 25-May-22

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W143-SP2**

Investigator(s): R. Plumb, D. Rapoza, L. Dominguez **Section, Township, Range:** S 17 T 20N R 4E

Landform (hillslope, terrace, etc.): Slope **Local relief (concave, convex, none):** none **Slope:** 1.0 % / 0.6 °

Subregion (LRR): LRR A **Lat.:** 47.22306 **Long.:** -122.32771 **Datum:** D North Ame

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ○

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ○	**Is the Sampled Area within a Wetland?** Yes ○ No (●)
Hydric Soil Present?	Yes ○ No (●)	
Wetland Hydrology Present?	Yes ○ No (●)	

Remarks:
Climatic conditions are normal for this time of year. Hydrophytic vegetation is present. No hydric soil or wetland hydrology in site, therefore site is determined to not be within a wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2 m rad)			
1. Rubus armeniacus	25	☑ 100.0%	FAC
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	25	= Total Cover	
Herb Stratum (Plot size: 1 m rad)			
1. Ranunculus repens	75	☑ 33.0%	FAC
2. Phalaris arundinacea	50	☑ 22.0%	FACW
3. Vicia americana	2	☐ 0.9%	FAC
4. Cirsium arvense	10	☐ 4.4%	FAC
5. Holcus lanatus	90	☑ 39.6%	FAC
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	227	= Total Cover	
Woody Vine Stratum (Plot size: 1 m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	202	x 3 =	606
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	252 (A)		706 (B)

Prevalence Index = B/A = 2.802

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ○

Remarks:
Hydrophytic indicators for the dominance test and prevalence index are met at pit. Hydrophytic vegetation is present.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W143-SP2

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Color (moist)		Redox %	Type[1]	Loc²	Texture	Remarks
0-6	10YR	3/2	100						Silt Loam	
6-16	10YR	3/3	100						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: 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 Muck Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except in MLRA 1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ●

Remarks:

No hydric soil indicators present at soil pit.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [ ] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] FAC-neutral Test (D5)
- [ ] Raised Ant Mounds (D6) (LRR A)
- [ ] Frost Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches):
Surface Water Present?	○	●	
Water Table Present?	○	●	
Saturation Present? (includes capillary fringe)	○	●	

Wetland Hydrology Present? Yes ○ No ●

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

Remarks:

No evidence of wetland hydrology.

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

Project/Site: SR 167 Stage 2 City/County: Puyallup/Pierce Sampling Date: 2022-11-30

Applicant/Owner: WSDOT State: Washington Sampling Point: W146-SP1

Investigator(s): J. Hearsey, L. Dominguez Section, Township, Range: S17, T29N, R04E

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

Subregion (LRR): A Lat: 47.21525 Long: -122.31982 Datum: NAD 83

Soil Map Unit Name: Sultan silt loam NWI classification: None

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

Are Vegetation ___, Soil ✔, or Hydrology ✔ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No ___

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

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

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

Remarks:

All three wetland parameters present. Test pit located in a presumed excavated area used to source fill material.

VEGETATION – Use scientific names of plants.

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 15 feet)			
1. Rubus armeniacus	20	✔	FAC
2.			
3.			
4.			
5.			
= Total Cover	20%		
Herb Stratum (Plot size: 5 feet)			
1. Phalaris arundinacea	100	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100%		
Woody Vine Stratum (Plot size: 5 feet)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 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	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	120 (A)		260 (B)

Prevalence Index = B/A = 2.17

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks:

Vegetation meets dominance test.

SOIL

Sampling Point: W146-SP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	10YR 4/2	80	7.5YR 4/4	20	C	M	Clay Loam	
9 - 17	2.5Y 5/1	60	5YR 4/6	40	C	M	Clay Loam	
-								
-								
-								
-								
-								
-								

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

Hydric soil indicator F3 is present.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ______	No ✔	Depth (inches): ______
Water Table Present?	Yes ______	No ✔	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ✔	No ______	Depth (inches): 10

Wetland Hydrology Present? Yes ✔ **No** ______

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

Hydrology indicator A3 is present.

Remarks:

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

Project/Site: SR 167 Stage 2 City/County: Puyallup/Pierce Sampling Date: 2022-11-30

Applicant/Owner: WSDOT State: Washington Sampling Point: W146-SP2

Investigator(s): J. Hearsey, L. Dominguez Section, Township, Range: S17, T29N, R04E

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

Subregion (LRR): A Lat: 47.21507 Long: -122.31970 Datum: NAD 83

Soil Map Unit Name: Sultan silt loam NWI classification: None

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

Are Vegetation ✔, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

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

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

	Yes	No
Hydrophytic Vegetation Present?	✔	
Hydric Soil Present?		✔
Wetland Hydrology Present?		✔

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✔

Remarks:

Upland test pit located near the edge of a regularly mowed lawn. Hydrophytic vegetation present but hydric soils and wetland hydrology are not present at the test pit.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prunus spp.	7	✔	FACU
2.			
3.			
4.			
	7%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 feet)			
1. Rubus armeniacus	40	✔	FAC
2.			
3.			
4.			
5.			
	40%	= Total Cover	
Herb Stratum (Plot size: ___)			
1. Poa spp.	99	✔	FAC
2. Trifolium repens	10		FAC
3. Ranunculus repens	3		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	112%	= Total Cover	
Woody Vine Stratum (Plot size: 15 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	152	x 3 =	456
FACU species	7	x 4 =	28
UPL species	0	x 5 =	0
Column Totals:	159 (A)		484 (B)

Prevalence Index = B/A = 3.04

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks:

Vegetation meets the dominance test.

SOIL

Sampling Point: W146-SP2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/3	100					Clay Loam	
10 - 16	10YR 3/3	98	10YR 5/1	1	C	M	Clay Loam	
-			5YR 4/6	1	D	M	Clay Loam	
-								
-								
-								
-								
-								

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

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

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

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

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

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

Hydric Soil Present? Yes ______ No ✔

Remarks:

Hydric soil indicators are not present.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
✔ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ______ No ✔ Depth (inches): ______
Water Table Present? Yes ______ No ✔ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✔ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✔

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

Secondary hydrology indicator D2 is present. No primary hydrology indicators present.

Remarks:

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

Project/Site: SR 167 Stage 2 City/County: Puyallup/Pierce Sampling Date: 2022-12-07

Applicant/Owner: WSDOT State: Washington Sampling Point: W146-SP3

Investigator(s): J. Hearsey, L. Dominguez Section, Township, Range: S17, T29N, R04E

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

Subregion (LRR): A Lat: 47.21400 Long: -122.31787 Datum: NAD 83

Soil Map Unit Name: Sultan silt loam NWI classification: None

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

Are Vegetation ___, Soil ✔, or Hydrology ✔ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

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

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

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

Remarks:

All three wetland parameters are present. The test pit is located in an excavated drainage adjacent to fill pile. Hydrology and soils are significantly disturbed due to excavation.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 feet)			
1. Cornus alba	45	✔	FACW
2. Rubus armeniacus	15	✔	FAC
3.			
4.			
5.			
	60%	= Total Cover	
Herb Stratum (Plot size: 5 feet)			
1. Phalaris arundinacea	50	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50%	= Total Cover	
Woody Vine Stratum (Plot size: 15 feet)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 50

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	0	x 1 = 0
FACW species	95	x 2 = 190
FAC species	15	x 3 = 45
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	110 (A)	235 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks:

Vegetation meets the dominance test.

SOIL

Sampling Point: W146-SP3

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	10YR 3/3	100					Silt	
9 - 18	10YR 4/2	75	7.5YR 4/4	15	C	M	Silt	
-			5Y 4/1	10	D	M		
-								
-								
-								
-								
-								

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

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

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

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

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

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

Hydric Soil Present? Yes ✔ No ___

Remarks:

Hydric soil indicator F3 present.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✔ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___
Water Table Present? Yes ✔ No ___ Depth (inches): 10
Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 8

Wetland Hydrology Present? Yes ✔ No ___

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

Remarks:

Hydrology indicators A2 and A3 present. Secondary indicator D5 also present.

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

Project/Site: SR 167 Stage 2 City/County: Puyallup/Pierce Sampling Date: 2022-12-05

Applicant/Owner: WSDOT State: Washington Sampling Point: W147-SP1

Investigator(s): J. Hearsey, L. Dominguez Section, Township, Range: S17, T29N, R04E

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

Subregion (LRR): A Lat: 47.21637 Long: -122.31949 Datum: NAD 83

Soil Map Unit Name: Sultan silt loam NWI classification: None

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

Are Vegetation ✔, Soil ✔, or Hydrology ✔ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

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

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

Hydrophytic Vegetation Present?	Yes ✔ No ___	Is the Sampled Area within a Wetland? Yes ✔ No ___
Hydric Soil Present?	Yes ✔ No ___	
Wetland Hydrology Present?	Yes ✔ No ___	

Remarks:

All three wetland parameters are present. The wetland is located in a ditch adjacent to the south side of a conventional agricultural field. Vegetation, soils, and hydrology are disturbed.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1. Prunus nigra	15	✔	FACU
2.			
3.			
4.			
	15%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 feet)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5 feet)			
1. Phalaris arundinacea	100	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100%	= Total Cover	
Woody Vine Stratum (Plot size: 5 feet)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	100	x 2 = 200
FAC species	0	x 3 = 0
FACU species	15	x 4 = 60
UPL species	0	x 5 = 0
Column Totals:	115 (A)	260 (B)

Prevalence Index = B/A = 2.26

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks:

Vegetation meets prevalece index.

SOIL

Sampling Point: W147-SP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/2	100					Clay Loam	
10 - 18	10YR 4/2	85	5YR 4/4	12	C	M	Clay Loam	
10 - 18			2.5YR 4/2	3	C	M	Clay Loam	
-								
-								
-								
-								
-								

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

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

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

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

Hydric soil indicators A11 and F3 present.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ______ No ✔ Depth (inches): ______
Water Table Present? Yes ✔ No ______ Depth (inches): 5
Saturation Present? (includes capillary fringe) Yes ✔ No ______ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ **No** ______

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

Remarks:

Wetland hydrology indicators A2 and A3 present.

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

Project/Site: SR 167 Stage 2 City/County: Puyallup/Pierce Sampling Date: 2022-12-05

Applicant/Owner: WSDOT State: Washington Sampling Point: W147-SP2

Investigator(s): J. Hearsey, L. Dominguez Section, Township, Range: S17, T29N, R04E

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

Subregion (LRR): A Lat: 47.21641 Long: -122.31953 Datum: NAD 83

Soil Map Unit Name: Sultan silt loam NWI classification: None

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

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

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

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

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

Remarks:

Upland soil pit located approximately 20 feet north of W147-SP1.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 15 feet)			
1. Cornus alba	2	✔	FACW
2.			
3.			
4.			
5.			
= Total Cover	2%		
Herb Stratum (Plot size: 5 feet)			
1. Daucus carota	75	✔	FACU
2. Phalaris arundinacea	10		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	85%		
Woody Vine Stratum (Plot size: 5 feet)			
1. Rubus armeniacus	15	✔	FAC
2.			
= Total Cover	15%		
% Bare Ground in Herb Stratum ___			

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	12	x 2 = 24
FAC species	15	x 3 = 45
FACU species	75	x 4 = 300
UPL species	0	x 5 = 0
Column Totals:	102 (A)	369 (B)

Prevalence Index = B/A = 3.62

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks:

Vegetation meets dominance test

SOIL

Sampling Point: W147-SP2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	10YR 3/2	100					Clay Loam	
-								
-								
-								
-								
-								
-								
-								

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✔

Remarks:

No hydric soil indicators present at soil pit.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ______	No ✔	Depth (inches): ______
Water Table Present?	Yes ✔	No ______	Depth (inches): 15
Saturation Present? (includes capillary fringe)	Yes ✔	No ______	Depth (inches): 12

Wetland Hydrology Present? Yes ✔ No ______

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

Remarks:

Primary hydrology indicator A3 and secondary indicator D5 present.

Appendix B. Wetland Rating Summaries and Figures

RATING SUMMARY – Western Washington

Name of wetland (or ID #): SR 167 Completion Project – Wetland 45

Date of site visit: 4/23/2019, 4/25/2019, 5/11/2021, 5/13/2021, 6/2/2022, 6/3/2022

Rated by J. LeClerc Trained by Ecology? ☒ Yes ☐ No Date of Training Oct. 2019

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☒ Yes ☐ No

Additional HGM Classes (*if multiple*): Riverine, Slope

Source of base aerial photo/map Google Earth Aerial, 2018

OVERALL WETLAND CATEGORY II (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

Category II – Total score = 20 – 22

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Enter the appropriate ratings				
Site Potential	M	M	H	
Landscape Potential	M	M	L	
Value	H	H	H	**TOTAL**
Score Based on Ratings	7	7	7	21

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	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

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	B-1
Hydroperiods and location of outlets	D 1.4, H 1.2, D 1.1, D 4.1	B-2
Flow directions and associated features	n/a	B-2a
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	B-2
Map of the contributing basin	D 4.3, D 5.3	B-3
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	B-4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	B-5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	B-6

Wetland name or number: Wetland 45

DEPRESSIONAL AND FLATS WETLANDS **Water Quality Functions** – Indicators that the site functions to improve water quality	
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland has a highly constricted permanently flowing outlet | points = 2	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area | points = 5	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is < 1/4 total area of wetland | points = 0	0
Total for D 1 — Add the points in the boxes above (F9 key)	7
Rating of Site Potential — If score is: 6–11 = M — *Record the rating on the first page*	
D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1	1
D 2.2. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? No = 0	0
D 2.3. Are there septic systems within 250 ft of the wetland? No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1–D 2.3? Source: encampment activity observed May 2021 Yes = 1	1
Total for D 2 — Add the points in the boxes above	2
Rating of Landscape Potential — If score is: 1 or 2 = M — *Record the rating on the first page*	
D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1	1
D 3.2. Is the wetland in a basin or subbasin where an aquatic resource is on the 303(d) list? Yes = 1	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? No = 0	0
Total for D 3 — Add the points in the boxes above	2
Rating of Value — If score is: 2–4 = H — *Record the rating on the first page*	

COMMENTS: D 1.2 Portion of wetland is mapped as Shalcar Muck. SP-1 shows organic material doesn't start until 11" below surface.
D 3.1 – D3.3 The wetland is in the Hylebos Creek-Frontal Commencement Bay subwatershed (HUC 12) which does not have TMDLs in place at the site. Surprise Lake Tributary flows through the wetland and has a 303d listing for mercury at the site.

Hydrologic Functions – Indicators that the site functions to reduce flooding and stream degradation	
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland has a highly constricted permanently flowing outlet | points = 2	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet | points = 7	7
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is more than 100 times the area of the unit | points = 0	0
Total for D 4 — Add the points in the boxes above	9
Rating of Site Potential — If score is: 6–11 = M — *Record the rating on the first page*	

Wetland name or number: Wetland 45

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? GIS analysis 6.1% No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1	1
Total for D 5 Add the points in the boxes above	2

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

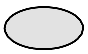
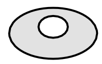
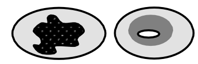
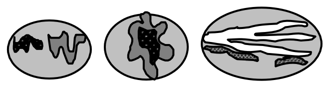
D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): Flooding occurs in a subbasin that is immediately down-gradient of unit | points = 2 **If not applicable chosen above:** Choose an item. **Explanation for 0 points (if required above):**	2
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for D 6 Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

These questions apply to wetlands of all HGM classes.
HABITAT FUNCTIONS – Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☒ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☒ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3

H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2	2
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* High | points = 3 **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points  All three diagrams in this row are **HIGH** = 3 points 	3
H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points*. ☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long). ☒ Standing snags (dbh >4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	15
Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*	
H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate*: % undisturbed habitat 9.9**+** [(% moderate and low intensity land uses)0/2] 0 **= 9.9**% If total accessible habitat is: <10% of 1 km Polygon | points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate*: % undisturbed habitat 13.3**+** [(% moderate and low intensity land uses)4.7/2] 2.4 **= 15.7**% Undisturbed habitat 10–50% and >3 patches | points = 1	1
H 2.3. Land use intensity in 1 km Polygon: 82.0% >50% of 1 km Polygon is high intensity land use | points = (-2)	-2
Total for H 2 Add the points in the boxes above	-1
Rating of Landscape Potential If score is: < 1 = L *Record the rating on the first page*	

Wetland name or number: Wetland 45

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.*	2

WDFW Priority Habitats within 100 m:

☐ Aspen Stands
☐ Old Growth/Mature Forests
☐ Westside Prairies
☐ Caves
☒ Snags and Logs
☒ Biodiversity Areas and Corridors
☐ Oregon White Oak
☒ Instream
☐ Cliffs
☐ Herbaceous Balds
☒ Riparian
☐ Nearshore
☐ Talus

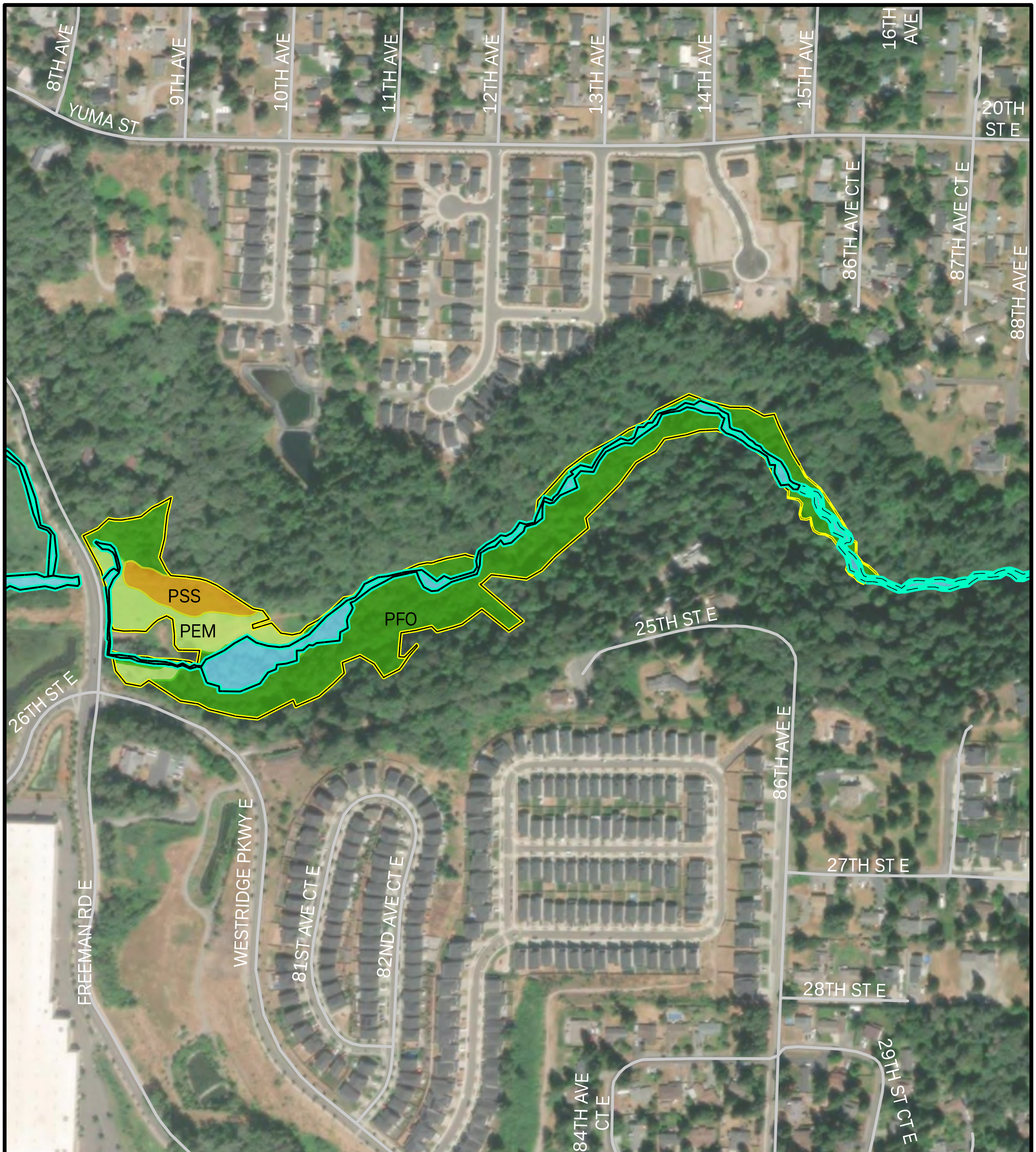
(*Priority habitats listed by WDFW: For complete descriptions of WDFW priority habitats, and the counties in which they can be found, see: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington,* <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>,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

Site meets ANY of the following criteria: points = 2

☒ It has 3 or more priority habitats within 100 m (checked above)
☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)
☐ It is mapped as a location for an individual WDFW priority species
☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources
☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan

Site has 1 or 2 priority habitats within 100 m (checked above) points = 1
Site does not meet any of the criteria above points = 0

Rating of Value If score is: 2 = H *Record the rating on the first page*



Legend

- Stream
- Delineated OHWM
- Estimated OHWM
- Delineated wetland boundary
- Estimated wetland boundary

Cowardin class

- PEM - Palustrine emergent
- PFO - Palustrine forested
- PSS - Palustrine scrub-shrub

Figure B-1.
Cowardin Classes for Wetland 45.

0 210 420 840 Feet

HERRERA

ESRI, Aerial (2021)

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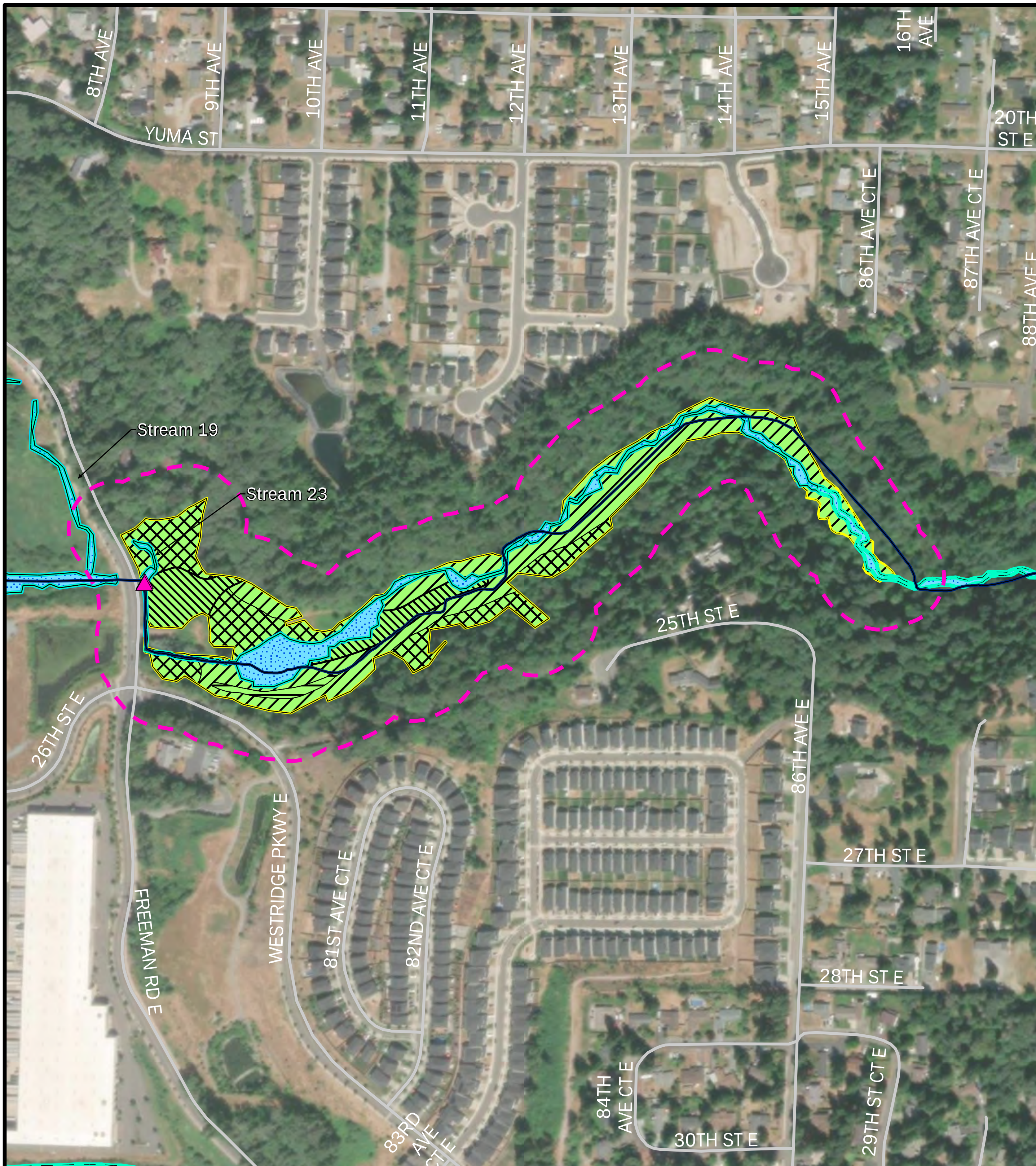

Legend

- Stream (Pierce County 2021)
- Delineated wetland boundary
- Estimated wetland boundary
- Delineated OHWM
- Estimated OHWM
- Wetland
- Stream
- 150ft boundary
- Outlet

Hydroperiod

- Occasionally flooded
- Permanently flooded
- Saturated only
- Seasonally flooded
- Permanently flowing stream

Figure B-2.
Hydroperiod, 150-Foot Boundary, and Location of Outlets for Wetland 45.

N

0 215 430 860
Feet

HERRERA

Esri, Aerial (2021)

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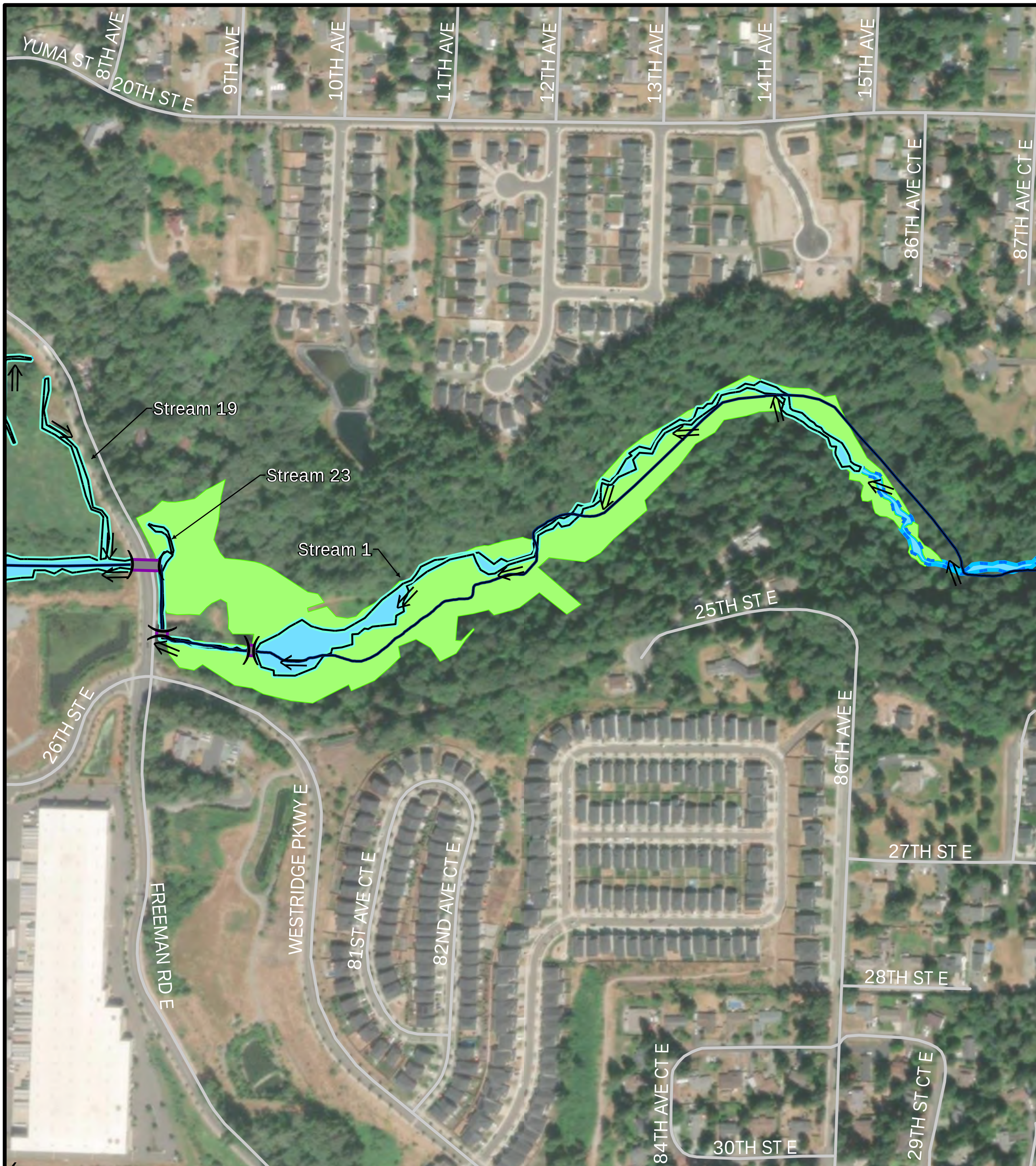

Legend

- Flow Direction
- Streams (Pierce County 2021)
- Culverts
- Wetland
- Stream
- Estimated OHWM
- Delineated OHWM

Figure B-**2**a.
Flow Directions and Features Associated with Wetland 45.

N

0 210 420 840
Feet

HERRERA

Esri, Aerial (2021)

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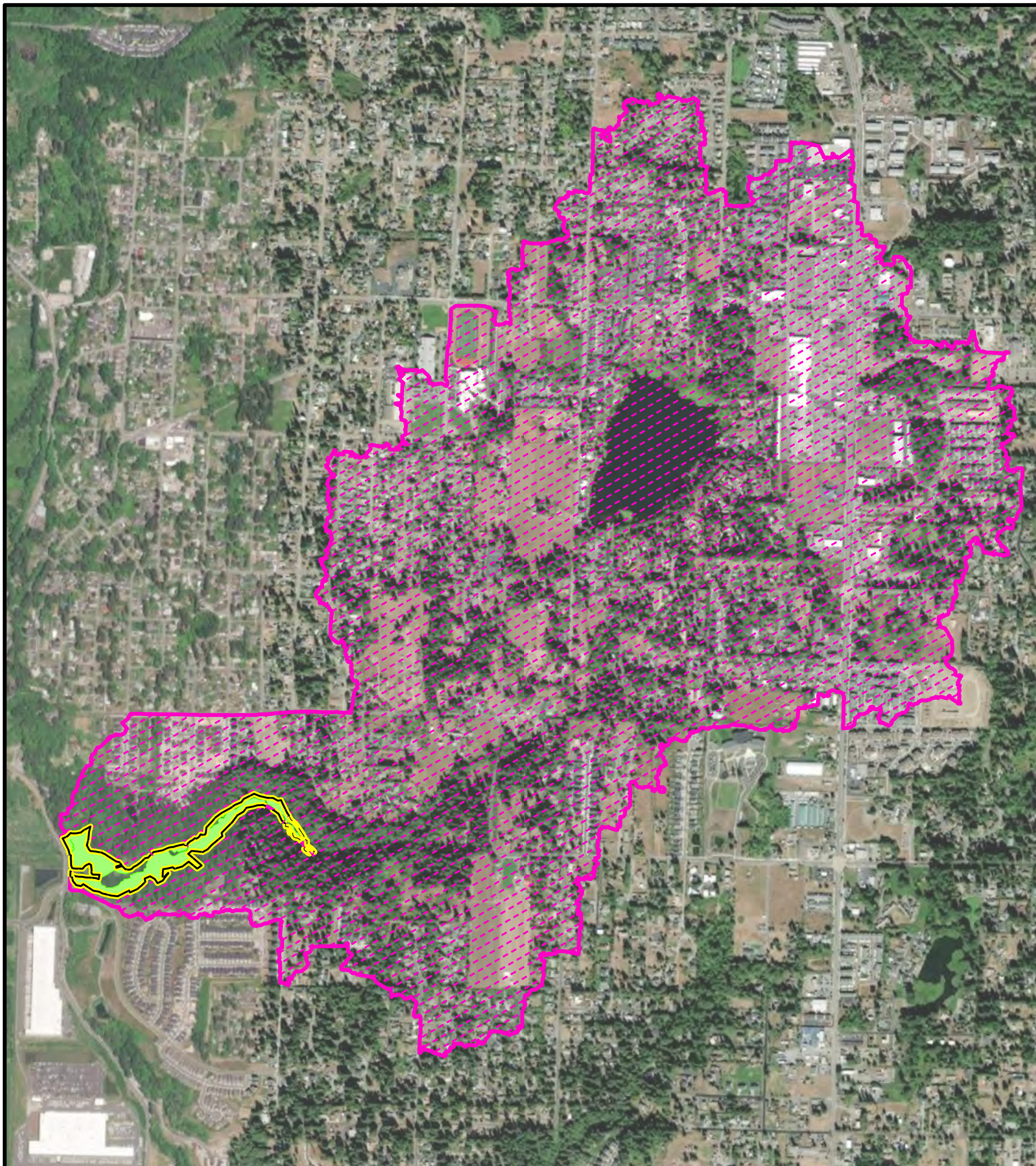

Legend

Contributing basin

Wetland

Delineated wetland boundary

Estimated wetland boundary

Figure B-3.
Map of Contributing Basin for Wetland 45.

HERRERA

Esri, Aerial (2021)

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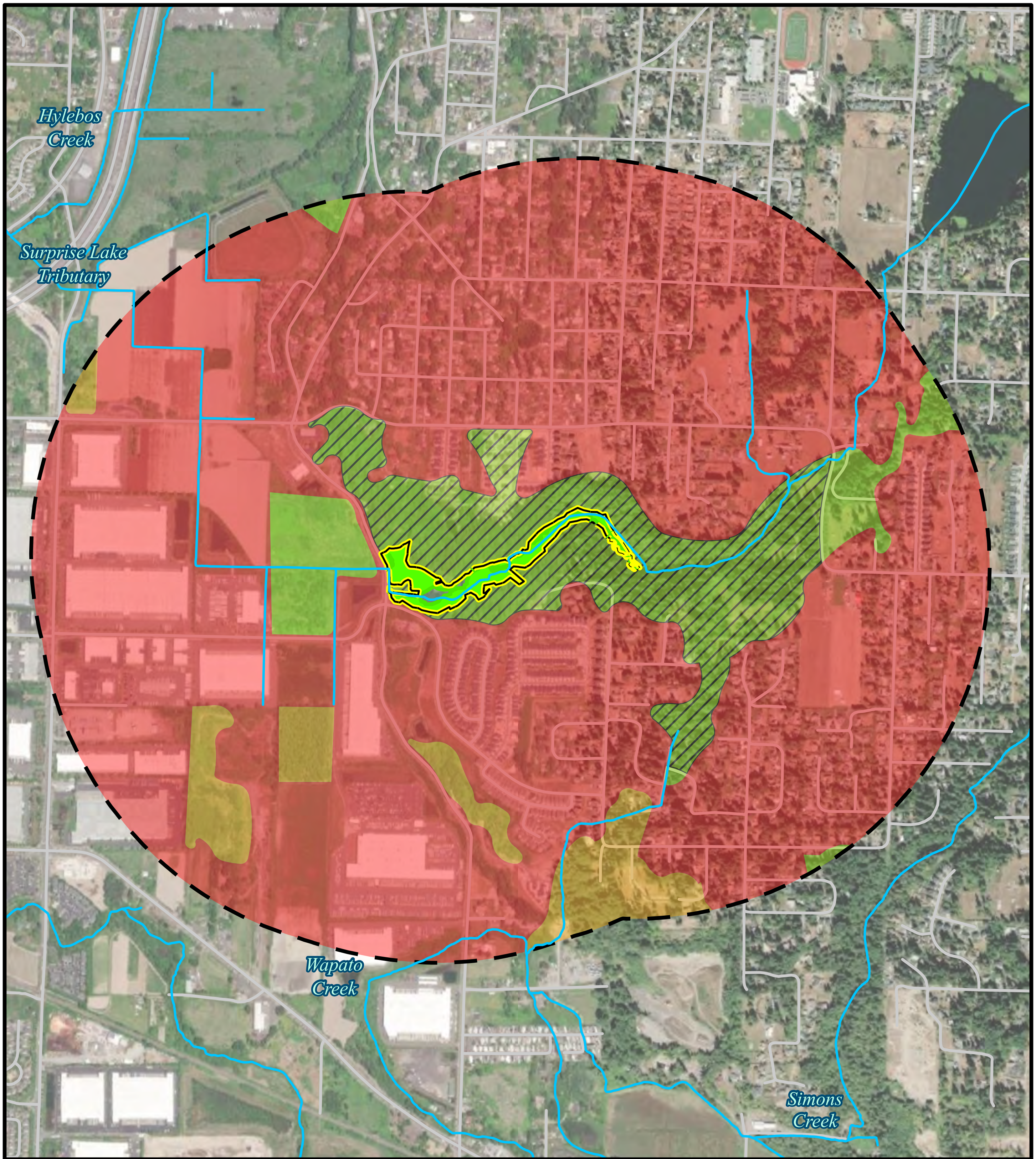

Legend

- Delineated wetland boundary
- Estimated wetland boundary
- 1-km boundary
- Wetland
- Stream (Pierce County)

Habitat type

- High intensity
- Low/Moderate Intensity
- Relatively undisturbed
- Relatively undisturbed and accessible

Figure B-4.
Habitat Within a 1-km Boundary of Wetland 45.

N

0 500 1,000 2,000 Feet

HERRERA

Esri, Aerial (2021)

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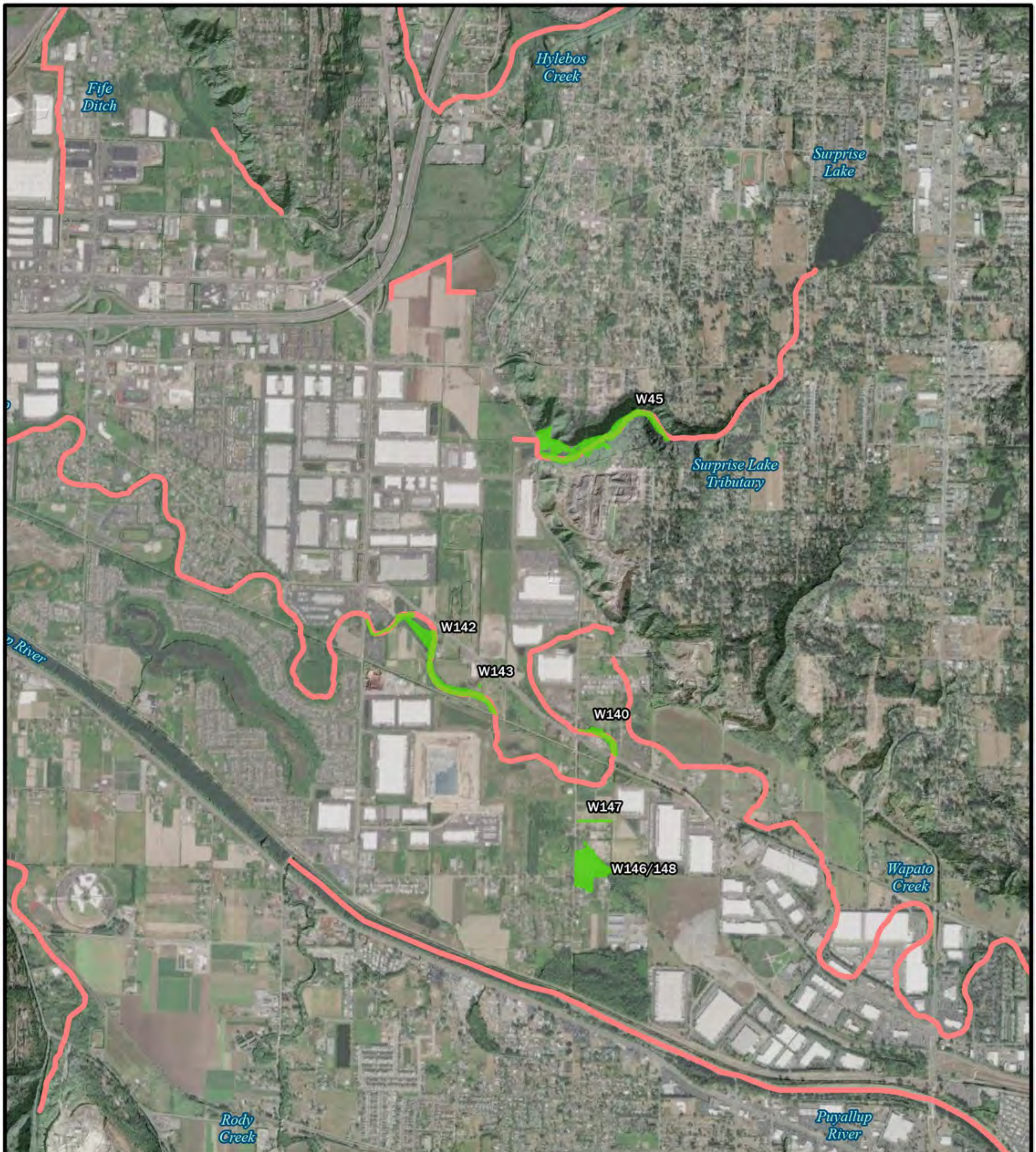


Legend

303(d) listed waters

Wetland area

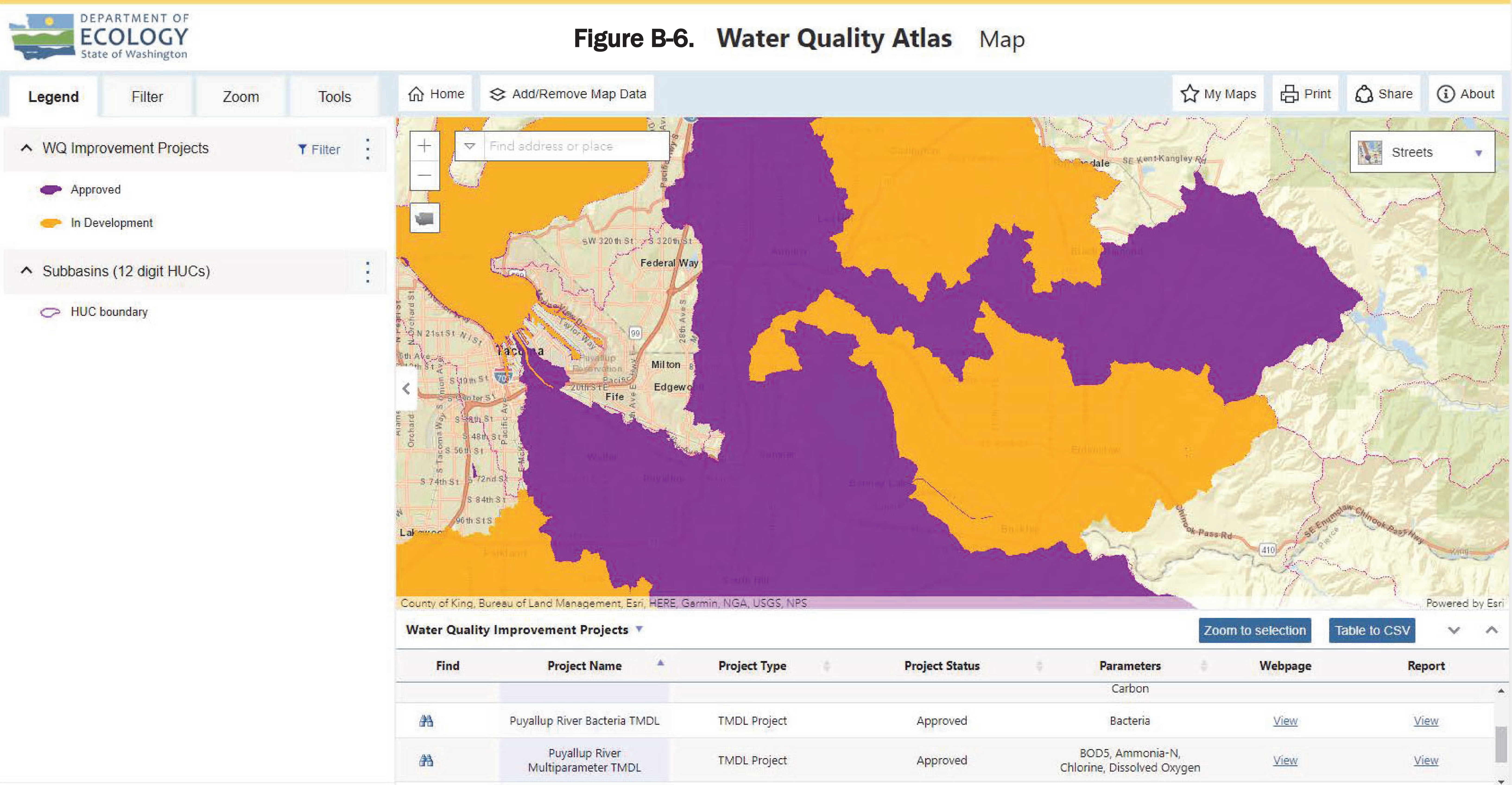
Figure B-5.
303(d) Waters in the Vicinity of the Stage 2 Study Area.

0 1,000 2,000 4,000
Feet

HERRERA

Esri Imagery (2021)

Figure B-6. Water Quality Atlas Map



RATING SUMMARY – Western Washington

Name of wetland (or ID #): SR 167 Completion Project – Wetland 140   Date of site visit: 4/29/2022

Rated by S. Wall   Trained by Ecology? ☒ Yes ☐ No Date of Training April 2015

HGM Class used for rating Riverine   Wetland has multiple HGM classes? ☐ Yes ☒ No

Additional HGM Classes (*if multiple*):

Source of base aerial photo/map ESRI aerial, 2020

OVERALL WETLAND CATEGORY Choose an item. (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

Category II – Total score = 20 – 22

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	M	M	
Landscape Potential	H	H	L	
Value	M	H	H	**TOTAL**
Score Based on Ratings	7	8	6	21

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	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	B-7
Hydroperiods	H 1.2	B-8
Flow directions and associated features	n/a	B-8a
Ponded depressions	R 1.1	B-9
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	B-8
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	B-10
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	B-9
Map of the contributing basin	R 2.2, R 2.3, R 5.2	B-11
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	B-12
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	B-5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	B-6

Wetland name or number: Wetland 140

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 — Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 2	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1	1
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? Yes = 1 **If yes,** other sources: waterfowl	1
Total for R 2 — Add the points in the boxes above	6

Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) No = 0	0
Total for R 3 — Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS: The wetland is in the Hylebos Creek-Frontal Commencement Bay subbasin (HUC 12) which does not have TMDLs in place. Wapato creek has a 303(d) listing for bacteria. It does not have TMDL limits.

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

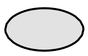
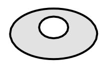
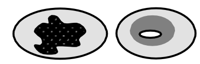
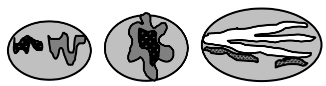
R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is 5–<10 | points = 4	4
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 — Add the points in the boxes above	11

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams?	No = 1	1
Total for R 5	Add the points in the boxes above	3
Rating of Landscape Potential If score is: 3 = H	*Record the rating on the first page*	
R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The subbasin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resours (e.g., houses or salmon redds) | points = 2		2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	No = 0	0
Total for R 6	Add the points in the boxes above	2
Rating of Value If score is: 2–4 = H	*Record the rating on the first page*	
COMMENTS:		

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☐ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	3 structures | points = 2	2
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☐ Occasionally flooded or inundated ☒ 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**	3 types present | points = 2 **2 points** **2 points**	2

Wetland name or number: Wetland 140

H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: 5–19 species | points = 1	1
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* High | points = 3 **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points  All three diagrams in this row are **HIGH** = 3 points 	3
H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points*. ☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long). ☒ Standing snags (dbh >4 in) within the wetland ☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
5Total for H 1 Add the points in the boxes above	11

Rating of Site Potential If score is: 7–14 = M *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate*: % undisturbed habitat 0**+** [(% moderate and low intensity land uses)8.2/2] **= 4.1**% If total accessible habitat is: <10% of 1 km Polygon | points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate*: % undisturbed habitat 12.7**+** [(% moderate and low intensity land uses)24.7/2] 12.4 **= 25.1**% Undisturbed habitat 10–50% and >3 patches | points = 1	1
H 2.3. Land use intensity in 1 km Polygon: If >50% of 1 km Polygon is high intensity land use | points = (-2)	-2
Total for H 2 Add the points in the boxes above	-1

Rating of Landscape Potential If score is: < 1 = L *Record the rating on the first page*

Wetland name or number: Wetland 140

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* WDFW Priority Habitats within 100 m: ☐ Aspen Stands ☒ Biodiversity Areas and Corridors ☐ Herbaceous Balds ☐ Old Growth/Mature Forests ☐ Oregon White Oak ☒ Riparian ☐ Westside Prairies ☒ Instream ☐ Nearshore ☐ Caves ☐ Cliffs ☐ Talus ☐ Snags and Logs (*Priority habitats listed by WDFW: For complete descriptions of WDFW priority habitats, and the counties in which they can be found, see: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington,* <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>, *or access the list from here:* <https://wdfw.wa.gov/species-habitats/at-risk/phs/list>.) Site meets ANY of the following criteria: points = 2 ☒ It has 3 or more priority habitats within 100 m (checked above) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (checked above) points = 1 Site does not meet any of the criteria above points = 0	2

Rating of Value If score is: 2 = H *Record the rating on the first page*

Legend

- Stream
- Delineated OHWM
- Estimated OHWM
- Delineated wetland boundary
- Estimated wetland boundary

Cowardin class

- PEM - Palustrine emergent
- PFO - Palustrine forested

Figure B-7.
Cowardin Classes for Wetland 140.

N

0 50 100 200
Feet

HERRERA

ESRI, Aerial (2021)

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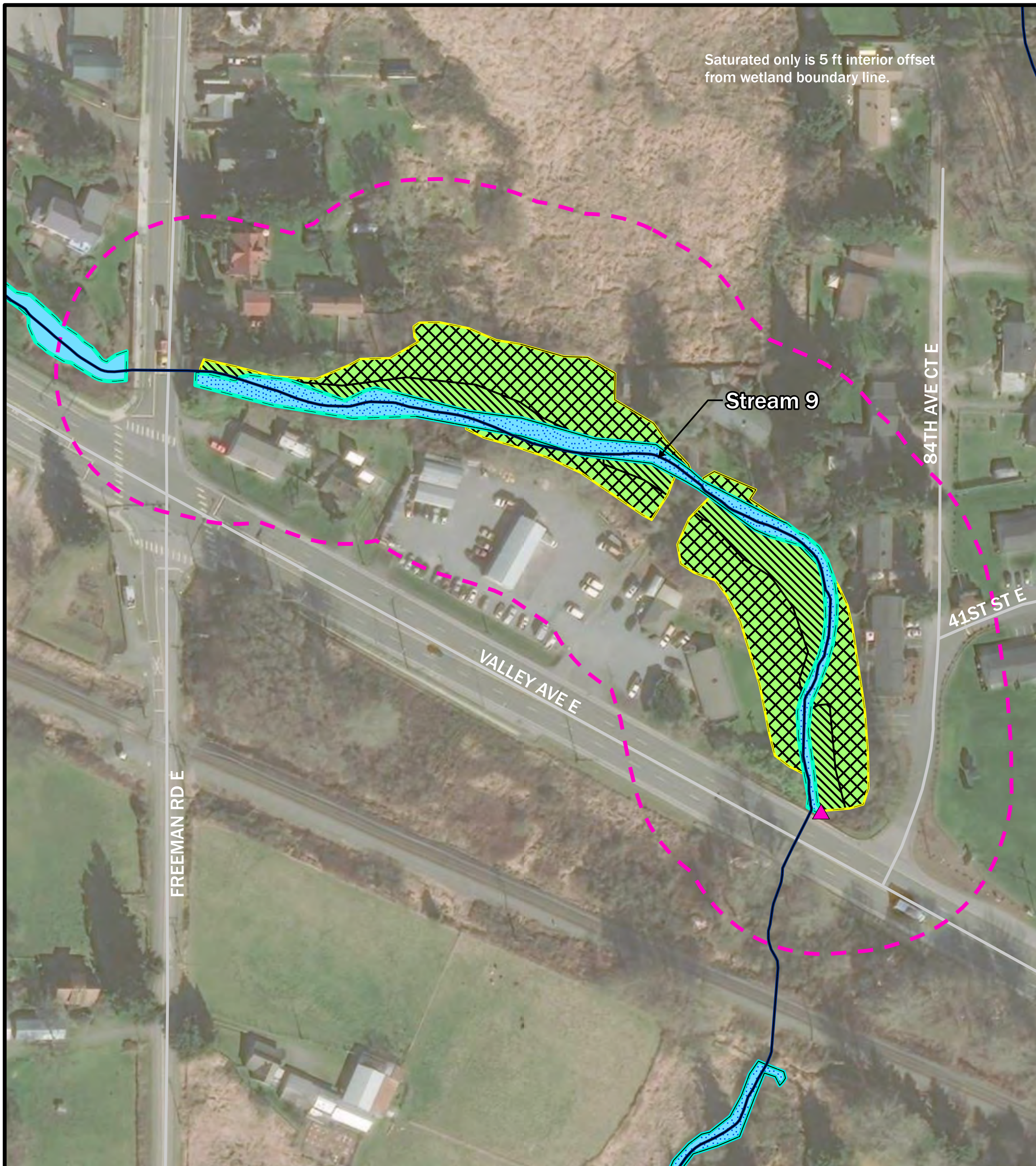

Legend

- Stream (Pierce County 2021)
- Delineated wetland boundary
- Estimated wetland boundary
- Delineated OHWM
- Estimated OHWM
- Wetland
- Stream
- 150ft boundary
- Outlet

Hydroperiod

- Saturated only
- Seasonally flooded
- Permanently flowing stream

Figure B-8.
Hydroperiod, 150-Foot Boundary, and Location of Outlets for Wetland 140.

0 70 140 280 Feet

HERRERA

ESRI, Aerial (2021)

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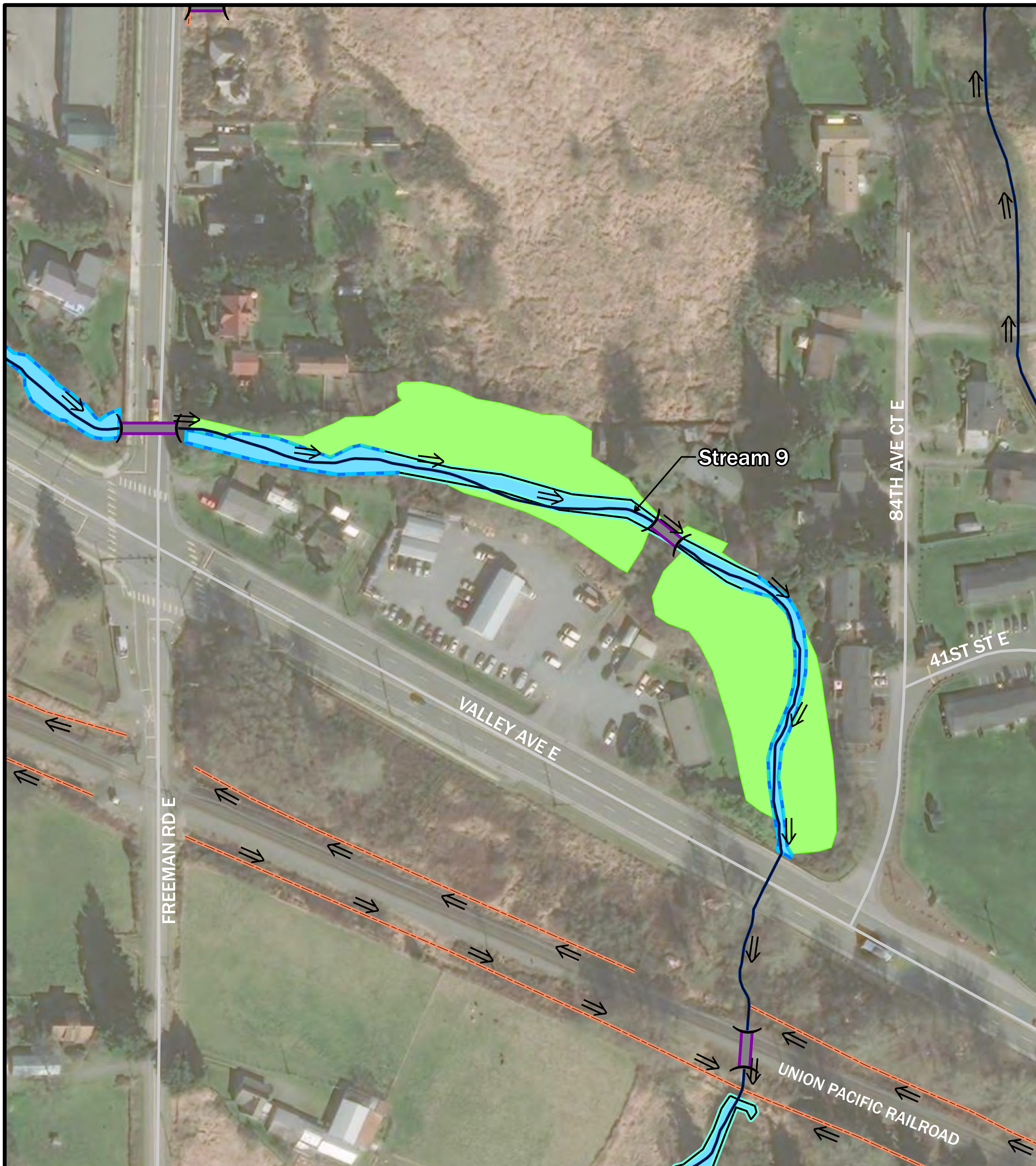

Legend

- Flow Direction
- Streams (Pierce County 2021)
- Estimated ditch centerline
- Culverts
- Wetland
- Stream
- Estimated OHWM
- Delineated OHWM

Figure B-8a.
Flow Directions and Features Associated with Wetland 140.

0 75 150 300 Feet

HERRERA

Esri, Aerial (2021)

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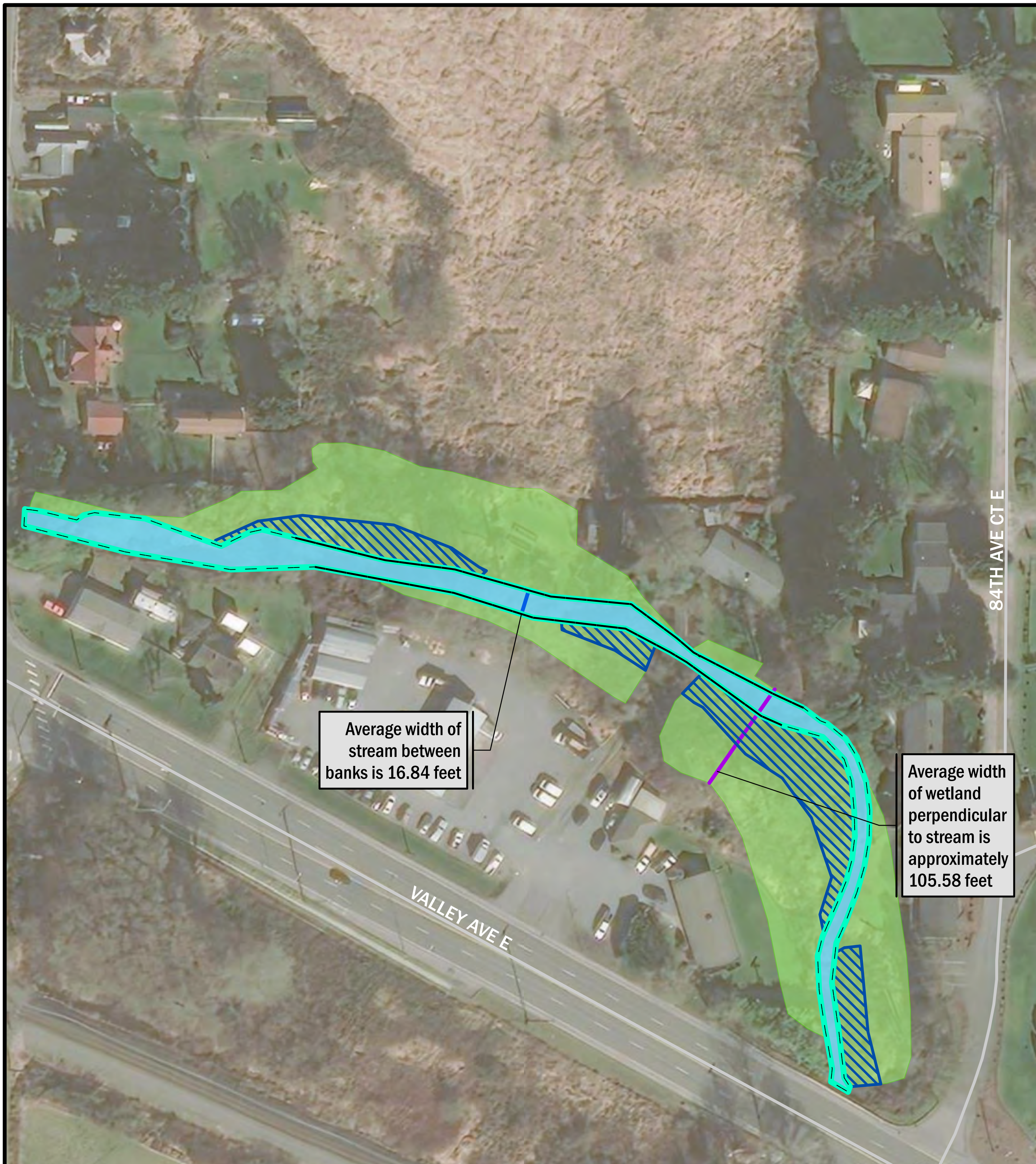

Legend

Wetland	Stream width
Stream	Estimated OHWM
Ponded Depressions	Delineated OHWM
Wetland width	

Figure B-9.
Ponded Depressions in Wetland 140 and the Width of the Unit vs. the Width of the Stream.

0 55 110 220 Feet

HERRERA

ESRI, Aerial (2021)

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Legend

Stream

Delineated wetland boundary

Estimated wetland boundary

Plant cover

Forest or shrub

Neither forest, shrub, nor ungrazed emergent plants

Ungrazed or unmowed emergent plants

Figure B-10.
Plant Cover of Trees, Shrubs, and Herbaceous Plants in Wetland 140.

0 170 340 680 Feet

HERRERA

ESRI, Aerial (2021)

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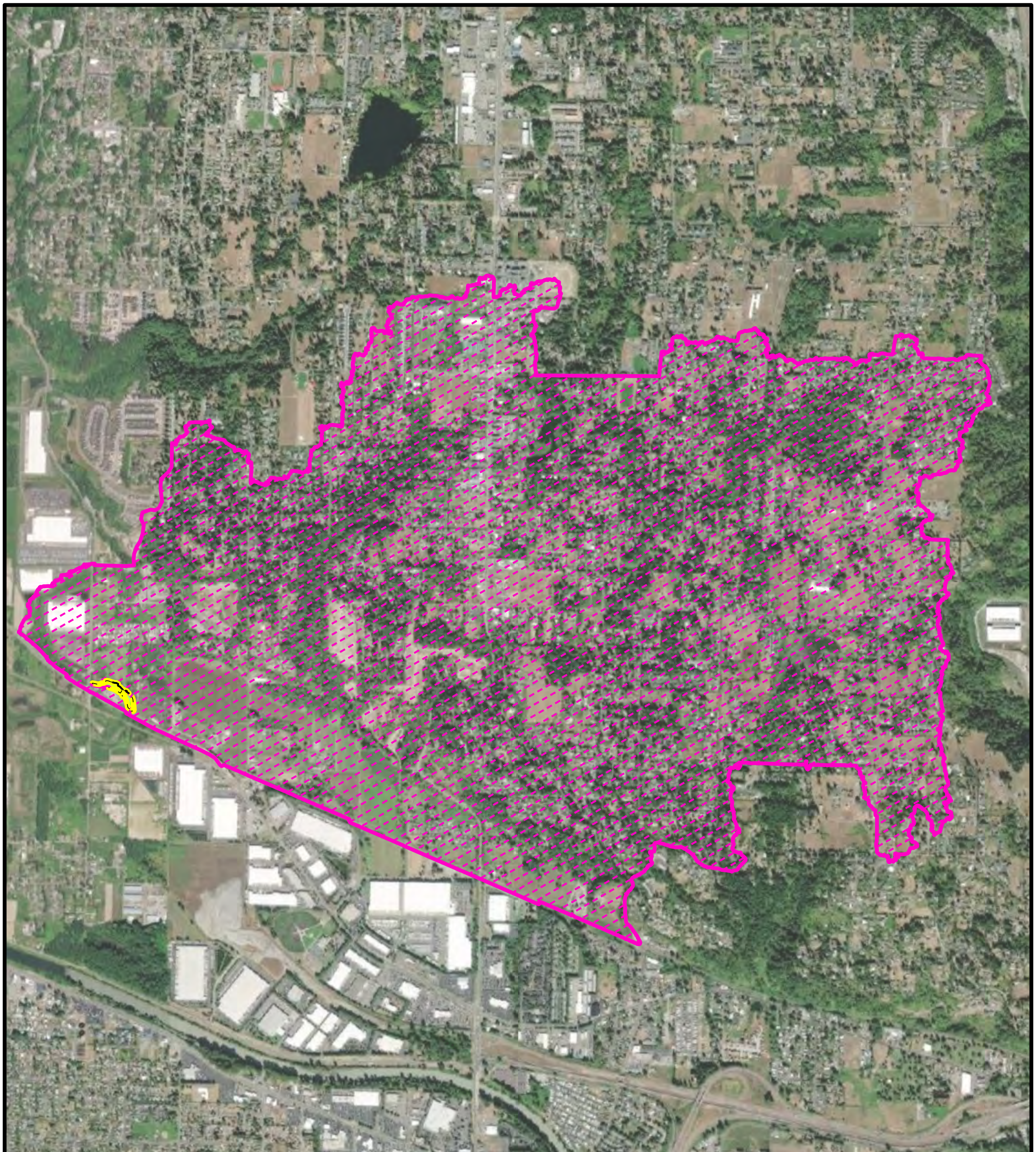

Legend

- Contributing basin
- Wetland
- Delineated wetland boundary
- Estimated wetland boundary

Figure B-11.
Map of Contributing Basin for Wetland 140.

0 1,000 2,000 4,000 Feet

HERRERA

Esri, Aerial (2021)

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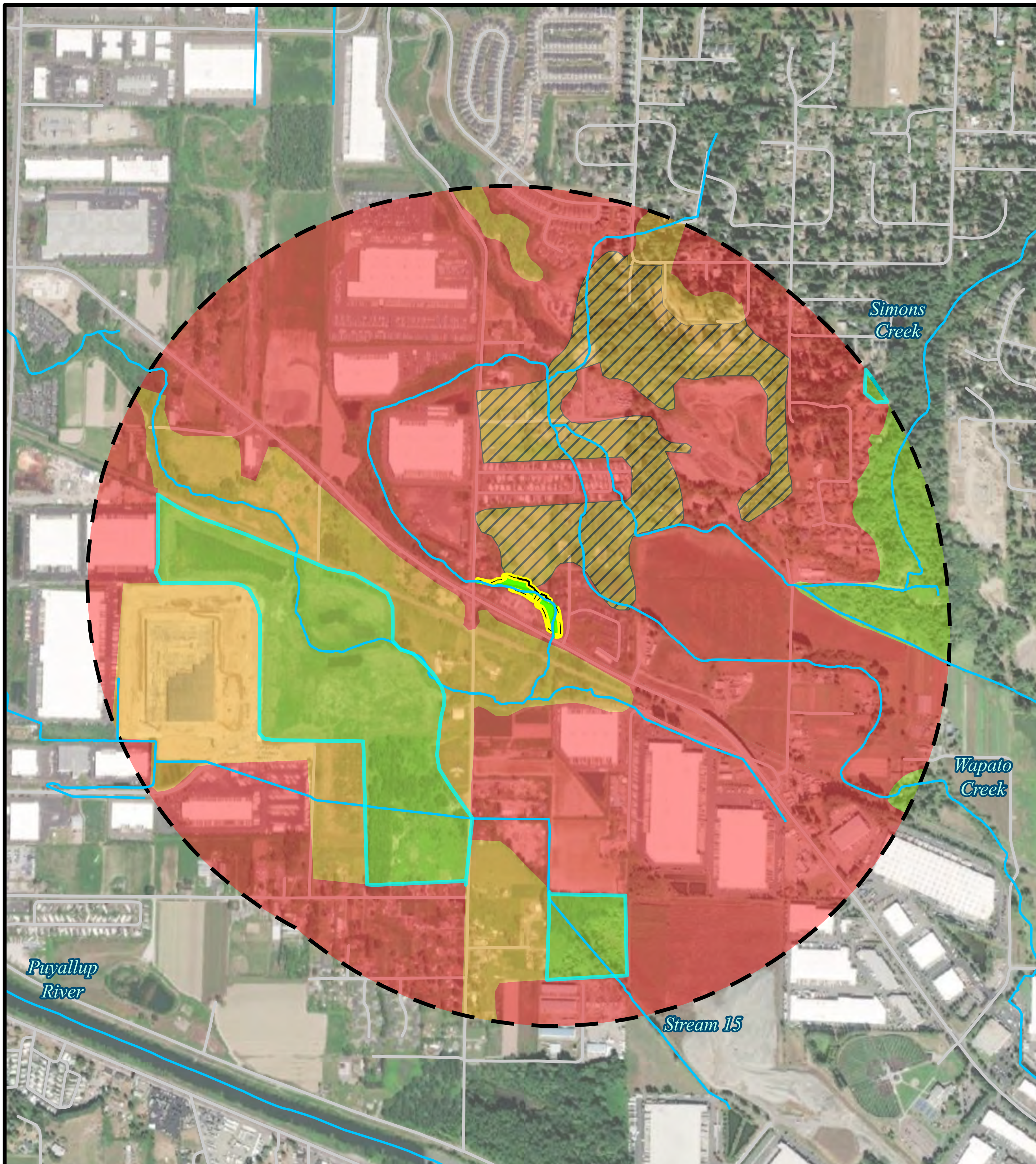

Legend

- Delineated wetland boundary
- Estimated wetland boundary
- 1-km boundary
- Wetland
- Stream (Pierce County)

Habitat type

- High intensity
- Low/Moderate Intensity and accessible
- Low/Moderate Intensity
- Relatively undisturbed

Figure B-12.
Habitat Within a 1-km Boundary of Wetland 140.

N

0 500 1,000 2,000
Feet

HERRERA

Esri, Aerial (2021)

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RATING SUMMARY – Western Washington

Name of wetland (or ID #): SR 167 Completion Project - Wetland 142 Date of site visit: 5/10/22 & 5/25/22

Rated by D. Rapoza Trained by Ecology? ☒ Yes ☐ No Date of Training 10/2018

HGM Class used for rating Riverine Wetland has multiple HGM classes? ☒ Yes ☐ No

Additional HGM Classes (*if multiple*): depressional

Source of base aerial photo/map ESRI Aerial, 2020

OVERALL WETLAND CATEGORY II (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

Category II – Total score = 20 – 22

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	M	H	
Landscape Potential	H	M	L	
Value	M	H	H	**TOTAL**
Score Based on Ratings	7	7	7	21

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	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	B-13
Hydroperiods	H 1.2	B-14
Flow directions and associated features	n/a	B-14a
Ponded depressions	R 1.1	B-15
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	B-14
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	B-16
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	B-15
Map of the contributing basin	R 2.2, R 2.3, R 5.2	B-17
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	B-18
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	B-5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	B-6

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 2	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1	1
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? Yes = 1 **If yes,** other sources: encampments	1
Total for R 2 Add the points in the boxes above	6

Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) No = 0	0
Total for R 3 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS: The wetland is in the Hylebos Creek-Frontal Commencement Bay subbasin (HUC 12) which does not have TMDLs in place. Wapato Creek has a 303(d) listing for bacteria. It does not have TMDL limits.

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is 5–<10 | points = 4	4
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 Add the points in the boxes above	11

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0	0
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams?	No = 1	1
Total for R 5	Add the points in the boxes above	2

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

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The subbasin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resours (e.g., houses or salmon redds) | points = 2		2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	No = 0	0
Total for R 6	Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

These questions apply to wetlands of all HGM classes.
HABITAT FUNCTIONS – Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☐ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	3 structures | points = 2	2
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3

H 1.3. Richness of plant species — **2**

Count the number of plant species in the wetland that cover at least 10 ft^2.

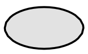
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.***

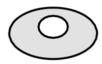
If you counted:

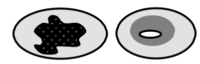
>19 species | points = 2

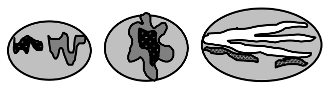
H 1.4. Interspersion of habitats — **3**

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* High | points = 3

None = 0 points 

Low = 1 point 

Moderate = 2 points 

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

H 1.5. Special habitat features: — **5**

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).

☒ Standing snags (dbh >4 in) within the wetland

☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)

☒ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)

☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1 — Add the points in the boxes above — **15**

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — **0**

Calculate: % undisturbed habitat 0.0 **+** [(% moderate and low intensity land uses)2.4/2] 1.2 **= 1.2**%

If total accessible habitat is:

<10% of 1 km Polygon | points = 0

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — **2**

Calculate: % undisturbed habitat 12.9**+** [(% moderate and low intensity land uses)13.1/2] 6.55 **= 19.45**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If — **-2**

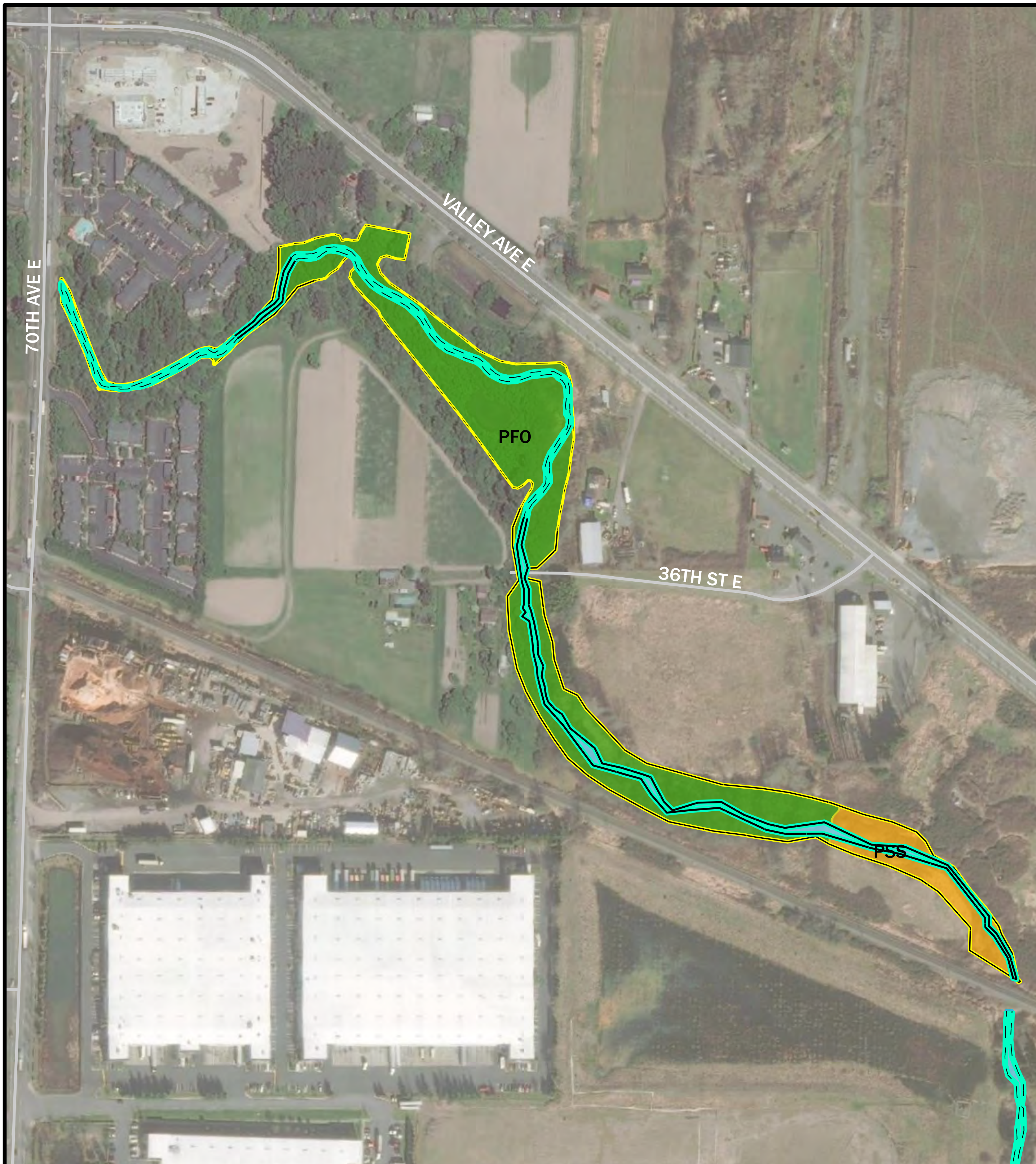
>50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2 — Add the points in the boxes above — **0**

Rating of Landscape Potential If score is: < 1 = L *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* WDFW Priority Habitats within 100 m: ☐ Aspen Stands ☐ Biodiversity Areas and Corridors ☐ Herbaceous Balds ☐ Old Growth/Mature Forests ☐ Oregon White Oak ☒ Riparian ☐ Westside Prairies ☒ Instream ☐ Nearshore ☐ Caves ☐ Cliffs ☐ Talus ☐ Snags and Logs (*<u>Priority habitats listed by WDFW</u>: For complete descriptions of WDFW priority habitats, and the counties in which they can be found, see: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington,* <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>, *or access the list from here:* <https://wdfw.wa.gov/species-habitats/at-risk/phs/list>.) Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (checked above) ☒ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (checked above) points = 1 Site does not meet any of the criteria above points = 0	2

Rating of Value If score is: 2 = H *Record the rating on the first page*



Legend

- Stream
- Delineated OHWM
- Estimated OHWM
- Delineated wetland boundary
- Estimated wetland boundary

Cowardin class

- PFO - Palustrine forested
- PSS - Palustrine scrub-shrub

Figure B-13.
Cowardin Classes for Wetland 142.

N

0 170 340 680 Feet

HERRERA

ESRI, Aerial (2021)

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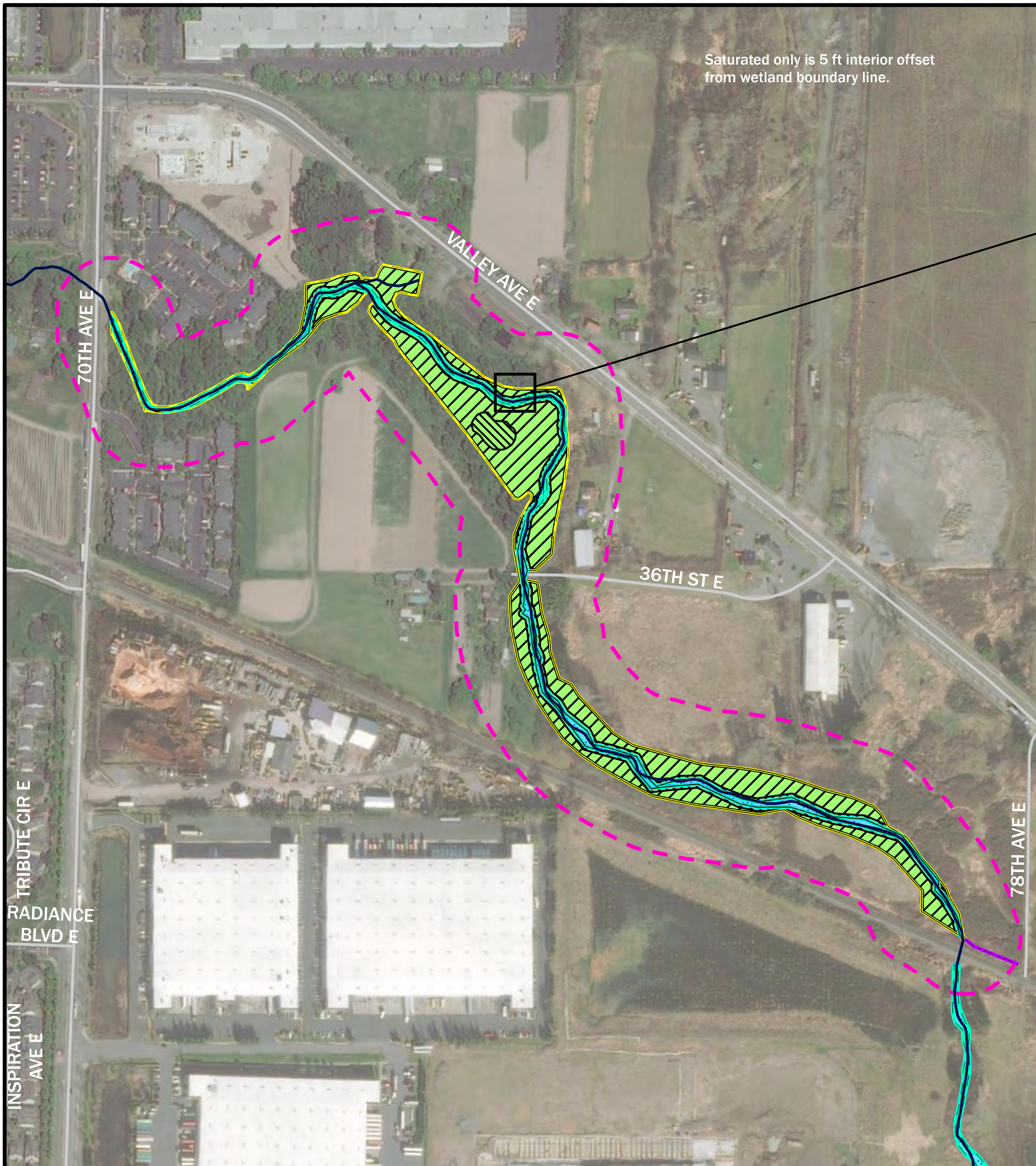

Legend

- Stream (Pierce County 2021)
- Delineated wetland boundary
- Estimated wetland boundary
- Delineated OHWM
- Estimated OHWM
- Wetland
- Stream
- 150ft boundary
- Surveyed ditches

Hydroperiod

- Occasionally flooded
- Saturated only
- Seasonally flooded
- Permanently flowing stream

Figure B-14.
Hydroperiod, 150-Foot Boundary, and Location of Outlets for Wetland 142.

N

0 190 380 760 Feet

HERRERA

ESRI, Aerial (2021)

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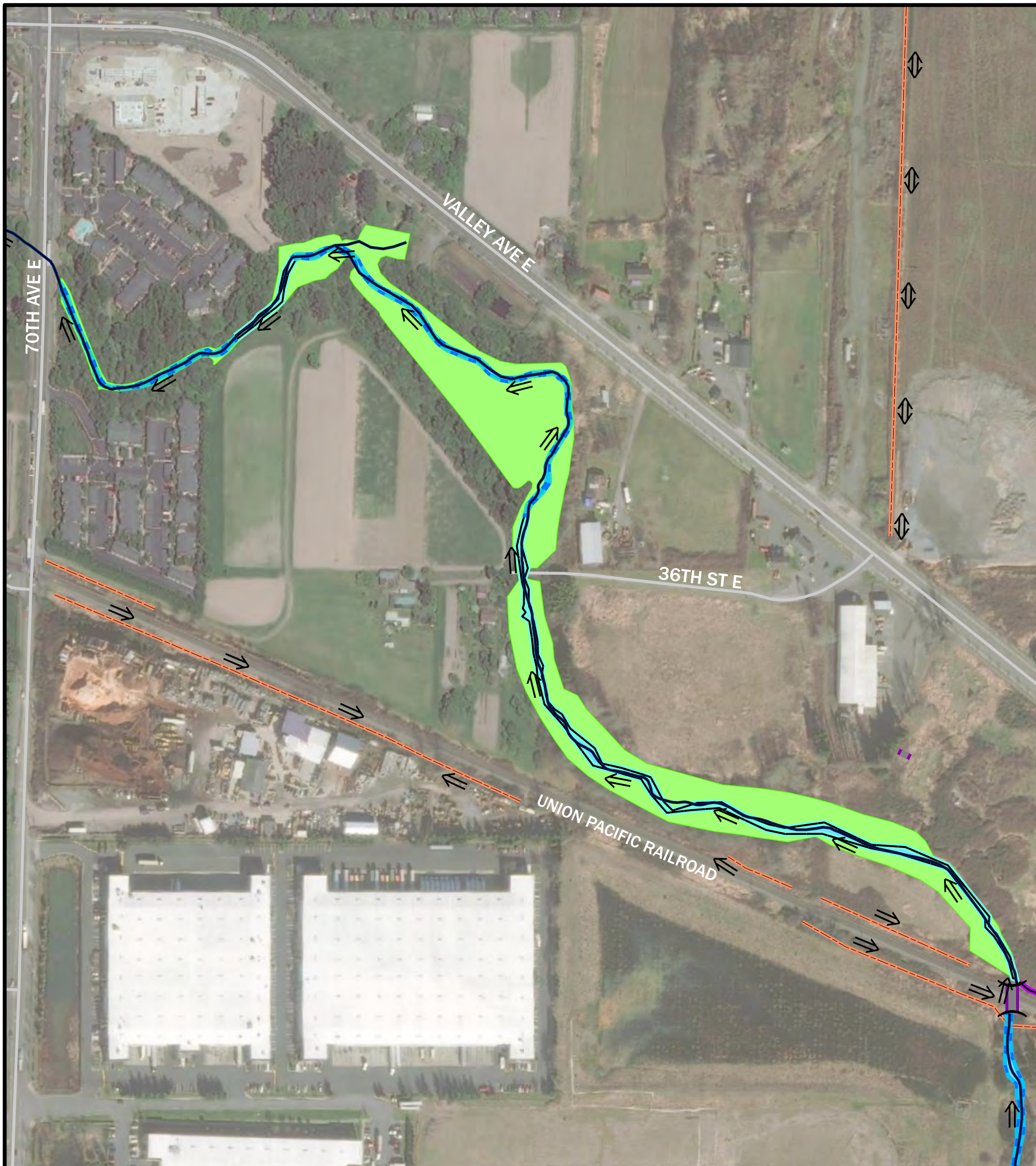

Legend

- Flow Direction
- Streams (Pierce County 2021)
- Estimated ditch centerline
- Ditch (survey)
- Surveyed ditches
- Culverts
- Wetland
- Stream
- Estimated OHWM
- Delineated OHWM

Figure B-14a.
Flow Directions and Features Associated with Wetland 142.

0 170 340 680 Feet

HERRERA

Esri, Aerial (2021)

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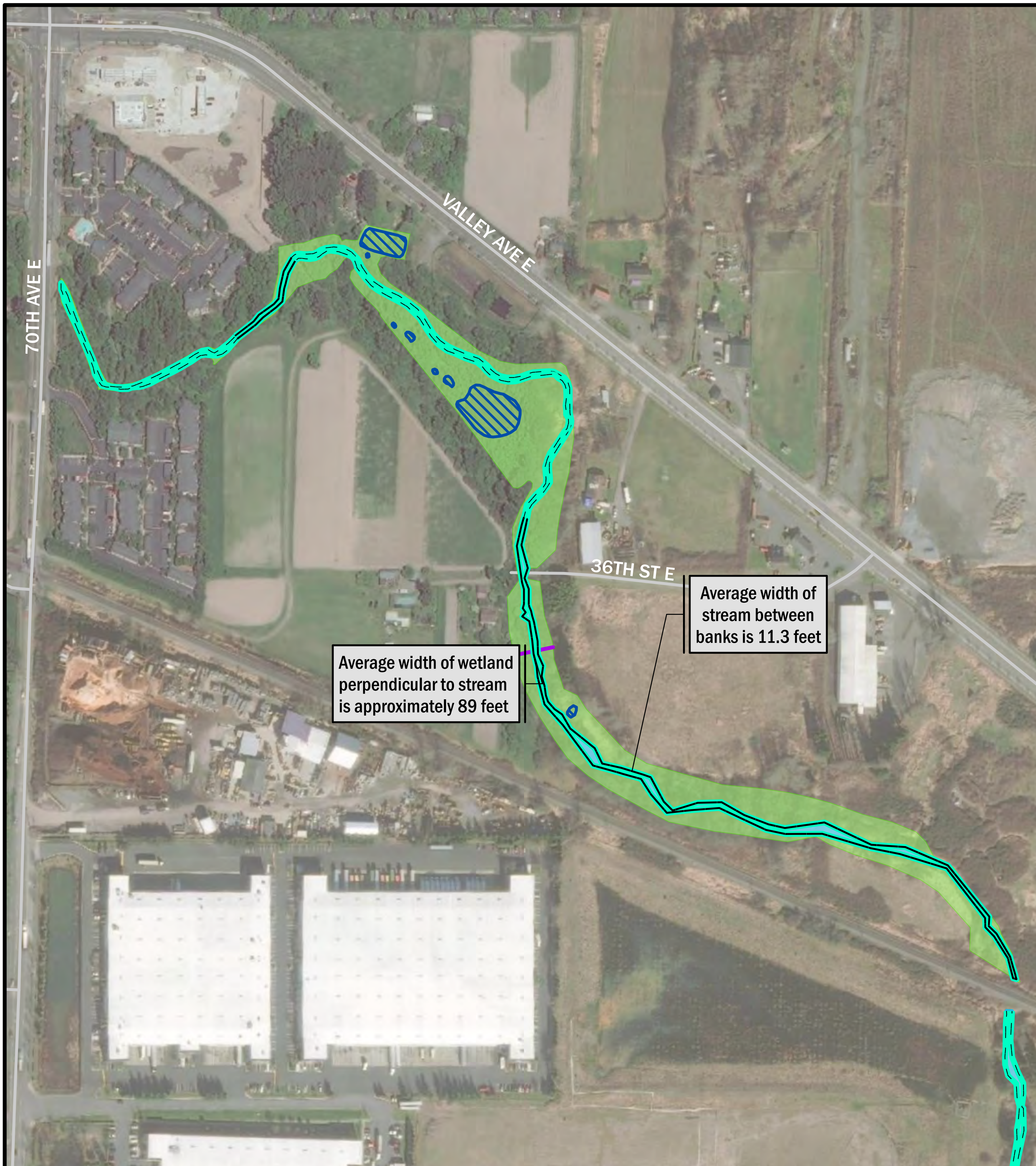

Legend

- Wetland
- Stream
- Ponded Depressions
- Wetland width
- Stream width
- Estimated OHWM
- Delineated OHWM

Figure B-15.
Ponded Depressions in Wetland 142 and the Width of the Unit vs. the Width of the Stream.

N

0 170 340 680 Feet

HERRERA

ESRI, Aerial (2021)

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Legend

Stream

Delineated wetland boundary

Estimated wetland boundary

Plant cover

Forest or shrub

Neither forest, shrub, nor ungrazed emergent plants

Ungrazed or unmowed emergent plants

Figure B-16.
Plant Cover of Trees, Shrubs, and Herbaceous Plants in Wetland 142.

0 170 340 680 Feet

HERRERA

ESRI, Aerial (2021)

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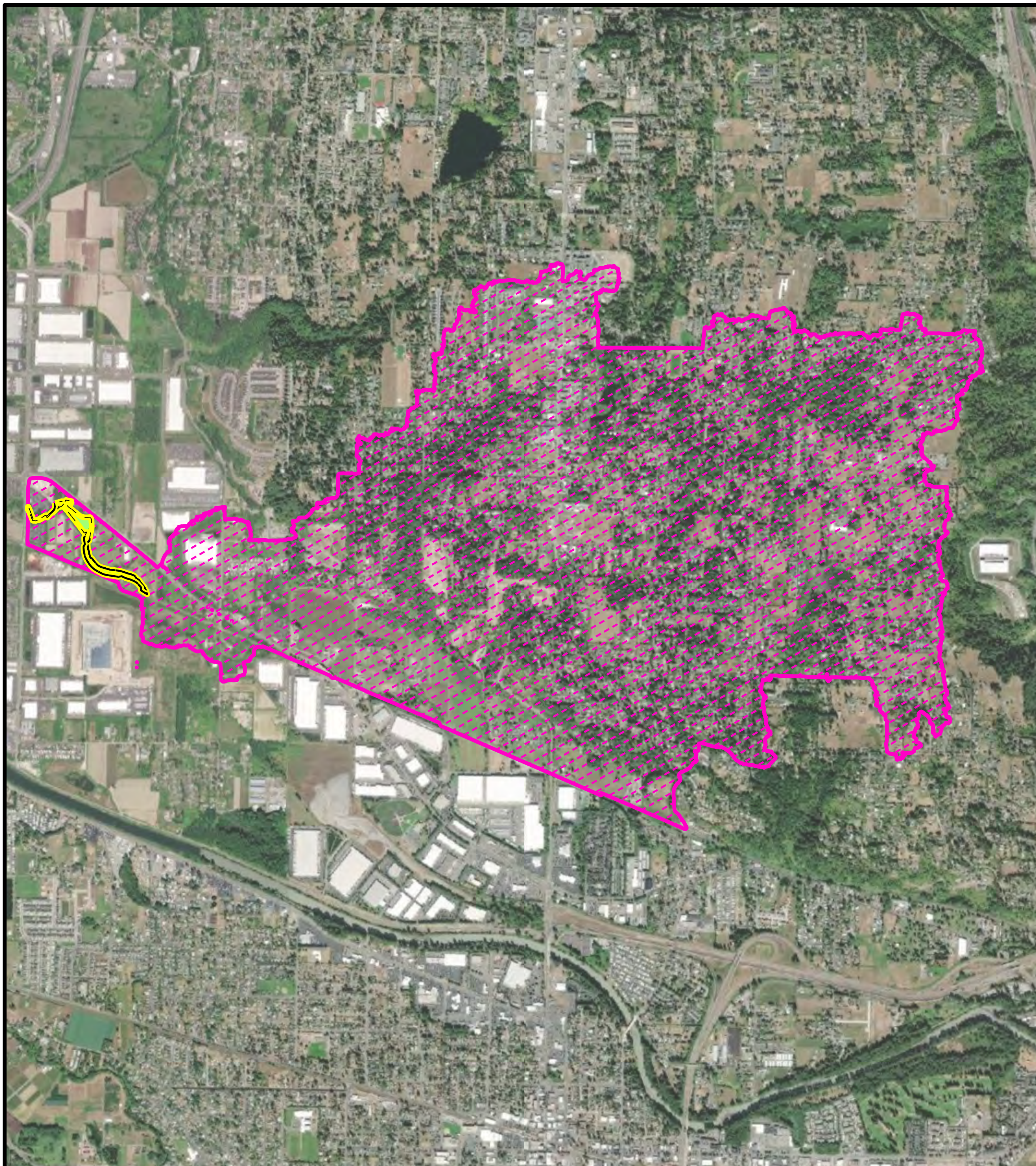

Legend

- Contributing basin
- Wetland
- Delineated wetland boundary
- Estimated wetland boundary

Figure B-17.
Map of Contributing Basin for Wetland 142.

N

0 1,250 2,500 5,000 Feet

HERRERA

Esri, Aerial (2021)

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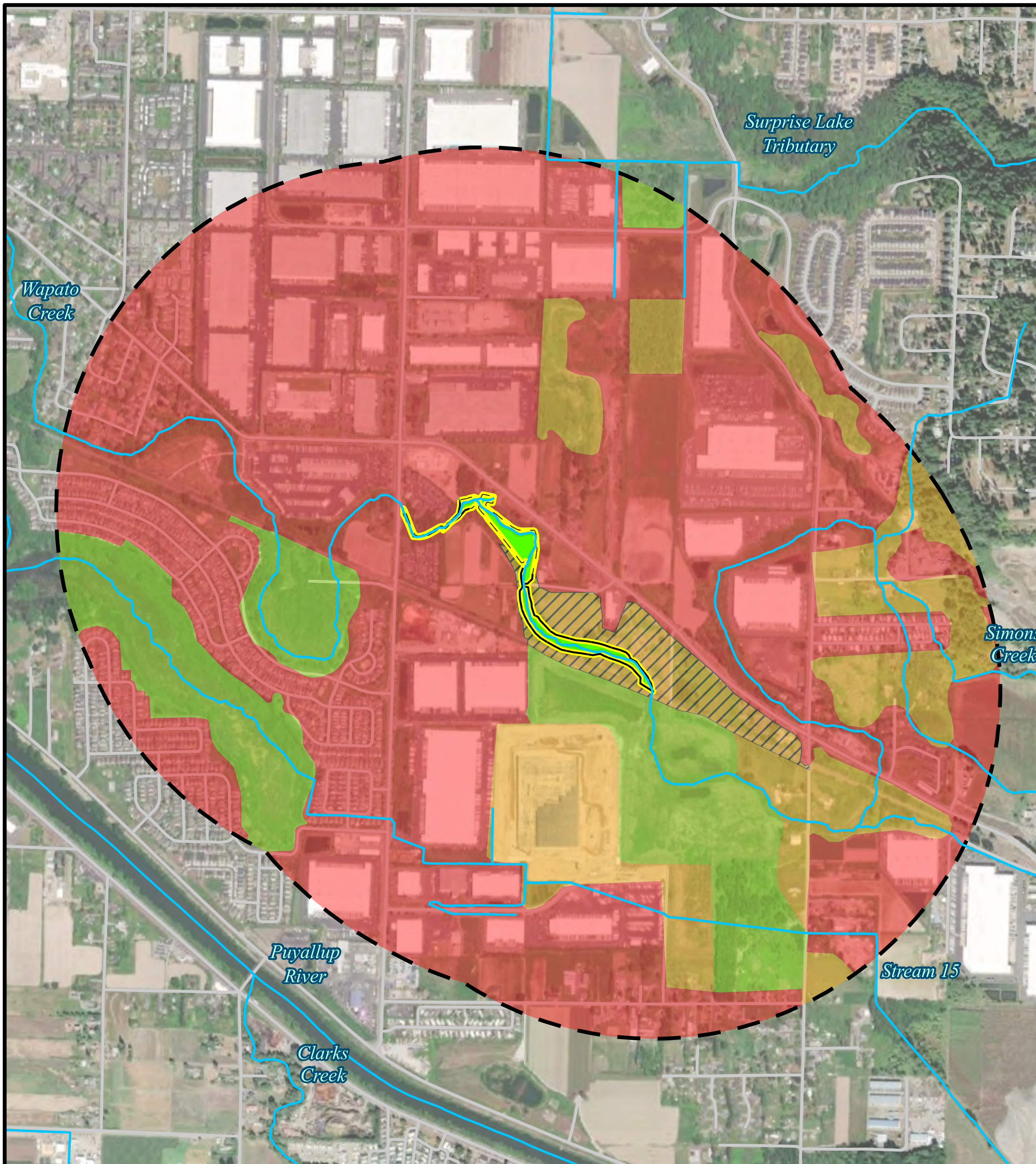

Legend

- Delineated wetland boundary
- Estimated wetland boundary
- 1-km boundary
- Wetland
- Stream (Pierce County)

Habitat type

- High intensity
- Low/Moderate Intensity and accessible
- Low/Moderate Intensity
- Relatively undisturbed

Figure B-18.
Habitat Within a 1-km Boundary of Wetland 142.

N

0 500 1,000 2,000 Feet

HERRERA

Esri, Aerial (2021)

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RATING SUMMARY – Western Washington

Name of wetland (or ID #): SR 167 Completion Project - Wetland 143 Date of site visit: 5/27/2022

Rated by D. Rapoza Trained by Ecology? ☒ Yes ☐ No Date of Training 10/2018

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Yes ☒ No

Additional HGM Classes (*if multiple*):

Source of base aerial photo/map ESRI Aerial, 2022

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

Category III – Total score = 16 – 19

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
Enter the appropriate ratings				
Site Potential	M	M	L	
Landscape Potential	M	H	L	
Value	M	H	M	**TOTAL**
Score Based on Ratings	6	8	4	18

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	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	

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	B-19
Hydroperiods and location of outlets	D 1.4, H 1.2	B-20
Flow directions and associated features	n/a	B-20a
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	B-20
Map of the contributing basin	D 4.3, D 5.3	B-21
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	B-22
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	B-5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	B-6

Wetland name or number: Wetland 143

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet) | points = 3	3
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area | points = 5	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is < 1/4 total area of wetland | points = 0	0
Total for D 1 Add the points in the boxes above (F9 key)	8

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

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

Rating of Landscape Potential If score is: 1 or 2 = M *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? No = 0	0
D 3.2. Is the wetland in a basin or subbasin where an aquatic resource is on the 303(d) list? Yes = 1	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? No = 0	0
Total for D 3 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS: The wetland is in the Hylebos Creek-Frontal Commencement Bay subwatershed (HUC 12) which does not have TMDLs in place at the site. Wapato Creek is in the HUC 12 and has a 303d listing for bacteria.

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

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) | points = 4	4
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks are at least 0.5 ft to <2 ft from surface or bottom of outlet | points = 3	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is more than 100 times the area of the unit | points = 0	0
Total for D 4 Add the points in the boxes above	7

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

Wetland name or number: Wetland 143

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1	1
Total for D 5 — Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

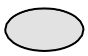
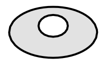
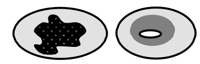
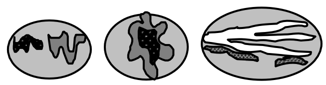
D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): Flooding occurs in a subbasin that is immediately down-gradient of unit | points = 2 **If not applicable chosen above:** Choose an item. **Explanation for 0 points (if required above):**	2
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for D 6 — Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

These questions apply to wetlands of all HGM classes.
HABITAT FUNCTIONS – Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☐ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	1 structure | points = 0	0
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☐ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☐ 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**	1 type present | points = 0 **2 points** **2 points**	0

H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: <5 species | points = 0	0
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* Choose an item. **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points  All three diagrams in this row are **HIGH** = 3 points 	0
H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points*. ☐ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long). ☐ Standing snags (dbh >4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 — Add the points in the boxes above	0

Rating of Site Potential If score is: 0–6 = L *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate*: % undisturbed habitat 0.0 **+** [(% moderate and low intensity land uses)4.5/2] 2.25 **= 2.25**% If total accessible habitat is: <10% of 1 km Polygon | points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate*: % undisturbed habitat 11.5**+** [(% moderate and low intensity land uses)24.4/2] 12.2 **= 23.7**% Undisturbed habitat 10–50% and in 1–3 patches | points = 2	2
H 2.3. Land use intensity in 1 km Polygon: If >50% of 1 km Polygon is high intensity land use | points = (-2)	-2
Total for H 2 — Add the points in the boxes above	0

Rating of Landscape Potential If score is: < 1 = L *Record the rating on the first page*

Wetland name or number: Wetland 143

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* WDFW Priority Habitats within 100 m: ☐ Aspen Stands ☐ Biodiversity Areas and Corridors ☐ Herbaceous Balds ☐ Old Growth/Mature Forests ☐ Oregon White Oak ☒ Riparian ☐ Westside Prairies ☒ Instream ☐ Nearshore ☐ Caves ☐ Cliffs ☐ Talus ☐ Snags and Logs (*Priority habitats listed by WDFW: For complete descriptions of WDFW priority habitats, and the counties in which they can be found, see: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington,* <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>, *or access the list from here:* <https://wdfw.wa.gov/species-habitats/at-risk/phs/list>.) Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (checked above) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (checked above) points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

Legend

Delineated wetland boundary

Cowardin class

PSS - Palustrine scrub-shrub

Figure B-19.
Cowardin Classes for Wetland 143.

N

0 15 30 60
Feet

HERRERA

ESRI, Aerial (2021)

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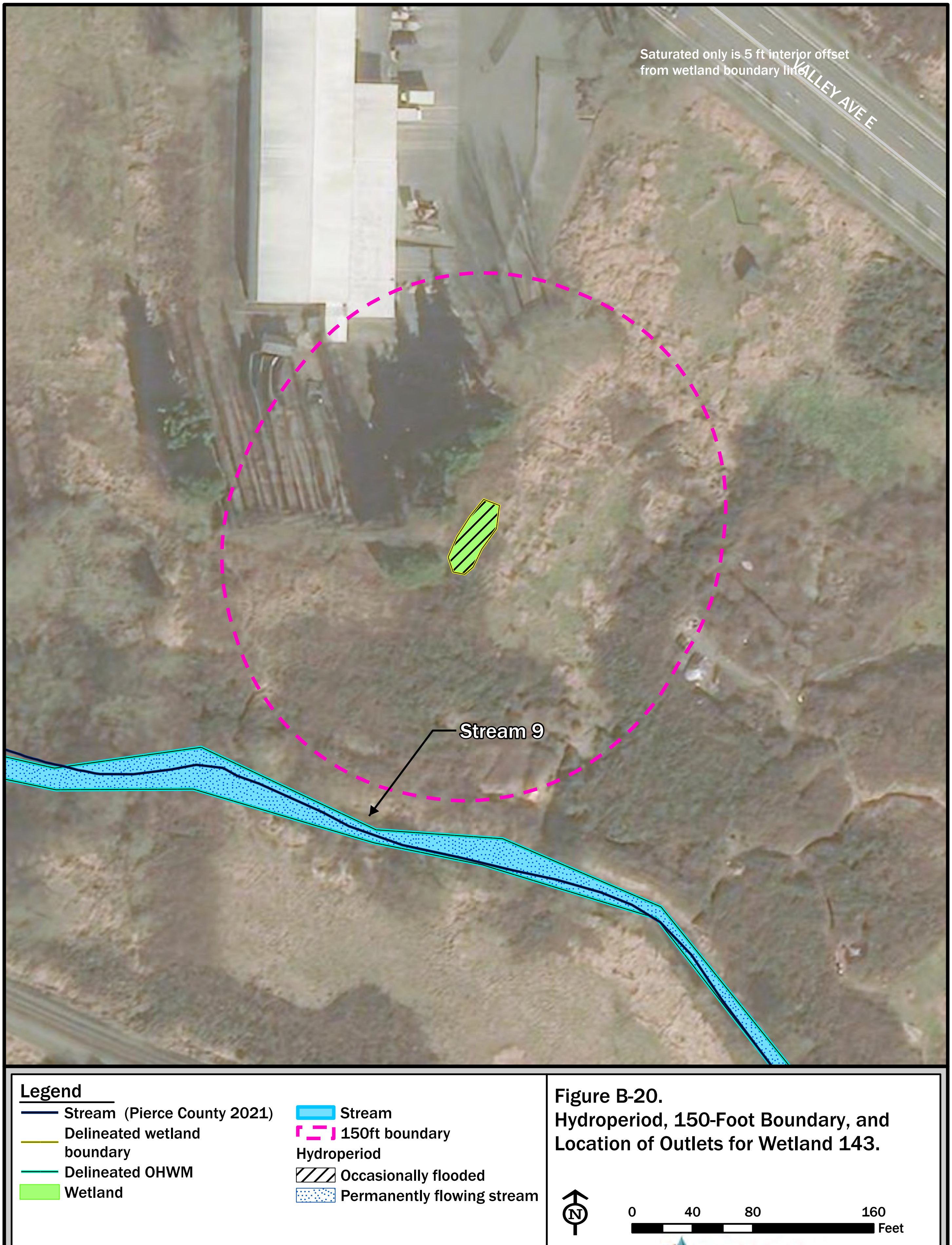
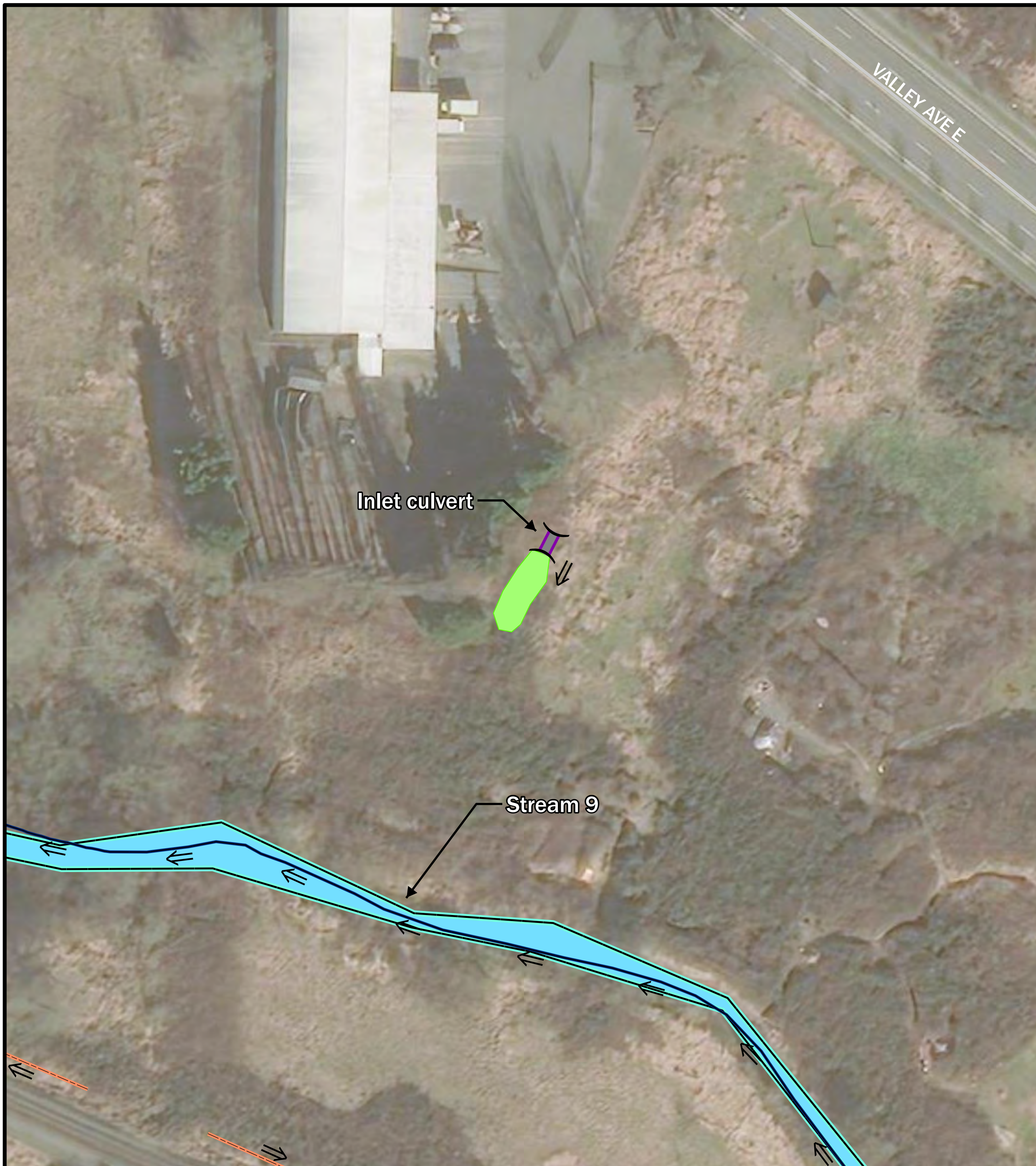


Figure B-20.
Hydroperiod, 150-Foot Boundary, and Location of Outlets for Wetland 143.



Legend

- Flow Direction
- Streams (Pierce County 2021)
- Estimated ditch centerline
- Culverts
- Wetland
- Stream
- Delineated OHWM

Figure B-20a.
Flow Directions and Features Associated with Wetland 143.

0 40 80 160 Feet

HERRERA

Esri, Aerial (2021)

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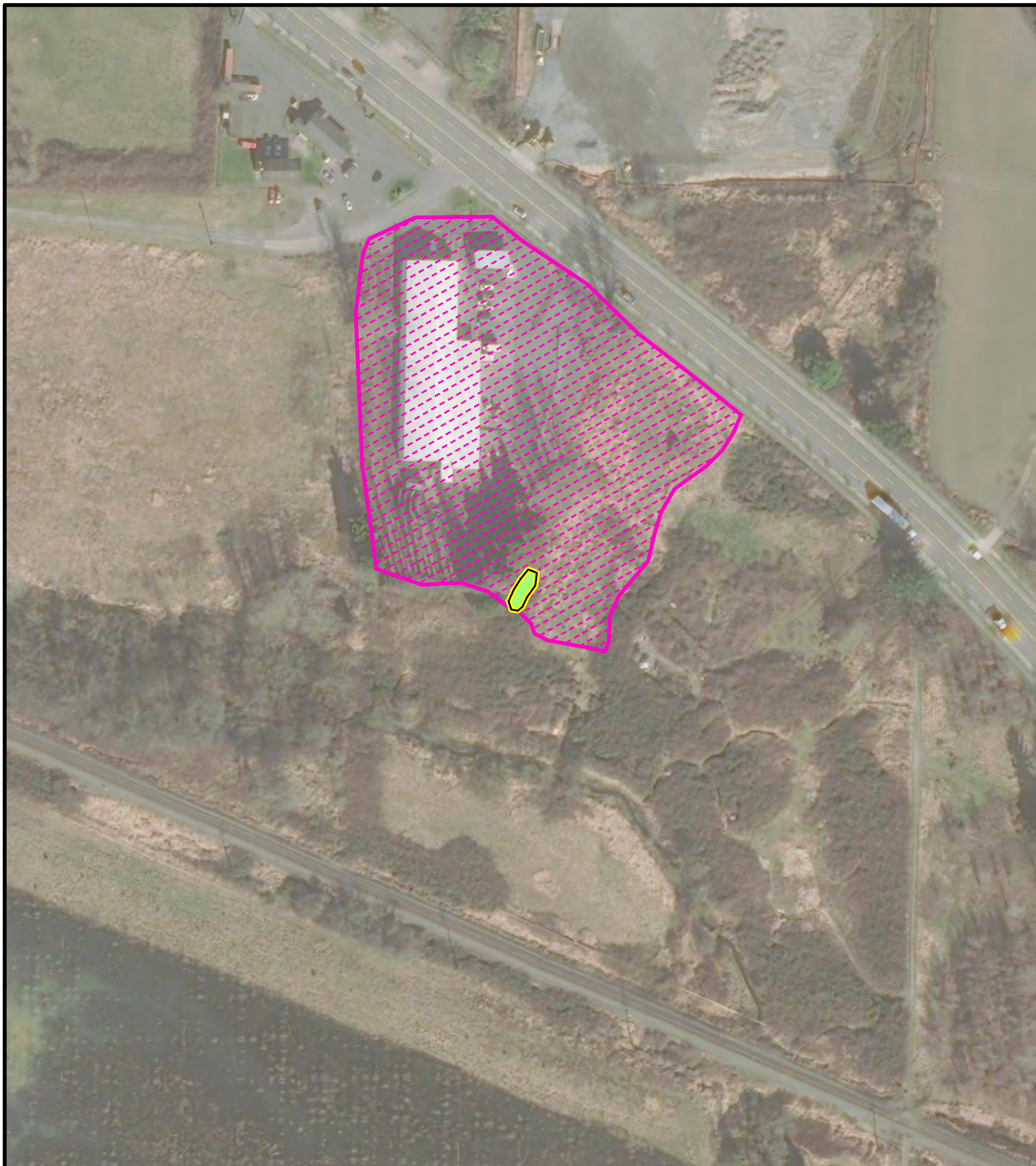

Legend

- Contributing basin
- Wetland
- Delineated wetland boundary

Figure B-21.
Map of Contributing Basin for Wetland 143.

N

0 80 160 320 Feet

HERRERA

Esri, Aerial (2021)

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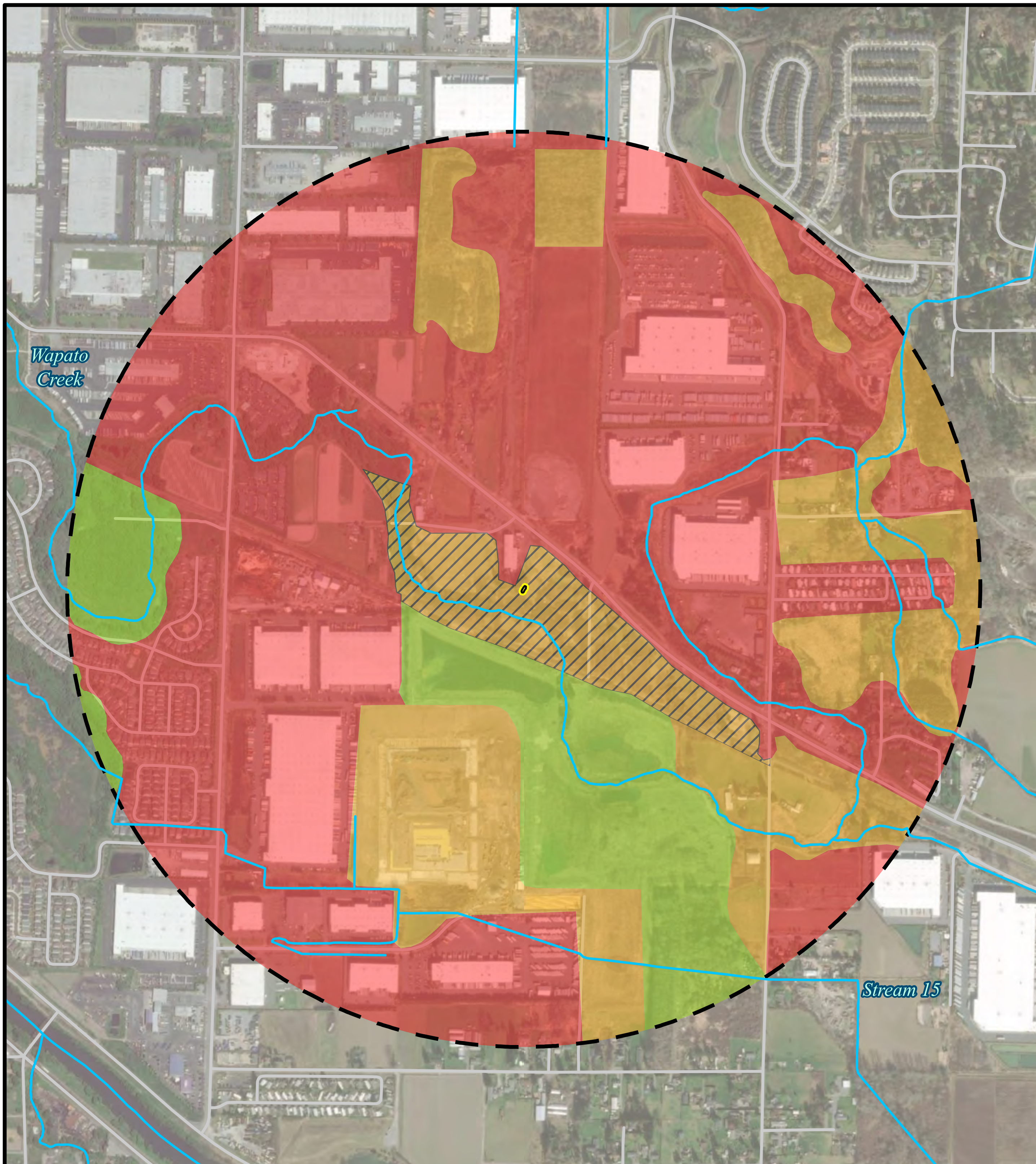

Legend

Delineated wetland boundary

1-km boundary

Wetland

Stream (Pierce County)

Habitat type

High intensity

Low/Moderate Intensity and accessible

Low/Moderate Intensity

Relatively undisturbed

Figure B-22.
Habitat Within a 1-km Boundary of Wetland 143.

0 500 1,000 2,000
Feet

HERRERA

Esri, Aerial (2021)

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RATING SUMMARY – Western Washington

Name of wetland (or ID #): SR 167 Completion Project – Wetland 146/148 Date of site visit: 11/30/2022

Rated by J. Hearsey Trained by Ecology? ☒ Yes ☐ No Date of Training 2016

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Yes ☒ No

Additional HGM Classes (*if multiple*):

Source of base aerial photo/map ESRI Aerial, 2020

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

Category III – Total score = 16 – 19

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Enter the appropriate ratings				
Site Potential	M	L	L	
Landscape Potential	H	H	L	
Value	H	M	M	**TOTAL**
Score Based on Ratings	8	6	4	18

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	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

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	B-23
Hydroperiods	D 1.4, H 1.2	B-24
Flow directions and associated features	n/a	B-24a
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	B-24
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	B-24
Map of the contributing basin	D 4.3, D 5.3	B-25
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	B-26
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	B-5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	B-6

Wetland name or number: Wetland 146/148

DEPRESSIONAL AND FLATS WETLANDS **Water Quality Functions** – Indicators that the site functions to improve water quality	
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland has an intermittently flowing stream or ditch | points = 2	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area | points = 5	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is < 1/4 total area of wetland | points = 0	0
Total for D 1 Add the points in the boxes above (F9 key)	7

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1	1
D 2.2. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1	1
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? Source: No = 0	0
Total for D 2 Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 or 4 = H *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? No = 0	0
D 3.2. Is the wetland in a basin or subbasin where an aquatic resource is on the 303(d) list? Yes = 1	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS: D 2.2: The wetland is adjacent to industrial truck yard with road asphalt and concrete disposal, derelict equipment, and demolition material. D 2.3: Pierce County GIS data indicates homes are outside of sewer service areas. D 3.1: The wetland outlets to Stream 15 which flows for approximately 1.5 miles to Oxbow Lake and eventually the Puyallup River downstream of mapped 303(d). D 3.2 and D 3.3. The wetland is in the Puyallup River basin (HUC 12), which contains 303(d) listed waters and has TMDLs in place.

Hydrologic Functions – Indicators that the site functions to reduce flooding and stream degradation	
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland has an intermittently flowing stream or ditch | points = 2	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding less than 0.5 ft (6 in) | points = 0	0
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is 10 to 100 times the area of the unit | points = 3	3
Total for D 4 Add the points in the boxes above	5

Rating of Site Potential If score is: 0–5 = L *Record the rating on the first page*

Wetland name or number: Wetland 146/148

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1	1
Total for D 5 Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. <u>The unit is in a landscape that has flooding problems</u>. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. <u>Choose the highest score if more than one condition is met</u>.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): Surface flooding problems are in a subbasin farther down-gradient | points = 1 **If not applicable chosen above:** The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why. | points = 0 **Explanation for 0 points (if required above): designed for infiltration with no inlet or outlets**	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for D 6 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS:

These questions apply to wetlands of all HGM classes.
HABITAT FUNCTIONS – Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	2 structures | points = 1	1

Wetland name or number: Wetland 146/148

H 1.2. Hydroperiods — 2 types present | points = 1 — **1**

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*).

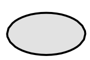
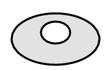
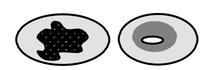
- ☐ Permanently flooded or inundated
- ☐ Seasonally flooded or inundated
- ☐ Occasionally flooded or inundated
- ☒ Saturated only
- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☒ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ **Lake Fringe wetland** — **2 points**
- ☐ **Freshwater tidal wetland** — **2 points**

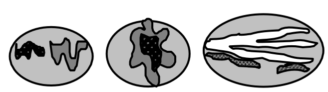
H 1.3. Richness of plant species — **1**

Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.***
If you counted:
5–19 species | points = 1

H 1.4. Interspersion of habitats — **1**

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* Low | points = 1

None = 0 points  **Low** = 1 point  **Moderate** = 2 points 

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

H 1.5. Special habitat features: — **0**

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

- ☐ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).
- ☐ Standing snags (dbh >4 in) within the wetland
- ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)
- ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1 — Add the points in the boxes above — **4**

Rating of Site Potential If score is: 0–6 = L *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — **0**

Calculate: % undisturbed habitat 0.0 **+** [(% moderate and low intensity land uses) 0.6/2] **0.3** **=** 0.0%
If total accessible habitat is: <10% of 1 km Polygon | points = 0

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — **1**

Calculate: % undisturbed habitat 13.0 **+** [(% moderate and low intensity land uses)20.0/2] 10.0 **=** **23.0**%
Undisturbed habitat 10–50% and >3 patches | points = 1

H 2.3. Land use intensity in 1 km Polygon: If — **-2**

>50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2	Add the points in the boxes above	-1
Rating of Landscape Potential If score is: < 1 = L	*Record the rating on the first page*	
H 3.0. Is the habitat provided by the site valuable to society?		
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* WDFW Priority Habitats within 100 m: ☐ Aspen Stands ☐ Biodiversity Areas and Corridors ☐ Herbaceous Balds ☐ Old Growth/Mature Forests ☐ Oregon White Oak ☒ Riparian ☐ Westside Prairies ☒ Instream ☐ Nearshore ☐ Caves ☐ Cliffs ☐ Talus ☐ Snags and Logs (*<u>Priority habitats listed by WDFW</u>: For complete descriptions of WDFW priority habitats, and the counties in which they can be found, see: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington,* <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>, *or access the list from here:* <https://wdfw.wa.gov/species-habitats/at-risk/phs/list>.) Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (checked above) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (checked above) points = 1 Site does not meet any of the criteria above points = 0		1
Rating of Value If score is: 1 = M	*Record the rating on the first page*	

Legend

- Stream
- Delineated wetland boundary
- Estimated wetland boundary

Cowardin class

- PEM - Palustrine emergent
- PSS - Palustrine scrub-shrub

Figure **B-23**.
Cowardin Classes for Wetland 146/148.

N

0 55 110 220
Feet

HERRERA

ESRI, Aerial (2021)

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Legend

Stream (Pierce County 2021)
Delineated wetland boundary
Estimated wetland boundary
Delineated OHWM
Estimated OHWM
Wetland
Stream
150ft boundary
Outlet
Hydroperiod
Saturated only

Figure **B-24**.
Hydroperiod, 150-**F**oot Boundary, and Location of Outlets for Wetland 146/148.

0 75 150 300 Feet

HERRERA

Esri, Aerial (2021)

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Legend

- Flow Direction
- Streams (Pierce County 2021)
- Estimated ditch centerline
- Culverts
- Wetland
- Stream
- Estimated OHWM
- Delineated OHWM

Figure B-24a.
Flow Directions and Features Associated with Wetland 146/148.

0 65 130 260 Feet

HERRERA

Esri, Aerial (2021)

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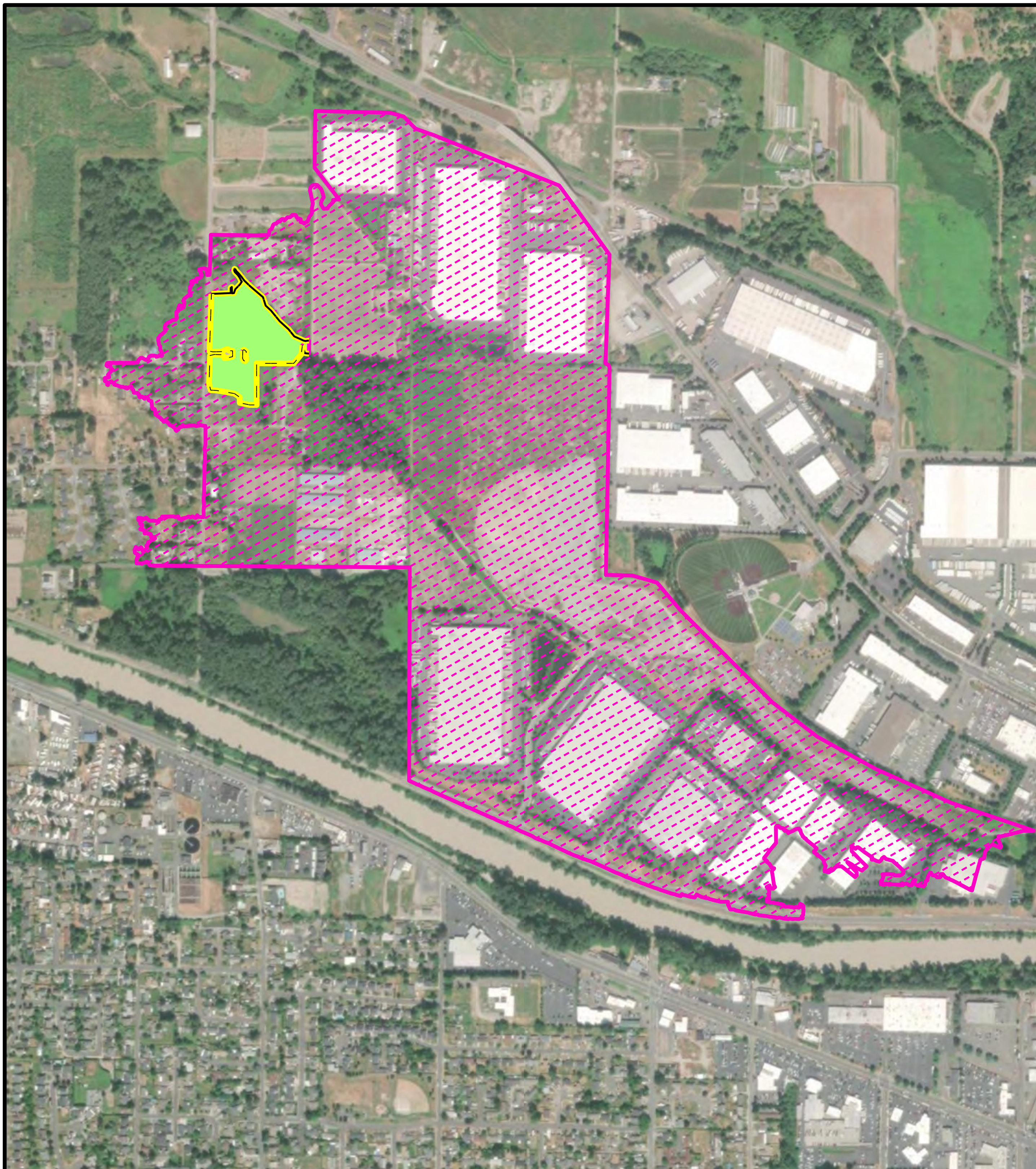

Legend

- Contributing basin
- Wetland
- Delineated wetland boundary
- Estimated wetland boundary

Figure B-25.
Map of Contributing Basin for Wetland 146/148.

N

0 460 920 1,840 Feet

HERRERA

Esri, Aerial (2021)

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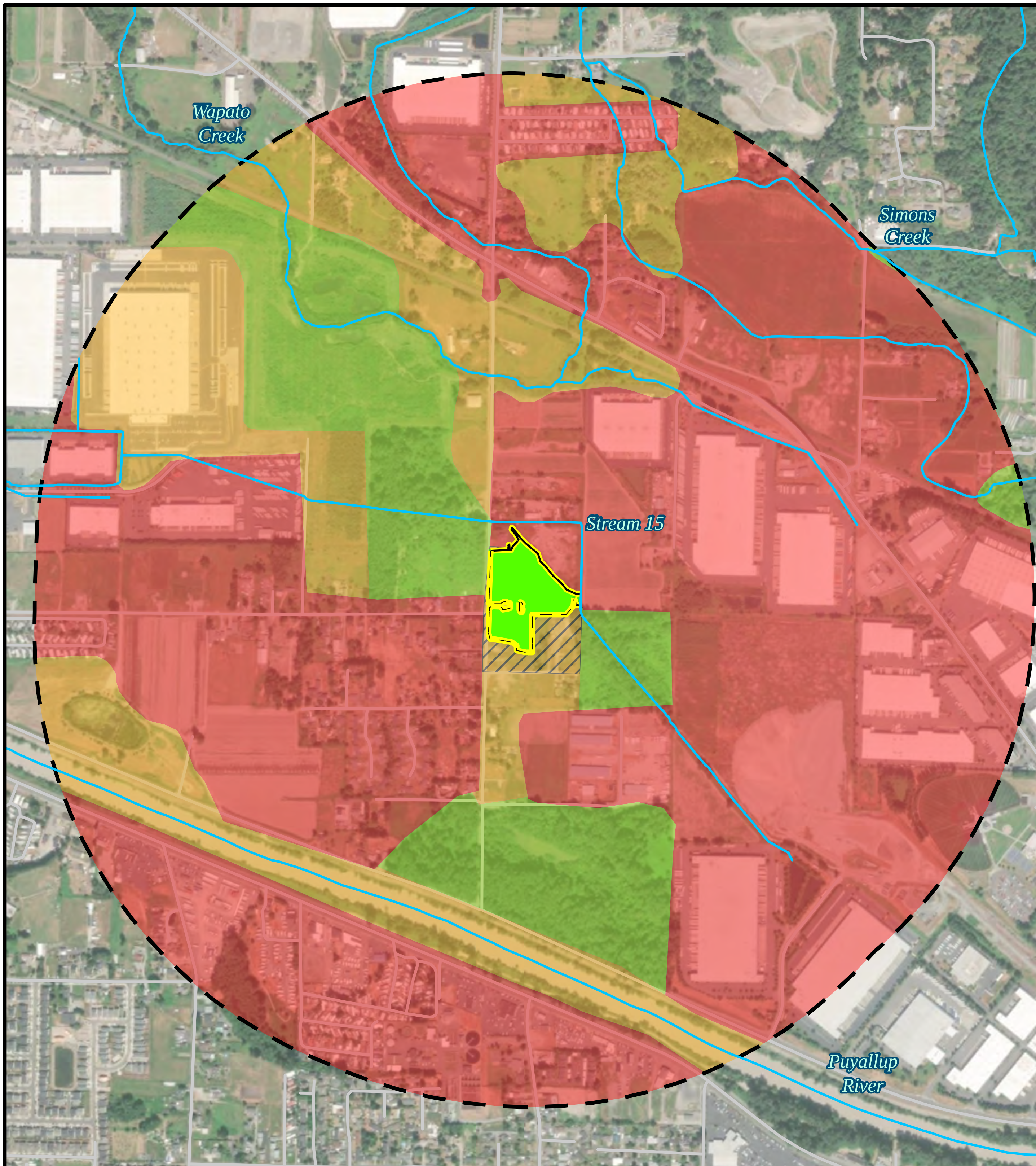

Legend

- Delineated wetland boundary
- Estimated wetland boundary
- 1-km boundary
- Wetland
- Stream (Pierce County)

Habitat type

- High intensity
- Low/Moderate Intensity and accessible
- Low/Moderate Intensity
- Relatively undisturbed

Figure B-26.
Habitat Within a 1-km Boundary of Wetland 146/148.

0 500 1,000 2,000 Feet

HERRERA

Esri, Aerial (2021)

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Wetland name or number: Wetland 147

RATING SUMMARY – Western Washington

Name of wetland (or ID #): SR 167 Completion Project – Wetland 147   Date of site visit: 11/30/2022

Rated by J. Hearsey   Trained by Ecology? ☒ Yes ☐ No   Date of Training 2016

HGM Class used for rating Depressional   Wetland has multiple HGM classes? ☐ Yes ☒ No

Additional HGM Classes (*if multiple*):

Source of base aerial photo/map ESRI Aerial, 2020

OVERALL WETLAND CATEGORY Choose an item. (based on functions ☐ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

Category III – Total score = 16 – 19

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Enter the appropriate ratings				
Site Potential	M	M	L	
Landscape Potential	H	H	L	
Value	H	M	M	**TOTAL**
Score Based on Ratings	8	7	4	19

Score for each function based on three ratings

(*order of ratings is not important*)

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

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	B-27
Hydroperiods	D 1.4, H 1.2	B-28
Flow directions and associated features	n/a	B-28a
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	B-28
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	B-28
Map of the contributing basin	D 4.3, D 5.3	B-29
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	B-30
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	B-5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	B-6

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. <u>Characteristics of surface water outflows from the wetland</u>: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet) | points = 3	3
D 1.2. <u>The soil 2 in below the surface (or duff layer)</u> is true clay or true organic *(use NRCS definitions).* No = 0	0
D 1.3. <u>Characteristics and distribution of persistent plants</u> (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area | points = 5	5
D 1.4. <u>Characteristics of seasonal ponding or inundation</u>: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > 1/4 total area of wetland | points = 2	2
Total for D 1 Add the points in the boxes above (F9 key)	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1	1
D 2.2. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1	1
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? Source: ______ No = 0	0
Total for D 2 Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 or 4 = H *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? No = 0	0
D 3.2. Is the wetland in a basin or subbasin where an aquatic resource is on the 303(d) list? Yes = 1	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS: D 2.2: The wetland is adjacent to an active conventional agricultural field, single family home, and industrial yard. D 2.3: Peirce County GIS data indicates homes are outside of sewer service areas. D 3.2 and D 3.3: The wetland is in the Puyallup River basin (HUC 12), which contains 303(d) listed waters and has TMDLs in place.

Hydrologic Functions – Indicators that the site functions to reduce flooding and stream degradation	
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. <u>Characteristics of surface water outflows from the wetland</u>: Wetland is a depression or flat depression with no surface water leaving it (no outlet) | points = 4	4
D 4.2. <u>Depth of storage during wet periods:</u> *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks are at least 0.5 ft to <2 ft from surface or bottom of outlet | points = 3	3
D 4.3. <u>Contribution of the wetland to storage in the watershed</u>: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is 10 to 100 times the area of the unit | points = 3	3
Total for D 4 Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1	1

D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1	1
Total for D 5 — Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): Surface flooding problems are in a subbasin farther down-gradient | points = 1 **If not applicable chosen above:** Choose an item. **Explanation for 0 points (if required above): designed for infiltration with no inlet or outlets**	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for D 6 — Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS:

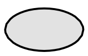
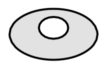
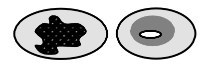
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	2 structures | points = 1	1
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☐ Occasionally flooded or inundated ☒ 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**	2 types present | points = 1 **2 points** **2 points**	1

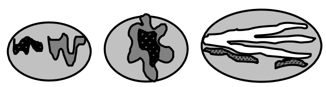
H 1.3. Richness of plant species — **1**

Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. **Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.**
If you counted:
5–19 species | points = 1

H 1.4. Interspersion of habitats — **1**

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* Low | points = 1

None = 0 points  **Low** = 1 point  **Moderate** = 2 points 

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

H 1.5. Special habitat features: — **0**

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

- ☐ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).
- ☐ Standing snags (dbh >4 in) within the wetland
- ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)
- ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1	Add the points in the boxes above	4

Rating of Site Potential If score is: 0–6 = L *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — **0**

Calculate: % undisturbed habitat 0.0 **+** [(% moderate and low intensity land uses)0.0/2] 0.0 **=** **0.0** %
If total accessible habitat is: <10% of 1 km Polygon | points = 0

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — **1**

Calculate: % undisturbed habitat 15.0 **+** [(% moderate and low intensity land uses)22.3/2] 11.1. **=** **26.1**%
Undisturbed habitat 10–50% and >3 patches | points = 1

H 2.3. Land use intensity in 1 km Polygon: If — **-2**

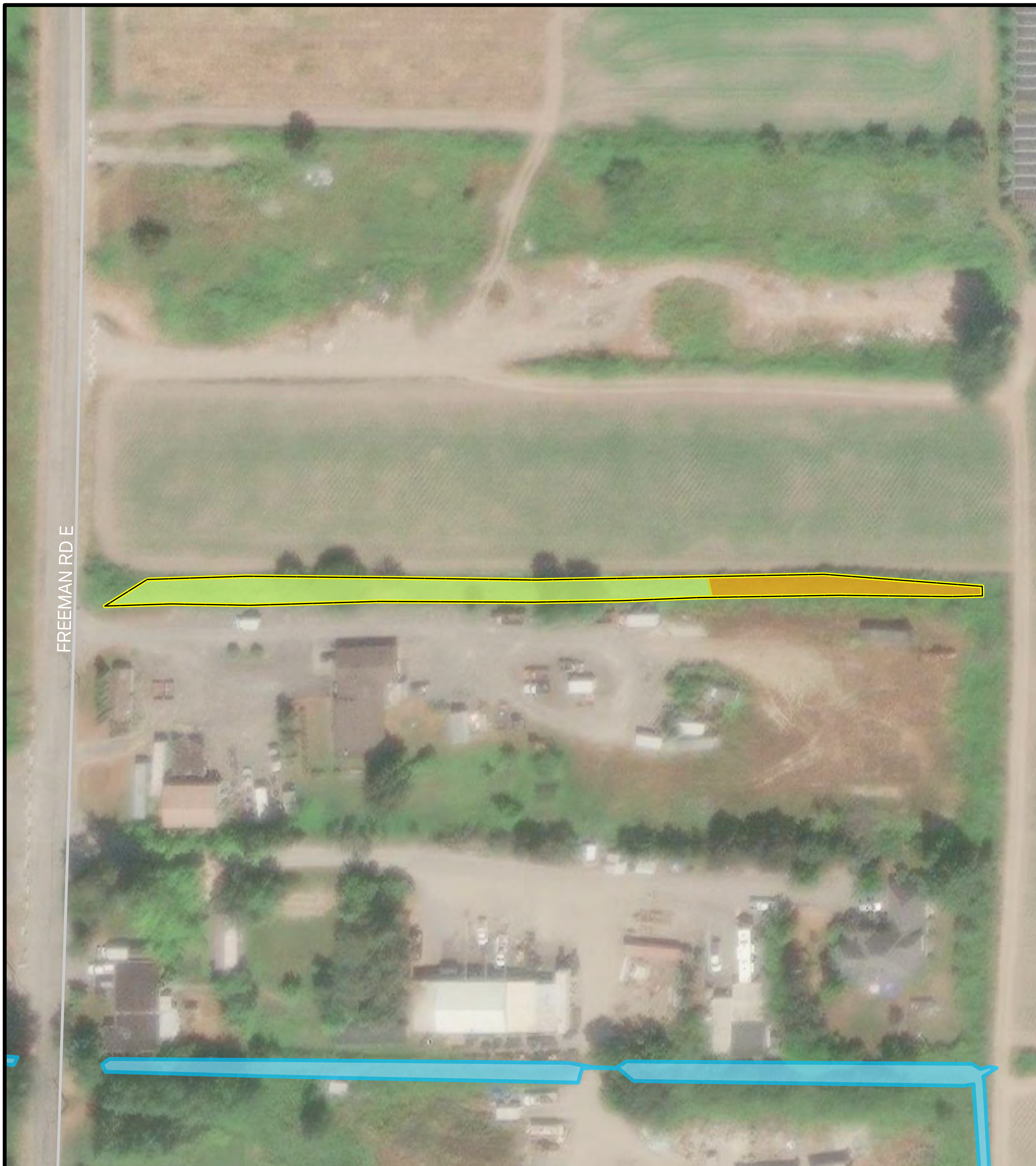
>50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2	Add the points in the boxes above	-1

Rating of Landscape Potential If score is: < 1 = L *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* WDFW Priority Habitats within 100 m: ☐ Aspen Stands ☐ Biodiversity Areas and Corridors ☐ Herbaceous Balds ☐ Old Growth/Mature Forests ☐ Oregon White Oak ☒ Riparian ☐ Westside Prairies ☒ Instream ☐ Nearshore ☐ Caves ☐ Cliffs ☐ Talus ☐ Snags and Logs (*<u>Priority habitats listed by WDFW</u>: For complete descriptions of WDFW priority habitats, and the counties in which they can be found, see: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington,* <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>, *or access the list from here:* <https://wdfw.wa.gov/species-habitats/at-risk/phs/list>.) Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (checked above) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (checked above) points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: 1 = M *Record the rating on the first page*



Legend

Stream

Delineated wetland boundary

Cowardin class

PEM - Palustrine emergent

PSS - Palustrine scrub-shrub

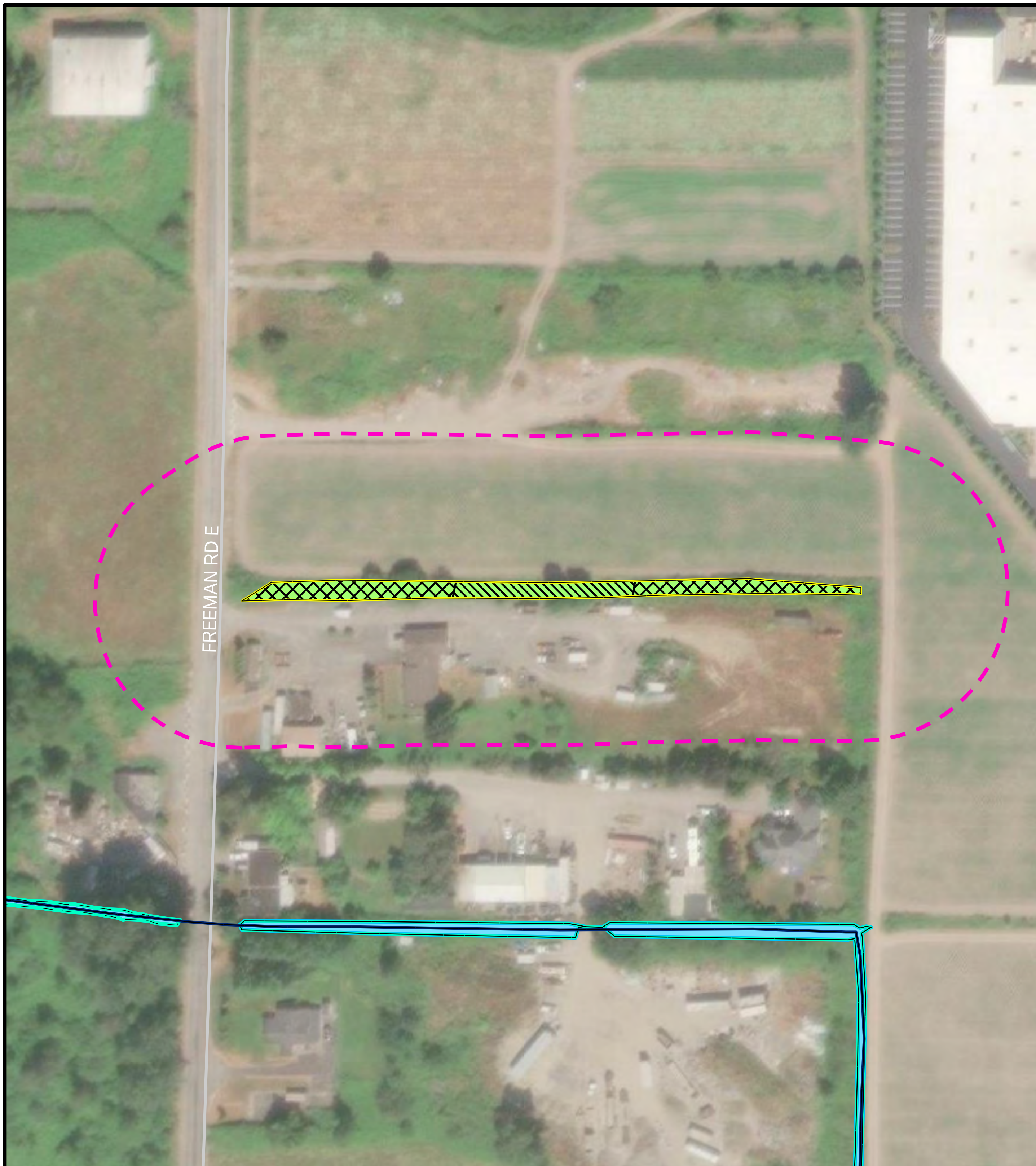
Figure **B-27**.
Cowardin Classes for Wetland 147.

0 50 100 200 Feet

HERRERA

ESRI, Aerial (2021)

K:\Projects\Y2016\16-06277-000\Pro\WSAR_Rating_Figures_Stage2\WSAR_Rating_Figures_Stage2.aprx\FigX_CowardinClass_WLX



Legend
- Stream (Pierce County 2021)
- Delineated wetland boundary
- Delineated OHWM
- Estimated OHWM
- Wetland
- Stream
- 150ft boundary

Hydroperiod
- Saturated only
- Seasonally flooded

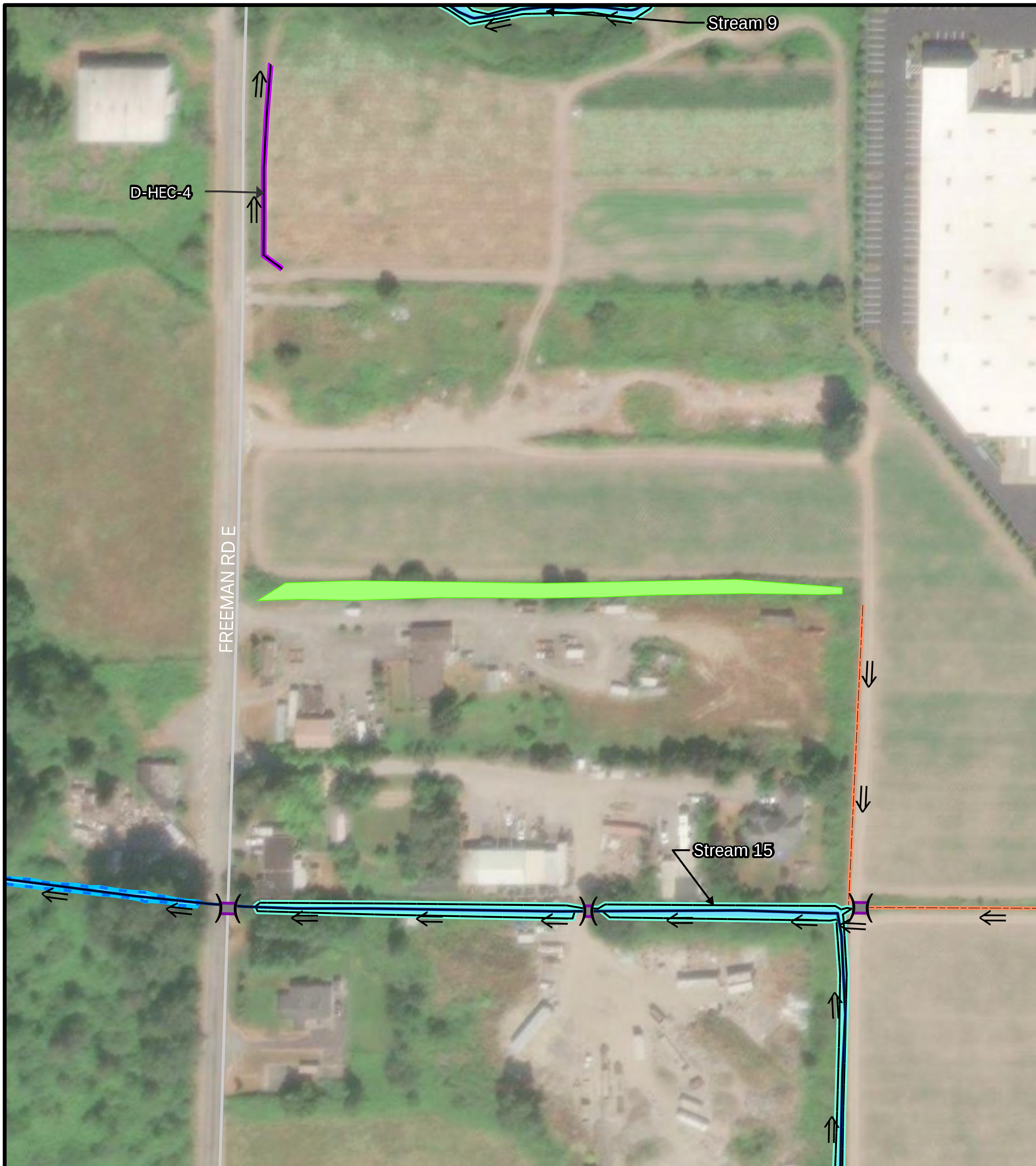
Figure B-28.
Hydroperiod, 150-Foot Boundary, and Location of Outlets for Wetland 147.

0 70 140 280 Feet

HERRERA

Esri, Aerial (2021)

K:\Projects\Y2016\16-06277-000\Pro\WSAR_Rating_Figures_Stage2\WSAR_Rating_Figures_Stage2.aprx\FigX_Hydroperiods_WLX



Legend

- Flow Direction
- Streams (Pierce County 2021)
- Estimated ditch centerline
- Ditch (survey)
- Surveyed ditches
- Culverts
- Wetland
- Stream
- Estimated OHWM
- Delineated OHWM

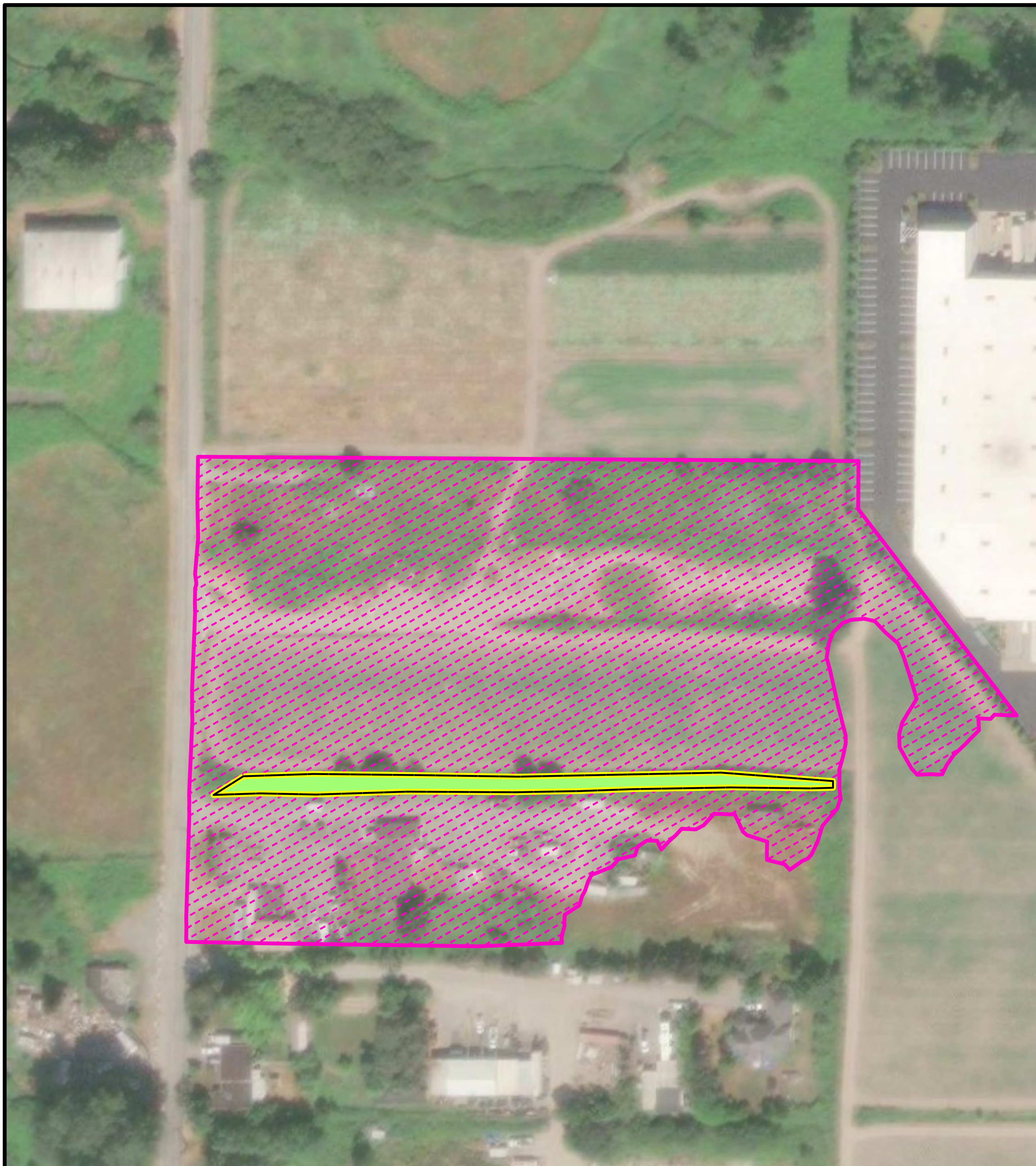
Figure B-28a.
Flow Directions and Features Associated with Wetland 147.

0 75 150 300 Feet

HERRERA

Esri, Aerial (2021)

K:\Projects\Y2016\16-06277-000\Pro\WSAR_Rating_Figures_Stage2\WSAR_Rating_Figures_Stage2.aprx\FigX_FlowDirection_WLX



Legend

- Contributing basin
- Wetland
- Delineated wetland boundary

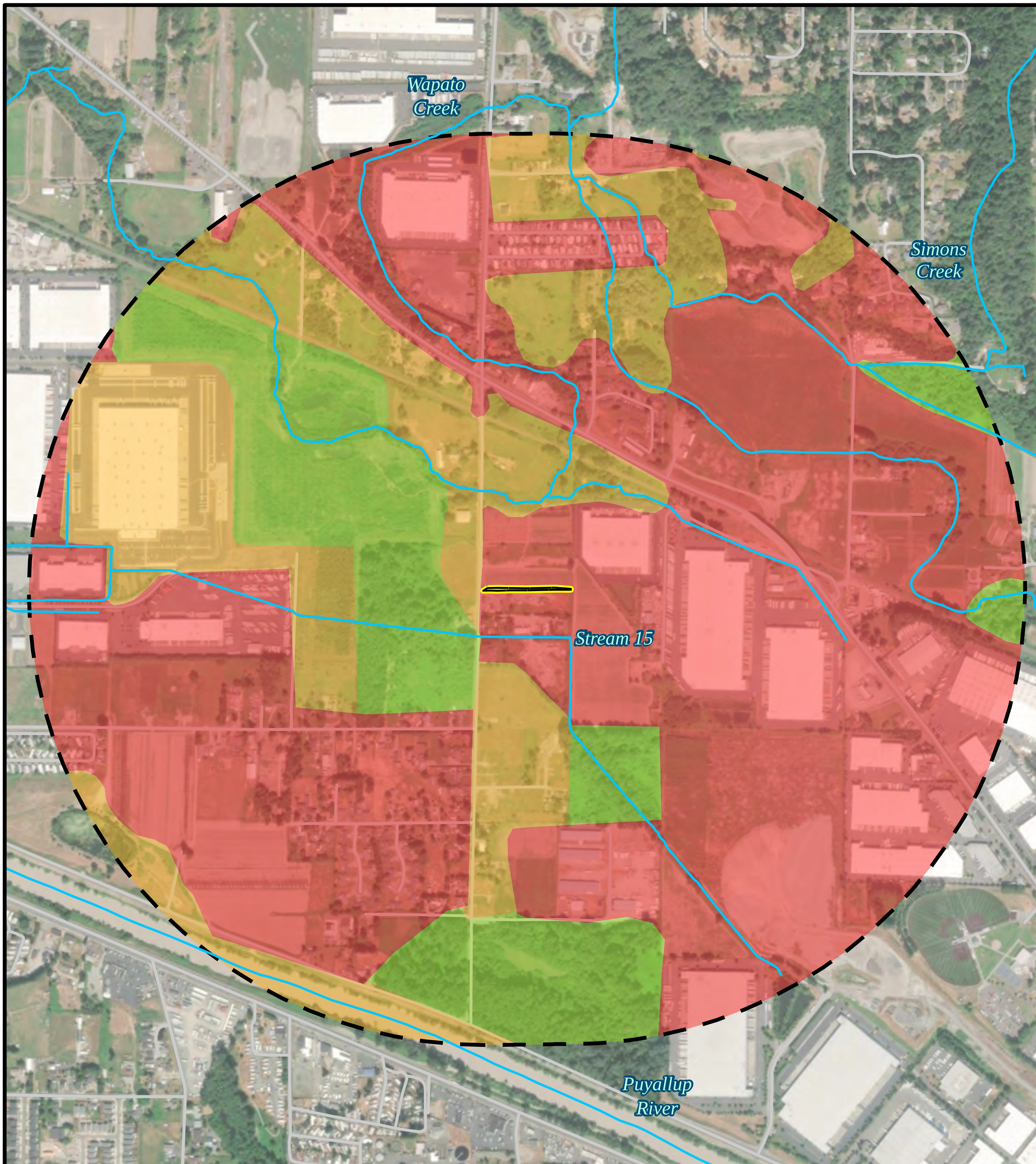
Figure B-29.
Map of Contributing Basin for Wetland 147.

N

0 70 140 280 Feet

Esri, Aerial (2021)

K:\Projects\Y2016\16-06277-000\Pro\WSAR_Rating_Figures_Stage2\WSAR_Rating_Figures_Stage2.aprx\FigX_ContributingBasin_WLX



Legend

- Delineated wetland boundary
- 1-km boundary
- Wetland
- Stream (Pierce County)

Habitat type

- High intensity
- Low/Moderate Intensity
- Relatively undisturbed

Figure B-30.
Habitat Within a 1-km Boundary of Wetland 147.

N

0 500 1,000 2,000 Feet

HERRERA

Esri, Aerial (2021)

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Appendix C. Wetland Functional Assessment Summaries

Wetland ID: W45 **Project:** SR 167 Completion Project **Assessed By:** R. Plumb

Date: 7/15/2022 **Cowardin Class:** PFO, PEM, PSS **Ecology Category:** II **Local Rating:** II

Function/Value	Occurrence Y	Occurrence N	Rationale (qualifiers and attributes present)	Principal Function	Comments
Flood flow alteration	X		2, 4, 5, 6, 7	X	Receives water from Surprise Lake Trib. as well as seeps on slopes. Outlet is highly constricted at culvert under Freeman Rd.
Sediment removal	X		2, 3, 4, 5		Water moves slowly through wetland in braided channel. Dense vegetation and ponding present.
Nutrient and toxicant removal	X		2, 3, 4, 5		Seasonal flooding occurs, and wetland has dense vegetation and fine-grained mineral soils.
Erosion control & shoreline stabilization	X		2, 3		Dense vegetation reduces erosive effects of floods in wetland.
Production of organic matter and its export	X		1, 2, 3, 4, 5, 6		Dense vegetation interspersed throughout braided channel.
General habitat suitability	X		1, 3, 4, 5, 6, 7	X	Diversity of plant species and Cowardin classes present, unbroken by development and accessible to undeveloped upland habitat. Coyotes observed on site.
Habitat for aquatic invertebrates	X		1, 2, 4, 5, 6		Seasonal flooding with emergent vegetation and cover present.
Habitat for amphibians	X		1, 2, 3, 4, 6		Seasonal flooding with thin-stemmed emergent vegetation and woody debris present. Low development in buffer.
Habitat for wetland-associated mammals	X		1, 2, 3, 4, 7		Permanently flooded areas along base of slope on southern edge of wetland. Dense shrubs and trees with interspersion of vegetation strata.
Habitat for wetland-associated birds	X		2, 3, 4, 6, 7		Emergent, forested, and scrub-shrub classes present. Snags and habitat for prey species present.
General fish habitat	X		1, 4, 5		WDFW mapped fish in Surprise Lake Trib. Herbaceous and woody vegetation present to provide cover.
Native plant richness	X		1, 2, 3, 4		Forested areas dominated by native trees, though reed canarygrass and Himalayan blackberry dominate PEM and PSS areas.

Educational or scientific use	X		2		Public ownership, and size and function of wetland make it scientifically valuable.
Uniqueness & heritage		X			Not designated for habitat or species

Source: Null, W.S., G. Skinner, and W. Leonard. 2000. Wetland functions characterization tool for linear projects. Washington State Department of Transportation, Environmental Affairs Office. Olympia.

Wetland ID: Wetland 140 **Project:** SR 167 Completion Project **Assessed By:** RP

Date: 7/5/2022 **Cowardin Class:** PEM, PFO **Ecology Category:** II **Local Rating:** II

Function/Value	Occurrence Y	Occurrence N	Rationale (qualifiers and attributes present)	Principal Function	Comments
Flood flow alteration	X		1, 2, 5, 7	X	The wetland is in the upper portion of the Wapato Creek watershed and receives regular overbank flooding from the stream.
Sediment removal	X		1, 3, 5		Sources of excess sediment from tillage present upgradient of wetland. Dense herbaceous vegetation and ponding present in wetland.
Nutrient and toxicant removal	X		1, 2, 4, 5	X	Sources of fertilizers and heavy metals are present upgradient of the wetland. Wetland is seasonally inundated and contains dense herbaceous vegetation and fine-grained soils.
Erosion control & shoreline stabilization	X		1, 2, 3	X	The wetland borders Wapato Creek and contains dense, energy absorbing vegetation.
Production of organic matter and its export	X		1, 2, 5, 6	X	The wetland receives seasonal overbank flooding and contains organic matter that is flushed via Wapato Creek.
General habitat suitability	X		1, 3, 5		The wetland has multiple Cowardin Classes and connectivity to riverine and riparian habitat types.
Habitat for aquatic invertebrates	X		1, 4, 6		The wetland contains areas of seasonal ponding with emergent vegetation. Wapato Creek flows through the wetland.
Habitat for amphibians	X		1, 2, 4, 6	X	The wetland contains woody debris and areas of seasonal inundation with thin-stemmed emergent vegetation.
Habitat for wetland-associated mammals		X	1, 3, 4		The wetland contains a permanently flowing stream but lacks areas of permanent inundation
Habitat for wetland-associated birds	X		3, 4, 6		Waterfowl observed in wetland. Wetland contains snags, invertebrates, and forested and emergent vegetation classes.
General fish habitat	X		1, 2, 4, 5		The wetland has a perennial surface-water connection to a fish-bearing stream and woody vegetation that provides cover and detrital matter.

Native plant richness		X	2, 3		Dominant plants are non-native.
Educational or scientific use		X	2		The wetland does not have documented scientific or education use and lacks public parking for a school bus.
Uniqueness & heritage	X		1		The wetland contains Wapato Creek which has documented occurrence of federally listed endangered and/or threatened fish species.

Source: Null, W.S., G. Skinner, and W. Leonard. 2000. Wetland functions characterization tool for linear projects. Washington State Department of Transportation, Environmental Affairs Office. Olympia.

Wetland ID: Wetland 142 **Project:** SR 167 Completion Project **Assessed By:** RP

Date: 7/5/2022 **Cowardin Class:** PSS, PFO **Ecology Category:** II **Local Rating:** II

Function/Value	Occurrence Y	Occurrence N	Rationale (qualifiers and attributes present)	Principal Function	Comments
Flood flow alteration	X		1, 2, 5, 7	X	The wetland receives overbank flooding from Wapato Creek and is capable of retaining higher volumes of water during storm events.
Sediment removal	X		1, 3, 4, 5	X	Sources of excess sediment from tillage present adjacent to and upgradient of wetland. Dense herbaceous vegetation and seasonal ponding present in wetland.
Nutrient and toxicant removal	X		1, 2, 3, 4, 5	X	Sources of fertilizers and heavy metals are present upgradient of the wetland. Wetland is seasonally inundated and contains dense herbaceous vegetation and fine-grained soils.
Erosion control & shoreline stabilization		X	1, 2, 3		The wetland borders Wapato Creek but the channel is downcut and eroding.
Production of organic matter and its export	X		1, 2, 3, 4, 5, 6	X	The wetland receives seasonal overbank flooding and contains organic matter that is flushed via Wapato Creek.
General habitat suitability	X		1, 3, 4, 5, 6		The wetland has multiple Cowardin Classes and connectivity to riverine and riparian habitat types. However, the presence of encampments in the eastern portion of the wetland decreases the habitat suitability.
Habitat for aquatic invertebrates	X		1, 4, 5, 6		The wetland contains areas of seasonal ponding with emergent vegetation. Wapato Creek flows through the wetland.
Habitat for amphibians	X		1, 2, 3, 4, 6	X	The wetland contains woody debris and areas of seasonal inundation with thin-stemmed emergent vegetation.
Habitat for wetland-associated mammals		X	1, 3, 4		The wetland contains a permanently flowing stream but lacks areas of permanent inundation
Habitat for wetland-associated birds	X		2, 3, 4, 6		Areas of seasonal shallow open water make up less than 30% of the wetland, but several Cowardin classes are present, and the wetland contains invertebrates, amphibians, and fish.

General fish habitat	X		1, 2, 4, 5	X	The wetland has a perennial surface-water connection to a fish-bearing stream and woody vegetation that provides cover and detrital matter.
Native plant richness		X	2, 3,		Dominant plants are non-native.
Educational or scientific use		X			The wetland is not in public ownership and does not have documented scientific or educational use.
Uniqueness & heritage	X		1		The wetland contains Wapato Creek which has documented occurrence of federally listed endangered and/or threatened fish species.

Source: Null, W.S., G. Skinner, and W. Leonard. 2000. Wetland functions characterization tool for linear projects. Washington State Department of Transportation, Environmental Affairs Office. Olympia.

Wetland ID: Wetland 143 **Project:** SR 167 Completion Project **Assessed By:** RP

Date: 7/5/2022 **Cowardin Class:** PSS **Ecology Category:** III **Local Rating:** III

Function/Value	Occurrence Y	Occurrence N	Rationale (qualifiers and attributes present)	Principal Function	Comments
Flood flow alteration	X		1, 2, 3, 5		The wetland is a closed depression capable of retaining higher volumes of water during storm events than under normal conditions.
Sediment removal	X		1, 3, 5, 6	X	Sources of excess sediment are present upgradient. Vegetation and occasional ponding present.
Nutrient and toxicant removal	X		1, 2, 3, 5	X	Wetland is a stormwater feature that receives flows from adjacent development. Occasional inundation, dense vegetation, and fine-grained mineral soil present.
Erosion control & shoreline stabilization		X			Wetland is not associated with a water course or shoreline.
Production of organic matter and its export		X	2, 5		The wetland lacks an outlet and has a low degree of plant community structure and species richness.
General habitat suitability		X	1		The wetland is a stormwater pond that lacks plant species diversity and Cowardin class interspersion.
Habitat for aquatic invertebrates		X	4, 6		The wetland does not have evidence of permanent or seasonal inundation.
Habitat for amphibians		X	3, 4, 6		The wetland does not contain areas of seasonal or permanent standing water.
Habitat for wetland-associated mammals		X	3		The wetland is a stormwater pond that does not provide suitable habitat for wetland-associated mammals.
Habitat for wetland-associated birds		X	3		The wetland does not have 30 to 50% open water or an aquatic bed class and lacks suitable habitat for wetland-associated birds.
General fish habitat		X	4		The wetland is not associated with a fish-bearing water.
Native plant richness		X			The wetland has one Cowardin class and lacks structural heterogeneity.
Educational or scientific use		X			The wetland does not have educational or scientific value.
Uniqueness & heritage		X			The wetland lacks uniqueness and heritage.

Source: Null, W.S., G. Skinner, and W. Leonard. 2000. Wetland functions characterization tool for linear projects. Washington State Department of Transportation, Environmental Affairs Office. Olympia.

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Wetland ID: Wetland 146/148 **Project:** SR 167 Completion Project **Assessed By:** J. LeClerc

Date: 1/24/2023 **Cowardin Class:** PEM, PSS **Ecology Category:** III **Local Rating:** III

Function/Value	Occurrence		Rationale (qualifiers and attributes present)	Principal Function	Comments
	Y	N			
Flood flow alteration	X		2, 5, 6, 7	X	Wetland is relatively flat with connection to seasonally flowing Stream 15.
Sediment removal	X		1, 3		Wetland is adjacent to agricultural fields.
Nutrient and toxicant removal	X		1, 4, 5		Wetland receives runoff from agricultural fields and has dense vegetation and fine-grained mineral soils.
Erosion control & shoreline stabilization	X		1, 2, 3		Dense vegetation borders Stream 15, but only for a short distance; not likely to provide significant erosion control.
Production of organic matter and its export	X		1, 2, 6		Wetland has vegetative cover and outlet to Stream 15.
General habitat suitability	X		1, 3, 5		Wetland is not fragmented and is connected to instream/riparian habitat.
Habitat for aquatic invertebrates		X	6		Wetland does not have permanent or seasonal ponding.
Habitat for amphibians		X	6		Wetland does not have permanent or seasonal ponding.
Habitat for wetland-associated mammals		X	3		Wetland does not have permanent water.
Habitat for wetland-associated birds	X		2, 3		Emergent and scrub-shrub vegetation are present within wetland.
General fish habitat		X			Wetland connects to Stream 15, but stream is not fish-bearing.
Native plant richness		X			Dominant plants are nonnative.
Educational or scientific use		X			No criteria met.
Uniqueness & heritage		X			No criteria met; not designated for habitat or species.

Source: Null, W.S., G. Skinner, and W. Leonard. 2000. Wetland functions characterization tool for linear projects. Washington State Department of Transportation, Environmental Affairs Office. Olympia.

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Wetland ID: Wetland 147 **Project:** SR 167 Completion Project **Assessed By:** J. LeClerc

Date: 1/24/2023 **Cowardin Class:** PEM, PSS **Ecology Category:** III **Local Rating:** III

Function/Value	Occurrence Y	Occurrence N	Rationale (qualifiers and attributes present)	Principal Function	Comments
Flood flow alteration	X		2, 3, 5	X	Wetland is depressional and has seasonal ponding.
Sediment removal	X		1, 3, 5		Wetland is adjacent to agricultural fields. Dense vegetation and ponding are present.
Nutrient and toxicant removal	X		1, 2, 3, 4, 5	X	Wetland receives runoff from agricultural fields. Seasonal flooding occurs, and wetland has dense vegetation and fine-grained mineral soils.
Erosion control & shoreline stabilization		X			Wetland is not associated with watercourse or shoreline.
Production of organic matter and its export		X	1, 2, 5		Wetland has cover of vegetation and seasonal flooding but does not have outlet.
General habitat suitability		X	1, 5		Wetland is not fragmented by development, but lacks structural complexity and connectivity to other habitats.
Habitat for aquatic invertebrates	X		1, 4, 5, 6		Wetland has seasonal flooding in emergent vegetation and scrub-shrub and is within 2 km of Wapato Creek and Stream 15.
Habitat for amphibians	X		1, 2, 6		Seasonal flooding in emergent area, and wetland is within 1 km of Wapato Creek and Stream 15.
Habitat for wetland-associated mammals		X	3		No permanent water is present.
Habitat for wetland-associated birds	X		2, 3, 6		Emergent and scrub-shrub vegetation within wetland. Amphibians and invertebrates are potentially present.
General fish habitat		X	4		No connection to fish-bearing water body.
Native plant richness		X	2		Nonnative plants are dominant.
Educational or scientific use		X			No criteria met.
Uniqueness & heritage		X			No criteria met; not designated for habitat or species.

Source: Null, W.S., G. Skinner, and W. Leonard. 2000. Wetland functions characterization tool for linear projects. Washington State Department of Transportation, Environmental Affairs Office. Olympia.

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Appendix B

Stockpile Memo

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CRITICAL AREAS REPORT
AND
MITIGATION PLAN

SR 167 COMPLETION PROJECT – STOCKPILE SITE 3

Prepared for
Washington State Department of Transportation
and
KLB Construction

Prepared by
Herrera Environmental Consultants, Inc.

HERRERA

Note:
Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.

CRITICAL AREAS REPORT
AND
MITIGATION PLAN

SR 167 COMPLETION PROJECT – STOCKPILE SITE 3

Prepared for
Washington State Department of Transportation
Puget Sound Gateway Program
SR 167 Completion Project

and

KLB Construction
3405 121st Street Southwest
Lynnwood, Washington 98087

Prepared by
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206-441-9080

March 14, 2022

CONTENTS

APPENDICES

TABLES

FIGURES

DISCLAIMER

Herrera Environmental Consultants, Inc., has prepared this report for use by the Washington State Department of Transportation and KLB Construction. The results and conclusions in this report represent the professional opinion of Herrera Environmental Consultants, Inc. They are based upon examination of public domain information concerning the study area, site reconnaissance, and data analysis.

The work was performed according to accepted standards in the field of jurisdictional wetland determination and delineation using the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region* (Environmental Laboratory 2010). However, final determination of jurisdictional wetland boundaries pertinent to Section 404 of the Clean Water Act is the responsibility of the Seattle District of the US Army Corps of Engineers. Various agencies of the State of Washington and local jurisdictions may require a review of final site development plans that could potentially affect zoning, buffer requirements, water quality, or habitat functions of lands in question. Therefore, the findings and conclusions in this report should be reviewed by appropriate regulatory agencies before any detailed site planning or construction activities.

HERRERA QUALIFICATIONS

Established in 1980, Herrera Environmental Consultants, Inc. (Herrera) has more than 25 years of experience with wetland delineation, functional analysis, and mitigation planning in Washington State. The following staff authored this report and conducted field work in support of this report. A summary of their qualifications is provided.

Eliza Spear, PWS

Eliza Spear is an ecologist and permitting specialist with 5 years of experience in wetland, forest, and meadow restoration; wetland delineation; environmental permitting; and invasive species control. Eliza delineates wetlands and ordinary high water marks of streams and shorelines; prepares wetland and stream delineation reports, critical area reports, and mitigation plans for impacts to wetlands, streams, and buffers.

Credentials

BS, Environmental Science and Ecology, College of William and Mary, 2013

Certificate in Wetland Science and Management, University of Washington, 2018

PWS, Professional Wetland Scientist, Society of Wetland Scientists, 2021

Josh LeClerc, WPIT

Josh LeClerc is an ecologist and permitting specialist with 7 years of experience specializing in biological surveys, habitat studies, and wildlife ecology. He is trained in wetland and ordinary high water mark delineation, vegetation survey, ecological restoration monitoring, and environmental permitting in Washington State. Josh works on projects involving critical areas analysis, mitigation planning, and environmental permitting.

Credentials

MA, Biology, College of William and Mary, 2004

BS, Biology, College of William and Mary, 1999

Certificate in Wetland Science and Management, University of Washington, 2015

WPIT, Wetland Professional in Training, Society of Wetland Scientists, 2019

EXECUTIVE SUMMARY

Herrera and SISU Environmental (SISU) biologists conducted wetland and stream delineations for the Washington State Department of Transportation (WSDOT) in support of Stage 2 of the State Route (SR) 167 Completion Project (hereafter referred to as the Project) in accordance with current federal, state, and local regulations and guidance.

Wetland delineations were conducted in compliance with the *Regional Supplement to the US Army Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region* (Environmental Laboratory 2010), which is consistent with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

The Project involves several miles of earth embankment construction, and thus requires large amounts of clean soil import. WSDOT has established soil stockpile areas within the project area in advance of the current SR 167 Stage 1b and future Stage 2 construction. Stockpile project activities at Stockpile Site 3, in the city of Fife have resulted in permanent impacts to wetland buffers, and further buffer impacts are anticipated with the proposed construction of a haul road at the site. The wetland and stream delineations described in this report are within areas relevant to the activity at Stockpile Site 3, which defines the study area. The purpose of this report is to describe wetlands and streams in and adjacent to the study area; wetland and stream ratings and required buffer widths; and applicable local, state, and federal laws and regulations. This report also quantifies impacts that have occurred to date and future impacts that are anticipated to critical areas and buffers at Stockpile Site 3 and proposes mitigation for these impacts.

Herrera and SISU biologists delineated one wetland within the study area, Wetland 83, and one wetland bordering the study area, Wetland 86, which has a buffer extending within the study area (Table ES-1).

Table ES-1. Wetlands Within or Bordering the SR 167 Completion Project – Stockpile Site 3 Study Area.						
	Wetland Classification					
Wetland[a]	Cowardin Class[b]	Hydrogeomorphic Classification (HGM)[c]	Ecology Rating[d]	City of Fife Rating	Wetland Size (acres)	Buffer Width (feet)
83	PEM, PSS, PFO	Depressional	III	III	19.62	105[e]
86	PEM	Depressional	III	III	0.12	60[e]

[a] Wetland identifier.

[b] Federal Geographic Data Committee (FGDC 2013) or NWI Class based on vegetation:
PEM = palustrine emergent, PSS = palustrine scrub-shrub PFO = palustrine forested, (Cowardin et al. 1979).

[c] Hydrogeomorphic classification of wetland based on source and direction of hydrologic conditions and local geomorphology.

[d] Washington State Department of Ecology (Ecology) rating (Hruby 2014), which is consistent with the local jurisdiction requirements of the City of Fife.

[e] Wetland buffer width according to the City of Fife Wetlands Ordinance (FMC 17.17.230).

No streams were observed within the study area.

Stockpiling activities that began in 2020 and the proposed construction of a haul road result in a total of 2.74 acres of permanent buffer impacts at Stockpile Site 3 (Table ES-2).

Table ES-2. Summary of Buffer Impacts for the SR 167 Completion Project – Stockpile Site 3.	
Project Element	**Permanent Buffer Impact (acres)**
Estimated existing stockpile	2.56
Proposed haul road	0.18
Total:	**2.74**

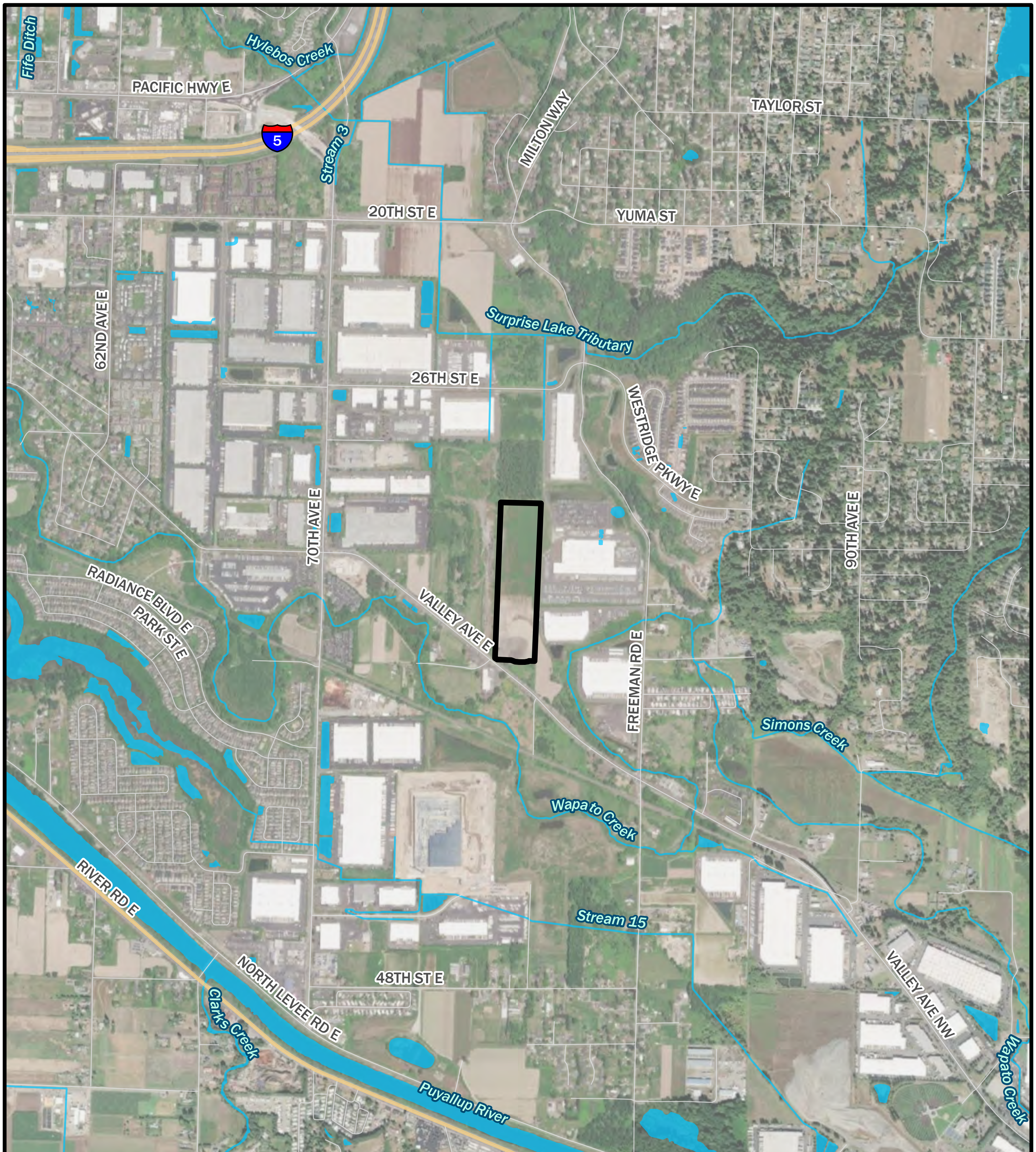
Mitigation for permanent buffer impacts will be completed as part of Project Stage 1b, specifically within the Hylebos Riparian Restoration Program area, and will be documented in the Stage 2 mitigation plan.

INTRODUCTION

The wetland and stream delineations described in this report were performed for the Washington State Department of Transportation (WSDOT) in support of the State Route (SR) 167 Completion Project (hereafter referred to as the Project). WSDOT plans to complete the SR 167 highway by building approximately 4 miles of a new four-lane limited-access highway. The new facility will begin at the current terminus in Puyallup at SR 161, extend through the Puyallup River Valley, and connect to Interstate 5 (I-5) near the existing Wapato Way East crossing over I-5. The Project also includes a new highway segment approximately 2 miles long. Defined as the SR 509 Spur, this new segment will extend from SR 509 near the Port of Tacoma to a new diverging diamond interchange at I-5 and SR 167. The Project will be constructed in three stages, through sequential design-build contracts. The future Stage 2 portion of the Project, known as the SR 167/I-5 to SR 161 – New Expressway Project (hereafter referred to as Stage 2) is the third construction contract of the SR 167 Completion Project "Phase 1 Improvements," which encompasses the entire 6-mile corridor.

In support of the Project, KLB Construction (KLB) obtained a Grading Permit from the City of Fife on May 5, 2020 (permit #GRA19-0011) and received coverage under the NPDES Construction Stormwater General Permit from the Washington State Department of Ecology (Ecology) on June 10, 2020 (permit #WAR307929) in support of obtaining a General Permit from WSDOT. After WSDOT conducted a preliminary site assessment and noted the presence of wetlands at the very north end of the site, KLB began to stockpile surplus roadway embankment fill materials from other WSDOT projects at the southern end of the site within an area called Stockpile Site 3 in 2020. In March 2021, Herrera and SISU Environmental (SISU) biologists began wetland and stream delineations for the future Stage 2 project and determined the presence of wetlands in the vicinity of Stockpile Site 3. Stockpile activities were suspended in October 2021. KLB proposes to construct a haul road to re-initiate stockpile fill placement and minimize further impacts at the site. The proposed haul road would be approximately 357 linear feet, covering an area of approximately 8,903 square feet, and with an approximate volume of 330 cubic yards of quarry spalls placed at a 12-inch depth for a durable driving surface. Appendix A shows the Temporary Erosion and Sediment Control Plan for the proposed haul road.

The wetland and stream delineations described in this report are within areas relevant to the activity at Stockpile Site 3 (hereafter referred to as the study area) (Figure 1). The purpose of this report is to describe wetlands and streams in the study area; wetland and stream ratings and required buffer widths; and applicable local, state, and federal laws and regulations. This report also quantifies existing and proposed impacts to critical areas and buffers specific to Stockpile Site 3 and proposes mitigation for these impacts in compliance with City of Fife Municipal Code (FMC) 17.05.085.



Legend

Study Area

Streams

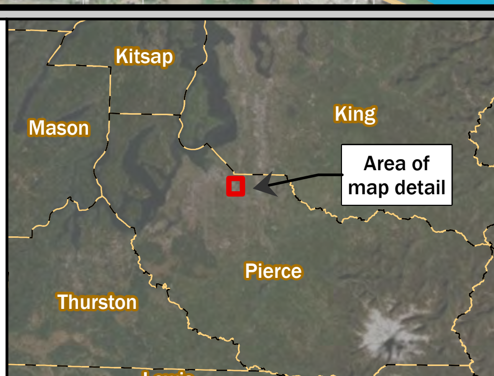


Figure 1.
Study Area and Vicinity Map for the SR 167 Completion Project – Stockpile Site 3.

0 500 1,000 2,000 Feet

HERRERA

Esri Imagery, Pierce County

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Project Setting

The study area is located entirely within Fife, in Pierce County, Washington. It is in Sections 8 and 17 of Township 20 North, Range 4 East of the Willamette Meridian, and it is in Water Resources Inventory Area (WRIA) 10, Puyallup-White River watershed. The study area is in the Hylebos Creek basin, which discharges to Puget Sound. It is within the regulatory jurisdiction of the City of Fife.

The study area is a 21.43-acre rectangle located north of Valley Avenue East, south of 26th Street East, and west of 78th Avenue East and Freeman Road East. It is bordered on the east by warehouse facilities and parking lots, on the north by deciduous forest, and on the west and south by disturbed vegetated areas.

At the time of the field assessment stockpiling activities occupied the southern portion of the site. Prior to stockpiling activities, the study area was an agricultural field; and the area not currently occupied by stockpiling activities is a flat, fallow field. Agricultural land uses ended in October 2019 within the study area.

Study Objectives

The objectives of the study were to:

- Delineate (flag) all wetlands and streams in the study area.
- Classify vegetation classes within delineated wetlands using the US Fish and Wildlife Service (USFWS) wetland classification system (FGDC 2013).
- Classify all delineated wetlands using the hydrogeomorphic (HGM) classification system (Brinson 1993).
- Classify all delineated wetlands and assess their functions using the *Washington State Wetland Rating System for Western Washington: 2014 Update* (Hruby 2014), which is the classification system required by the City of Fife (Fife Municipal Code [FMC] 17.17.020).
- Determine wetland categories and classes; stream type; and applicable wetland and stream buffer widths required by FMC 17.17.020, 17.17.230, 17.15.060, and 17.15.090.
- Identify fish and wildlife habitat conservation areas within the study area, if any exist, as described by FMC 17.15.040 and 17.15.050.
- Classify all streams within the study area, if any exist, according to the Washington Department of Natural Resources (DNR) Forest Practices Water Typing as described in the Washington Administrative Code (WAC 222-16-030).

- Identify regulations and guidance applicable to stockpile project impacts on wetlands, streams, and buffers set forth by local, state, and federal authorities.
- Identify impacts proposed from stockpile activities and identify mitigation for unavoidable impacts to critical area buffers.

METHODS AND MATERIALS

Evaluating the presence, extent, and type of wetlands and streams requires a review of available information about the site (e.g., surveys, studies), followed by an onsite wetland and stream delineation. The following sections describe the research methods and field protocols for the wetland and stream evaluations. More information about the methodology used in the wetland delineation performed for this Project is available in Appendix B.

REVIEW OF AVAILABLE INFORMATION

A literature review was performed to determine the historical and current presence of wetlands and streams in and near the study area. Sources of information included the following:

- Climate and precipitation data (NRCS 2021a; NOAA 2021)
- Pierce County topographic data (Pierce County 2011)
- National Wetlands Inventory (NWI) map of wetland areas in the study area (USFWS 2021)
- Soil survey maps for the study area (NRCS 2021b)
- Soil descriptions for the study area (NRCS 2021b, 2021c)
- Aerial photographs of the study area (ESRI 2021)
- Pierce County, City of Fife, and City of Edgewood public geographic information system (GIS) and maps (tax parcels, road locations, and critical areas) (Pierce County 2021a, 2021b; City of Fife 2021; City of Edgewood 2021)
- Hydrographic data (stream locations) for Pierce County (Pierce County 2021c)
- Washington State Priority Habitat and Species (PHS) database (WDFW 2021a)
- SalmonScape computer mapping system (WDFW 2021b)
- Washington Natural Heritage Program Data (DNR 2021a)
- Washington State Fish Passage map (WDFW 2021c)
- Google Earth historical aerial mapping (Google Earth Pro 2021)

WETLAND DELINEATION

Herrera biologists Eliza Spear, Josh LeClerc, Danielle Rapoza, and Riley Plumb and SISU biologists Larry Dominguez and Jim Hearsey conducted wetland and OHWM delineation field activities on March 30 and 31 and April 1 and 6, 2021. These biologists performed the wetland delineation in accordance with the *Regional Supplement to the US Army Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region* (Environmental Laboratory 2010), which is consistent with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

The methods in the guidance manuals listed above use a three-parameter approach for identifying and delineating wetlands and rely on the presence of field indicators for hydrophytic vegetation, hydric soils, and hydrology. The detailed methods for evaluating these three parameters and for performing the wetland delineation are described in Appendix B. Biologists established test plots to document conditions in wetlands and in adjacent uplands. For each test plot, biologists recorded data on dominant plant species, soil conditions in test plots, and evidence of hydrologic conditions on wetland determination data forms (Appendix C).

Following confirmation of wetland conditions, biologists delineated the wetland boundary by placing sequentially numbered, pink flagging along the wetland perimeter. Test plot locations were marked with pink and black striped flagging. The wetland boundary and test plot flags were subsequently located by a survey crew.

WETLAND CLASSIFICATION, RATING, AND FUNCTIONAL ASSESSMENT

Wetland Classification

Herrera and SISU biologists classified wetlands observed in the study area according to the US Fish and Wildlife Service classification system (FGDC 2013), which is based on an evaluation of attributes such as vegetation class, hydrologic regime, salinity, and substrate. Biologists also classified wetlands according to the HGM system (Brinson 1993), which is based on an evaluation of attributes including the wetland's source of water, direction of water flow, and the position of the wetland within the surrounding landscape.

Wetland Rating

Herrera and SISU biologists rated wetlands using the *Washington State Wetland Rating System for Western Washington: 2014 Update* (referred to as the Ecology rating system; Hruby 2014), as required by FMC 17.17.020. The Ecology rating system generates scores for each wetland function. Using the scores, a qualitative functional rating (high, moderate, or low) was derived for each of the functions (water quality, hydrology, and habitat) provided by each delineated wetland.

Wetland Functional Assessment

Wetlands were evaluated using the Ecology rating system and Wetland Functions Characterization Tool for Linear Projects (hereafter referred to as the best professional judgement [BPJ] Tool) (Null et al. 2000). The BPJ Tool evaluates wetlands in a consistent, yet rapid manner for routine application on linear highway projects based on best professional judgement.

Fish and Wildlife Habitat Conservation Area Delineation and Classification

FMC 17.15.040 defines streams as one type of fish and wildlife habitat conservation area (FWHCA). A fish and wildlife habitat conservation area is an area that supports regulated fish or wildlife species or habitats, typically identified by known point locations of specific species, habitat areas, or both.

Herrera and SISU biologists delineated the ordinary high water marks (OHWMs) of streams within the study area using the definition provided in the WAC, Section 222-16-010, which has been adopted by the City of Fife. According to this definition, the OHWM of streams is "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." In addition, methods in the publication *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson et al. 2016) were applied. The detailed methods for evaluating field conditions to perform the OHWM delineation are described in Appendix A. Streams were classified per FMC 17.15.060 and Washington State Department of Natural Resources water typing system based on WAC 222-16-030.

For those streams that did not have clear indication of water presence for longer than 2 months out of the year, desktop analysis and review of historical aerial photographs was conducted to determine if flow or historical stream presence could be verified. If historical conditions could not be determined or water was not observed in the channels during the delineation period, these features were identified as ditches. If a ditch was excavated in uplands and does not carry a stream or tributary that is a water of the United States, the ditch bottom was surveyed in the field or estimated using topographic data and aerial photographs; and the ditch bottom is shown on figures in this report with a jurisdictional ditch centerline.

RESULTS

This section discusses the results of the wetland and stream delineations, including a review of information obtained from various references, and an analysis of wetland and stream conditions in the study area as observed during field investigations.

ANALYSIS OF AVAILABLE INFORMATION

The available existing information compiled for the wetland and stream delineation is summarized in the following subsections.

Previously Mapped Wetlands and Streams

The NWI, City of Fife, City of Edgewood, and Pierce County hydrographic data identify no previously mapped wetlands or streams within the study area (USFWS 2021; City of Fife 2021; City of Edgewood 2021; Pierce County 2021c; Figure 2).

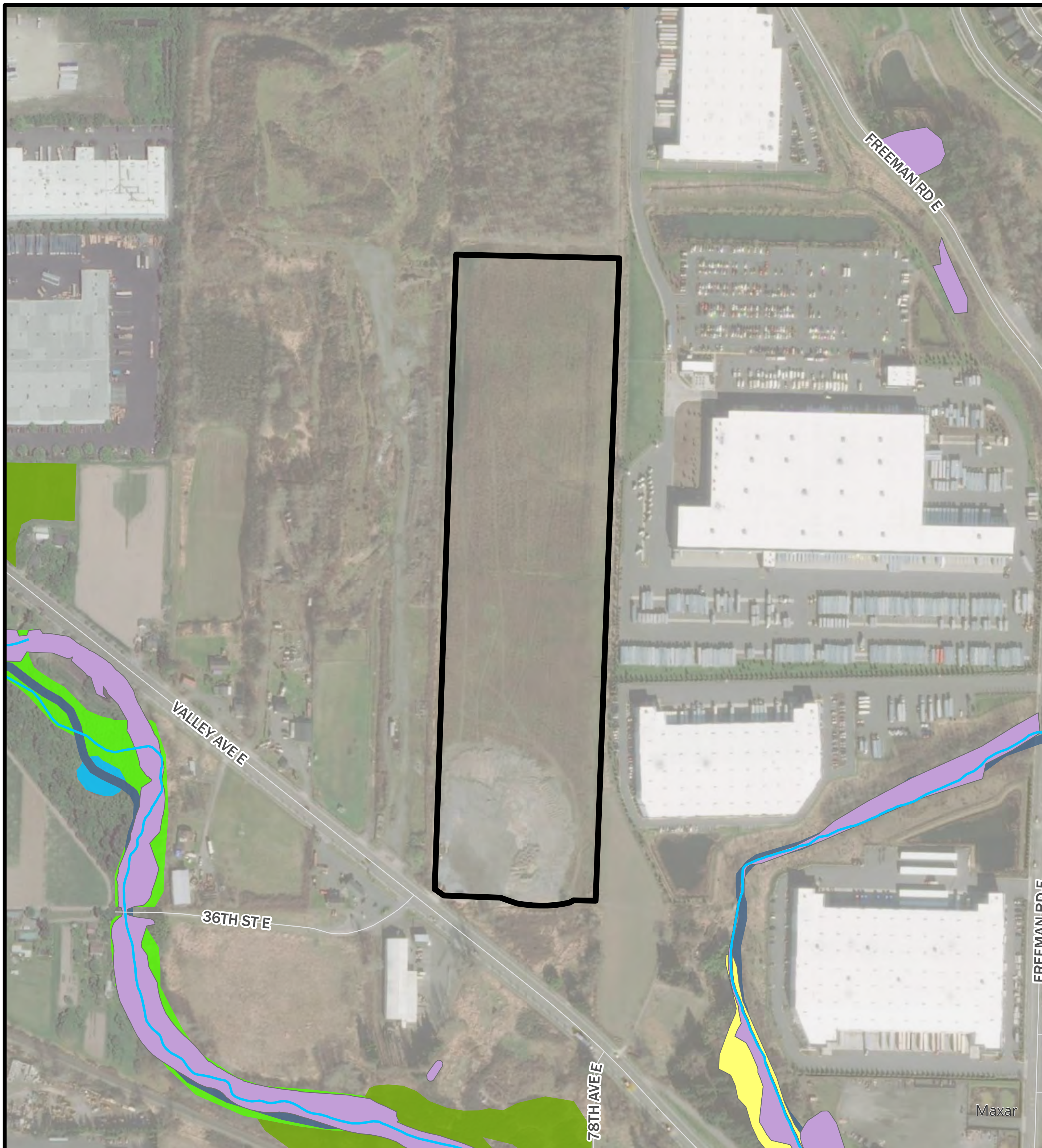
Precipitation Data

The historical average precipitation measurements were based on data collected in Tacoma, Washington (WETS Station Tacoma No. 1) for the period of record 1981 to 2021. The station is approximately 2 miles west of the study area.

Precipitation was evaluated for a 3-month period prior to field investigations in the study area, which occurred on March 30 and 31 and April 1 and 6, 2021. When considering the 3 months preceding each month in which field investigations occurred, normal precipitation characteristics were applicable in both months. Methodology and calculations for climatic conditions for the preceding months are presented in Appendix B. In the 10 days leading up to fieldwork on March 30, 1.22 inches of rainfall was recorded at the nearby reference precipitation station (NOAA 2021; Table 1).

Table 1. Evaluation of Normal Precipitation for the Three-Month Period Preceding Field Investigations.

Month	WETS Rainfall Percentile (inches)		Measured Rainfall (inches)	Condition: Dry, Wet, Normal	Results of Precedent Precipitation Analysis: Drier than Normal, Normal, Wetter than Normal
	30th	70th			
December 2020	4.20	6.50	5.64	Normal	
January 2021	4.22	7.22	8.79	Wet	
February 2021	2.29	4.40	3.91	Normal	
March 2021	3.18	4.78	2.06	Dry	**Normal**
April 2021					**Normal**



Legend

- Study Area
- Streams (Pierce County)
- City of Edgewood Wetlands[1]
- Pierce County Wetlands

NWI Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond[2]
- Riverine

1. Removed wetland areas that overlap impervious surface in map extent.
2. Removed stormwater ponds in map extent.

Figure 2.
Previously Mapped Wetlands and Streams in the SR 167 Completion Project – Stockpile Site 3 Study Area.

N

0 150 300 600 Feet

HERRERA

Esri Imagery, Pierce County, City of Edgewood

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Mapped Soils

Two types of soil are mapped within the study area: Briscot loam and Sultan silt loam (NRCS 2021b; Figure 3).

Briscot Loam

Briscot loam is a very deep, poorly drained, and hydric soil formed in recent alluvium on floodplains (NRCS 2021c, 2021d).

Sultan Silt Loam

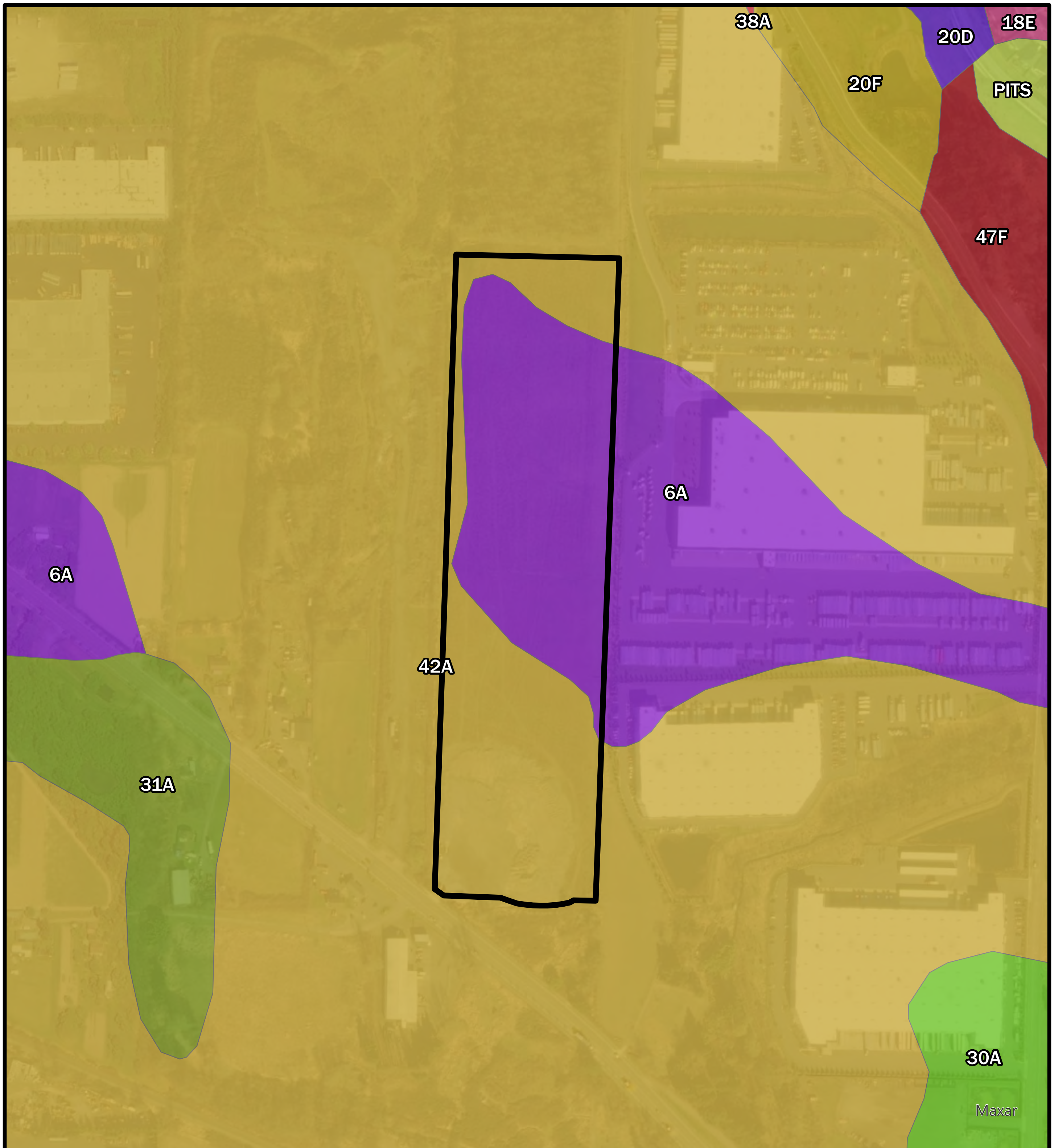
Sultan silt loam is a very deep, moderately well-drained, and hydric soil formed in recent alluvium on floodplains at or near sea level (NRCS 2021c, 2021d).

Fish Habitat Use

WDFW's SalmonScape and PHS mapping document no fish use within the study area (WDFW 2021a, 2021b).

Wildlife Habitat Use

WDFW PHS data document no specific locations for priority wildlife habitats or species within the study area (WDFW 2021a). There is one documented occurrence of western pond turtle (*Actinemys marmorata*), a State Endangered species, in the study area vicinity (WDFW 2021a), but this observation was from 1992, and the species has likely been extirpated from the study area since then.



Legend

Study Area

Soil type

- 18E - Indianola loamy sand, 15 to 30 percent slopes
- 20D - Kitsap silt loam, 15 to 30 percent slopes
- 20F - Kitsap silt loam, 30 to 65 percent slopes
- 30A - Puget silty clay loam
- 31A - Puyallup fine sandy loam
- 38A - Shalcar muck
- 42A - Sultan silt loam
- 47F - Xerochrepts, 45 to 70 percent slopes
- 6A - Briscot loam
- PITS - Pits

Figure 3.
Mapped Soils in the SR 167 Completion Project – Stockpile Site 3 Study Area.

N

0 150 300 600 Feet

HERRERA

Esri Imagery, Pierce County

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Analysis of Wetland Conditions

The weather conditions during the wetland and stream delineation fieldwork consisted of daytime high temperatures of approximately 50 to 60 degrees Fahrenheit (°F) with partly sunny skies. According to WETS (NRCS 2021a), the growing season, measured at 32°F or greater, in the vicinity of the study area demonstrates a 70 percent probability of occurring between April 16 and October 24 (191 days). However, based on observation of new seedling growth within the study area, it was determined that the field work was being conducted within the growing season.

Table 2 includes a summary of the delineated wetlands within and adjacent to the study area, and an explanation of City of Fife regulatory buffer widths can be found in the "Regulatory Implications" section of this report. The biologists completed wetland delineation data forms (Appendix C) and an Ecology wetland rating form (Appendix D) for each of the wetlands delineated in and adjacent to the study area. Herrera and SISU biologists delineated one wetland within the study area, Wetland 83, and one wetland bordering the study area, Wetland 86, which has a buffer extending within the study area (Tables 3 and 4; Figure 4). Representative photographs of the delineated wetlands are included in Tables 3 and 4.

Table 2. Wetlands Within or Bordering the SR 167 Completion Project – Stockpile Site 3 Study Area.

Wetland[a]	Wetland Classification				Wetland Size (acres)	Buffer Width (feet)
	Cowardin Class[b]	Hydrogeomorphic Classification (HGM)[c]	Ecology Rating[d]	City of Fife Rating		
83	PEM, PSS, PFO	Depressional	III	III	19.62	105[e]
86	PEM	Depressional	III	III	0.12	60[e]

[a] Wetland identifier.

[b] Federal Geographic Data Committee (FGDC 2013) or NWI Class based on vegetation:
PEM = palustrine emergent, PSS = palustrine scrub-shrub, PFO = palustrine forested (Cowardin et al. 1979).

[c] Hydrogeomorphic classification of wetland based on source and direction of hydrologic conditions and local geomorphology.

[d] Washington State Department of Ecology (Ecology) rating (Hruby 2014), which is consistent with the local jurisdiction requirements of the City of Fife.

[e] Wetland buffer width according to the City of Fife Wetlands Ordinance (FMC 17.17.230).

Table 3. Wetland 83 Information Summary.

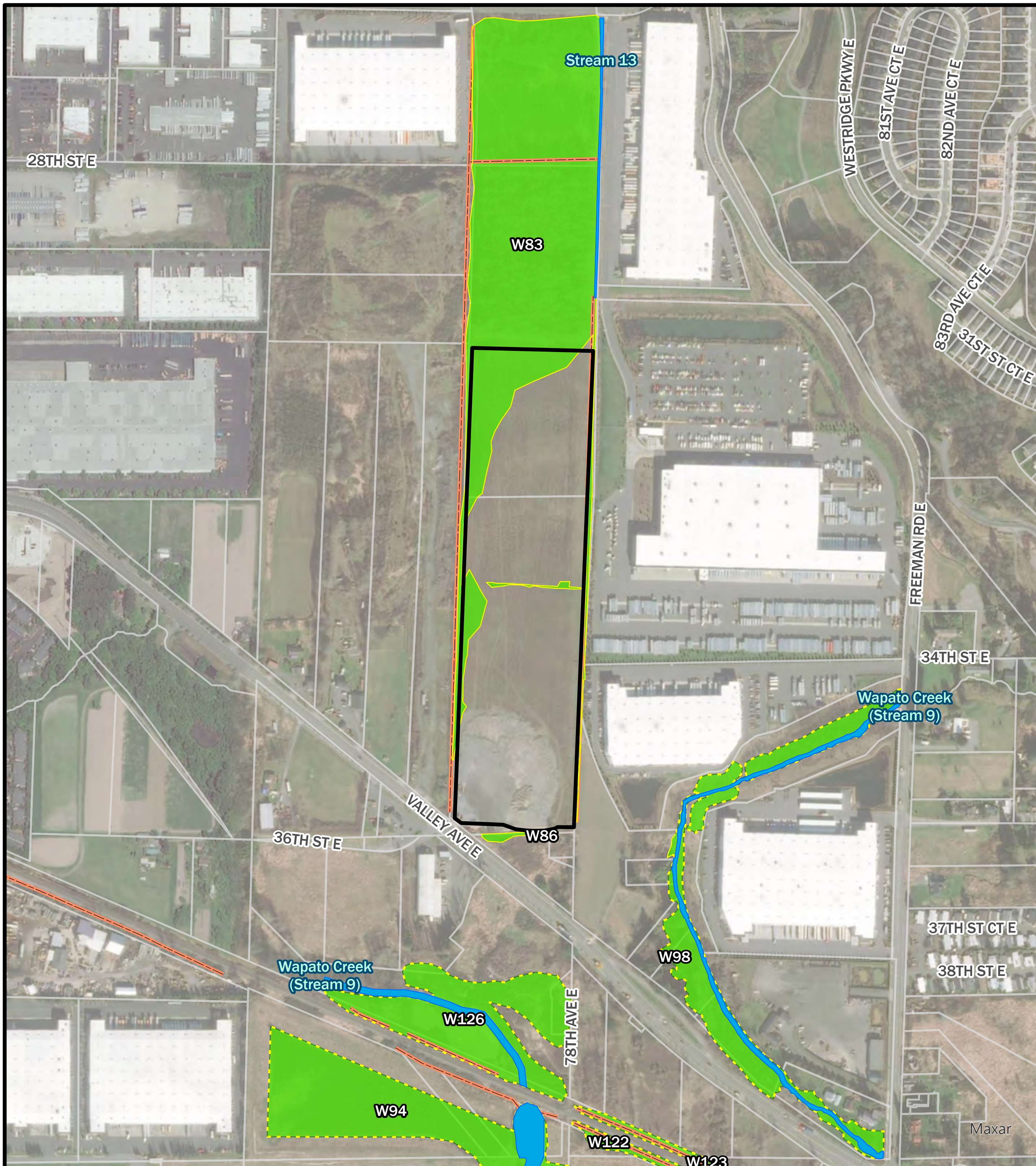
Location	West of 78th Avenue East, south of 26th Street East

Local Jurisdiction	City of Fife
Ecology Rating (2014)	Category III
Local Rating	Category III
City of Fife Buffer Width	105 feet
Wetland Size	19.62 acres
Cowardin Class	PEM, PSS, PFO
HGM Class	Depressional
Wetland Data Sheet(s)	Appendix C: W83-SP1, W83-SP3, W83-SP4, W83-SP5
Upland Data Sheet(s)	Appendix C: W83-SP2, W83-SP6, W83-SP7

Wetland Delineation	
Dominant Vegetation	Trees: black cottonwood (*Populus balsamifera* spp. *trichocarpa*) Shrubs: hardhack, Himalayan blackberry, red osier dogwood Herbaceous: small-fruited bulrush (*Scirpus microcarpus*), slough sedge (*Carex obnupta*), creeping buttercup, reed canarygrass.
Soils	All soil pits dug in Wetland 83 contained hydric soils. Indicators included Depleted Matrix (F3), hydrogen sulfide (A4), and redox dark surface (F6).
Hydrology	Groundwater is the primary source of hydrology for this wetland. This wetland also receives stormwater runoff discharges. A ditch flowing west to east in the wetland contributes flow to Stream 13, which flows north. Primary indicators high water table (A2) and saturation (A3) were met.
Rationale for Delineation	All three wetland parameters were met.
Wetland Rating and Functions	
Rationale for Local Rating	The FMC classifies wetlands based on the Washington State Wetland Rating System and on habitat score (FMC 17.17.230). Wetland 83 rates as a Category III.
Functions	The wetland has moderate water quality, hydrologic, and habitat functions.
Wetland Buffers	
Buffer Condition	The buffer to the north is a narrow, mowed strip and the 26th Street East corridor. Mowed vegetation and paved surfaces are to the east. Fallow agricultural fields are to the south. Disturbed vegetated areas are to the west. The buffer is generally in poor condition.

Table 4. Wetland 86 Information Summary.

<table>
<tr><td>Location</td><td colspan="3">North of Valley Avenue East, west of Wapato Creek and Freeman Road East</td></tr>
<tr><td colspan="2" rowspan="9"></td><td>Local Jurisdiction</td><td>City of Fife</td></tr>
<tr><td>Ecology Rating (2014)</td><td>Category III</td></tr>
<tr><td>Local Rating</td><td>Category III</td></tr>
<tr><td>City of Fife Buffer Width</td><td>60 feet</td></tr>
<tr><td>Wetland Size</td><td>0.12 acre</td></tr>
<tr><td>Cowardin Class</td><td>PEM</td></tr>
<tr><td>HGM Class</td><td>Depressional</td></tr>
<tr><td>Wetland Data Sheet(s)</td><td>Appendix C: W86-SP1</td></tr>
<tr><td>Upland Data Sheet(s)</td><td>Appendix C: W86-SP2</td></tr>
<tr><td colspan="4">Wetland Delineation</td></tr>
<tr><td colspan="2">Dominant Vegetation</td><td colspan="2">Trees: black cottonwood
Shrubs: Himalayan blackberry
Herbaceous: reed canarygrass</td></tr>
<tr><td colspan="2">Soils</td><td colspan="2">Soil matrices of 10YR 4/1 with redoximorphic concentrations were observed within the upper 14 inches of the soil surface. Hydric soil indicator Depleted Matrix (F3) was met.</td></tr>
<tr><td colspan="2">Hydrology</td><td colspan="2">Precipitation and runoff from the road are likely the primary sources of hydrology in this wetland. Secondary indicators water-stained leaves (B9), geomorphic position (D2), and FAC-neutral test (D5) were met.</td></tr>
<tr><td colspan="2">Rationale for Delineation</td><td colspan="2">All three wetland indicators were met.</td></tr>
<tr><td colspan="4">Wetland Rating and Functions</td></tr>
<tr><td colspan="2">Rationale for Local Rating</td><td colspan="2">The FMC classifies wetlands based on the Washington State Wetland Rating System and on habitat score (FMC 17.17.230). Wetland 86 rates as a Category III.</td></tr>
<tr><td colspan="2">Functions</td><td colspan="2">Water quality and hydrologic functions are of moderate to high quality. The wetland provides low habitat functions.</td></tr>
<tr><td colspan="4">Wetland Buffers</td></tr>
<tr><td colspan="2">Buffer Condition</td><td colspan="2">A Project stockpile area is located to the north, a fallow agricultural area and disturbed upland buffer is located to the east and south, and Valley Avenue East is located to the south and west. The buffer is generally in poor condition.</td></tr>
</table>



Legend

- Study Area
- Stream area
- Wetland area
- Wetland boundary
- Estimated boundary
- Estimated ditch centerline
- Parcel

Figure 4.
Wetlands, Streams, and Ditches Delineated in the SR 167 Completion Project – Stockpile Site 3 Study Area.

N

0 205 410 820
Feet

HERRERA

Esri Imagery, Pierce County

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Evaluation of Wetland Functions

The Ecology rating system generates a qualitative functional rating (high, moderate, or low) for each of the functions (water quality, hydrology, and habitat) provided by wetlands. Table 5 includes a summary of the function scores, the total wetland score, and the associated rating (category) for each delineated wetland. Functions provided by each wetland are described further below.

Table 5. Individual Wetland Function Scores for Wetlands Within or Bordering the SR 167 Completion Project – Stockpile Site 3 Study Area.

Wetland Name	Water Quality Functions Rating[a]			Hydrologic Functions Rating[a]			Habitat Functions Rating[a]			Total Score[b]	Ecology Rating Category
	Site Potential	Landscape Potential	Value	Site Potential	Landscape Potential	Value	Site Potential	Landscape Potential	Value		
83	M	M	M	L	H	H	M	L	M	18	III
86	M	M	M	M	M	H	L	L	L	16	III

[a] Qualitative ratings of H (high), M (moderate), and L (low) are based on the Washington State Department of Ecology (Ecology) rating system (Hruby 2014).

[b] Total score is derived by adding all qualitative ratings together. Low ratings are worth 1 point, Moderate ratings are worth 2 points, and High ratings are worth 3 points.

Wetland 83

Wetland 83 is in an agricultural field and extends into an adjacent forested area. The wetland has a moderate potential to improve water quality due to its depressional HGM class, highly constricted outlet, seasonal ponding, and dense vegetation. These characteristics increase the retention time of surface water in the wetland, allowing for the absorption and filtration of pollutants in surface water entering the wetland. Agricultural runoff, a nearby Project fill stockpile, and surrounding development contribute pollutants to surface water, increasing the potential of the wetland to improve water quality in the area. The wetland is in a basin with an aquatic resource on the State's Clean Water Act Section 303(d) list of degraded water bodies, which makes the water quality functionality moderately valuable to society.

Although Wetland 83 has a constricted outlet and the ability to store water during wet periods, its potential to reduce flooding and erosion is lowered because the area of the contributing basin is large compared to the size of the wetland. It has a high potential to support hydrologic functions due to surrounding runoff and adjacent land use. The wetland is in a landscape that has flooding problems, making its hydrologic functions valuable to society.

Wetland 83 has a moderate potential to provide habitat due to the presence of several Cowardin classes and vegetation strata, high plant species diversity, and the presence of a fish-bearing stream adjacent to the wetland. In particular, the occurrence of seasonal flooding in forested and emergent areas increases its potential to provide amphibian habitat. The wetland has low landscape potential due to low habitat accessibility as a result of the high land use intensity nearby. The presence of instream and riparian habitat makes the site moderately valuable to society.

Wetland 86

Wetland 86 has a moderate water quality function due to its depressional HGM class with no outlet, persistent vegetation cover, and pollutants in stormwater runoff discharges into the wetland. The wetland is in the Puyallup River basin, which is on the State's Section 303(d) list. Several total maximum daily loads (TMDLs) have been established for pollutants in the Puyallup River, making the water quality function of this wetland more valuable to society.

The lack of an outlet also contributes to moderate hydrologic function, as does surrounding development. Wetland 86 is large compared to the size of its contributing basin, and it is in a landscape with flooding problems, which adds value to its hydrologic function.

The wetland has low potential to provide habitat for wildlife due to the lack of vegetation structure and hydroperiods, low vegetation diversity, and lack of direct connectivity to other habitats. The wetland does, however, provide some invertebrate, amphibian, and bird habitat because it has seasonal ponding, vegetation cover, and proximity to other wetlands and water bodies.

Analysis of Fish and Wildlife Habitat Conservation Area Conditions

No streams were observed in the study area.

The study area is bordered on the east and west by ditches (Figure 4). Areas of standing water were present in the ditches at the time of field delineations, but there was no flow observed or evidence of flow occurring regularly. As shown in Figure 4, Wetland 83 extends southward amid these ditches.

Approximately 180 feet north of the study area, Stream 13 enters the eastern ditch from the east and flows northward (WSDOT 2022). Stream 13 is a potentially fish bearing tributary to Surprise Lake Tributary (defined as Stream 01 for the SR 167 Completion Project). Table 6 summarizes the characteristics of Stream 13.

Table 6. Stream 13 Information Summary.

Stream Name	13
Long./Lat. ID Number	Start: 47.2303078/-122.325774 End: 47.233422/-122.325771
WRIA Name/ Stream No.	10: Puyallup-White/ 17110019020833
WDFW Site ID(s)	935183, 935185, 935184
Local Jurisdiction	City of Fife
DNR Water Type	Type N
Local Stream Rating	N/A
Buffer Width	Case by case
Documented Fish Use[a]	Potential presence: Chinook, chum, coho, and pink salmon and steelhead trout
Location of Stream Relative to Project Corridor	Stream 13 flows north from a culvert under an industrial complex driveway east of the project corridor. The stream flows along the west side of 78th Avenue East and exits the Stage 2 study area through a culvert under 26th Avenue East. The stream continues north and joins Surprise Lake Tributary (Stream 01) approximately 600 feet north of the Stage 2 study area.
Connectivity	A ditch connects to Stream 13 draining Wetland 83 from the west. South of the stream, a stormwater outfall drains northward into the ditch that drains to Stream 13. This ditch extends approximately 2,100 feet south along the corridor's eastern edge and is mapped as part of Wetland 83. On its west bank, Stream 13 is bordered by Wetlands 83 and 47. Stream 13 flows north out of the project corridor and into Surprise Lake Tributary (Stream 01) approximately 600 feet north of the Stage 2 study area.
Fish Habitat	Stream 13 is potentially accessible to Chinook, chum, coho, and pink salmon, and steelhead trout (WDFW 2021b). There are several unassessed culverts located within the Stage 2 study area that may be barriers to fish passage. Stream 13 is permanently flowing and provides poor fish habitat as it primarily has a mud/silt bottom, contains no instream wood, and has little channel complexity. Some shade and overhanging vegetation is provided by trees and shrubs in Wetland 83. Many bullfrog tadpoles were observed in an area of standing water at the 26th Street East culvert.
Riparian/Buffer Condition	Stream 13 flows along the east edge of a forested and scrub-shrub wetland (Wetland 83). Riparian vegetation consists of black cottonwood, Oregon ash, willows, Himalayan blackberry (*Rubus armeniacus*), and red osier dogwood (*Cornus sericea*). Reed canarygrass (*Phalaris arundinacea*) dominates the banks of the stream. The buffer to the west contains moderate to high quality forested species, but also has been used recently for encampments by people experiencing homelessness that likely have increased pollutants in stormwater runoff. Mowed roadside vegetation and an industrial complex sidewalk and driveway lie immediately to the east of Stream 13.

[a] Documented fish species known to occur in the stream from available data sources (WDFW 2021b).

REGULATORY IMPLICATIONS

Wetlands and streams are subject to a variety of federal, state, and local regulations that will apply to current and any future activities planned for the study area. Federal laws regulating wetlands and streams include Sections 404 and 401 of the Clean Water Act (United States Code [USC], Title 33, Chapters 1344 and 1251). Washington State laws and programs designed to control the loss of wetland acreage include the State Environmental Policy Act (SEPA) and Section 401 of the Clean Water Act (administered in the State of Washington by the Washington State Department of Ecology [Ecology], as mandated by the Washington State Water Pollution Control Act). In addition, Washington State laws include the state Hydraulic Code (Washington Administrative Code [WAC] 220-110). The Fife Municipal Code Title 17 specifies wetland categories, required buffer widths, development standards, and mitigation requirements for critical areas in its jurisdiction. Federal, state, and City of Fife regulations require mitigation for impacts on wetlands and streams.

CLEAN WATER ACT SECTIONS 404 AND 401

Section 404 of the federal Clean Water Act regulates the placement or removal of soil or other fill, grading, or alteration (hydrologic or vegetative) in waters of the United States, including wetlands and streams (33 USC 1344). The Seattle District of the US Army Corps of Engineers (USACE) administers the permitting program under the act. The permits include nationwide (general) permits for projects involving small areas of fill, grading, or alteration and individual permits for projects that require larger areas of wetland disturbance. USACE does not regulate wetland buffers.

Section 401 of the Clean Water Act requires that proposed dredge (removal) and fill activities permitted under Section 404 be reviewed and certified to ensure that such activities meet state water quality standards. State 401 certification is administered by Ecology for all Section 404 permits. State 401 certification is granted without the need for a separate permit from Ecology for projects that qualify for a Section 404 nationwide permit, meet specific 401 certification conditions of the nationwide permit, and meet Ecology 401 General Conditions. If that is not the case, an Individual 401 Water Quality Certification permit is required by Ecology.

Stockpile project activities at Stockpile Site 3 are not anticipated to require Section 404 permitting or Section 401 review due to avoidance of fill placement within waters of the United States or Washington State.

Washington State Laws

Washington State laws and programs designed to control the loss of wetland acreage include SEPA and Section 401 of the Clean Water Act as noted above.

The Washington Department of Fish and Wildlife (WDFW) administers the Hydraulic Project Approval (HPA) program under the state Hydraulic Code (WAC 220-110), which was specifically designed to protect fish life. An HPA is required for projects that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the State.

Stockpile project activities at Stockpile Site 3 are not anticipated to require an HPA or SEPA review.

Fife Municipal Code

Wetlands

The City of Fife designates wetlands as critical areas (FMC 17.05.015). The City of Fife rates wetlands according to the *Washington State Wetland Rating System for Western Washington: 2014 Update* (FMC 17.17.020; Hruby 2014). Wetlands are rated as Category I, II, III, or IV, according to the level of function they provide and how highly they score on the Ecology wetland rating system. Required buffer widths defined by FMC 17.17.230, listed in Table 7, are based on the wetland rating and habitat score.

Table 7. Wetland Ratings and Required Buffer Widths for the SR 167 Completion Project – Stockpile Site 3.

Wetland Name	Wetland Rating Category (2014)	Habitat Score	City of Fife Buffer Width (feet)
83	III	5	105
86	III	3	60

As shown in Table 7, Wetlands 83 and 86 meet the criteria for Category III wetlands. Wetland 83 has a habitat score of 5, and its required buffer width is 105 feet. Wetland 86 has a habitat score of 3, and its required buffer width is 60 feet.

Fish and Wildlife Habitat Conservation Areas

The City of Fife regulates streams within its jurisdiction as environmentally critical FWHCAs (FMC 17.15.040). In accordance with FMC, streams were classified using the DNR forest practices stream type (DNR 2021b; FMC 17.15.060). DNR classifies Stream 13 as Type N (DNR 2021b). The City of Fife sets buffer widths on a case-by-case basis (FMC 17.15.050).

IMPACT ANALYSIS

The following section describes the proposed stockpile project impacts to critical areas and buffers.

CRITICAL AREA AND BUFFER IMPACTS

Activities at Stockpile Site 3 will not affect wetlands or streams, but there are existing and proposed impacts to the adjacent buffer (Table 8 and Figure 5). Stockpiling activities that began in 2020 permanently impacted 2.56 acres of buffer within the site, and the proposed haul road will permanently impact approximately 0.18 acre of additional buffer area within the site. Proposed buffer impacts occur in an area of poor buffer condition, a fallow agricultural field with sparse herbaceous vegetation. Buffer impacts that occurred after April 2021 are in buffers with similarly poor conditions. Stockpile fill encroachment prior to April 2021 likely occurred in buffer of similarly poor condition, though this could not be verified due to fill that was in place at the time of field work.

Table 8. Summary of Buffer Impacts for the SR 167 Completion Project – Stockpile Site 3.

Project Element	Permanent Buffer Impact (acres)
Estimated existing stockpile	2.56
Proposed haul road	0.18
Total:	**2.74**

Figure 5. Impact Areas for the SR 167 Completion Project – Stockpile Site 3.

Washington State Department of Transportation

SR 167 STAGE 2 STOCKPILE AREA IMPACTS

LINE 1:
LINE 2:

PLOTTED BY: tprescott
DATE: 2/22/2022 TIME: 5:21:42 PM

O:\proj\Y2016\16-06277-000\CAD\Dwg\Stockpile\SR167 Stage 2 Stockpile.dgn

MITIGATION PLAN

The City of Fife requires compensatory mitigation for impacts to wetland buffers (FMC 17.17.320). The FMC does not specify buffer mitigation ratios, only that "the overall goal of any compensatory project shall be no net loss of wetland functions and values and to strive for a net resource gain in wetland functions and values over present conditions" (FMC 17.17.320). Mitigation for 2.74 acres of permanent buffer impacts at Stockpile Site 3 will be completed as part of the SR 167 Completion Project Stage 1b Hylebos Riparian Restoration Program (RRP).

As documented in the *SR 167 Completion Project, Stage 1b: SR 167/I-5 to SR 509 – New Expressway Project Final Stage 1b Mitigation Plan* (WSDOT 2021) the Hylebos RRP will result in an excess of almost 65 acres of buffer enhancement. Stream 13 is a tributary to Surprise Lake Tributary, which is one of the primary streams flowing through the Hylebos RRP area. The Upper Surprise Lake Tributary and Middle Surprise Lake Tributary mitigation sites associated with the Hylebos RRP are located approximately 1/3 mile north of the study area and will contribute to restoration of the Surprise Lake Tributary system. Compensatory mitigation for permanent buffer impacts (including impacts of Stockpile Site 3 described in this report) will be provided through a combination of wetland and stream re-establishment and enhancement and upland buffer enhancement within the perimeter buffer of the RRP. These activities will result in an increase in wetland and stream functions over the present degraded conditions of buffers within the study area.

Construction of the Hylebos RRP is anticipated to begin in mid-2022 and was authorized through City of Fife permitting (SLCUP20-0001 and CAP21-0001). Excess buffer mitigation will be documented as part of the SR 167 Completion Project Stage 1b documentation. Excess credits will then be applied to the impacts associated with the Stockpile Site 3 activities at a ratio of 1.25:1 to compensate for the temporal loss of function resulting from placement of fill in the buffer starting in 2020. This will result in utilization of 3.43 acres of enhanced buffer associated with the Hylebos RRP as mitigation for the permanent impact of 2.74 acres of wetland buffer associated with stockpile activities. The use of this acreage as mitigation for buffer impacts will be documented and potentially considered as part of the SR 167 Completion Project – Stage 2 mitigation plan that will be submitted for City of Fife (and state and federal agencies) permit review in the future.

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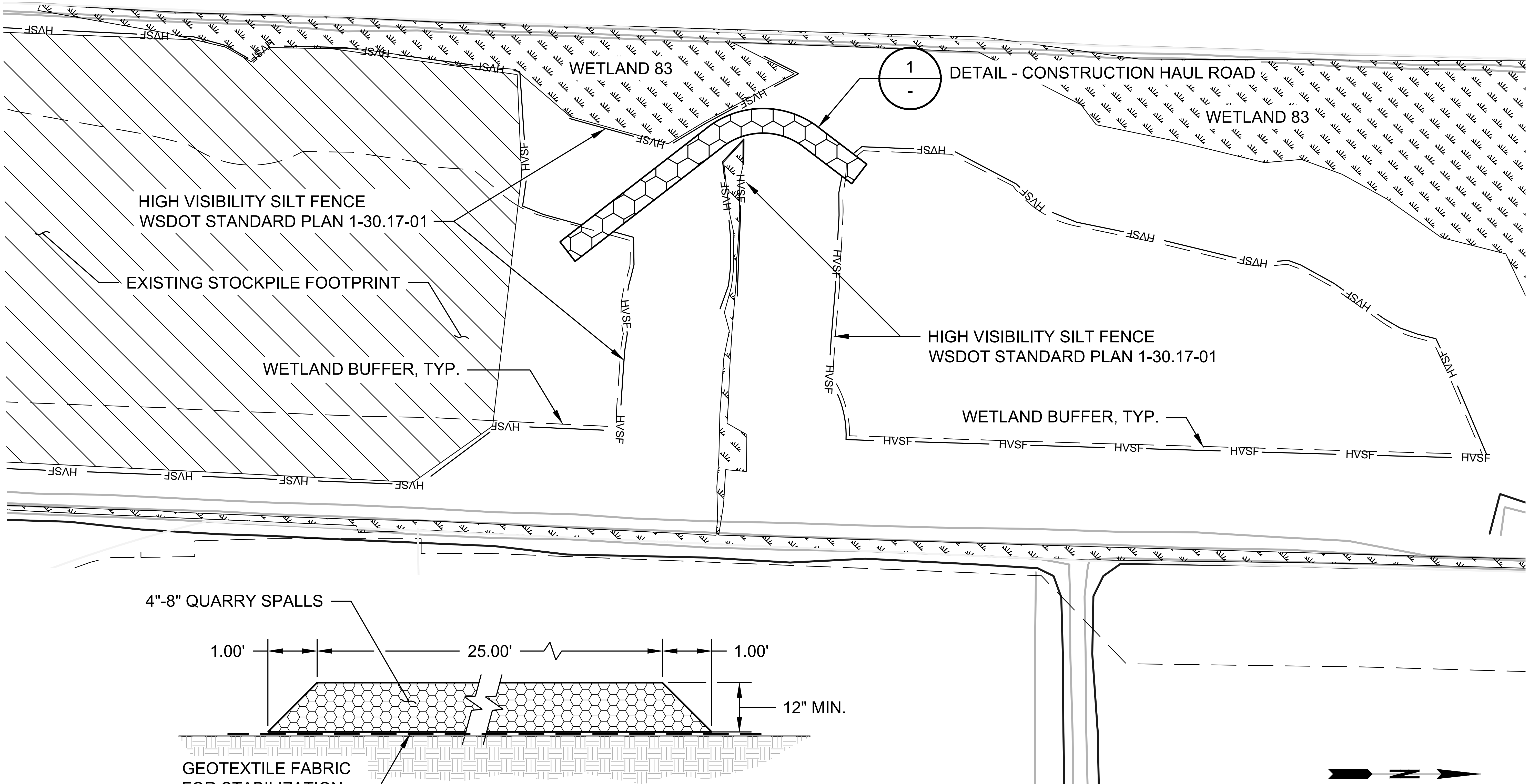
APPENDIX A

Proposed Haul Road Temporary Erosion and Sediment Control Plan



DETAIL - CONSTRUCTION HAUL ROAD 1 / -

SCALE: NTS

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SCALE IN FEET

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TIME				REGION NO.	STATE	FED.AID PROJ.NO.			
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DESIGNED BY XXXXX				JOB NUMBER					
ENTERED BY									
CHECKED BY				CONTRACT NO.		LOCATION NO.			
PROJ. ENGR.									
REGIONAL ADM.	REVISION	DATE	BY						

P.E. STAMP BOX — DATE

P.E. STAMP BOX — DATE

Washington State
Department of Transportation

SR 167
1-5 TO SR 161
NEW EXPRESSWAY

STOCKPILE SITE HAUL ROAD

PLAN REF NO

SHEET 1 OF 1 SHEETS

APPENDIX B

Wetland Delineation Methods

Wetland and Fish and Wildlife Habitat Conservation Area Delineation Methods

Wetland Delineation Methods

The wetland delineation for the SR 167 Completion Project – Stage 2, Stockpile Site 3 was performed in accordance with the *Regional Supplement to the US Army Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region* (Environmental Laboratory 2010), which is consistent with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). These methods use a three-parameter approach for identifying and delineating wetlands: the presence of field indicators for hydrophytic vegetation, hydric soils, and hydrology. This wetland delineation was performed according to procedures specified for the routine wetland determination method (Environmental Laboratory 1987).

To identify potential wetlands, wetland biologists evaluated field conditions by traversing the study area and noting wetlands, streams, and other aquatic features. The biologists evaluated field conditions within 200 feet of the study area boundary by observing them from within the study area boundaries because permission to access property beyond the study area was not provided.

A test plot was established for each area that appeared to have potential wetland characteristics. For each test plot, data on dominant plant species, soil conditions, and evidence of hydrologic conditions were recorded on wetland determination data forms. Plants, soils, and hydrologic conditions were also analyzed and documented in adjacent uplands. Based on collected data, a determination of wetland or upland was made for each area examined.

Following confirmation of wetland conditions in a given area, the wetland boundary was delineated by placing sequentially numbered, fluorescent pink flagging along the wetland perimeter. Test plot locations were marked with pink and black striped flagging. A pole-mounted Global Positioning System (GPS) unit (Arrow 100) was used to record the location of the wetland boundary flags and test plots, and these data were overlaid on aerial photographs using geographic information system (GIS) software. The locations of wetland boundary flags and test plots were subsequently surveyed by 1 Alliance Geomatics, LLC.

Hydrophytic Vegetation

Hydrophytic vegetation is characterized by the ability to grow, effectively compete, reproduce, and persist in anaerobic soil conditions resulting from periodic or long-term saturation (Environmental Laboratory 1987). Vegetation must meet at least one of the four indicators (described below) that are used to determine the presence of hydrophytic vegetation in wetlands. Problematic and atypical situations for hydrophytic vegetation are also described in the US Army Corps of Engineers (USACE) delineation manual and supplement (Environmental Laboratory 1987, 2010).

Plant Species Identification

Plant species were identified using *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1987) and *A Field Guide to the Common Wetland Plants of Western Washington and Northwestern Oregon* (Cooke 1997). The indicator status of each plant species is based on the *National Wetland Plant List* (Lichvar 2018) for the Western Mountains, Valleys, and Coast Region.

Dominant Species Determination

Dominant species are those that contribute more than other species to the character of a plant community. To determine dominance, a vegetation sampling area is determined by the field biologist to accurately characterize the plant community that occurs in the area to be evaluated. These are commonly circular sampling areas, centered on the location of the test plot (where soil and hydrologic data is also collected). The radius of the circle is determined in the field, based on site conditions. In large wetlands, a typical sampling radius would be 2 to 5 meters for tree and sapling/shrub species, and 1 meter for herbaceous species. In a small or narrow wetland (or upland), the radius might be reduced to accurately sample wetland (upland) areas, thereby avoiding an overlap into an adjacent community having different vegetation, soils, or hydrologic conditions (Environmental Laboratory 2010).

Within the vegetation sampling area, a complete list of plant species that occur in the sampling area is compiled and the species divided into four strata: tree, shrub (including saplings, see criteria below), herb, and woody vines. A plant is included in the tree stratum if it is a woody plant 3 inches in diameter at breast height (dbh) or greater; in the shrub stratum if it is a woody plant less than 3 inches dbh (including tree saplings under 3 inches dbh); in the herb stratum if it is an herbaceous (non-woody) plant; and in the woody vine stratum if it is a woody vine of any height (Environmental Laboratory 2010). To be included in the sampling, 50 percent or more of the plant base must be within the radius of the sampling area. For trees specifically, more than 50 percent of the trunk (diameter) must be within the sampling radius to be included.

A rapid test, dominance test (e.g., the 50/20 rule), or prevalence index are commonly used to determine which species are considered dominant and to assess whether the criteria for hydrophytic vegetation are met at each test plot (Environmental Laboratory 2010). Additional hydrophytic vegetation indicators are discussed in the following section.

To conduct a rapid test (Indicator 1 on the wetland determination data form), the dominant species are evaluated visually and if all are facultative wetland (FACW) or obligate wetland (OBL), the vegetation data passes the rapid test. To conduct a dominance test (Indicator 2 on the wetland determination data form), the absolute areal coverage of the plant species within a stratum are totaled, starting with the most abundant species and including other species in descending order of coverage, until the cumulative coverage exceeds 50 percent of the total coverage for the stratum. The plant species that constitute this first 50 percent of areal coverage are considered the dominant species in the stratum. In addition, any single plant species that constitutes at least 20 percent of the total percent cover in the stratum is also considered a dominant species (Environmental Laboratory 2010). The indicator status category for each plant (shown in Table B-1) is also listed on the wetland determination form. If more than 50 percent of the dominant species across all strata are rated OBL, FACW, or facultative (FAC), the hydrophytic vegetation dominance test (Indicator 2) is met.

The prevalence index (Indicator 3 on the wetland determination data form) is a weighted-average wetland indicator status of all plant species in the sampling plot, where weighting is by abundance (Environmental Laboratory 2010). This method is used where indicators of hydric soil and wetland hydrology are present, but the vegetation initially fails the rapid and dominance tests (Indicators 1 and 2). To determine the prevalence index, the absolute cover of each species in each stratum is determined. All species (across all strata) are organized into wetland indicator status groups (i.e., OBL, FACW, FAC, facultative upland [FACU], or upland [UPL]) and their cover values are summed within the groups. The formula for the prevalence index is applied. If the prevalence index (which ranges from 1.0 to 5.0) equals 3.0 or less, this hydrophytic vegetation indicator is met.

Table B-1. Plant Indicator Status Categories.

Indicator Status	Indicator Symbol	Definition
Obligate wetland plants	OBL	Plants that occur almost always (estimated probability >99%) in wetlands under natural conditions but also occur rarely (estimated probability <1%) in upland areas
Facultative wetland plants	FACW	Plants that usually occur (estimated probability >67%) in wetlands under natural conditions but also occur (estimated probability 1% to 33%) in upland areas
Facultative plants	FAC	Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and upland areas
Facultative upland plants	FACU	Plants that sometimes occur (estimated probability 1% to 33%) in wetlands but occur more often (estimated probability >67% to 99%) in upland areas
Obligate upland plants	UPL	Plants that rarely occur (estimated probability <1%) in wetlands under natural conditions
WET ⟵⟶ DRY *OBL – FACW – FAC – FACU – UPL*		

Source: Environmental Laboratory (1987).

Additional Hydrophytic Vegetation Indicators

The presence of morphological adaptations to wetland conditions in plants that lack a published hydrophytic vegetation indicator status or with an indicator status of FACU or drier is also a hydrophytic vegetation indicator (Indicator 4). Evidence of physiological, morphological, or reproductive adaptations indicating growth in hydrophytic conditions can include, but are not limited to, buttressed roots, adventitious roots, multi-stemmed trunks, or tussocks. To determine whether Indicator 4 is met, the morphological features must be observed on more than 50 percent of the individuals of a FACU species (or species without a published indicator status) living in an area where hydric soil and wetland hydrology are present. On the wetland determination data form, the indicator status of the species with morphological adaptations would be changed to FAC (with supporting notes), and the dominance test (Indicator 2) and/or prevalence index (Indicator 3) would then be recalculated.

Wetland non-vascular plants, referred to as bryophytes and consisting of mosses, liverworts, and hornworts, may also meet the hydric vegetation criteria, under Indicator 5 (Environmental Laboratory 2010). These plants must be present in areas containing hydric soils and wetland hydrology. The percent cover of wetland specialist bryophytes is determined in 10-inch by 10-inch square plots placed at the base of hummocks, if present. The summed cover of wetland specialist bryophytes must be more than 50 percent of the total bryophyte cover in the vegetation sampling area.

The problematic hydrophytic vegetation indicator section in the USACE regional supplement further explains how to interpret situations in which hydric soils and wetland hydrology are present but hydrophytic vegetation Indicators 1 through 5 are lacking (Environmental Laboratory 2010). Procedures for looking at settings such as areas with active vegetation management (e.g., farms), areas dominated by aggressive invasive species, active floodplains, and low terraces are described, as well as explanations for specific situations, such as seasonal shifts in plant communities, extended drought conditions, and riparian areas.

Hydric Soils

A hydric soil is a soil that is saturated, flooded, or inundated long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation (Environmental Laboratory 1987, 2010). The evaluation of existing soil maps (developed by the US Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS] and other sources) is used to understand hydric soil distribution and to identify the likely locations of hydric soils (by verifying their inclusion on the hydric soils list). Comparison of these mapped soils to conditions found on site help verify the presence of hydric soils.

For onsite soils characterization, hydric soils data were obtained generally by digging test pits at least 20 inches deep and 4 inches wide. Hydric soil conditions were evaluated using indicators outlined in *Field Indicators of Hydric Soils in the United States* (NRCS 2017) and adopted by the *Regional Supplement to the US Army Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region* (Environmental Laboratory 2010).

Hydric soil indicators applicable to the Western Mountains, Valleys, and Coast region include, but are not limited to, the presence of organic soils (i.e., histosols or histic epipedons); sulfidic material (i.e., hydrogen sulfide); depleted, gleyed, or reduced soil matrices; and/or the presence of iron or manganese concretions (Environmental Laboratory 2010). Soil color characterization (i.e., hue, value, and chroma) is a critical tool in determining depleted, gleyed, and reduced soil conditions. Soil color was evaluated by comparing soil colors at test plots to standardized color samples in *Munsell Soil Color Charts* (Munsell Color 2000).

Wetland Hydrology

Wetland hydrology is indicated by site conditions that demonstrate the periodic inundation or saturation to the soil surface for a sufficient duration during the total growing season. A *sufficient duration* during the growing season is defined as 14 or more consecutive days of flooding, ponding, or presence of a water table at a depth of 12 inches or less from the soil surface (Environmental Laboratory 2010). The growing season is the period of consecutive frost-free days, or the longest period during which the soil temperature stays above biological zero (41°F), when measured at 12 inches below the soil surface.

Two indicators of biological activity can be used to determine whether the growing season has begun and is ongoing (Environmental Laboratory 2010):

- Occurrence of aboveground growth and development of at least two non-evergreen vascular plant species growing within the wetland. Examples of this growth include the emergence or elongation of leaves on woody plants and the emergence or opening of flowers.

- Soil temperature, which can be measured once during a single site visit, should be at least 41°F or higher at a depth of 12 inches.

For this assessment, onsite hydrologic indicators were examined at the test plots. Hydrologic indicators may include the presence of surface water, standing water in the test pit at a depth of 12 inches or less, saturation in the root zone, watermarks, drift lines, sediment deposits, drainage patterns within wetlands, oxidized rhizospheres surrounding living roots, and water-stained leaves.

Antecedent Precipitation Analysis

Analyzing climatic conditions and local weather patterns are important in the assessment of vegetation, soil conditions, and hydrology for wetland delineations (Environmental Laboratory 1987, 2010), and information on precipitation that precedes a site visit is valuable in helping determine whether conditions observed at a site are reflective of normal rainfall. The NRCS (1997) provides methodology for the analysis of normal environmental conditions using antecedent rainfall measurements. For this method, “normal precipitation” is defined as ranges of normal precipitation or values falling within defined thresholds, in this case, the 30th and 70th percentile thresholds (Sprecher and Warne 2000). These ranges for a particular site are provided by WETS tables, which can be accessed through the NRCS National Water and Climate Center (NRCS 2018) and are calculated using long-term data (30 years) recorded at National Weather Service meteorological stations. USDA WETS tables display monthly average rainfall data (50th percentile) in addition to the upper and lower limits at which there is a 30 percent chance that rainfall will be more or less than the average (30th and 70th percentiles) (NRCS 2017). USDA WETS tables use climatological probabilities and are calculated on the basis of the most recent three decades of data, as factors such as climate change and different recording technologies may alter probabilities (Sprecher and Warne 2000). Currently, the 30-year range from 1981 to 2010 is used. This method makes the assumptions that rainfall is evenly distributed within a month, that antecedent precipitation can be properly evaluated for a 3-month period (i.e., assumes that evapotranspiration is the same in each season), that antecedent precipitation affects different systems similarly, and that snowmelt has the same contribution to hydrology as rainfall (Sprecher and Warne 2000).

To determine whether recent precipitation is reflective of normal precipitation, a representative weather station near the site is selected; as other conditions may affect precipitation (e.g., elevation, aspect, and proximity to mountains), the nearest station may not be the most representative of the site (Environmental Laboratory 2010). The procedure for determining normal precipitation uses measured rainfall data from the 3 months prior to the month of the site visit. For example, if the site visit occurs in September, precipitation data from June, July, and August would be analyzed. The recorded rainfall of each month is first compared to the long term range of normal precipitation (30th and 70th percentiles) and is determined to have a "normal" condition if it falls within this range; if the recorded data is higher or lower than the range, then it is determined to have a "wet" or "dry" condition, respectively. The condition is then given a value, "1" for "dry," "2" for "normal," and "3" for "wet." This value is multiplied by the weighted monthly value, where the most recent month (one month prior) is weighted "3," the next most recent month is weighted "2," and the third most recent (3 months prior) is rated "1." The sum of these products is then used to determine whether the entire 3-month period is "drier than normal" (6–9), "normal" (10–14) or "wetter than normal" (15–18). While this method is useful for comparing a short-term time period to normal, this method is limited in that it discounts analysis of daily precipitation patterns within a given month (Sprecher and Warne 2000; Sumner et al. 2009).

Fish and Wildlife Habitat Conservation Area Delineation Methods

The OHWMs of streams within the study area were delineated using the definition provided in the WAC, Section 222-16-010. According to this definition, the OHWM of streams is "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." In addition, methods in the publication *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson et al. 2016) were applied.

To delineate the OHWM, the bed and adjacent banks of streams in the study area were examined for indications of regular high water events. Factors considered when assessing changes in vegetation include:

- Scour (removal of vegetation and exposure of gravel, sand, or other soil substrate)
- Drainage patterns
- Elevation of floodplain benches
- Changes in sediment texture across the floodplain
- Sediment layering
- Sediment or vegetation deposition
- Changes in vegetation communities across the floodplain

Herrera biologists placed blue pin flags on the site, indicating the horizontal and vertical location of the OHWM along the streams. In addition, biologists hung a white flag with blue dots on vegetation above this pin flag, in order to provide a more visible marking for those subsequently surveying/observing flags. The flag locations were subsequently surveyed by 1 Alliance Geomatics, LLC.

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APPENDIX C

Wetland Delineation Data Forms

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 30-Mar-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W83-SP1**

Investigator(s): DR, ES, LD, JH **Section, Township, Range:** **S** 8 **T** 29N **R** 4E

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** none **Slope:** 0.0 **%** / 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.233248 **Long.:** -122.327143 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?**	Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )		
Wetland Hydrology Present?	Yes (●) No ( )		

Remarks:
All 3 wetland parameters are met. PSS pit.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size: 2m rad)			
1. Spiraea douglasii	40	☑ 72.7%	FACW
2. Rubus armeniacus	15	☑ 27.3%	FAC
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	55	**= Total Cover**	
Herb Stratum (Plot size: 1m rad)			
1. Phalaris arundinacea	60	☑ 80.0%	FACW
2. Poa abbreviata	10	☐ 13.3%	FACU
3. Ranunculus repens	5	☐ 6.7%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	75	**= Total Cover**	
Woody Vine Stratum (Plot size: 1m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 25

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:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	20	x 3 =	60
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	130 (A)		300 (B)

Prevalence Index = B/A = 2.308

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Vegetation meets dominance test and prevelance index.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W83-SP1

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR	3/2	100						gravely silt/silt loam	
3-17	10YR	4/1	60	5YR	4/4	40	C	M	Silty 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicator F3 is met. Some evidence of past fill at surface and at 10 inches.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	○	◉	
Water Table Present?	◉	○	12
Saturation Present? (includes capillary fringe)	◉	○	0

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Wetland hydrology indicators A2 and A3 are present. Secondary indicator D5 met.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 30-Mar-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W83-SP2**

Investigator(s): DR, ES, LD, JH **Section, Township, Range: S** 8 **T** 29N **R** 04E

Landform (hillslope, terrace, etc.): Roadside **Local relief (concave, convex, none):** None **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.233366 **Long.:** -122.327121 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( ) No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes ( ) No (●)	

Remarks:
Upland pit.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2m rad)				
1. Cytisus scoparius	15	☑	33.3%	UPL
2. Rubus armeniacus	30	☑	66.7%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	45	= Total Cover		
Herb Stratum (Plot size: 1m rad)				
1. Tanacetum vulgare	60	☑	85.7%	FACU
2. Phalaris arundinacea	5	☐	7.1%	FACW
3. Poa abbreviata	5	☐	7.1%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size: 1m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 30

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:	33.3%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	30	x 3 =	90
FACU species	65	x 4 =	260
UPL species	15	x 5 =	75
Column Totals:	115 (A)		435 (B)

Prevalence Index = B/A = 3.783

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:
No hydrophytic vegetation indicators are met.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W83-SP2

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	2.5Y	4/1	90	10YR	3/6	10	C	M	Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicator F3 is met.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	○	◉	
Water Table Present?	○	◉	
Saturation Present? (includes capillary fringe)	○	◉	

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks:

No hydology indicators present.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 31-Mar-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W83-SP3**

Investigator(s): LD, JH, RP, JL **Section, Township, Range:** **S** 8 **T** 29N **R** 04E

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** concave **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR A **Lat.:** 47.23015 **Long.:** -122.32733 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:
All 3 wetland parameters are met. PFO wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)			
1. Populus balsamifera	80	☑ 100.0%	FAC
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2 m rad)			
1. Cornus alba	20	☑ 90.9%	FACW
2. Rubus armeniacus	2	☐ 9.1%	FAC
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	22	= Total Cover	
Herb Stratum (Plot size: 1 m rad)			
1. Epilobium ciliatum	1	☐ 100.0%	FACW
2.		☐ 0.0%	
3.		☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	1	= Total Cover	
Woody Vine Stratum (Plot size: 1m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 99

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:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	21	x 2 =	42
FAC species	82	x 3 =	246
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	103 (A)		288 (B)

Prevalence Index = B/A = 2.796

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Vegetation meets dominance test, and prevalence index.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W83-SP3

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR	3/2	100						Silt Loam	
7-16	10YR	3/2	60	5YR	4/6	40	C	M	Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicator F6 is met.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 5
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 3

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Wetland hydrology indicators A2 and A3 are present.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 31-Mar-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W83-SP4**

Investigator(s): LD, RP **Section, Township, Range:** **S** 8 **T** 29N **R** 4E

Landform (hillslope, terrace, etc.): Flat, lowland **Local relief (concave, convex, none):** depression **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.22981 **Long.:** -122.327609 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☑ **, Soil** ☑ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:
All 3 wetland parameters are met. Former ag field, history of manipulated vegetation and tilled soils.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover		Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	**= Total Cover**		
Sapling/Shrub Stratum (Plot size: 2m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0	**= Total Cover**		
Herb Stratum (Plot size: 1 m rad)				
1. Phalaris arundinacea	85	☑	100.0%	FACW
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	85	**= Total Cover**		
Woody Vine Stratum (Plot size: 1m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	**= Total Cover**		

% Bare Ground in Herb Stratum: 15

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:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	85	x 2 =	170
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		170 (B)

Prevalence Index = B/A = 2.000

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
vegetation meets rapid test for hydrophytic vegetation, dominance test, and prevalence index.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W83-SP4

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2										Organic root matter
2-16	10YR	3/2	75	5YR	4/4	25	C	M	Silty Clay Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Clay

Depth (inches): 16

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicators A4 and F6 are met. Restrictive layer at 16".

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 1
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Wetland hydrology indicators A2 and A3 are met. Secondary indicator D5 is met. Surface water present 2 feet from the soil pit.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 01-Apr-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W83-SP5**

Investigator(s): JL, LD **Section, Township, Range:** **S** 17 **T** 29N **R** 4E

Landform (hillslope, terrace, etc.): Ditch **Local relief (concave, convex, none):** concave **Slope:** 0.0 **%** / 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.224596 **Long.:** -122.32584 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☑ **, Soil** ☑ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?**	Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )		
Wetland Hydrology Present?	Yes (●) No ( )		

Remarks:
All 3 wetland parameters are met. Soil pit is located in agricultural field with history of manipulated vegetation and tilled soils. PEM pit in ditch extending from larger wetland complex.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size: 1m rad)			
1. Ranunculus repens	15	☑ 75.0%	FAC
2. Epilobium ciliatum	1	☐ 5.0%	FACW
3. Cardamine oligosperma	2	☐ 10.0%	FAC
4. Rumex acetosa	2	☐ 10.0%	FAC
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	20	= Total Cover	
Woody Vine Stratum (Plot size: 1m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 80

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:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	1	x 2 =	2
FAC species	19	x 3 =	57
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	20 (A)		59 (B)

Prevalence Index = B/A = 2.950

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Vegetation meets dominance test, and prevalence index.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W83-SP5

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR	3/2	100						Silt Loam	
8-16	10YR	4/2	65	7.5YR	4/6	35	C	M	Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicator F3 is met.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 10

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Wetland hydrology indicator A3 is met.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 01-Apr-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W83-SP6**

Investigator(s): JL, LD **Section, Township, Range:** **S** 17 **T** 29N **R** 04E

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** none **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.224596 **Long.:** -122.32584 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☑ **, Soil** ☑ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Hydric Soil Present?	Yes ( ) No (●)	
Wetland Hydrology Present?	Yes ( ) No (●)	

Remarks:
UPL pit is ag field adjacent to wetland ditch. Soil pit is located in agricultural field with history of manipulated vegetation and tilled soils.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2 m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 1m rad)				
1. Cardamine oligosperma	80	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	80	= Total Cover		
Woody Vine Stratum (Plot size: 1m rad)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 20

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:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	80	x 3 =	240
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		240 (B)

Prevalence Index = B/A = 3.000

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Vegetation meets dominance test, and prevalence index.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W83-SP6

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR	3/2	100						Silt Loam	Highly compacted below 11"

[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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

Hydric soil indicators are not present.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks:

Wetland hydrology is not present.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 01-Apr-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W83-SP7**

Investigator(s): ES, JH **Section, Township, Range:** **S** 8 **T** 29N **R** 4E

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** none **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.229314 **Long.:** -122.326679 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation [x] **, Soil** [x] **, or Hydrology** [ ] **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

Are Vegetation [ ] **, Soil** [ ] **, or Hydrology** [ ] **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( ) No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Hydric Soil Present?	Yes ( ) No (●)	
Wetland Hydrology Present?	Yes ( ) No (●)	

Remarks:
Soil pit is located in former agricultural field with history of manipulated vegetation and tilled soils.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)				
1.	0	[ ]	0.0%	
2.	0	[ ]	0.0%	
3.	0	[ ]	0.0%	
4.	0	[ ]	0.0%	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 2m rad)				
1.	0	[ ]	0.0%	
2.	0	[ ]	0.0%	
3.	0	[ ]	0.0%	
4.	0	[ ]	0.0%	
5.	0	[ ]	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size: 1m rad)				
1. Chamerion angustifolium ssp. circumvagum	15	[ ]	14.3%	FACU
2. Trifolium albopurpureum	90	[x]	85.7%	FACU
3.	0	[ ]	0.0%	
4.	0	[ ]	0.0%	
5.	0	[ ]	0.0%	
6.	0	[ ]	0.0%	
7.	0	[ ]	0.0%	
8.	0	[ ]	0.0%	
9.	0	[ ]	0.0%	
10.	0	[ ]	0.0%	
11.	0	[ ]	0.0%	
	105	= Total Cover		
Woody Vine Stratum (Plot size: 1m rad)				
1.	0	[ ]	0.0%	
2.	0	[ ]	0.0%	
	0	= Total Cover		

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	0.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	105	x 4 =	420
UPL species	0	x 5 =	0
Column Totals:	105 (A)		420 (B)

Prevalence Index = B/A = 4.000

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:
No hydrophytic vegetation indicators are met.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W83-SP7

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR	3/2	100						Silt Loam	
12-18	10YR	3/4	90	7.45YR	4/6	10	C	M	Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

Hydric soil indicators are not present

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches): 14

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks:

Saturation is present at 14 inches. Wetland hydrology indicators are not present.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 06-Apr-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** **W86-SP1**

Investigator(s): JH, ES **Section, Township, Range: S** 17 **T** 29N **R** 04E

Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** Convex **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR A **Lat.:** 47.224347 **Long.:** -122.327418 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Hydric Soil Present?	Yes (●) No ( )	
Wetland Hydrology Present?	Yes (●) No ( )	

Remarks:
All 3 wetland parameters are met. Test pit is approximately 100 feet south of stockpile, approximately 50 feet north of the sidewalk.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)			
1. Populus balsamifera	15	☑ 100.0%	FAC
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2 m rad)			
1. Rubus armeniacus	15	☑ 100.0%	FAC
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	15	= Total Cover	
Herb Stratum (Plot size: 1 m rad)			
1. Phalaris arundinacea	90	☑ 100.0%	FACW
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	90	= Total Cover	
Woody Vine Stratum (Plot size: 1 m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= 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:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	120 (A)		270 (B)

Prevalence Index = B/A = 2.250

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Vegetation meets the domiinance test and prevalence index.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W86-SP1

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR	3/2	100						Silt Loam	Roots present in the top 2 inches
2-14	10YR	4/1	75	10YR	4/6	25	C	M	Silt 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 Muck Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except in MLRA 1)
- [ ] Loamy Gleyed Matrix (F2)
- [x] 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)
- [ ] Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

Hydric soil indicator F3 is met.

Hydrology

Wetland Hydrology Indicators:

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

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on 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 (minimum of two required)

- [x] Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- [ ] Drainage Patterns (B10)
- [ ] Dry Season Water Table (C2)
- [ ] Saturation Visible on Aerial 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 (●)	Depth (inches):
Water Table Present?	Yes ( )	No (●)	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ( )	No (●)	Depth (inches):

Wetland Hydrology Present? Yes (●) No ( )

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

Remarks:

Secondary hydrology indicators B9, D2, and D5 are present. Soils are damp but not saturated.

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

Project/Site: SR 167 Stage 2 **City/County:** Fife/Pierce **Sampling Date:** 06-Apr-21

Applicant/Owner: WSDOT **State:** WA **Sampling Point:** W86-SP2

Investigator(s): JH, ES **Section, Township, Range:** S 17 T 29N R 04E

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** None **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR A **Lat.:** 47.224414 **Long.:** -122.326343 **Datum:** NAD 1983 H

Soil Map Unit Name: Sultan silt loam **NWI classification:** None

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes (●) No ( )

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

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●) No ( )	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Hydric Soil Present?	Yes ( ) No (●)	
Wetland Hydrology Present?	Yes ( ) No (●)	

Remarks:
Evidence of active human encampment (trash, carpet).

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 3 m rad)			
1. Salix babylonica	10	☑ 100.0%	FACW
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2 m rad)			
1. Rubus armeniacus	80	☑ 100.0%	FAC
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	80	= Total Cover	
Herb Stratum (Plot size: 1 m rad)			
1. Phalaris arundinacea	5	☑ 38.5%	FACW
2. Epilobium anagallidifolium	5	☑ 38.5%	FACU
3. Trifolium pratense	3	☑ 23.1%	FACU
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	13	= Total Cover	
Woody Vine Stratum (Plot size: 1 m rad)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 90

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:	60.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	80	x 3 =	240
FACU species	8	x 4 =	32
UPL species	0	x 5 =	0
Column Totals:	103 (A)		302 (B)

Prevalence Index = B/A = 2.932

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:
Vegetation meets the dominance test and prevalence index. Salix looks like ornamental species planted at edge of agricultural field.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: W86-SP2

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

Depth (inches)	Matrix Color (moist)		Matrix %	Redox Features Color (moist)		Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR	3/2	100						Silt 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 Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

No soil indicators met.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on 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 (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks:

No hydology indicators present.

APPENDIX D

Wetland Rating Forms

RATING SUMMARY – Western Washington

Name of wetland (or ID #): SR 167 Completion Project – Wetland 83 Date of site visit: 3/30/2021, 3/31/2021, 4/1/2021

Rated by J. LeClerc Trained by Ecology? ☒ Yes ☐ No Date of Training Oct. 2019

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Yes ☒ No

Additional HGM Classes (*if multiple*): n/a

Source of base aerial photo/map ESRI Aerial, 2020

OVERALL WETLAND CATEGORY: III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

Category III – Total score = 16 – 19

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Enter the appropriate ratings				
Site Potential	M	L	M	
Landscape Potential	M	H	L	
Value	M	H	M	**TOTAL**
Score Based on Ratings	6	7	5	18

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	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

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	D-7
Hydroperiods and location of outlets	D 1.4, H 1.2, D 1.1, D 4.1	D-8
Flow directions and associated features	n/a	D-8a
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	D-8
Map of the contributing basin	D 4.3, D 5.3	D-9
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-10
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	D-5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	D-6

DEPRESSIONAL AND FLATS WETLANDS **Water Quality Functions** – Indicators that the site functions to improve water quality	
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland has a highly constricted permanently flowing outlet | points = 2	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area | points = 5	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > 1/4 total area of wetland | points = 2	2
Total for D 1 — Add the points in the boxes above (F9 key)	9
Rating of Site Potential — If score is: 6–11 = M — *Record the rating on the first page*	
D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1	1
D 2.2. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
D 2.3. Are there septic systems within 250 ft of the wetland? No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1–D 2.3? Source: No = 0	0
Total for D 2 — Add the points in the boxes above	2
Rating of Landscape Potential — If score is: 1 or 2 = M — *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? No = 0	0
D 3.2. Is the wetland in a basin or subbasin where an aquatic resource is on the 303(d) list? Yes = 1	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? No = 0	0
Total for D 3 — Add the points in the boxes above	1
Rating of Value — If score is: 1 = M — *Record the rating on the first page*	
COMMENTS:	

Hydrologic Functions – Indicators that the site functions to reduce flooding and stream degradation	
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland has a highly constricted permanently flowing outlet | points = 2	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks are at least 0.5 ft to <2 ft from surface or bottom of outlet | points = 3	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is more than 100 times the area of the unit | points = 0	0
Total for D 4 — Add the points in the boxes above	5
Rating of Site Potential — If score is: 0–5 = L — *Record the rating on the first page*	
D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1	1
Total for D 5 — Add the points in the boxes above	3
Rating of Landscape Potential — If score is: 3 = H — *Record the rating on the first page*	

Wetland name or number: Wetland 83

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. <u>The unit is in a landscape that has flooding problems</u>. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. <u>Choose the highest score if more than one condition is met</u>.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): Flooding occurs in a subbasin that is immediately down-gradient of unit | points = 2 **If not applicable chosen above:** Choose an item. **Explanation for 0 points (if required above):**	2
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for D 6 — Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

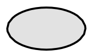
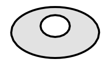
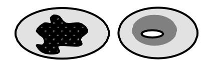
These questions apply to wetlands of all HGM classes.

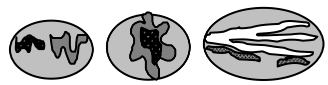
HABITAT FUNCTIONS – Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☐ Occasionally flooded or inundated ☒ 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**	3 types present | points = 2 **2 points** **2 points**	2
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

H 1.4. Interspersion of habitats — **2**

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* Moderate | points = 2

None = 0 points  **Low** = 1 point  **Moderate** = 2 points 

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

H 1.5. Special habitat features: — **3**

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).
☒ Standing snags (dbh >4 in) within the wetland
☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)
☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1 — Add the points in the boxes above — **13**

Rating of Site Potential If score is: 7–14 = M *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — **0**

Calculate: % undisturbed habitat 0 **+** [(% moderate and low intensity land uses)0/2] 0 **= 0.0**%

If total accessible habitat is: <10% of 1 km Polygon | points = 0

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — **1**

Calculate: % undisturbed habitat 15.6**+** [(% moderate and low intensity land uses)15.2/2] 7.6 **= 23.2**%

Undisturbed habitat 10–50% and >3 patches | points = 1

H 2.3. Land use intensity in 1 km Polygon: **70.9%** — **-2**

>50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2 — Add the points in the boxes above — **-1**

Rating of Landscape Potential If score is: < 1 = L *Record the rating on the first page*

Wetland name or number: Wetland 83

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* WDFW Priority Habitats within 100 m: ☐ Aspen Stands ☐ Biodiversity Areas and Corridors ☐ Herbaceous Balds ☐ Old Growth/Mature Forests ☐ Oregon White Oak ☒ Riparian ☐ Westside Prairies ☒ Instream ☐ Nearshore ☐ Caves ☐ Cliffs ☐ Talus ☐ Snags and Logs (*<u>Priority habitats listed by WDFW</u>: For complete descriptions of WDFW priority habitats, and the counties in which they can be found, see: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington,* <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>, *or access the list from here:* <https://wdfw.wa.gov/species-habitats/at-risk/phs/list>.) Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (checked above) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (checked above) points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS: Qualifying snags and logs were present in the forested portion of the wetland, but not outside of wetland within 100m.

Legend

Stream

Delineated wetland boundary

Cowardin class

PEM - Palustrine emergent

PFO - Palustrine forested

PSS - Palustrine scrub-shrub

Figure D-7.
Cowardin Classes for Wetland 83.

N

0 200 400 800 Feet

HERRERA

ESRI, Aerial (2020)

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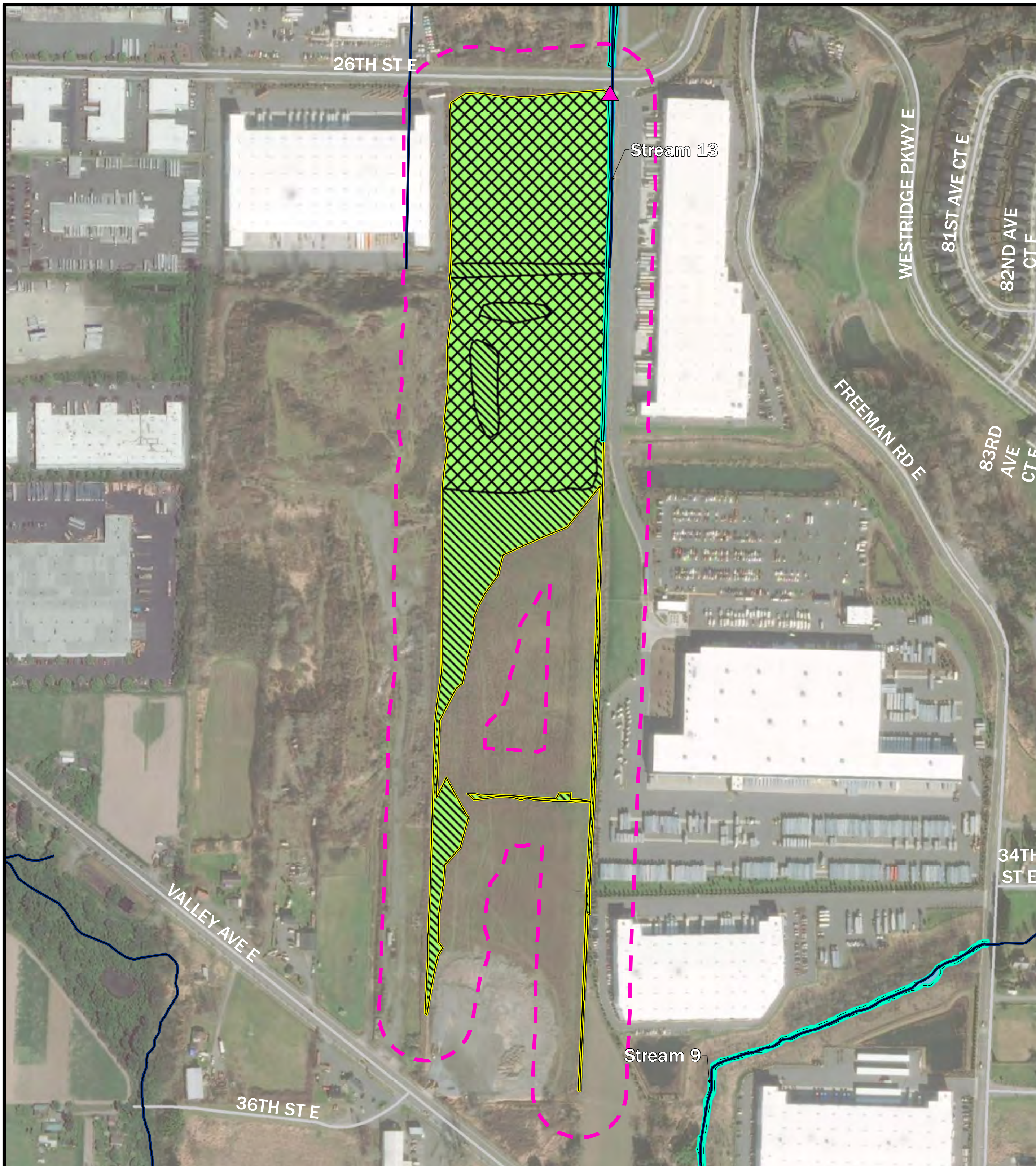

Legend

- Streams (Pierce County 2021)
- Delineated wetland boundary
- Delineated OHWM
- Estimated OHWM
- Wetland
- Stream
- 150ft boundary
- Outlet

Hydroperiod

- Permanently flowing stream
- Saturated only
- Seasonally flooded

Figure D-8.
Hydroperiod, 150-Foot Boundary, and Location of Outlets for Wetland 83.

N

0 225 450 900 Feet

HERRERA

ESRI, Aerial (2021)

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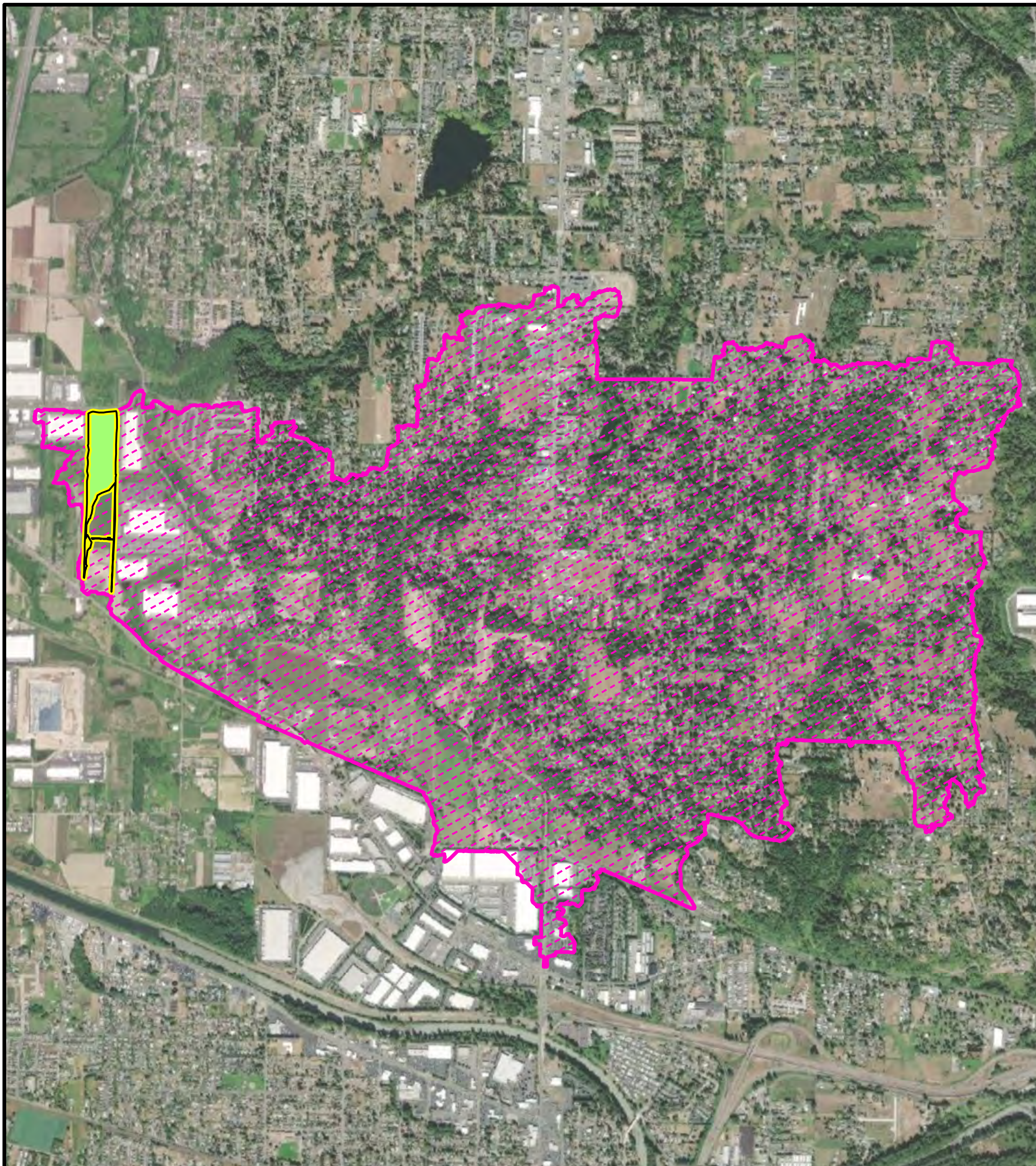
Figure D-8a.
Flow Directions and Features Associated with Wetland 83.



Legend

Contributing basin

Wetland

Delineated wetland boundary

Figure D-9.
Map of Contributing Basin for Wetland 83.

0 1,250 2,500 5,000 Feet

HERRERA

Esri, Aerial (2021)

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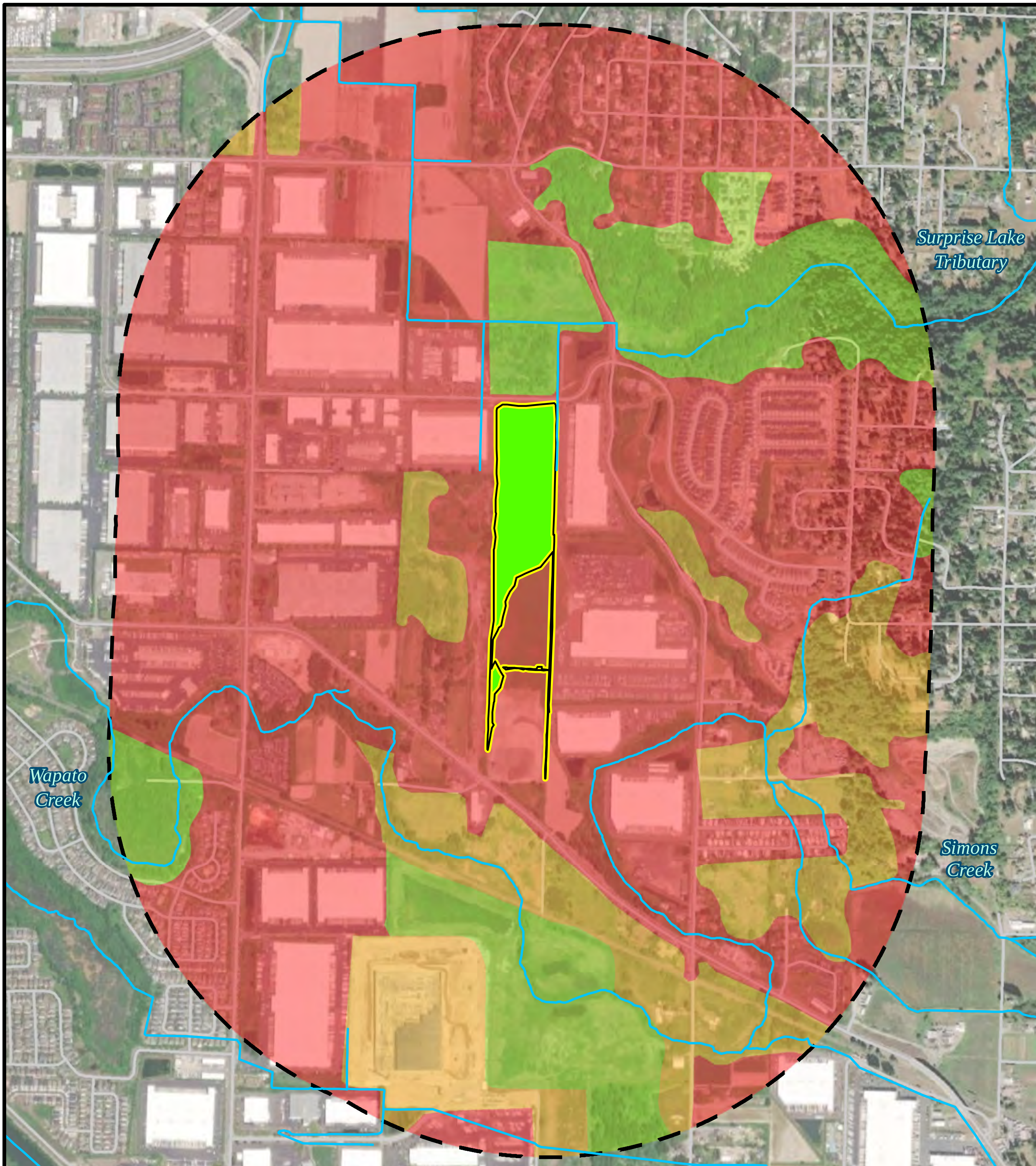

Legend

Delineated wetland boundary
1-km boundary
Wetland
Stream (Pierce County)

Habitat type
High intensity
Low/Moderate Intensity
Relatively undisturbed

Figure D-10.
Habitat Within a 1-km Boundary of Wetland 83.

N

0 600 1,200 2,400 Feet

HERRERA

Esri, Aerial (2021)

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RATING SUMMARY – Western Washington

Name of wetland (or ID #): SR 167 Completion Project – Wetland 86 Date of site visit: 4/6/2021

Rated by J. LeClerc Trained by Ecology? ☒ Yes ☐ No Date of Training Oct. 2019

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Yes ☒ No

Additional HGM Classes (*if multiple*): n/a

Source of base aerial photo/map ESRI Aerial, 2020

OVERALL WETLAND CATEGORY: III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

Category III – Total score = 16 – 19

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Enter the appropriate ratings				
Site Potential	M	M	L	
Landscape Potential	M	M	L	
Value	M	H	L	**TOTAL**
Score Based on Ratings	6	7	3	16

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	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	**X**

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	D-11
Hydroperiods and location of outlets	D 1.4, H 1.2, D 1.1, D 4.1	D-12
Flow directions and associated features	n/a	D-12a
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	D-12
Map of the contributing basin	D 4.3, D 5.3	D-13
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-14
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	D-5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	D-6

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet) | points = 3	3
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area | points = 5	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > 1/4 total area of wetland | points = 2	2
Total for D 1 — Add the points in the boxes above (F9 key)	10
Rating of Site Potential — If score is: 6–11 = M — *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? No = 0	0
D 2.2. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
D 2.3. Are there septic systems within 250 ft of the wetland? No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1–D 2.3? Source: encampment activity Yes = 1	1
Total for D 2 — Add the points in the boxes above	2
Rating of Landscape Potential — If score is: 1 or 2 = M — *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? No = 0	0
D 3.2. Is the wetland in a basin or subbasin where an aquatic resource is on the 303(d) list? Yes = 1	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? No = 0	0
Total for D 3 — Add the points in the boxes above	1
Rating of Value — If score is: 1 = M — *Record the rating on the first page*	
COMMENTS:	

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

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) | points = 4	4
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks are at least 0.5 ft to <2 ft from surface or bottom of outlet | points = 3	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is 10 to 100 times the area of the unit | points = 3	3
Total for D 4 — Add the points in the boxes above	10
Rating of Site Potential — If score is: 6–11 = M — *Record the rating on the first page*	

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?		
D 5.1. Does the wetland receive stormwater discharges?	No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	No = 0	0
Total for D 5	Add the points in the boxes above	1

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

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. <u>The unit is in a landscape that has flooding problems</u>. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. <u>Choose the highest score if more than one condition is met</u>.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): Flooding occurs in a subbasin that is immediately down-gradient of unit | points = 2 **If not applicable chosen above:** Choose an item. **Explanation for 0 points (if required above):**	2
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for D 6 — Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

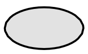
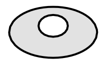
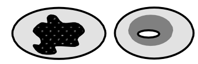
COMMENTS:

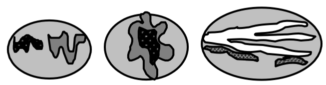
These questions apply to wetlands of all HGM classes.
HABITAT FUNCTIONS – Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☐ Scrub-shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	1 structure | points = 0	0
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☐ Occasionally flooded or inundated ☒ 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**	2 types present | points = 1 **2 points** **2 points**	1

Wetland name or number: Wetland 86

H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. **Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.** If you counted: <5 species | points = 0	0
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* None | points = 0	0

None = 0 points  **Low** = 1 point  **Moderate** = 2 points 

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

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points*. ☐ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long). ☐ Standing snags (dbh >4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 — Add the points in the boxes above	1

Rating of Site Potential — If score is: 0–6 = L — *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate*: % undisturbed habitat 0**+** [(% moderate and low intensity land uses)0/2] 0 **= 0.0**% If total accessible habitat is: <10% of 1 km Polygon | points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate*: % undisturbed habitat 9.6**+** [(% moderate and low intensity land uses)25.1/2] 12.6 **= 22.2**% Undisturbed habitat 10–50% and >3 patches | points = 1	1
H 2.3. Land use intensity in 1 km Polygon: **69.9%** >50% of 1 km Polygon is high intensity land use | points = (-2)	-2
Total for H 2 — Add the points in the boxes above	-1

Rating of Landscape Potential — If score is: < 1 = L — *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* WDFW Priority Habitats within 100 m: ☐ Aspen Stands ☐ Biodiversity Areas and Corridors ☐ Herbaceous Balds ☐ Old Growth/Mature Forests ☐ Oregon White Oak ☐ Riparian ☐ Westside Prairies ☐ Instream ☐ Nearshore ☐ Caves ☐ Cliffs ☐ Talus ☐ Snags and Logs (*Priority habitats listed by WDFW: For complete descriptions of WDFW priority habitats, and the counties in which they can be found, see: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington,* <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>, *or access the list from here:* <https://wdfw.wa.gov/species-habitats/at-risk/phs/list>.) Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (checked above) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (checked above) points = 1 Site does not meet any of the criteria above points = 0	0

Rating of Value If score is: 0 = L *Record the rating on the first page*

Legend

Delineated wetland boundary

Cowardin class

PEM - Palustrine emergent

Figure D-11.
Cowardin Classes for Wetland 86.

N

0 25 50 100 Feet

HERRERA

ESRI, Aerial (2020)

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Legend

Delineated wetland boundary

Wetland

150ft boundary

Hydroperiod

Saturated only

Seasonally flooded

Figure D-12.
Hydroperiod, 150-Foot Boundary, and Location of Outlets for Wetland 86.

0 60 120 240 Feet

HERRERA

ESRI, Aerial (2021)

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Legend

Flow Direction

Estimated ditch centerline

Wetland

Figure D-12a.
Flow Directions and Features Associated with Wetland 86.

N

0 60 120 240 Feet

HERRERA

ESRI, Aerial (2020)

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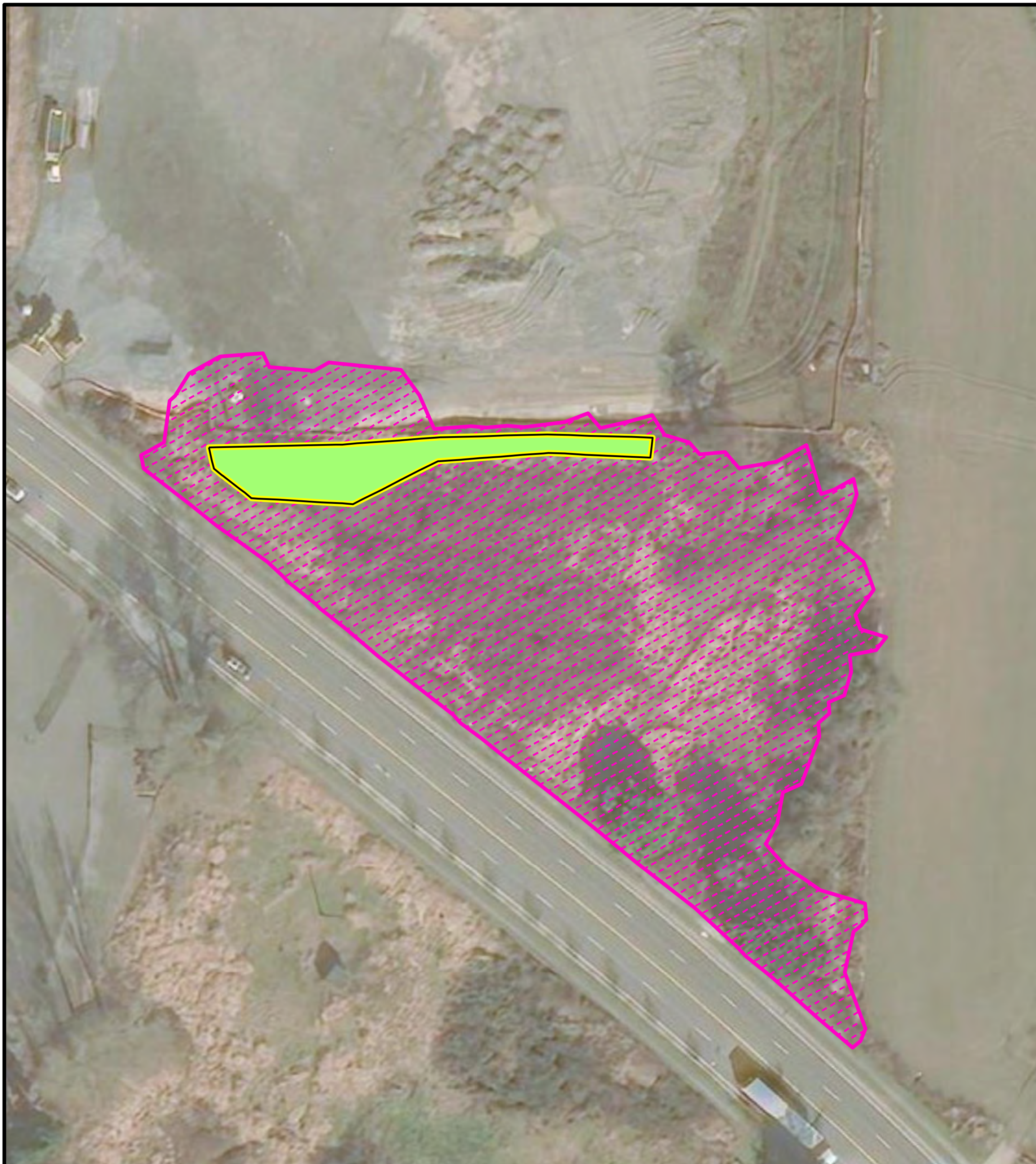

Legend

- Contributing basin
- Wetland
- Delineated wetland boundary

Figure D-13.
Map of Contributing Basin for Wetland 86.

N

0 40 80 160
Feet

HERRERA

Esri, Aerial (2021)

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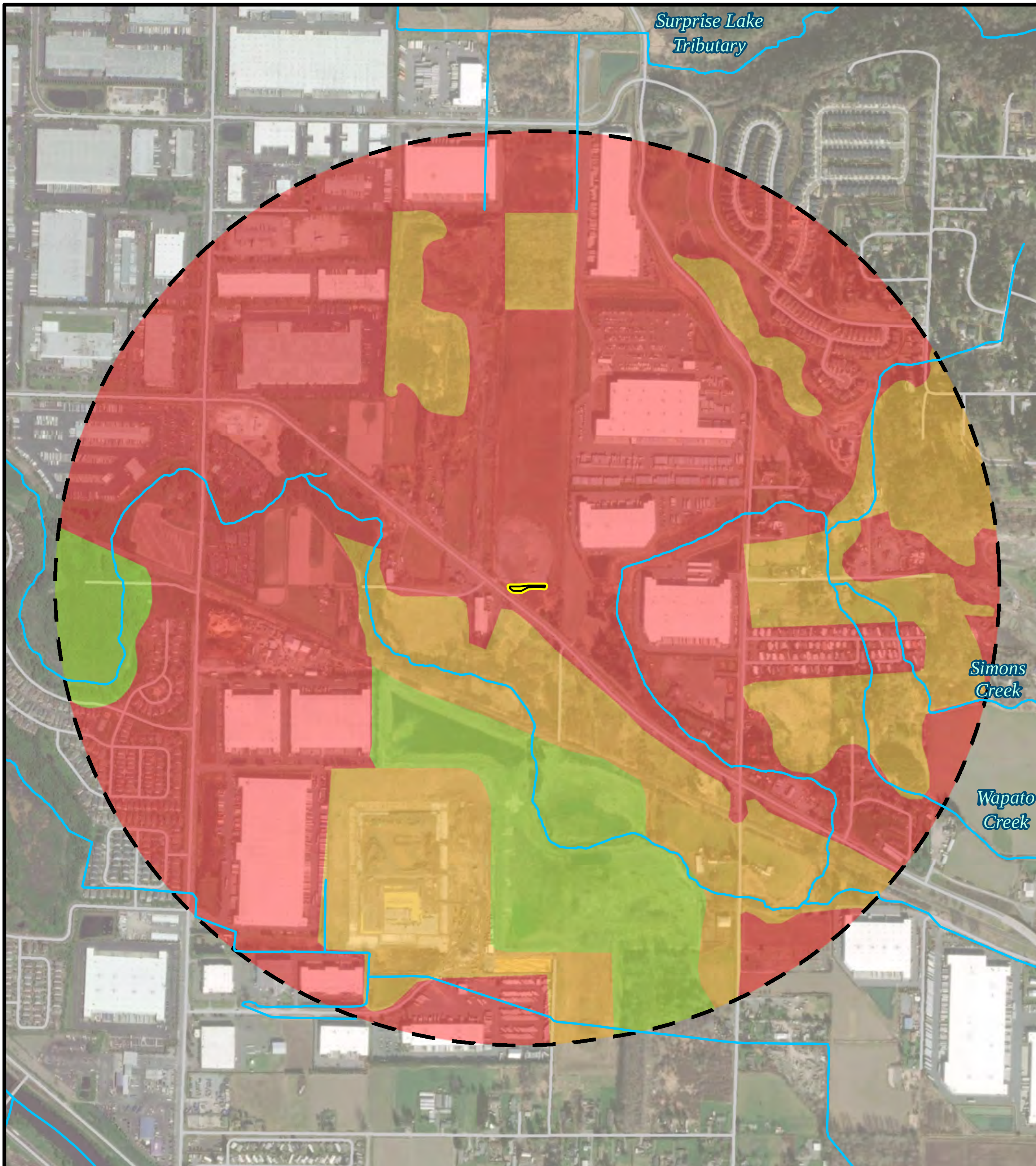

Legend

- Delineated wetland boundary
- 1-km boundary
- Wetland
- Stream (Pierce County)

Habitat type

- High intensity
- Low/Moderate Intensity
- Relatively undisturbed

Figure D-14.
Habitat Within a 1-km Boundary of Wetland 86.

N

0 500 1,000 2,000
Feet

HERRERA

Esri, Aerial (2021)

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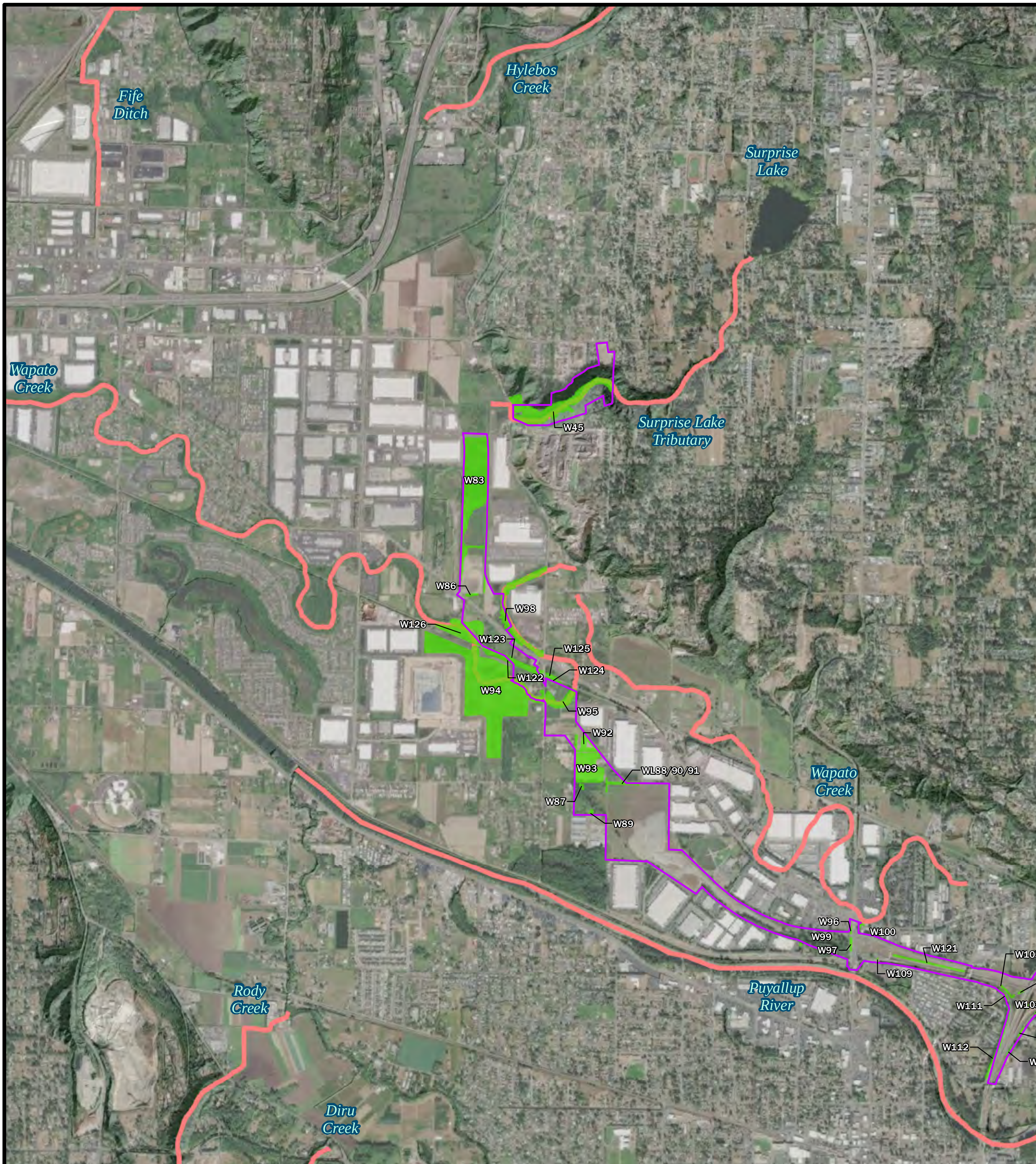

Legend

- Study area
- 303(d) listed waters
- Wetland area

Figure D-5-A.
303(d) Waters in the Vicinity of the Stage 2 Study Area.

0 1,150 2,300 4,600 Feet

HERRERA

Esri Imagery (2021)

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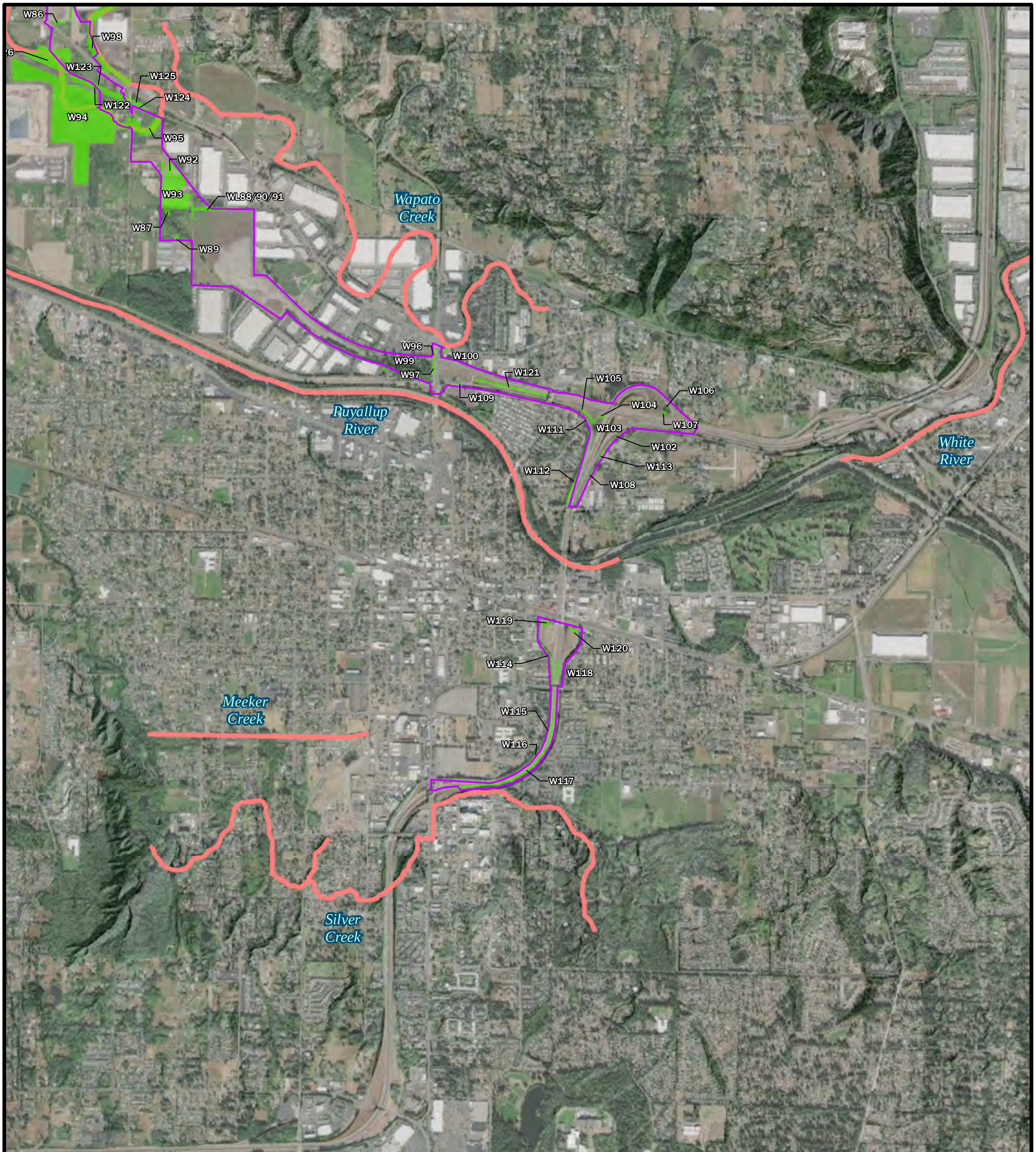

Legend

- Study area
- 303(d) listed waters
- Wetland area

Figure D-5-B.
303(d) Waters in the Vicinity of the Stage 2 Study Area.

0 1,150 2,300 4,600 Feet

HERRERA

Esri Imagery (2021)

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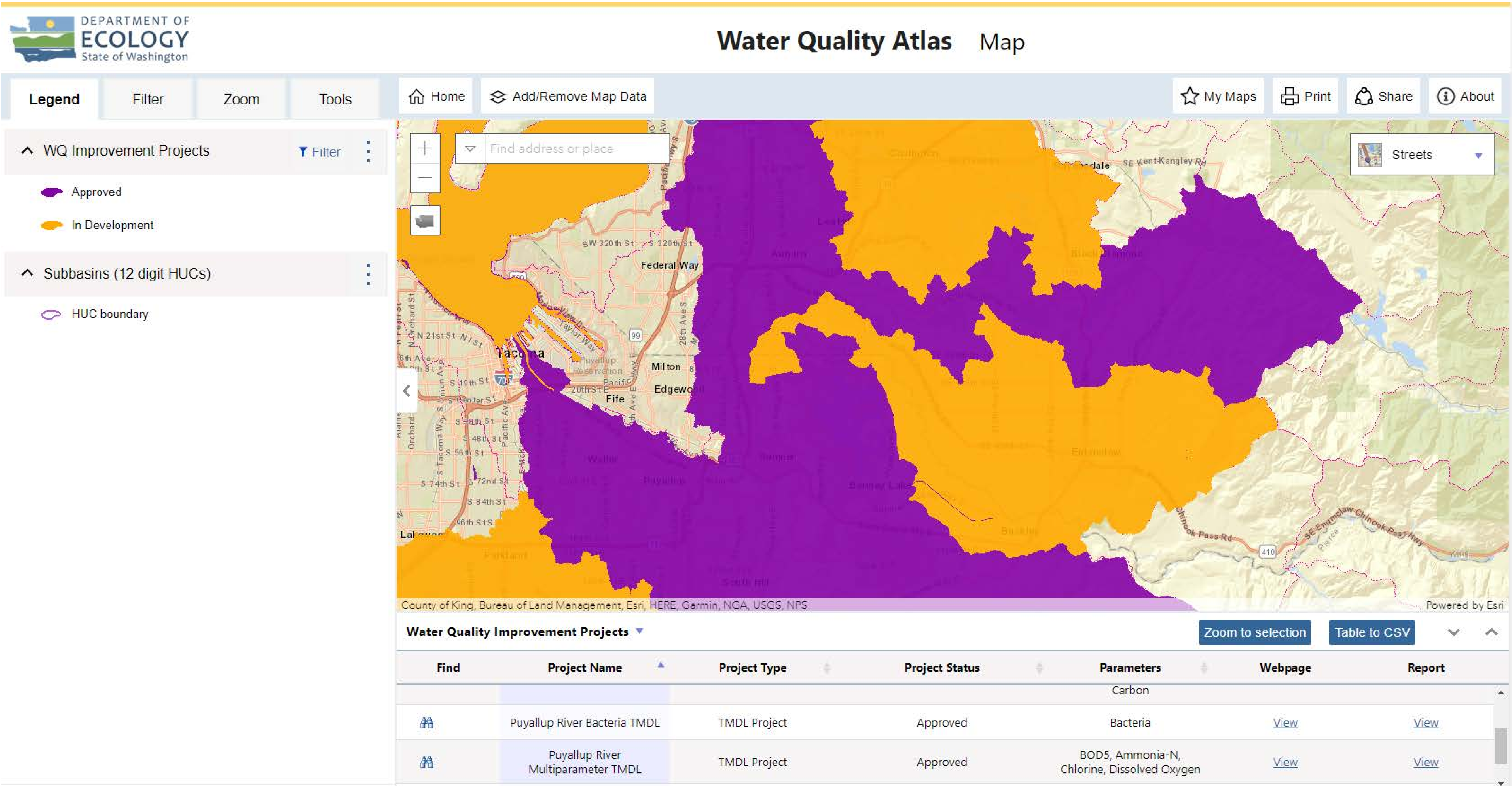
DEPARTMENT OF ECOLOGY State of Washington
Water Quality Atlas Map
Legend
Filter
Zoom
Tools
Home
Add/Remove Map Data
My Maps
Print
Share
About
WQ Improvement Projects
Filter
Approved
In Development
Subbasins (12 digit HUCs)
HUC boundary
Find address or place
Streets
Federal Way
Tacoma
Milton
Edgewood
Fife
County of King, Bureau of Land Management, Esri, HERE, Garmin, NGA, USGS, NPS
Powered by Esri
Water Quality Improvement Projects
Zoom to selection
Table to CSV
Find
Project Name
Project Type
Project Status
Parameters
Webpage
Report
Carbon
Puyallup River Bacteria TMDL
TMDL Project
Approved
Bacteria
View
View
Puyallup River Multiparameter TMDL
TMDL Project
Approved
BOD5, Ammonia-N, Chlorine, Dissolved Oxygen
View
View

Appendix C

Wetland and Stream Impacts Tables

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Table C-1. Wetland Impacts.

Wetland Number	Wetland Local Jurisdiction	Basin	Wetland Category	Cowardin Class	Wetland Size (acre)	Permanent Direct Wetland Impact (acre)	Percent of Wetland Permanently Impacted	Permanent Indirect Wetland Impact: Habitat (acre)	Permanent Indirect Wetland Impact: Isolation (acre)	Permanent Indirect: Shading	Long-Term Temporary Wetland Impact 1–2 years (acre)	Short-Term Temporary Wetland Impact (acre) (< 1 year)
1	Fife	Hylebos Creek	III	PEM	2.30	0.35	15.22%	0.00	0.00	0.00	0.00	2.87
4/48/50	Fife	Hylebos Creek	III	PEM, PSS, PFO	50.09	0.63	1.26%	0.21	0.00	0.00	0.00	0.00
15	Fife	Hylebos Creek	III	PEM	0.61	0.19	31.15%	0.00	0.01	0.00	0.00	0.00
47	Fife	Hylebos Creek	II	PEM, PSS, PFO	20.46	6.28	30.69%	1.32	0.00	0.00	0.65	0.12
53	Fife	Hylebos Creek	III	PEM	9.55	3.65	38.22%	0.04	0.00	0.00	0.00	0.48
54	Fife	Hylebos Creek	II	PEM	2.29	0.10	4.37%	0.00	0.00	0.00	0.00	0.31
55	Fife	Hylebos Creek	III	PEM, PSS	0.20	0.01	5.00%	0.00	0.00	0.00	0.00	0.00
83	Fife	Wapato Creek	III	PEM, PSS, PFO	19.62	8.28	42.20%	0.90	0.00	0.00	3.54	0.68
86	Fife	Hylebos Creek	III	PEM	0.11	0.11	100.00%	0.00	0.00	0.00	0.00	0.00
88/90/91	Puyallup	Puyallup River	II	PEM, PSS	0.49	0.14	28.57%	0.00	0.00	0.00	0.00	0.00
92	Puyallup	Puyallup River	III	PEM	1.56	1.09	69.87%	0.00	0.00	0.00	0.00	0.02
93	Puyallup	Puyallup River	III	PEM	6.81	2.12	31.13%	0.00	0.10	0.00	0.00	0.00
94	Fife	Wapato Creek	II	PEM, PSS, PFO	42.45	0.18	0.42%	0.11	0.00	0.00	0.04	0.00
95	Puyallup	Wapato Creek	III	PEM, PSS, PFO	2.16	0.70	32.41%	0.22	0.00	0.07	0.01	0.02
98	Fife	Wapato Creek	II	PEM, PSS, PFO	4.25	0.18	4.24%	0.76	0.00	0.00	0.00	0.00
104	Pierce County	Puyallup River	III	PEM	0.02	0.00	0.00%	0.00	0.02	0.00	0.00	0.00
105	Pierce County	Puyallup River	III	PEM	0.05	0.04	80.00%	0.00	0.01	0.00	0.00	0.00
109	Pierce County	Puyallup River	III	PEM	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00
122	Fife	Wapato Creek	II	PEM, PSS	1.13	0.10	8.85%	0.11	0.00	0.00	0.18	0.09
123	Fife	Wapato Creek	III	PEM	0.71	0.14	19.72%	0.02	0.00	0.00	0.00	0.14
124	Puyallup	Wapato Creek	III	PEM, PSS	0.26	0.03	11.54%	0.00	0.00	0.00	0.00	0.00
125	Puyallup	Wapato Creek	III	PSS	0.11	0.02	18.18%	0.00	0.00	0.00	0.00	0.00
136	Fife	Hylebos Creek	III	PEM	3.48	0.00	0.00%	0.00	0.00	0.00	0.00	0.01
138	Fife	Hylebos Creek	III	PEM	1.31	0.66	50.38%	0.00	0.00	0.00	0.00	0.00
147	Puyallup	Puyallup River	III	PEM, PSS	0.23	0.05	21.74%	0.00	0.00	0.00	0.00	0.00
Totals					**170.25**	**25.05**	**NA**	**3.69**	**0.14**	**0.07**	**4.42**	**4.74**

Total Perm Fill (cy)	287,575
Total Perm Excav (cy)	1,455
Total Perm Fill (acre)	19.43
Total Perm Excav (acre)	1.00

Total Temp Fill (cy)	2,630
Total Temp Excav (cy)	9,275
Total Temp Fill (acre)	0.39
Total Temp Excav (acre)	7.38

Table C-2. Stream Impacts.							
Stream #	Stream Name	Stream Rating	Local Jurisdiction At Impact Site	Permanent Stream Impact (Acre)	Permanent Stream Impact Length (lf)	Temporary Stream Impact (Acre)	Temporary Stream Impact Length (lf)
1	Surpise Lake Tributary	F	Fife	0.21	696	0.02	92
8	8	N/A	Fife	0.00	5	0.00	4
9	Wapato Creek	Puyallup	Puyallup	0.00	0	0.15	443
11	11	N/A	Fife	0.03	216	0.00	0
12	12	N	Fife	0.00	14	0.00	0
14	14	N/A	Puyallup	0.02	111	0.00	0
15	15	Ns	Puyallup	0.01	31	0.00	0
24	24	NA	Fife	0.02	157	0.00	0
Totals				**0.29**	**1,230**	**0.17**	**539**
				Total Perm Fill (cy)	2,801	Total Temp Fill (cy)	0
				Total Perm Excav (cy)	0	Total Temp Excav (cy)	49
				Total Perm Fill (acre)	0.25	TotTemp Fill (acre)	0
				Total Perm Excav (acre)	0	Total Temp Excav (acre)	0.03

Appendix D

Estimated Post-Construction Mitigation Site Rating Forms and Figures

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Wetland name or number: Upper Surprise Lake Tributary Addition

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Upper Surprise Lake Tributary (Stage 1b), Upper Surprise Lake Tributary Addition (Stage 2) Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes __ No Date of Training 6/14, 10/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? __Yes __No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY I (based on functions ✓ or special characteristics _____)

1. Category of wetland based on FUNCTIONS

Category I – Total score = 23 – 27

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	M	H	
Landscape Potential	H	H	M	
Value	H	H	H	**TOTAL**
Score Based on Ratings	8	8	8	24

Score for each function based on three ratings
(*order of ratings is not important*)
9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	**To answer questions:**	**Figure #**
Cowardin plant classes	H 1.1, H 1.4	D-7
Hydroperiods	H 1.2	D-15
Ponded depressions	R 1.1	D-18
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	D-15
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	D-7
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	D-15
Map of the contributing basin	R 2.2, R 2.3, R 5.2	D-2
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-10
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	D-21

Wetland name or number: Upper Surprise Lake Tributary Addition

HGM Classification of Wetlands in Western Washington

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

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

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

   NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   NO – Go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands*.

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

   ______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ______At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

   ______The wetland is on a slope (*slope can be very gradual*),
   ______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number: Upper Surprise Lake Tributary Addition

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

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

✓ The overbank flooding occurs at least once every 2 years.

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

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

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

NO – Go to 7 **YES** – The wetland class is **Depressional**

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

NO – Go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating

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

Wetland name or number: Upper Surprise Lake Tributary Addition

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 — Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 1	1
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1	1
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? No = 0 **If yes,** other sources:	0
Total for R 2 — Add the points in the boxes above	4

Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) Yes = 2	2
Total for R 3 — Add the points in the boxes above	3

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is 5–<10 | points = 4	4
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 — Add the points in the boxes above	11

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams?	No =1	1
Total for R 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The subbasin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resours (e.g., houses or salmon redds) | points = 2	2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for R 6 — Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

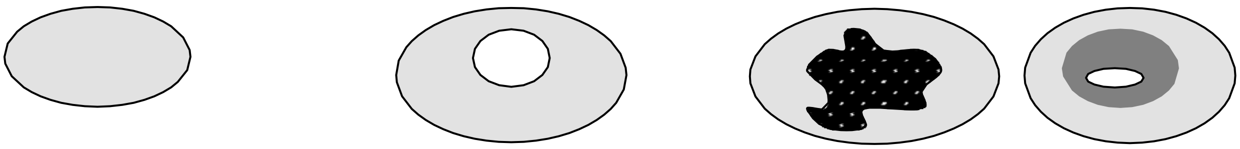
Wetland name or number: Upper Surprise Lake Tributary Addition

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☒ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

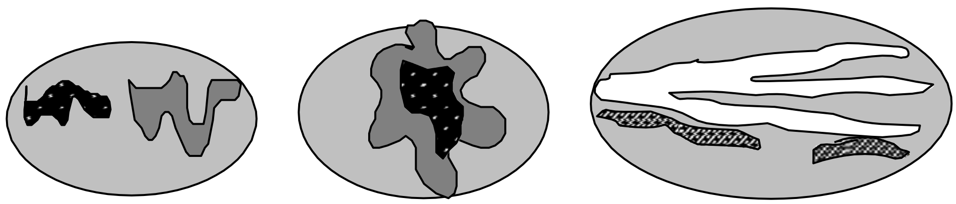
H 1.4. Interspersion of habitats — 3

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

High | points = 3



None = 0 points   **Low** = 1 point   **Moderate** = 2 points



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

H 1.5. Special habitat features: — 5

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).

☒ Standing snags (dbh >4 in) within the wetland

☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)

☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)

☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1	Add the points in the boxes above	17

Rating of Site Potential   If score is: 15–18 = H   *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — 1

Calculate: % undisturbed habitat 12.0 **+** [(% moderate and low intensity land uses)0/2] 0 **= 12**%

If total accessible habitat is:

10–19% of 1 km Polygon | points = 1

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — 2

Calculate: % undisturbed habitat 18.0 **+** [(% moderate and low intensity land uses)/2] 3.0 **= 21**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If **76%** — -2

50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2	Add the points in the boxes above	1

Rating of Landscape Potential   If score is: 1–3 = M   *Record the rating on the first page*

Wetland name or number: Upper Surprise Lake Tributary Addition

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Middle Surprise Lake Tributary (Stage 1b), Middle Surprise Lake Tributary Addition (Stage 2) Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes __ No Date of Training 6/14, 10/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? __ Yes __ No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY I (based on functions ✓ or special characteristics ____)

1. Category of wetland based on FUNCTIONS

Category I – Total score = 23 – 27

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	H	H	
Landscape Potential	H	H	M	
Value	H	H	H	**TOTAL**
Score Based on Ratings	8	9	8	25

Score for each function based on three ratings
(*order of ratings is not important*)
9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Wetland name or number Middle Surprise Lake Tributary Addition

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	D-7
Hydroperiods	H 1.2	D-15
Ponded depressions	R 1.1	D-18
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	D-15
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	D-7
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	D-15
Map of the contributing basin	R 2.2, R 2.3, R 5.2	D-2
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-10
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	D-21

Wetland name or number Middle Surprise Lake Tributary Addition

HGM Classification of Wetlands in Western Washington

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

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

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

   NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe, it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

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

   NO – Go to 3 **YES** – The wetland class is **Flats**
   If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands*.

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

   ______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ______At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

   ______The wetland is on a slope (*slope can be very gradual*),
   ______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number Middle Surprise Lake Tributary Addition

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

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

   ✓ The overbank flooding occurs at least once every 2 years.

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

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

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

   NO – Go to 7 **YES** – The wetland class is **Depressional**

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

   NO – Go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating
Choose an item.

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

Wetland name or number Middle Surprise Lake Tributary Addition

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 1	1
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1	1
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? No = 0 **If yes,** other sources:	0
Total for R 2 Add the points in the boxes above	4

Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) Yes = 2	2
Total for R 3 Add the points in the boxes above	3

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20 | points = 9	9
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 Add the points in the boxes above	16

Rating of Site Potential If score is: 12–16 = H *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	No =1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams?	No = 1	1
Total for R 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

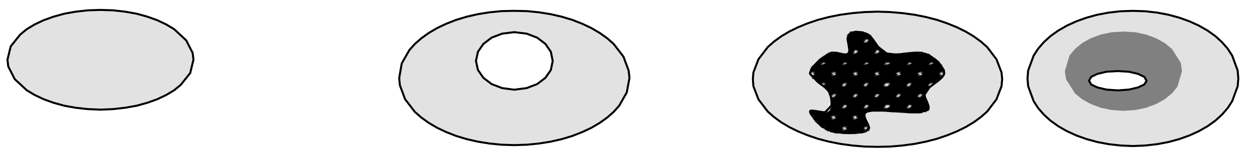
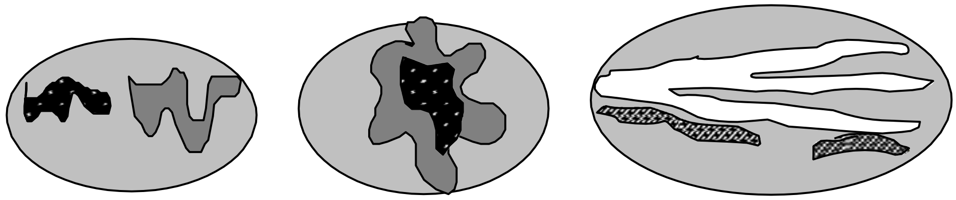
R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The subbasin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resours (e.g., houses or salmon redds) | points = 2	2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for R 6 Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland*. Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac*. *Add the number of structures checked.* ☒ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

Wetland name or number Middle Surprise Lake Tributary Addition

H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.* Choose an item.  **None** = 0 points **Low** = 1 point **Moderate** = 2 points  All three diagrams in this row are **HIGH** = 3 points	3
H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points*. ☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long). ☒ Standing snags (dbh >4 in) within the wetland ☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*) ☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	5
Total for H 1 Add the points in the boxes above	17

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate*: % undisturbed habitat 12.0**+** [(% moderate and low intensity land uses)/2] 0 **= 12.0**% If total accessible habitat is: 10–19% of 1 km Polygon | points = 1	1
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate*: % undisturbed habitat 18.0**+** [(% moderate and low intensity land uses)/2] 3.0 **= 21.0**% Undisturbed habitat 10–50% and in 1–3 patches | points = 2	2
H 2.3. Land use intensity in 1 km Polygon: If 50% of 1 km Polygon is high intensity land use | points = (-2)	-2
Total for H 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: 1–3 = M *Record the rating on the first page*

Wetland name or number Middle Surprise Lake Tributary Addition

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

Wetland name or number Middle Surprise Lake Tributary Addition

WDFW Priority Habitats

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

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

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

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

Wetland name or number Middle Surprise Lake Tributary Addition

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ● The dominant water regime is tidal, ● Vegetated, and ● With a salinity greater than 0.5 ppt Yes: Go to **SC 1.1** No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No: Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ● The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of nonnative plant species. (If nonnative species are *Spartina*, see page 25) ● At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland.	**Cat. I**
● The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes: Go to **SC 2.2** No: Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes: **Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below*. ***If you answer YES, you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

Wetland name or number Middle Surprise Lake Tributary Addition

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES, you will still need to rate the wetland based on its functions.*** ● **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ● **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80–200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes **= Category I** No **= Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in 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, less frequently, rocks ● The lagoon in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon**	**Cat. I**
SC 5.1. 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 on p. 100). ● At least 3/4 of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ● The wetland is larger than 1/10 ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ● Long Beach Peninsula: Lands west of SR 103 ● Grayland-Westport: Lands west of SR 105 ● Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating**	**Cat I**
SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2**	**Cat. II**
SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3**	**Cat. III**
SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number: Lower Surprise Lake Tributary Addition

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Lower Surprise Lake Tributary (Stage 1b), Lower Surprise Lake Tributary Addition (Stage 2)

Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes ___ No Date of Training 6/14, 10/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? ___Yes ___No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY I (based on functions ✓ or special characteristics ______)

1. Category of wetland based on FUNCTIONS

Category I – Total score = 23 – 27

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	H	H	
Landscape Potential	H	H	M	
Value	H	H	H	**TOTAL**
Score Based on Ratings	8	9	8	25

Score for each function based on three ratings

(*order of ratings is not important*)

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Wetland name or number: Lower Surprise Lake Tributary Addition

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	D-6
Hydroperiods	H 1.2	D-14
Ponded depressions	R 1.1	D-18
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	D-14
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	D-6
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	D-14
Map of the contributing basin	R 2.2, R 2.3, R 5.2	D-2
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-10
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	D-21

Wetland name or number: Lower Surprise Lake Tributary Addition

HGM Classification of Wetlands in Western Washington

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

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

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

   NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   NO – Go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands*.

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

   ______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ______At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

   ______The wetland is on a slope (*slope can be very gradual*),
   ______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number: Lower Surprise Lake Tributary Addition

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

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

✓ The overbank flooding occurs at least once every 2 years.

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

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

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

NO – Go to 7 **YES** – The wetland class is **Depressional**

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

NO – Go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating

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

Wetland name or number: Lower Surprise Lake Tributary Addition

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 — Add the points in the boxes above	10

Rating of Site Potential — If score is: 6–11 = M — *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 1	1
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1	1
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? No = 0 **If yes,** other sources:	0
Total for R 2 — Add the points in the boxes above	4

Rating of Landscape Potential — If score is: 3–6 = H — *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) Yes = 2	2
Total for R 3 — Add the points in the boxes above	3

Rating of Value — If score is: 2–4 = H — *Record the rating on the first page*

COMMENTS:

Wetland name or number: Lower Surprise Lake Tributary Addition

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is 5–<10 | points = 4	9
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 Add the points in the boxes above	6

Rating of Site Potential If score is: 12–16 = H *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams?	No = 1	1
Total for R 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The subbasin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resours (e.g., houses or salmon redds) | points = 2	2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for R 6 Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

Wetland name or number: Lower Surprise Lake Tributary Addition

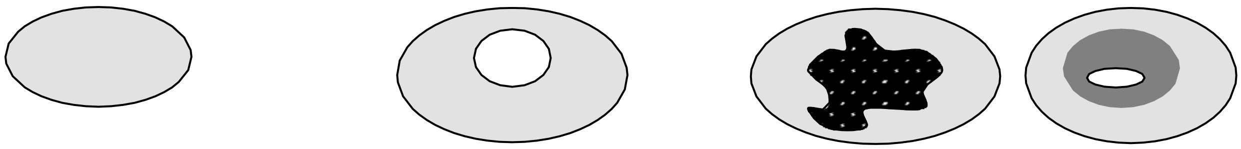
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☒ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

Wetland name or number: Lower Surprise Lake Tributary Addition

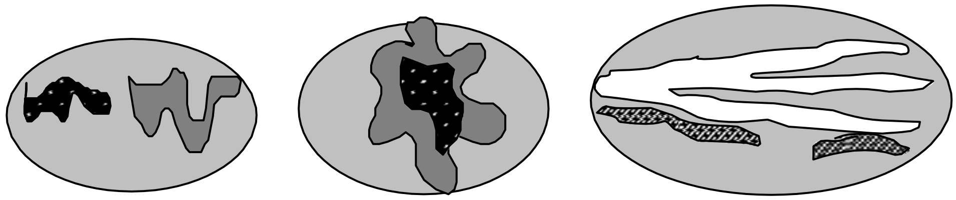
H 1.4. Interspersion of habitats — **3**

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

High | points = 3



None = 0 points **Low** = 1 point **Moderate** = 2 points



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

H 1.5. Special habitat features: — **5**

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).

☒ Standing snags (dbh >4 in) within the wetland

☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)

☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)

☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1	Add the points in the boxes above	17

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — **1**

Calculate: % undisturbed habitat 12.0**+** [(% moderate and low intensity land uses)/2] 0.0 **= 12.0**%

If total accessible habitat is:

10–19% of 1 km Polygon | points = 1

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — **2**

Calculate: % undisturbed habitat 18.0 **+** [(% moderate and low intensity land uses)/2] 3.0 **= 21.0**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If **76%** — **-2**

50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2	Add the points in the boxes above	1

Rating of Landscape Potential If score is: 1–3 = M *Record the rating on the first page*

Wetland name or number: Lower Surprise Lake Tributary Addition

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

Wetland name or number Upper Hylebos North Addition

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Upper Hylebos (Stage 1b), Upper Hylebos Addition (Stage 2), Upper Hylebos North Addition (Stage 2)

Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes __ No Date of Training 6/14, 10/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? __Yes __No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY I (based on functions ✓ or special characteristics _____)

1. Category of wetland based on FUNCTIONS

Category I – Total score = 23 – 27

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	H	H	
Landscape Potential	H	H	L	
Value	H	H	H	**TOTAL**
Score Based on Ratings	8	9	7	24

Score for each function based on three ratings

(*order of ratings is not important*)

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Wetland name or number Upper Hylebos North Addition

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	D-6
Hydroperiods	H 1.2	D-14
Ponded depressions	R 1.1	D-18
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	D-14
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	D-6
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	D-14
Map of the contributing basin	R 2.2, R 2.3, R 5.2	D-2
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-10
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	D-21

Wetland name or number Upper Hylebos North Addition

HGM Classification of Wetlands in Western Washington

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

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

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

   NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   NO – Go to 3 **YES** – The wetland class is **Flats**

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

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

   ______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ______At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

   ______The wetland is on a slope (*slope can be very gradual*),
   ______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number Upper Hylebos North Addition

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

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

   ✓ The overbank flooding occurs at least once every 2 years.

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

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

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

   NO – Go to 7 **YES** – The wetland class is **Depressional**

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

   NO – Go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating
Choose an item.

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

Wetland name or number Upper Hylebos North Addition

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 1	1
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? No = 0	0
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? No = 0 **If yes,** other sources:	0
Total for R 2 Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) Yes = 2	2
Total for R 3 Add the points in the boxes above	3

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

Wetland name or number Upper Hylebos North Addition

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS **Hydrologic Functions** – Indicators that site functions to reduce flooding and stream erosion	
R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20 | points = 9	9
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 Add the points in the boxes above	16

Rating of Site Potential If score is: 12–16 = H *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams?	No = 1	1
Total for R 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The subbasin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resours (e.g., houses or salmon redds) | points = 2	2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for R 6 Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

Wetland name or number Upper Hylebos North Addition

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species.* ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

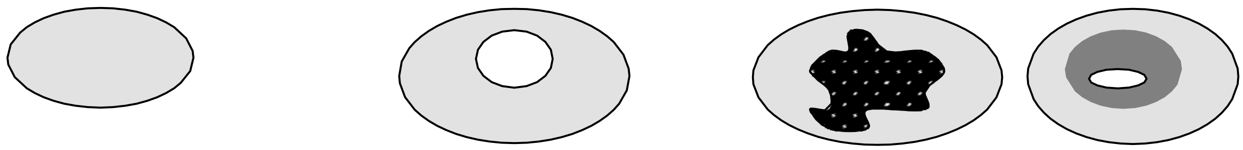
Wetland name or number Upper Hylebos North Addition

H 1.4. Interspersion of habitats

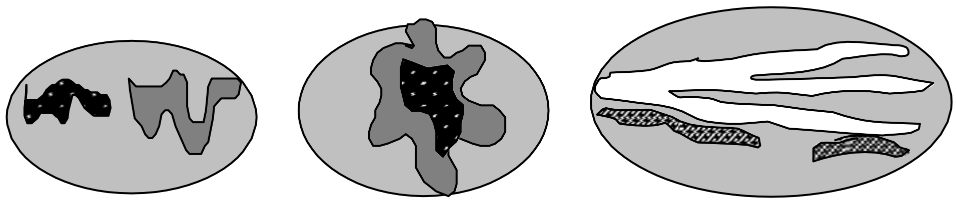
3

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

Choose an item.



None = 0 points **Low** = 1 point **Moderate** = 2 points



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

H 1.5. Special habitat features:

5

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).

☒ Standing snags (dbh >4 in) within the wetland

☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)

☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)

☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1	Add the points in the boxes above	17

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*).

0

Calculate: % undisturbed habitat 7.0 **+** [(% moderate and low intensity land uses)/2] 1.0 **= 8.0**%

If total accessible habitat is:

<10% of 1 km Polygon | points = 0

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland.

2

Calculate: % undisturbed habitat 19.0 **+** [(% moderate and low intensity land uses)/2] 3.5 **= 22.5**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If

-2

50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2	Add the points in the boxes above	0

Rating of Landscape Potential If score is: < 1 = L *Record the rating on the first page*

Wetland name or number Upper Hylebos North Addition

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

WDFW Priority Habitats

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

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

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

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

Wetland name or number Upper Hylebos North Addition

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ● The dominant water regime is tidal, ● Vegetated, and ● With a salinity greater than 0.5 ppt Yes: Go to **SC 1.1** No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No: Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ● The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of nonnative plant species. (If nonnative species are *Spartina*, see page 25) ● At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland. ● The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes: Go to **SC 2.2** No: Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes: **Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below*. ***If you answer YES, you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

Wetland name or number Upper Hylebos North Addition

SC 4.0. Forested Wetlands Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES, you will still need to rate the wetland based on its functions.*** ● **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ● **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80–200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes **= Category I** No **= Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in 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, less frequently, rocks ● The lagoon in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon**	**Cat. I**
SC 5.1. 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 on p. 100). ● At least 3/4 of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ● The wetland is larger than 1/10 ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ● Long Beach Peninsula: Lands west of SR 103 ● Grayland-Westport: Lands west of SR 105 ● Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating**	**Cat I**
SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2**	**Cat. II**
SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3**	**Cat. III**
SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number Lower Hylebos Addition

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Lower Hylebos Addition Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes __ No Date of Training 6/14, 10/18

HGM Class used for rating Depressional Wetland has multiple HGM classes? __Yes __No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY II (based on functions ✓ or special characteristics ____)

1. Category of wetland based on FUNCTIONS

Category II – Total score = 20 – 22

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	M	M	
Landscape Potential	M	H	M	
Value	M	H	H	**TOTAL**
Score Based on Ratings	6	8	7	21

Score for each function based on three ratings

(*order of ratings is not important*)

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Wetland name or number Lower Hylebos Addition

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	D-5
Hydroperiods	D 1.4, H 1.2	D-13
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	D-13
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	D-13
Map of the contributing basin	D 4.3, D 5.3	D-2
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-10
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	D-21

Wetland name or number Lower Hylebos Addition

HGM Classification of Wetlands in Western Washington

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

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

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

   NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

   If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe, it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

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

   NO – Go to 3 **YES** – The wetland class is **Flats**

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

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

   ______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ______At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

   ______The wetland is on a slope (*slope can be very gradual*),
   ______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number Lower Hylebos Addition

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

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

   ______The overbank flooding occurs at least once every 2 years.

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

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

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

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

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

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

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating
Choose an item.

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

Wetland name or number Lower Hylebos Addition

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland has an intermittently flowing stream or ditch | points = 2	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area | points = 5	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > 1/4 total area of wetland | points = 2	2
Total for D 1 Add the points in the boxes above (F9 key)	9

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

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

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

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

Rating of Value If score is: 1 or 2 = M *Record the rating on the first page*

COMMENTS:

Wetland name or number Lower Hylebos Addition

DEPRESSIONAL AND FLATS WETLANDS

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

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland has an intermittently flowing stream or ditch | points = 2	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks are at least 0.5 ft to <2 ft from surface or bottom of outlet | points = 3	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit | points = 5	5
Total for D 4 Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1	1
Total for D 5 Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): Flooding occurs in a subbasin that is immediately down-gradient of unit | points = 2 **If not applicable chosen above:** Choose an item. **Explanation for 0 points (if required above):**	2
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for D 6 Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

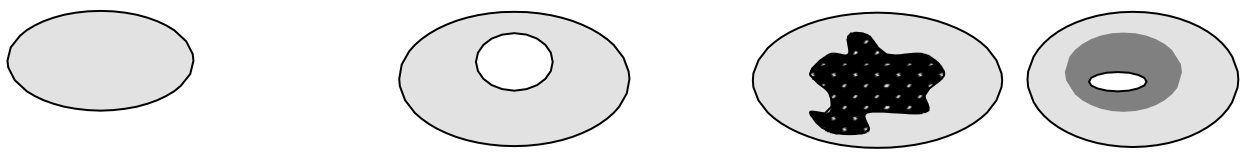
Wetland name or number Lower Hylebos Addition

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☐ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	3 structures | points = 2	3
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☐ Occasionally flooded or inundated ☒ 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**	2 types present | points = 1 **2 points** **2 points**	1
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

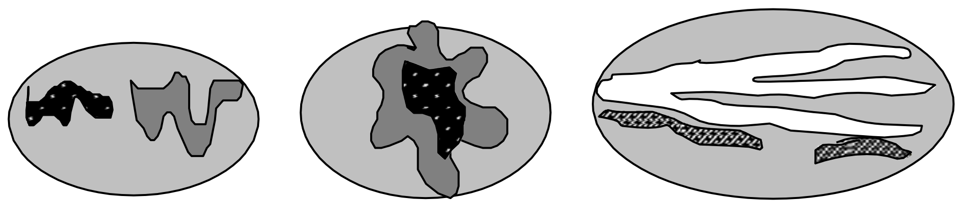
H 1.4. Interspersion of habitats — 3

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

Choose an item.



None = 0 points **Low** = 1 point **Moderate** = 2 points



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

H 1.5. Special habitat features: — 4

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

- ☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).
- ☒ Standing snags (dbh >4 in) within the wetland
- ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)
- ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1	Add the points in the boxes above	13

Rating of Site Potential If score is: 7–14 = M *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — 2

Calculate: % undisturbed habitat 18.1**+** [(% moderate and low intensity land uses)/2] 12.9 **= 31.0**%

If total accessible habitat is:

20–33% of 1 km Polygon | points = 2

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — 2

Calculate: % undisturbed habitat 20.0**+** [(% moderate and low intensity land uses)/2] 15.3 **= 35.3**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If — -2

50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 1–3 = M *Record the rating on the first page*

Wetland name or number Lower Hylebos Addition

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

WDFW Priority Habitats

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

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

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

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

Wetland name or number East Wapato RRP

RATING SUMMARY – Western Washington

Name of wetland (or ID #): East Wapato RRP Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes __ No Date of Training 6/14, 10/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? __Yes __No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY I (based on functions ✓ or special characteristics ____)

1. Category of wetland based on FUNCTIONS

Category I – Total score = 23 – 27

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	H	H	
Landscape Potential	H	H	M	
Value	M	M	H	**TOTAL**
Score Based on Ratings	7	8	8	23

Score for each function based on three ratings

(*order of ratings is not important*)

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	D-9
Hydroperiods	H 1.2	D-17
Ponded depressions	R 1.1	D-20
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	D-17
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	D-9
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	D-17
Map of the contributing basin	R 2.2, R 2.3, R 5.2	D-4
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-12
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	D-21

Wetland name or number East Wapato RRP

HGM Classification of Wetlands in Western Washington

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

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

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

   NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   NO – Go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands*.

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

   ______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ______At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

   ______The wetland is on a slope (*slope can be very gradual*),
   ______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number East Wapato RRP

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

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

✓ The overbank flooding occurs at least once every 2 years.

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

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

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

NO – Go to 7 **YES** – The wetland class is **Depressional**

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

NO – Go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating
Choose an item.

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

Wetland name or number East Wapato RRP

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 1	1
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1	1
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? No = 0 **If yes,** other sources:	0
Total for R 2 Add the points in the boxes above	4

Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) No = 0	0
Total for R 3 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS:

Wetland name or number East Wapato RRP

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is 10–20 | points = 6	6
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 Add the points in the boxes above	13

Rating of Site Potential If score is: 12–16 = H *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	No =1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams?	No = 1	1
Total for R 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* Surface flooding problems are in a subbasin farther down-gradient | points = 1	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for R 6 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS:

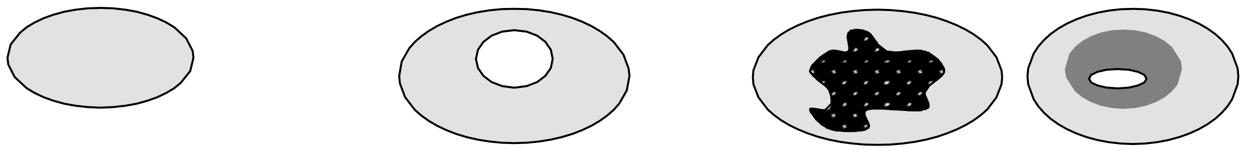
Wetland name or number East Wapato RRP

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland*. Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac*. *Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

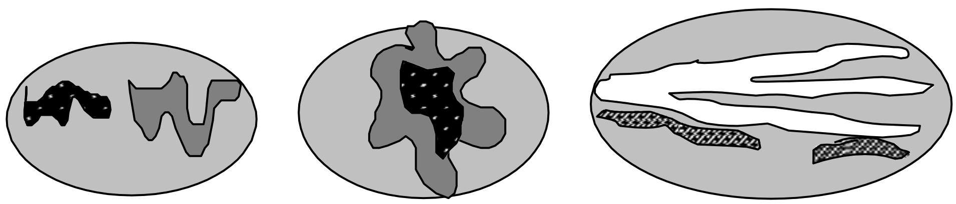
H 1.4. Interspersion of habitats — 3

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

Choose an item.



None = 0 points **Low** = 1 point **Moderate** = 2 points



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

H 1.5. Special habitat features: — 5

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).

☒ Standing snags (dbh >4 in) within the wetland

☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)

☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)

☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1 — Add the points in the boxes above — 17

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — 2

Calculate: % undisturbed habitat 25.9 **+** [(% moderate and low intensity land uses)/2] 6.4 **= 32.2**%

If total accessible habitat is:

20–33% of 1 km Polygon | points = 2

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — 2

Calculate: % undisturbed habitat 29.3**+** [(% moderate and low intensity land uses)/2] 12.2 **= 41.5**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If — -2

50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2 — Add the points in the boxes above — 2

Rating of Landscape Potential If score is: 1–3 = M *Record the rating on the first page*

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

WDFW Priority Habitats

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

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

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

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

Wetland name or number East Wapato RRP

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ● The dominant water regime is tidal, ● Vegetated, and ● With a salinity greater than 0.5 ppt Yes: Go to **SC 1.1** No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No: Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ● The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of nonnative plant species. (If nonnative species are *Spartina*, see page 25) ● At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland.	**Cat. I**
● The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes: Go to **SC 2.2** No: Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes: **Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below*. ***If you answer YES, you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES, you will still need to rate the wetland based on its functions.*** ● **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ● **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80–200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes **= Category I** No **= Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in 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, less frequently, rocks ● The lagoon in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon**	**Cat. I**
SC 5.1. 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 on p. 100). ● At least 3/4 of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ● The wetland is larger than 1/10 ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ● Long Beach Peninsula: Lands west of SR 103 ● Grayland-Westport: Lands west of SR 105 ● Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating**	**Cat I**
SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2**	**Cat. II**
SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3**	**Cat. III**
SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number West Wapato RRP

RATING SUMMARY – Western Washington

Name of wetland (or ID #): West Wapato RRP Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes __ No Date of Training 6/14, 10/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? __Yes __No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY I (based on functions ✓ or special characteristics ____)

1. Category of wetland based on FUNCTIONS

Category I – Total score = 23 – 27

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	H	H	
Landscape Potential	H	H	M	
Value	M	M	H	**TOTAL**
Score Based on Ratings	7	8	8	23

Score for each function based on three ratings

(*order of ratings is not important*)

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Wetland name or number West Wapato RRP

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	D-9
Hydroperiods	H 1.2	D-17
Ponded depressions	R 1.1	D-20
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	D-17
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	D-9
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	D-17
Map of the contributing basin	R 2.2, R 2.3, R 5.2	D-4
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-12
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	D-21

Wetland name or number West Wapato RRP

HGM Classification of Wetlands in Western Washington

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

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

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

   NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   NO – Go to 3 **YES** – The wetland class is **Flats**

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

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

   ______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ______At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

   ______The wetland is on a slope (*slope can be very gradual*),
   ______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number West Wapato RRP

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

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

   ✓ The overbank flooding occurs at least once every 2 years.

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

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

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

   NO – Go to 7 **YES** – The wetland class is **Depressional**

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

   NO – Go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating
Choose an item.

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

Wetland name or number West Wapato RRP

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS **Water Quality Functions** – Indicators that the site functions to improve water quality	
R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 Add the points in the boxes above	10
Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*	
R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 1	1
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1	1
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? No = 0 **If yes,** other sources:	0
Total for R 2 Add the points in the boxes above	4
Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*	
R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) No = 0	0
Total for R 3 Add the points in the boxes above	1
Rating of Value If score is: 1 = M *Record the rating on the first page*	

COMMENTS:

Wetland name or number West Wapato RRP

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is 10–20 | points = 6	6
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 Add the points in the boxes above	13

Rating of Site Potential If score is: 12–16 = H *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
R 5.1. Is the stream or river adjacent to the wetland downcut? No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area? Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams? No = 1	1
Total for R 5 Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* Surface flooding problems are in a subbasin farther down-gradient | points = 1	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for R 6 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS:

Wetland name or number West Wapato RRP

<table>
<tr><th colspan="3">These questions apply to wetlands of all HGM classes.
HABITAT FUNCTIONS – Indicators that site functions to provide important habitat</th></tr>
<tr><td colspan="3">H 1.0. Does the site have the potential to provide habitat?</td></tr>
<tr><td>H 1.1. Structure of plant community: Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.
☐ Aquatic bed
☒ Emergent
☒ Scrub-shrub (areas where shrubs have >30% cover)
☒ Forested (areas where trees have >30% cover)
If the unit has a Forested class, check if:
☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon</td><td>4 structures or more | points = 4</td><td>4</td></tr>
<tr><td>H 1.2. Hydroperiods
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (see text for descriptions of hydroperiods).
☐ Permanently flooded or inundated
☒ Seasonally flooded or inundated
☒ Occasionally flooded or inundated
☒ 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</td><td>4 or more types present | points = 3

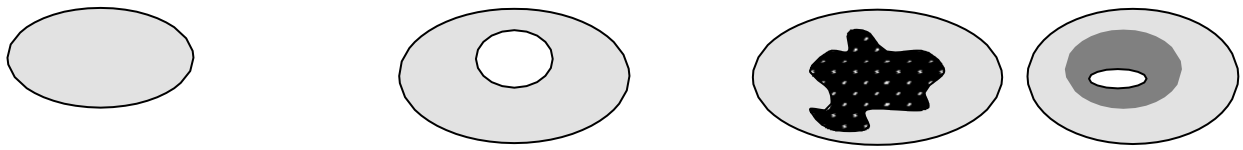
2 points
2 points</td><td>3</td></tr>
<tr><td colspan="2">H 1.3. Richness of plant species
Count the number of plant species in the wetland that cover at least 10 ft^2.
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.
If you counted:
>19 species | points = 2</td><td>2</td></tr>
</table>

Wetland name or number West Wapato RRP

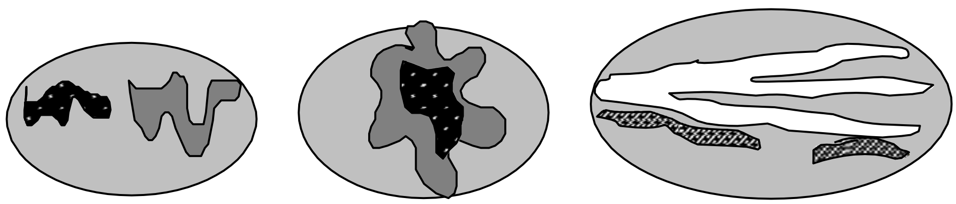
H 1.4. Interspersion of habitats — 3

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

Choose an item.



None = 0 points | **Low** = 1 point | **Moderate** = 2 points



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

H 1.5. Special habitat features: — 5

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

- ☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).
- ☒ Standing snags (dbh >4 in) within the wetland
- ☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)
- ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1 — Add the points in the boxes above — **17**

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — 3

Calculate: % undisturbed habitat 22.3**+** [(% moderate and low intensity land uses)/2] 12.4 **= 34.7**%

If total accessible habitat is:

1/3 (33.3%) of 1 km Polygon | points = 3

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — 2

Calculate: % undisturbed habitat 22.6**+** [(% moderate and low intensity land uses)/2] 12.5 **= 35.1**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If — -2

Choose an item.

Total for H 2 — Add the points in the boxes above — **3**

Rating of Landscape Potential If score is: 1–3 = M *Record the rating on the first page*

Wetland name or number West Wapato RRP

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

Wetland name or number West Wapato RRP

WDFW Priority Habitats

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

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

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

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

Wetland name or number West Wapato RRP

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ● The dominant water regime is tidal, ● Vegetated, and ● With a salinity greater than 0.5 ppt Yes: Go to **SC 1.1** No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No: Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ● The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of nonnative plant species. (If nonnative species are *Spartina*, see page 25) ● At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland. ● The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes: Go to **SC 2.2** No: Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes: **Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below*. ***If you answer YES, you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES, you will still need to rate the wetland based on its functions.*** ● **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ● **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80–200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes **= Category I** No **= Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in 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, less frequently, rocks ● The lagoon in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon**	**Cat. I**
SC 5.1. 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 on p. 100). ● At least 3/4 of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ● The wetland is larger than 1/10 ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ● Long Beach Peninsula: Lands west of SR 103 ● Grayland-Westport: Lands west of SR 105 ● Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating**	**Cat I**
SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2**	**Cat. II**
SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3**	**Cat. III**
SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number Northwest Wapato RRP

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Northwest Wapato RRP Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓Yes __No Date of Training 6/14, 10/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? __Yes __No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY I ((based on functions ✓ or special characteristics ____)

1. Category of wetland based on FUNCTIONS

Category I – Total score = 23 – 27

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	H	H	
Landscape Potential	H	H	M	
Value	M	M	H	**TOTAL**
Score Based on Ratings	7	8	8	23

Score for each function based on three ratings

(*order of ratings is not important*)

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Wetland name or number Northwest Wapato RRP

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	D-9
Hydroperiods	H 1.2	D-17
Ponded depressions	R 1.1	D-20
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	D-17
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	D-9
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	D-17
Map of the contributing basin	R 2.2, R 2.3, R 5.2	D-4
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-12
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	D-21

Wetland name or number Northwest Wapato RRP

HGM Classification of Wetlands in Western Washington

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

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

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

NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe, it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

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

NO – Go to 3 **YES** – The wetland class is **Flats**

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

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

______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
______At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

______The wetland is on a slope (*slope can be very gradual*),
______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number Northwest Wapato RRP

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

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

   ✓ The overbank flooding occurs at least once every 2 years.

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

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

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

   NO – Go to 7 **YES** – The wetland class is **Depressional**

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

   NO – Go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating
Choose an item.

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

Wetland name or number Northwest Wapato RRP

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS **Water Quality Functions** – Indicators that the site functions to improve water quality	
R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 1	1
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1	1
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? No = 0 **If yes,** other sources:	0
Total for R 2 Add the points in the boxes above	4

Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? Yes = 1	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) No = 0	0
Total for R 3 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS:

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20 | points = 9	9
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 Add the points in the boxes above	16

Rating of Site Potential If score is: 12–16 = H *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
R 5.1. Is the stream or river adjacent to the wetland downcut? No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area? Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams? No = 1	1
Total for R 5 Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* Surface flooding problems are in a subbasin farther down-gradient | points = 1	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for R 6 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS:

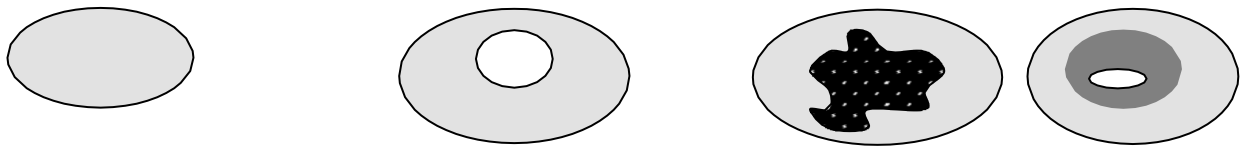
Wetland name or number Northwest Wapato RRP

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland*. Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac*. *Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

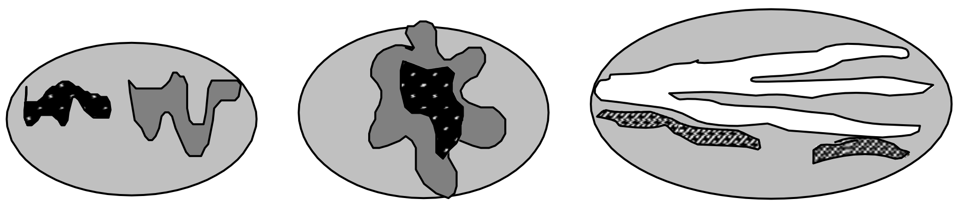
H 1.4. Interspersion of habitats | 3

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

Choose an item.



None = 0 points **Low** = 1 point **Moderate** = 2 points



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

H 1.5. Special habitat features: | 5

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).

☒ Standing snags (dbh >4 in) within the wetland

☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)

☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)

☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1 — Add the points in the boxes above | 17

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). | 1

Calculate: % undisturbed habitat 13.2**+** [(% moderate and low intensity land uses)/2] 4.9 **=18.1**%

If total accessible habitat is:

10–19% of 1 km Polygon | points = 1

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. | 2

Calculate: % undisturbed habitat 18.9**+** [(% moderate and low intensity land uses)/2] 9.8 **= 28.7**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If | -2

50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2 — Add the points in the boxes above | 1

Rating of Landscape Potential If score is: 1–3 = M *Record the rating on the first page*

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

WDFW Priority Habitats

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

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

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

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

Wetland name or number Northwest Wapato RRP

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ● The dominant water regime is tidal, ● Vegetated, and ● With a salinity greater than 0.5 ppt Yes: Go to **SC 1.1** No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No: Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ● The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of nonnative plant species. (If nonnative species are *Spartina*, see page 25) ● At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland.	**Cat. I**
● The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes: Go to **SC 2.2** No: Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes: **Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below*. ***If you answer YES, you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

Wetland name or number Northwest Wapato RRP

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES, you will still need to rate the wetland based on its functions.*** ● **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ● **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80–200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes **= Category I** No **= Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in 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, less frequently, rocks ● The lagoon in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon**	**Cat. I**
SC 5.1. 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 on p. 100). ● At least 3/4 of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ● The wetland is larger than 1/10 ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ● Long Beach Peninsula: Lands west of SR 103 ● Grayland-Westport: Lands west of SR 105 ● Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating**	**Cat I**
SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2**	**Cat. II**
SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3**	**Cat. III**
SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number Puyallup North

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Puyallup North Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes __ No Date of Training 6/14, 10/18

HGM Class used for rating Depressional Wetland has multiple HGM classes? __Yes __No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY II (based on functions ✓ or special characteristics ____)

1. Category of wetland based on FUNCTIONS

Category II – Total score = 20 – 22

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	M	H	
Landscape Potential	M	H	M	
Value	M	H	H	**TOTAL**
Score Based on Ratings	6	8	8	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	**I II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I II**
Interdunal	**I II III IV**
None of the above	✓

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	D-8
Hydroperiods	D 1.4, H 1.2	D-16
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	D-16
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	D-16
Map of the contributing basin	D 4.3, D 5.3	D-3
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-11
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	D-21

Wetland name or number Puyallup North

HGM Classification of Wetlands in Western Washington

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

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

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

   NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

   NO – Go to 3 **YES** – The wetland class is **Flats**

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

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

   ______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ______At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

   ______The wetland is on a slope (*slope can be very gradual*),
   ______The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ______The water leaves the wetland **without being impounded**.

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

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

Wetland name or number Puyallup North

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

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

   ______The overbank flooding occurs at least once every 2 years.

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

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

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

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

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

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

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating
Choose an item.

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

Wetland name or number Puyallup North

DEPRESSIONAL AND FLATS WETLANDS **Water Quality Functions** – Indicators that the site functions to improve water quality	
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland has an intermittently flowing stream or ditch | points = 2	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area | points = 5	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is < 1/4 total area of wetland | points = 0	0
Total for D 1 Add the points in the boxes above (F9 key)	7

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

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

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

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

Rating of Value If score is: 1 or 2 = M *Record the rating on the first page*

COMMENTS:

DEPRESSIONAL AND FLATS WETLANDS

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

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland has an intermittently flowing stream or ditch | points = 2	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks are at least 0.5 ft to <2 ft from surface or bottom of outlet | points = 3	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit | points = 5	5
Total for D 4 Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1	1
Total for D 5 Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): Flooding occurs in a subbasin that is immediately down-gradient of unit | points = 2 **If not applicable chosen above:** Choose an item. **Explanation for 0 points (if required above):**	2
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for D 6 Add the points in the boxes above	2

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

Wetland name or number Puyallup North

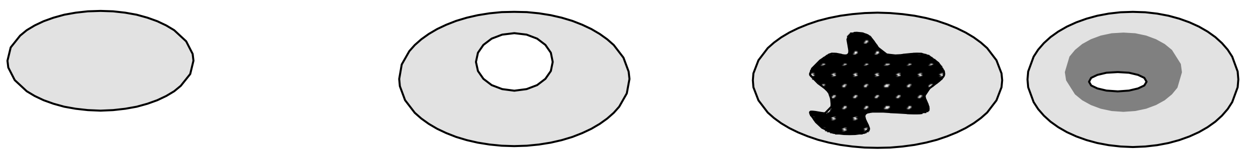
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac*. *Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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**	3 types present | points = 2 **2 points** **2 points**	2
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

Wetland name or number Puyallup North

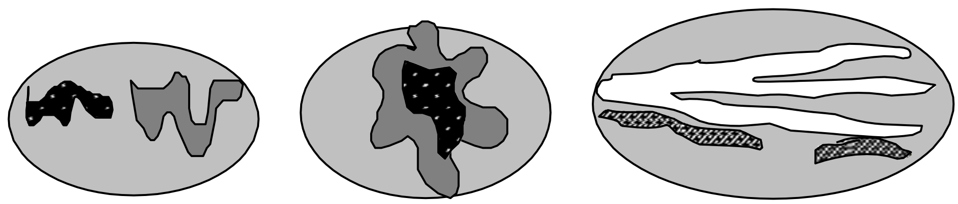
H 1.4. Interspersion of habitats **3**

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

Choose an item.



None = 0 points **Low** = 1 point **Moderate** = 2 points



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

H 1.5. Special habitat features: **4**

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

- ☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).
- ☒ Standing snags (dbh >4 in) within the wetland
- ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)
- ☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)
- ☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1	Add the points in the boxes above	15

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). **1**

Calculate: % undisturbed habitat 15.8 **+** [(% moderate and low intensity land uses)/2] 2.6 **= 18.4**%

If total accessible habitat is:

10–19% of 1 km Polygon | points = 1

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. **2**

Calculate: % undisturbed habitat 24.2 **+** [(% moderate and low intensity land uses)/2] 8.6 **= 32.8**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If **-2**

50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2	Add the points in the boxes above	1

Rating of Landscape Potential If score is: 1–3 = M *Record the rating on the first page*

Wetland name or number Puyallup North

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

Wetland name or number Puyallup North

WDFW Priority Habitats

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

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

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

Wetland name or number Freeman Road and Puyallup South

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Freeman Road and Puyallup South Date of site visit: NA

Rated by G. Ritchotte, D. Rapoza Trained by Ecology? ✓ Yes __ No Date of Training 6/14, 10/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? __ Yes __ No

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

Source of base aerial photo/map Google Earth Aerial 2018, Digital Globe Aerial 2017

OVERALL WETLAND CATEGORY I (based on functions ✓ or special characteristics ____)

1. Category of wetland based on FUNCTIONS

Category I – Total score = 23 – 27

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	M	H	H	
Landscape Potential	H	H	M	
Value	H	M	H	**TOTAL**
Score Based on Ratings	8	8	8	24

Score for each function based on three ratings

(*order of ratings is not important*)

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

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

Maps and figures required to answer questions correctly for Western Washington

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	D-8
Hydroperiods	H 1.2	D-16
Ponded depressions	R 1.1	D-20
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	D-16
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	D-8
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	D-16
Map of the contributing basin	R 2.2, R 2.3, R 5.2	D-3
1 km Polygon: Area that extends 1 km from entire wetland edge—including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	D-11
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	D-1
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	D-21

Wetland name or number Freeman Road and Puyallup South

HGM Classification of Wetlands in Western Washington

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

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

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

NO – Go to 2 **YES** – The wetland class is **Tidal Fringe** – Go to 1.1

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

NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

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

NO – Go to 3 **YES** – The wetland class is **Flats**

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

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

______The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

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

NO – Go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

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

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

______The water leaves the wetland **without being impounded**.

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

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

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

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

✓ The overbank flooding occurs at least once every 2 years.

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

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

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

NO – Go to 7 **YES** – The wetland class is **Depressional**

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

NO – Go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1–7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated | HGM class to use in rating
Choose an item.

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

Wetland name or number Freeman Road and Puyallup South

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions present but cover <1/2 area of wetland | points = 2	2
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height, **not** Cowardin classes) Trees or shrubs >2/3 area of the wetland | points = 8	8
Total for R 1 — Add the points in the boxes above	10

Rating of Site Potential If score is: 6–11 = M *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 1	1
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area? Yes = 1	1
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? No = 0	0
R 2.4. Is >10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1–R 2.4? No = 0 **If yes,** other sources:	0
Total for R 2 — Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3–6 = H *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens? Yes = 1	1
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which the unit is found*) Yes = 2	2
Total for R 3 — Add the points in the boxes above	3

Rating of Value If score is: 2–4 = H *Record the rating on the first page*

COMMENTS:

Wetland name or number Freeman Road and Puyallup South

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

Hydrologic Functions – Indicators that site functions to reduce flooding and stream erosion

R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 20 | points = 9	9
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for >1/3 area | points = 7	7
Total for R 4 Add the points in the boxes above	16

Rating of Site Potential If score is: 12–16 = H *Record the rating on the first page*

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1	1
R 5.3. Is the up-gradient stream or river controlled by dams?	No = 1	1
Total for R 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: 3 = H *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* Surface flooding problems are in a subbasin farther down-gradient | points = 1	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? No = 0	0
Total for R 6 Add the points in the boxes above	1

Rating of Value If score is: 1 = M *Record the rating on the first page*

COMMENTS:

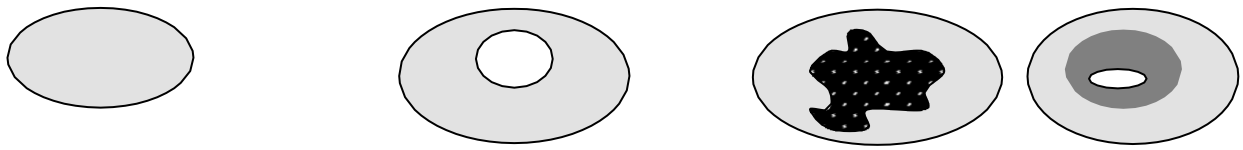
Wetland name or number Freeman Road and Puyallup South

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** – Indicators that site functions to provide important habitat		
H 1.0. Does the site have the potential to provide habitat?		
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of 1/4 ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* ☐ Aquatic bed ☒ Emergent ☒ Scrub-shrub (areas where shrubs have >30% cover) ☒ Forested (areas where trees have >30% cover) *If the unit has a Forested class, check if:* ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4 structures or more | points = 4	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 ac to count (*see text for descriptions of hydroperiods*). ☐ Permanently flooded or inundated ☒ Seasonally flooded or inundated ☒ Occasionally flooded or inundated ☒ 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 **2 points** **2 points**	3
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species*. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle.*** If you counted: >19 species | points = 2		2

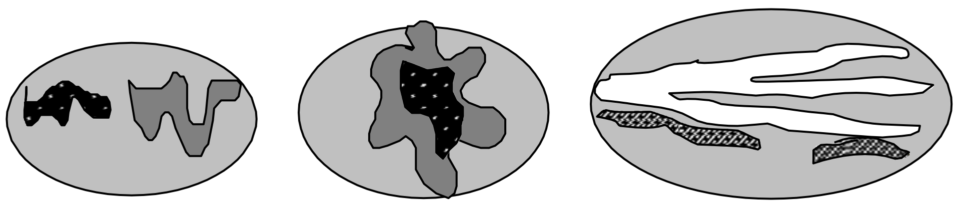
H 1.4. Interspersion of habitats — 3

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

Choose an item.



None = 0 points **Low** = 1 point **Moderate** = 2 points



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

H 1.5. Special habitat features: — 5

Check the habitat features that are present in the wetland. *The number of checks is the number of points*.

☒ Large, downed, woody debris within the wetland (>4 in diameter and 6 ft long).

☒ Standing snags (dbh >4 in) within the wetland

☒ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)

☐ 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 1/4 ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (*structures for egg-laying by amphibians*)

☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

Total for H 1 — Add the points in the boxes above — 17

Rating of Site Potential If score is: 15–18 = H *Record the rating on the first page*

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

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). — 2

Calculate: % undisturbed habitat 21.5 **+** [(% moderate and low intensity land uses)/2] 10.3 **= 31.8**%

If total accessible habitat is:

20–33% of 1 km Polygon | points = 2

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. — 2

Calculate: % undisturbed habitat 22.9 **+** [(% moderate and low intensity land uses)/2] 23.2 **=46.1**%

Undisturbed habitat 10–50% and in 1–3 patches | points = 2

H 2.3. Land use intensity in 1 km Polygon: If 66% — -2

50% of 1 km Polygon is high intensity land use | points = (-2)

Total for H 2 — Add the points in the boxes above — 2

Rating of Landscape Potential If score is: 1–3 = M *Record the rating on the first page*

Wetland name or number Freeman Road and Puyallup South

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

Rating of Value If score is: 2 = H *Record the rating on the first page*

WDFW Priority Habitats

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

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

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

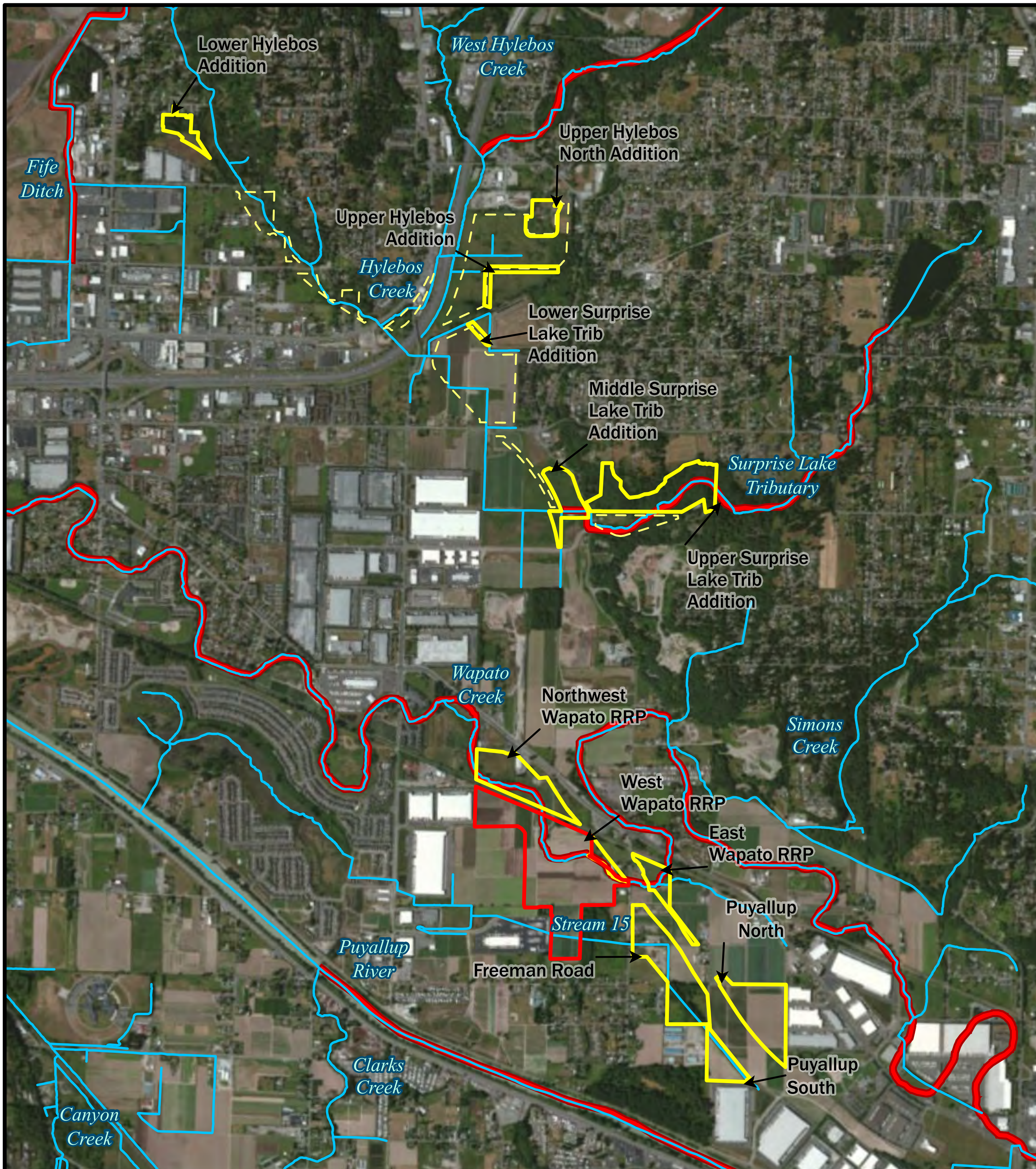
Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number Freeman Road and Puyallup South

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ● The dominant water regime is tidal, ● Vegetated, and ● With a salinity greater than 0.5 ppt Yes: Go to **SC 1.1** No = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No: Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ● The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of nonnative plant species. (If nonnative species are *Spartina*, see page 25) ● At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland.	**Cat. I**
● The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes: Go to **SC 2.2** No: Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes: **Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below*. ***If you answer YES, you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES, you will still need to rate the wetland based on its functions.*** ● **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ● **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80–200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes **= Category I** No **= Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in 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, less frequently, rocks ● The lagoon in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the lagoon (*needs to be measured near the bottom*) Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon**	**Cat. I**
SC 5.1. 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 on p. 100). ● At least 3/4 of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ● The wetland is larger than 1/10 ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ● Long Beach Peninsula: Lands west of SR 103 ● Grayland-Westport: Lands west of SR 105 ● Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating**	**Cat I**
SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2**	**Cat. II**
SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3**	**Cat. III**
SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	



Legend
- 303(d) listed waters (Dept. of Ecology)
- Existing Stream (Pierce County)
- Stage 2 RRP Boundaries
- Stage 1B RRP Boundaries
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-1.
303(d) Waters in the Vicinity of the SR 167 Completion Project Stage 2 Mitigation Sites.

0 1,000 2,000 4,000 Feet

HERRERA

ESRI, Aerial (2022)

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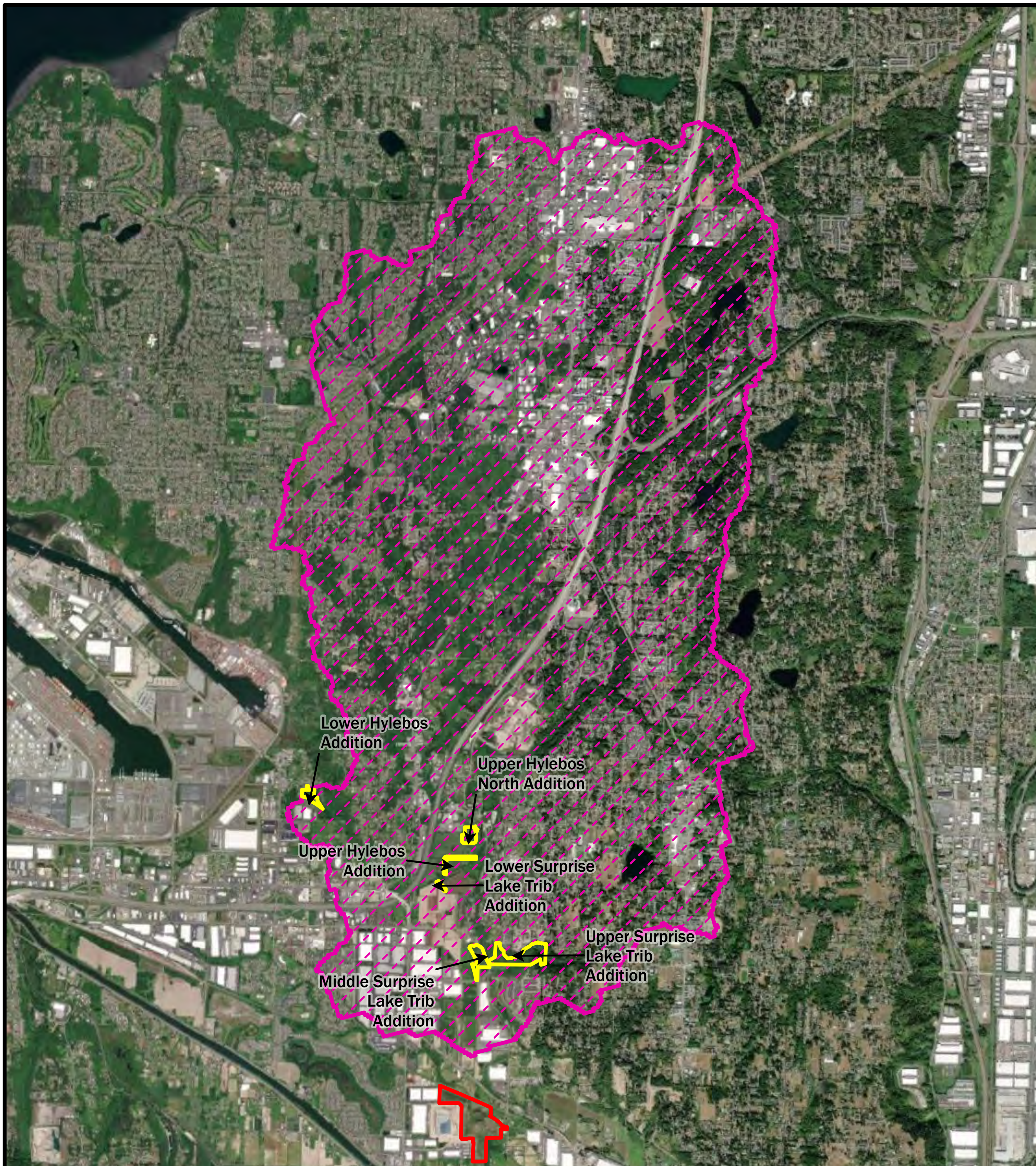

Legend

- Contributing Basin
- Stage 2 RRP Boundaries
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-2. Contributing Basin for Hylebos Basin Mitigation Sites.

0 2,500 5,000 10,000 Feet

HERRERA

ESRI, Aerial (2022)

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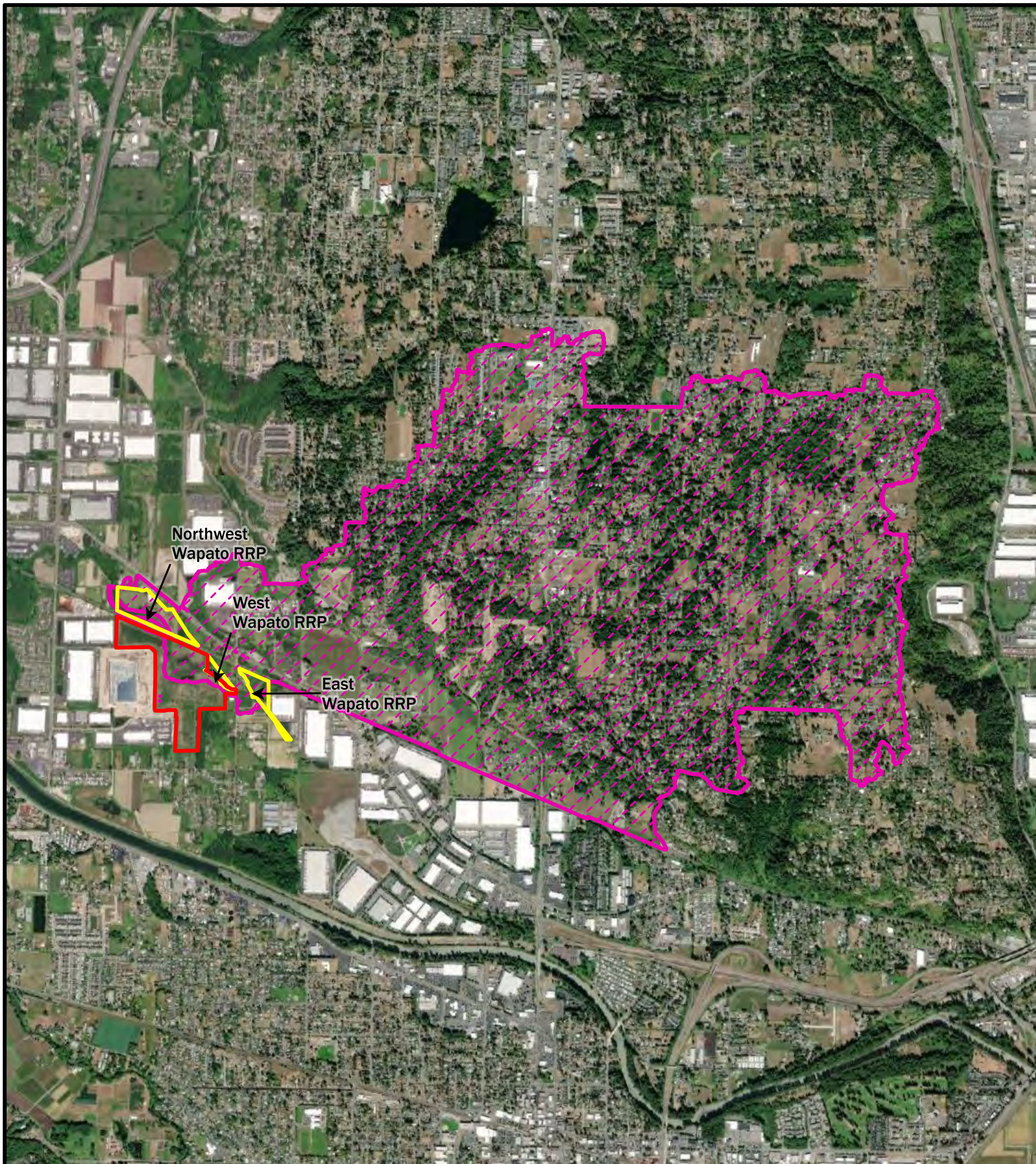

Legend

- Contributing Basin
- Stage 2 RRP Boundaries
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-3.
Contributing Basin for Wapato RRP Sites.

N

0 1,250 2,500 5,000 Feet

HERRERA

ESRI, Aerial (2022)

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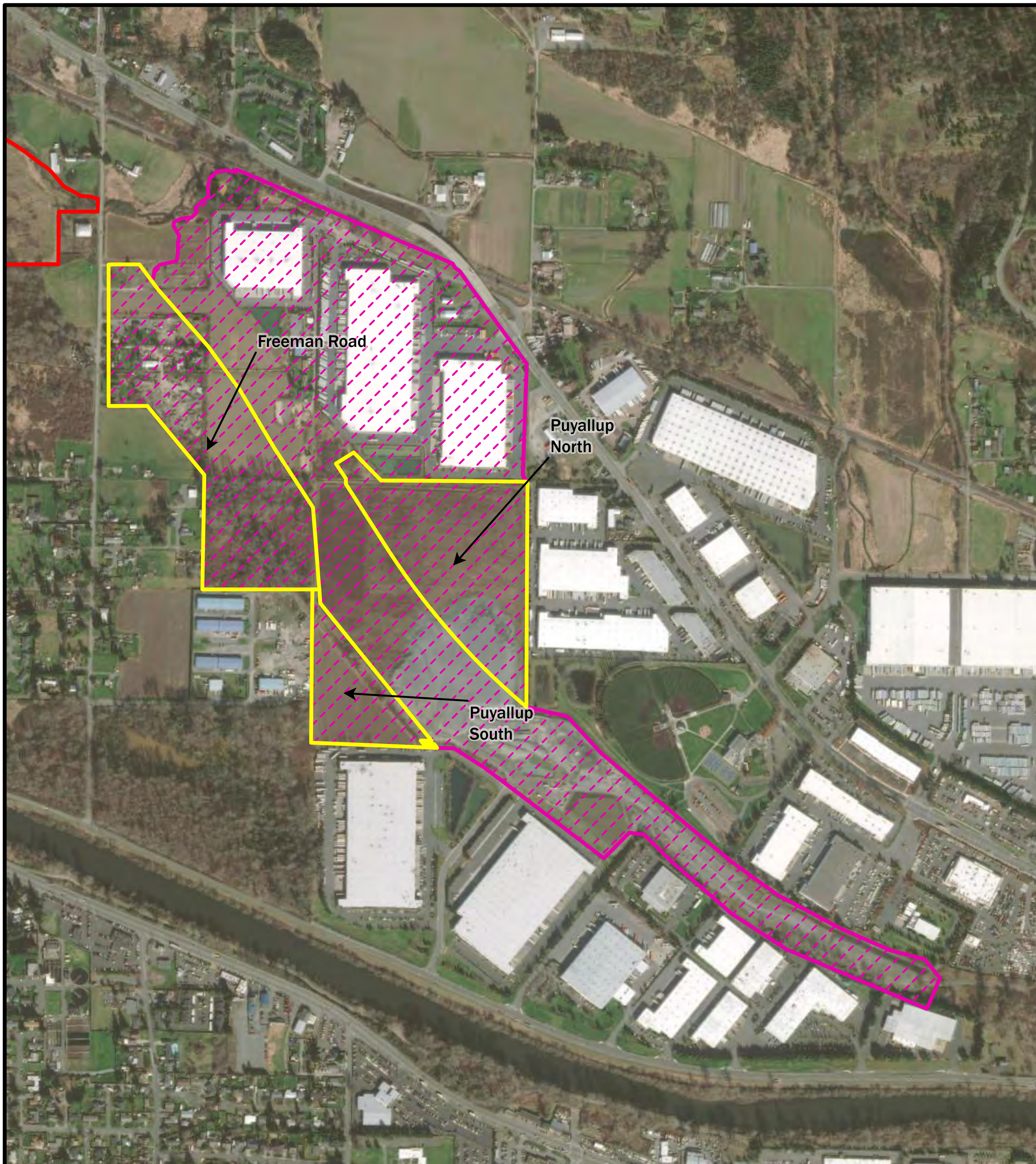

Legend

Contributing Basin

Stage 2 RRP Boundaries

Existing Mitigations Sites by PTOI and Other Agencies

Figure D-4.
Contributing Basin for Puyallup Basin Mitigation Sites.

0 425 850 1,700 Feet

HERRERA

ESRI, Aerial (2022)

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Legend

Stage 2 RRP Boundaries

Cowardin

PEM

PFO

PSS

Plant cover in all planting areas estimated to be 100%

Figure D-5.
Cowardin Classes for the Lower Hylebos Addition.

0 55 110 220
Feet

HERRERA

ESRI, Aerial (2022)

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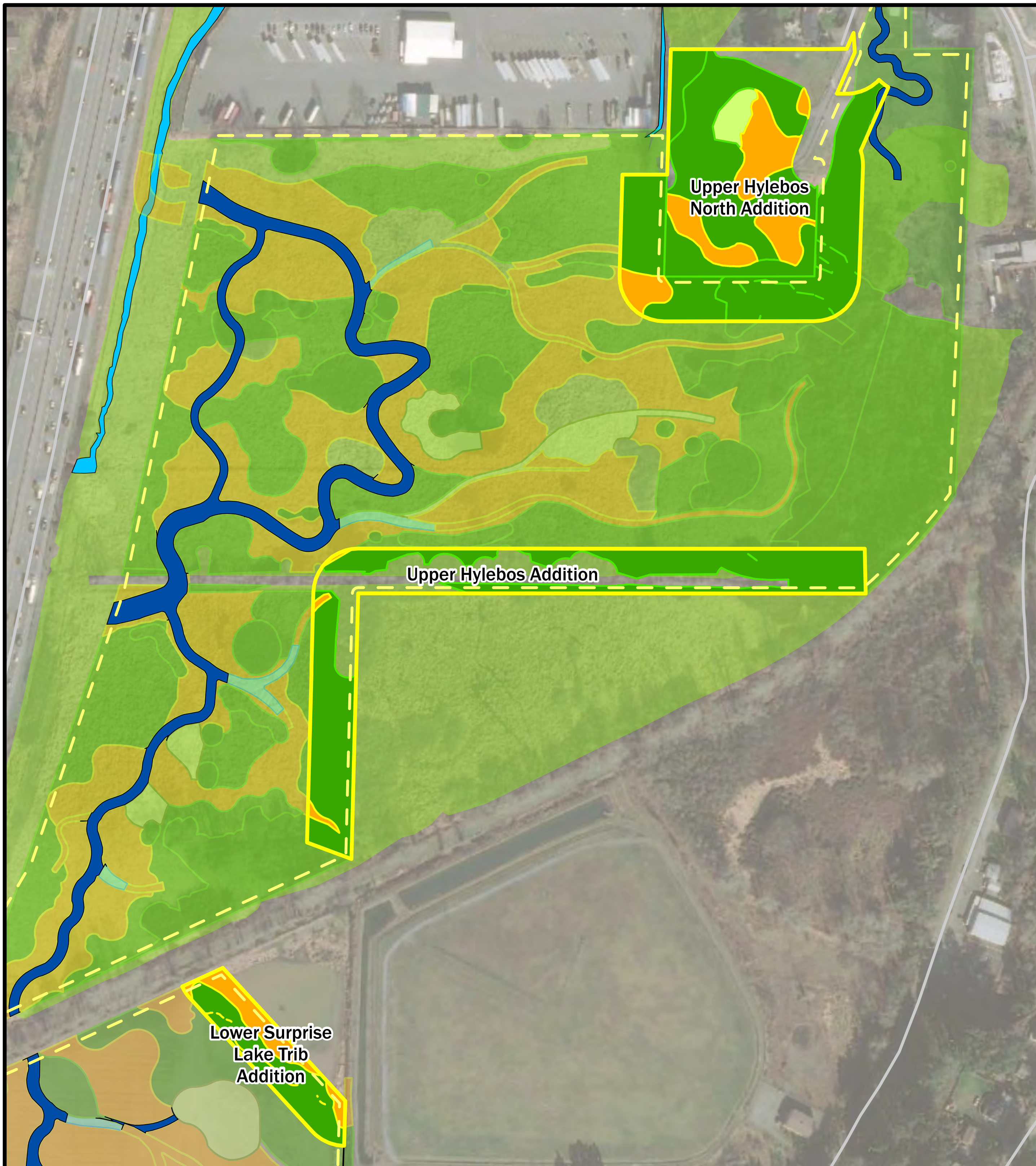

Legend

Stage 1B RRP Boundaries

Stage 2 RRP Boundaries

Cowardin

PEM

PFO

PSS

Proposed Stream

Delineated Wetlands and Streams

Delineated Stream

Delineated Wetland

Plant cover in all planting areas estimated to be 100%

Figure D-6.
Cowardin Classes for the Upper Hylebos North Addition, Upper Hylebos Addition, Lower Surprise Lake Trib Addition.

N

0 150 300 600 Feet

HERRERA

ESRI, Aerial (2022)

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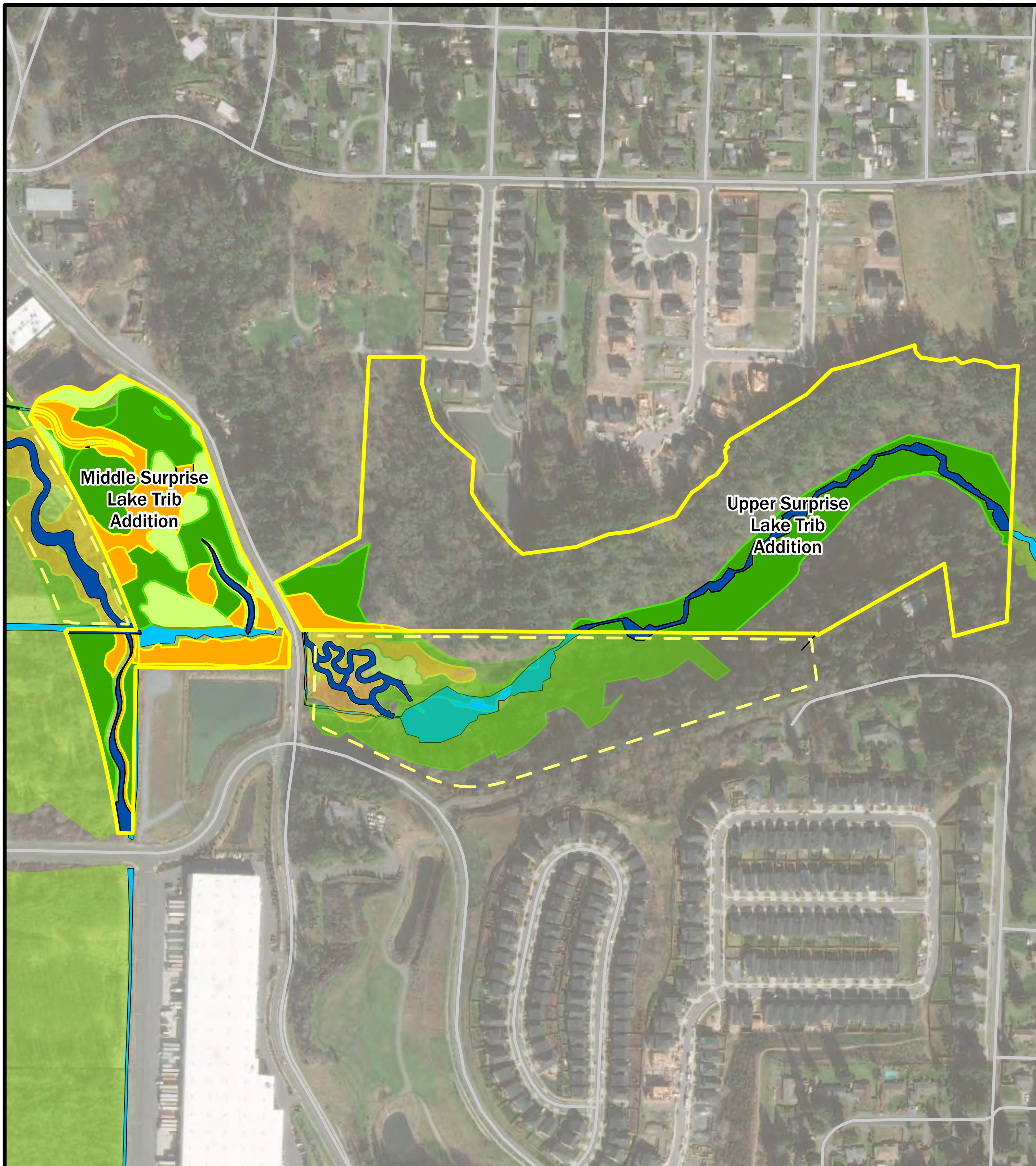

Legend

- Stage 1B RRP Boundaries
- Stage 2 RRP Boundaries

Cowardin

- PEM
- PFO
- PSS
- Proposed Stream

Delineated Wetlands and Streams

- Delineated Stream
- Delineated Wetland

Plant cover in all planting areas estimated to be 100%

Figure D-7.
Cowardin Classes for the Middle Surprise Lake Trib Addition, Upper Surprise Lake Trib Addition.

N

0 205 410 820 Feet

HERRERA

ESRI, Aerial (2022)

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Legend

- Stage 2 RRP Boundaries

Cowardin

- PEM
- PFO
- PSS

- Proposed Stream

Delineated Wetlands and Streams

- Delineated Stream
- Delineated Wetland

Plant cover in all planting areas estimated to be 100%

Figure D-8.
Cowardin Classes for the Puyallup Basin Sites.

N

0 185 370 740 Feet

HERRERA

ESRI, Aerial (2022)

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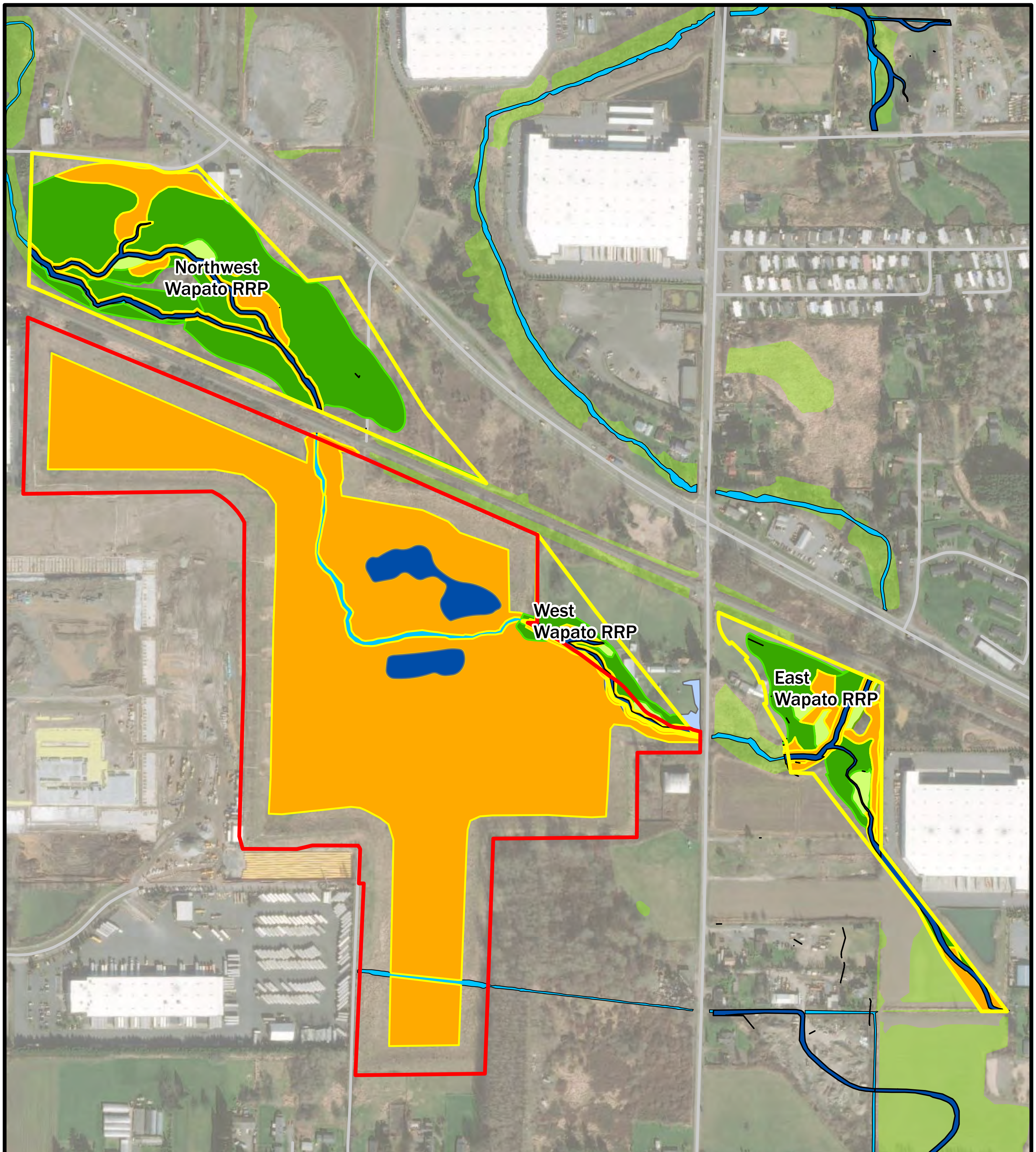

Legend

Stage 2 RRP Boundaries

Cowardin

PEM

PFO

PSS

Proposed Stream

Delineated Wetlands and Streams

Delineated Stream

Delineated Wetland

Existing Mitigations Sites by PTOI and Other Agencies

Plant cover in all planting areas estimated to be 100%

Figure D-9.
Cowardin Classes for the Wapato RRP Sites.

N

0 260 520 1,040 Feet

HERRERA

ESRI, Aerial (2022)

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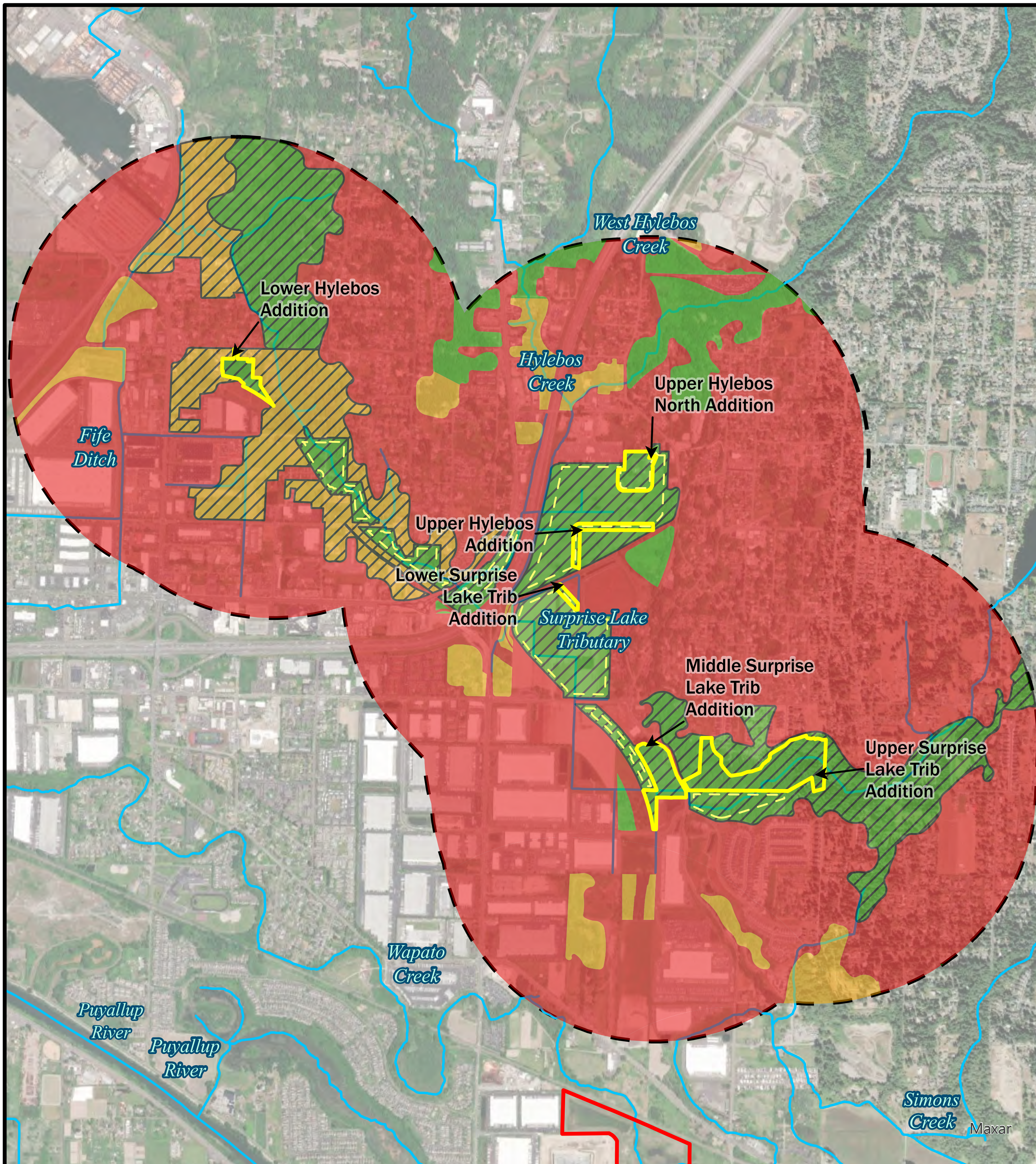

Legend

- 1km Boundary
- Stage 1B RRP Boundaries
- Stage 2 RRP Boundaries
- Stream (Pierce County)

Habitat Type and Access

- High Intensity
- Low/Moderate Intensity, Accessible
- Low/Moderate Intensity, Inaccessible
- Relatively undisturbed, Accessible
- Relatively undisturbed, Inaccessible
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-10.
Habitat Within a 1-km Boundary of Hylebos Basin Sites.

N

0 1,000 2,000 4,000 Feet

HERRERA

ESRI, Aerial (2022)

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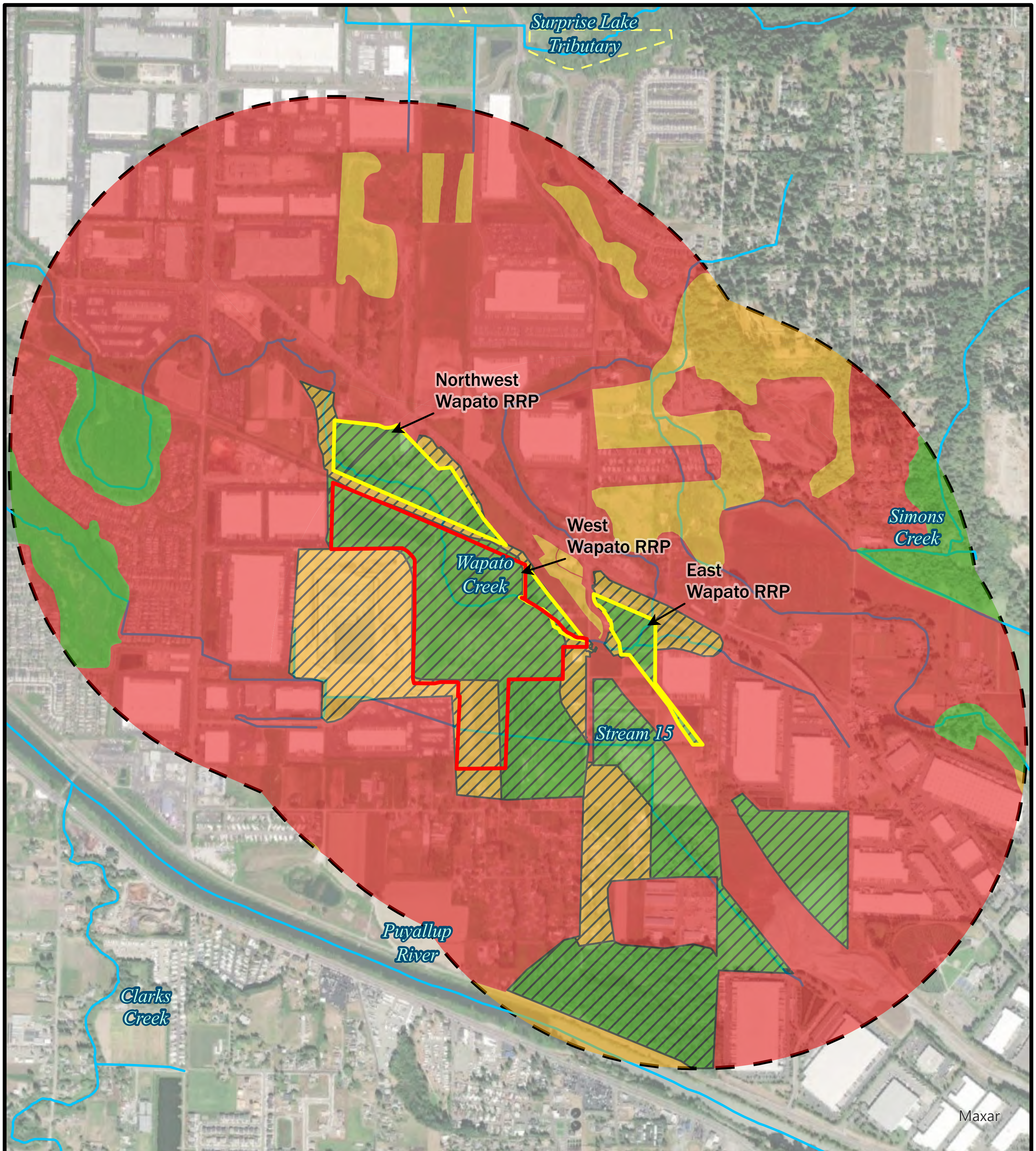

Legend

- 1km Boundary
- Stage 1B RRP Boundaries
- Stage 2 RRP Boundaries
- Stream (Pierce County)

Habitat Type and Access

- High Intensity
- Low/Moderate Intensity, Accessible
- Low/Moderate Intensity, Inaccessible
- Relatively undisturbed, Accessible
- Relatively undisturbed, Inaccessible
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-11.
Habitat Within a 1-km Boundary of Wapato RRP Sites.

N

0 500 1,000 2,000 Feet

HERRERA

ESRI, Aerial (2022)

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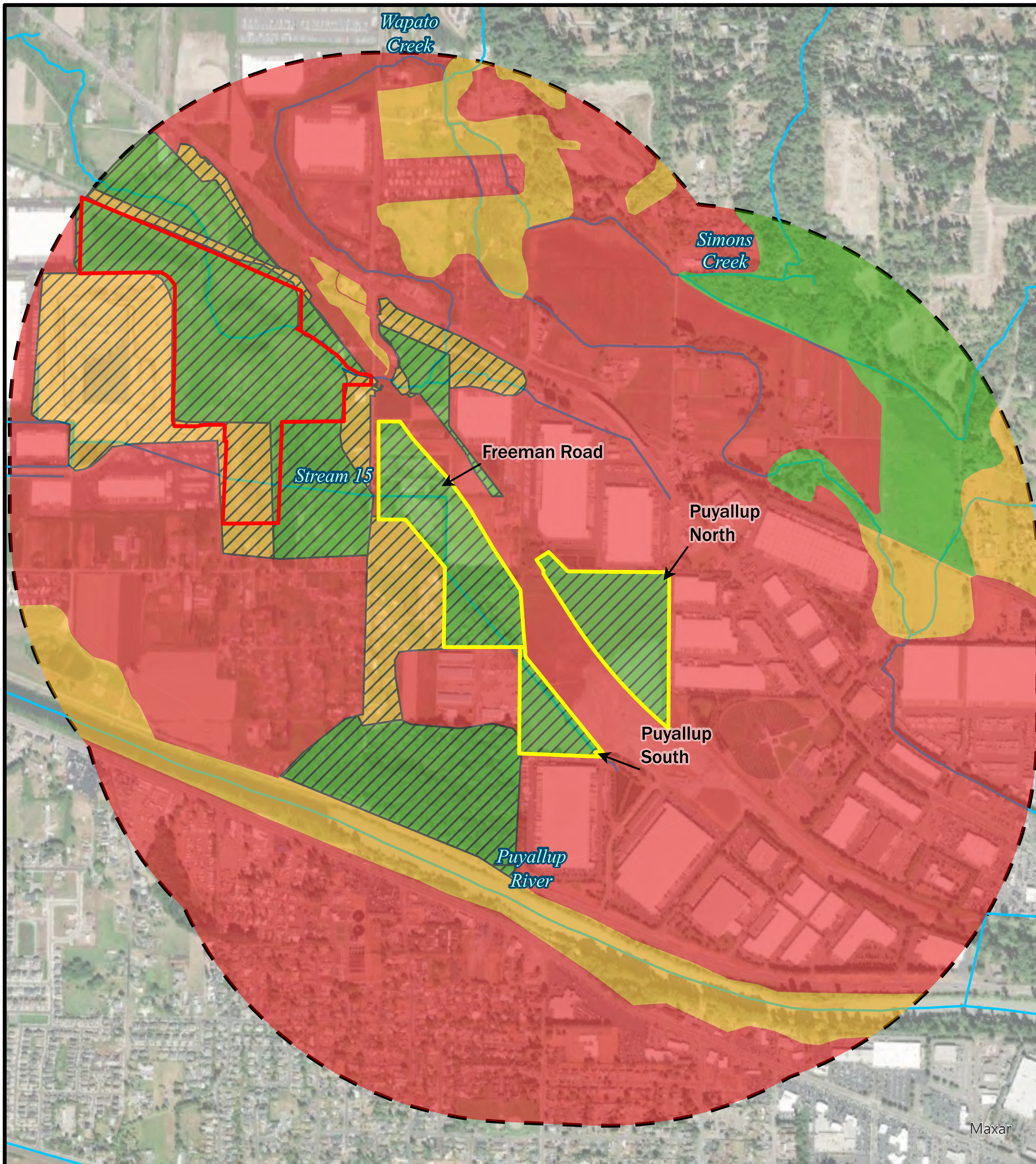

Legend

- 1km Boundary
- Stage 2 RRP Boundaries
- Stream (Pierce County)

Habitat Type and Access

- High Intensity
- Low/Moderate Intensity, Accessible
- Low/Moderate Intensity, Inaccessible
- Relatively undisturbed, Accessible
- Relatively undisturbed, Inaccessible
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-12.
Habitat Within a 1-km Boundary of Puyallup Basin Sites.

N

0 500 1,000 2,000 Feet

HERRERA

ESRI, Aerial (2022)

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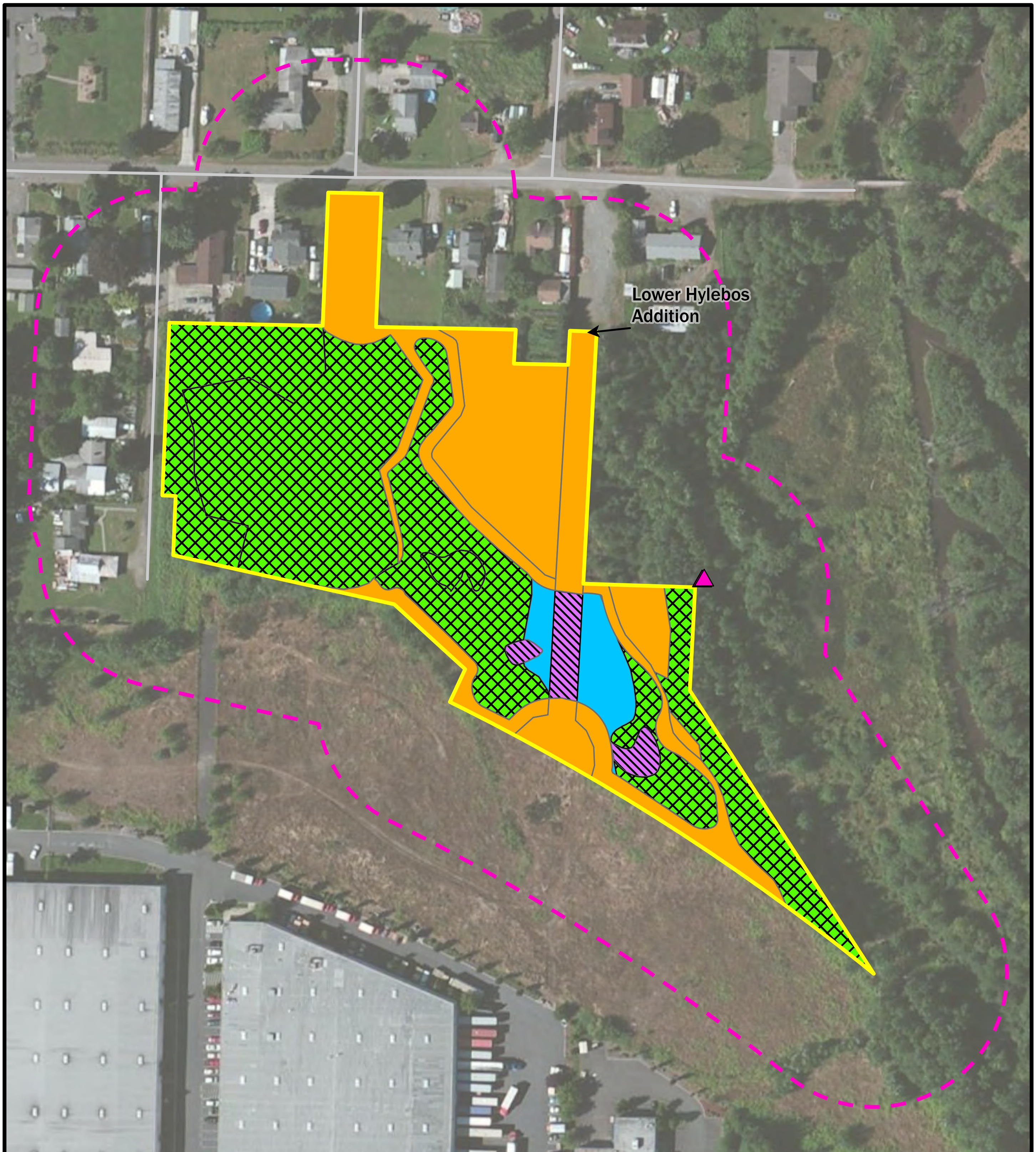

Legend

Hydroperiod

- Occasionally flooded
- Saturated only
- Seasonally flooded
- Stage 2 RRP Boundaries
- 150ft boundary
- Upland
- Wetland 46 Outlet

Lower Hylebos Addition
Ave wetland width = 125'
Average channel width = NA

Figure D-13.
Hydroperiods for Lower Hylebos Addition.

N

0 75 150 300 Feet

HERRERA

ESRI, Aerial (2018)

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Legend

Hydroperiod

- Occasionally flooded
- Saturated only
- Seasonally flooded
- Stage 1B RRP
- Stage 2 RRP Boundaries
- 150ft boundary
- Proposed Stream
- Upland
- Flow Direction
- Delineated Stream

Upper Hylebos North Addition
Ave wetland width = 325’
Average channel width = NA

Upper Hylebos Addition
Ave wetland width = 100’
Average channel width = NA

Lower Surprise Lake Trib Addition
Ave wetland width = 100’
Average channel width = NA

Figure D-14.
Hydroperiods for Upper Hylebos North Addition, Upper Hylebos Addition, Lower Surprise Lake Trib Addition.

N

0 170 340 680 Feet

HERRERA

ESRI, Aerial (2018)

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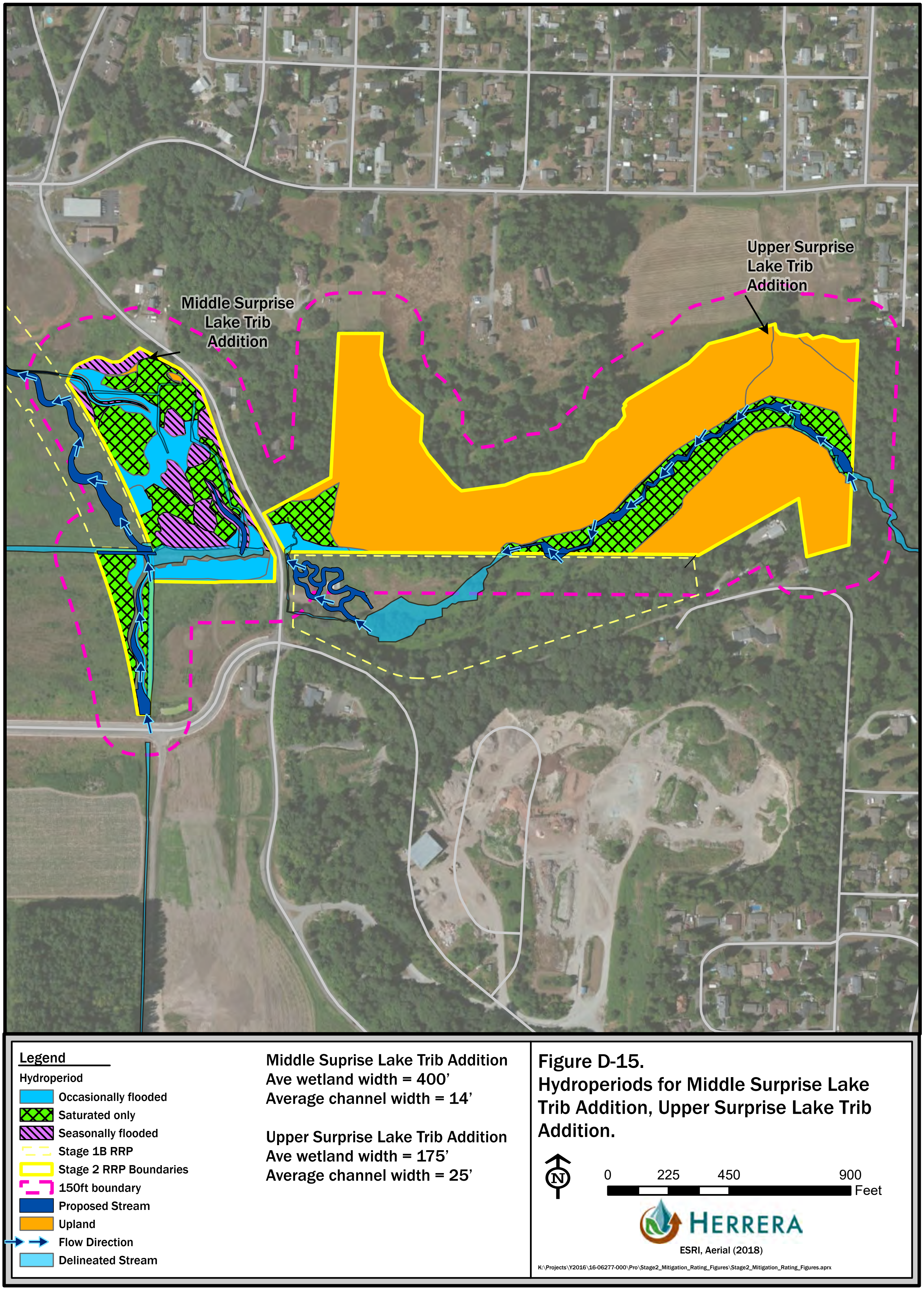
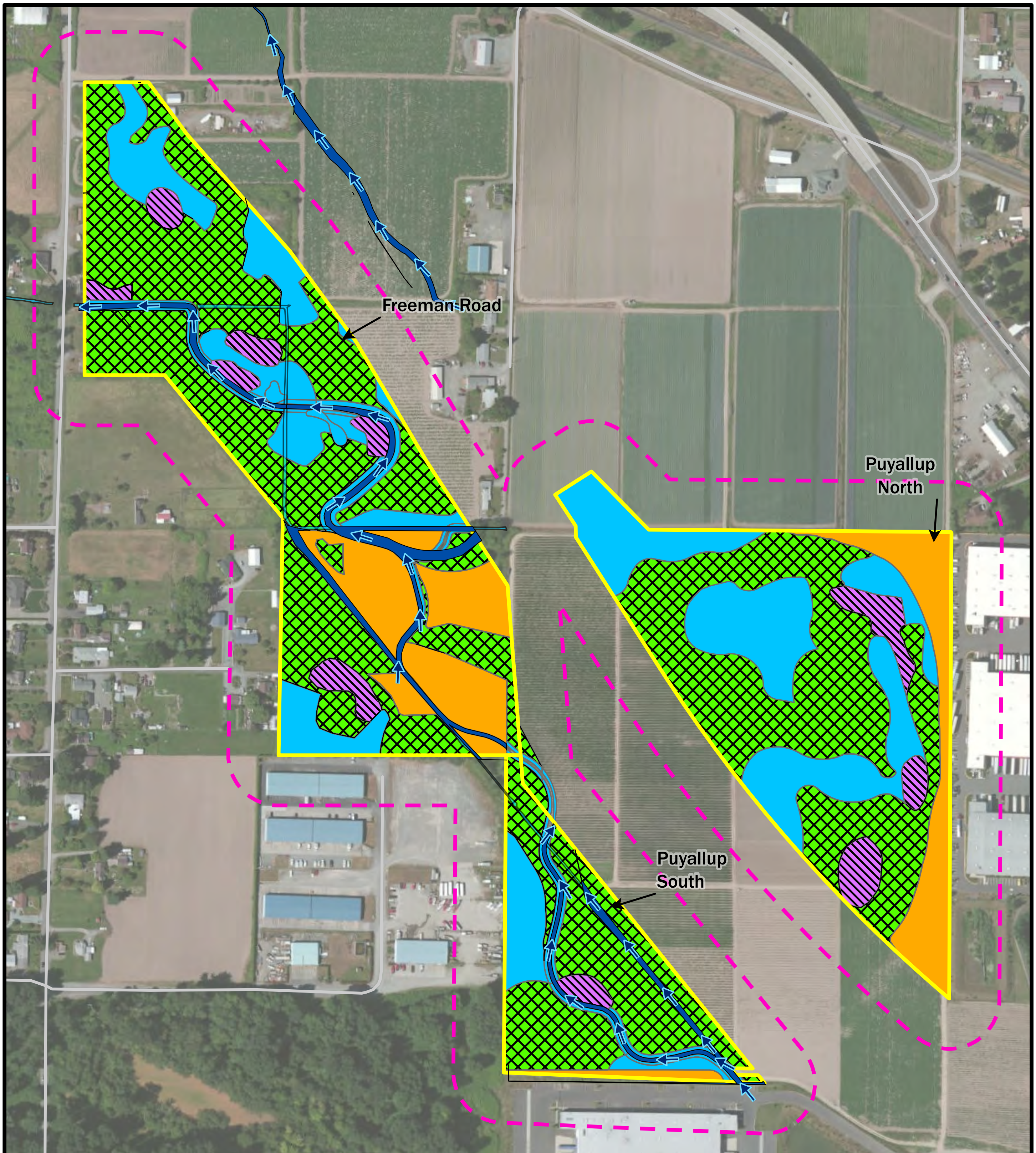


Figure D-15.
Hydroperiods for Middle Surprise Lake Trib Addition, Upper Surprise Lake Trib Addition.



Legend

Hydroperiod

- Occasionally flooded
- Saturated only
- Seasonally flooded
- Stage 2 RRP Boundaries
- 150ft boundary
- Proposed Stream
- Upland
- Flow Direction
- Delineated Stream

Freeman Road
Ave wetland width = 575'
Average channel width = 14'

Puyallup North
Ave wetland width = 580'
Average channel width = NA

Puyallup South
Ave wetland width = 350'
Average channel width = 15'

Figure D-16.
Hydroperiods for Puyallup Basin Sites.

N

0 200 400 800 Feet

HERRERA

ESRI, Aerial (2018)

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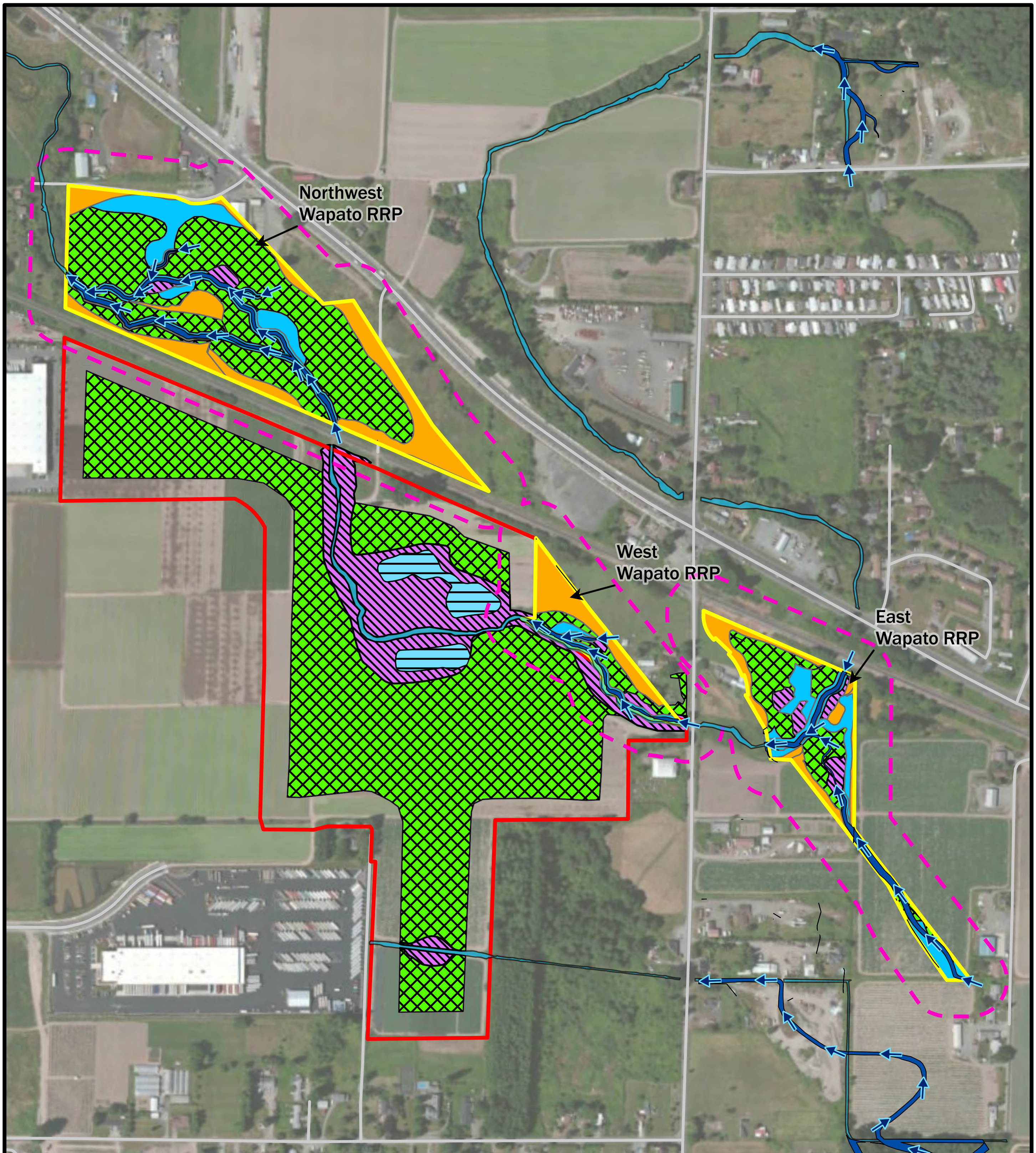

Legend

Hydroperiod

- Occasionally flooded
- Saturated only
- Seasonally flooded
- Permanently flooded
- Stage 2 RRP Boundaries
- 150ft boundary
- Proposed Stream
- Upland
- Flow Direction
- Delineated Stream
- Existing Mitigations Sites by PTOI and Other Agencies

Northwest Wapato
Ave wetland width = 450’
Average channel width = 15’

West Wapato
Ave wetland width = 1000'
Average channel width = 15'

East Wapato
Ave wetland width = 200’
Average channel width = 18’

Figure D-17.
Hydroperiods for Wapato RRP Sites.

N

0 280 560 1,120 Feet

HERRERA

ESRI, Aerial (2018)

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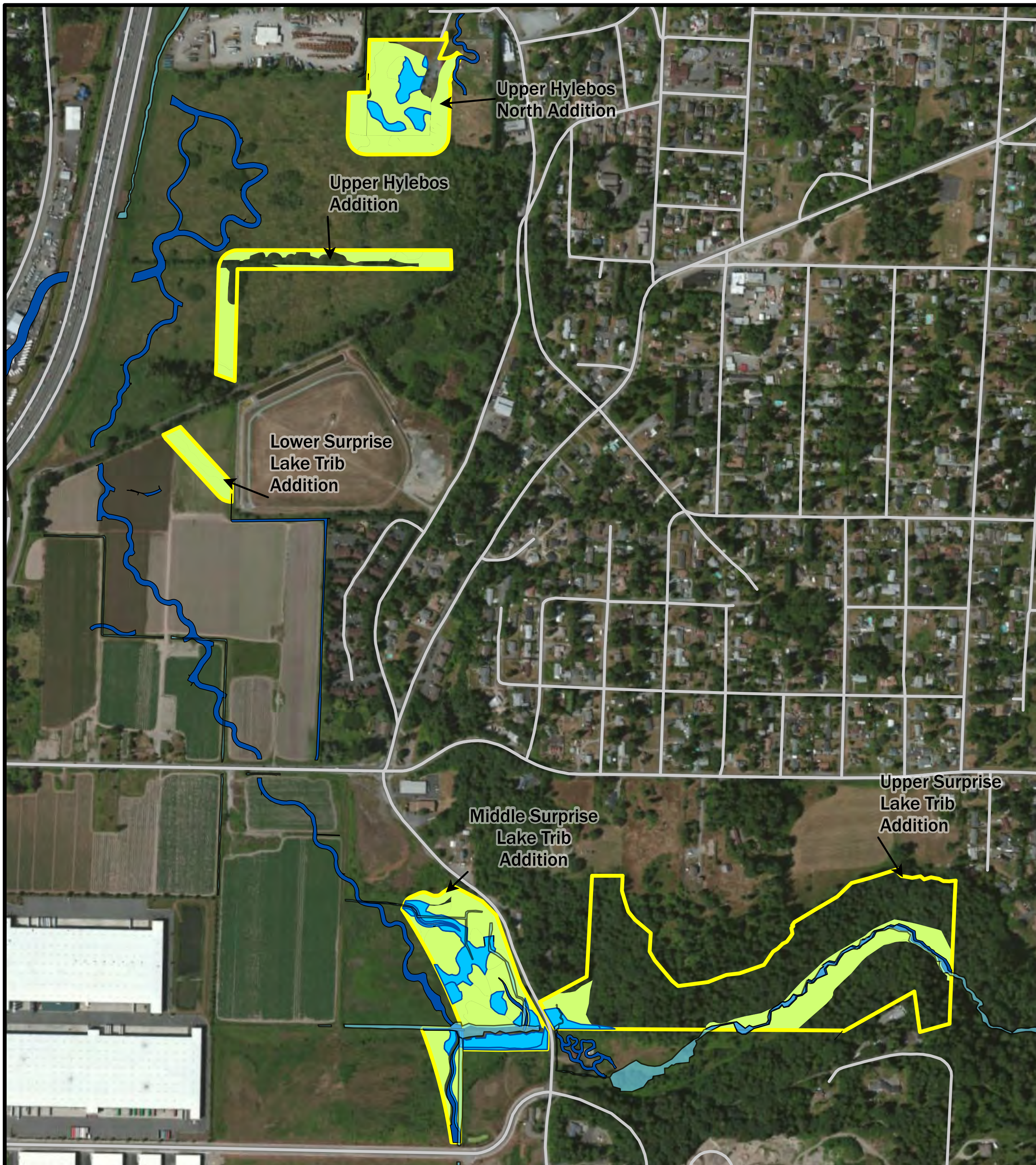

Legend

- Stage 2 RRP Boundaries
- Ponded Depression
- Proposed Stream
- Proposed Wetland
- Delineated Stream
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-18.
Ponded Depressions for Mitigation Sites Within the Hylebos Creek Basin.

N

0 365 730 1,460 Feet

HERRERA

ESRI, Aerial (2022)

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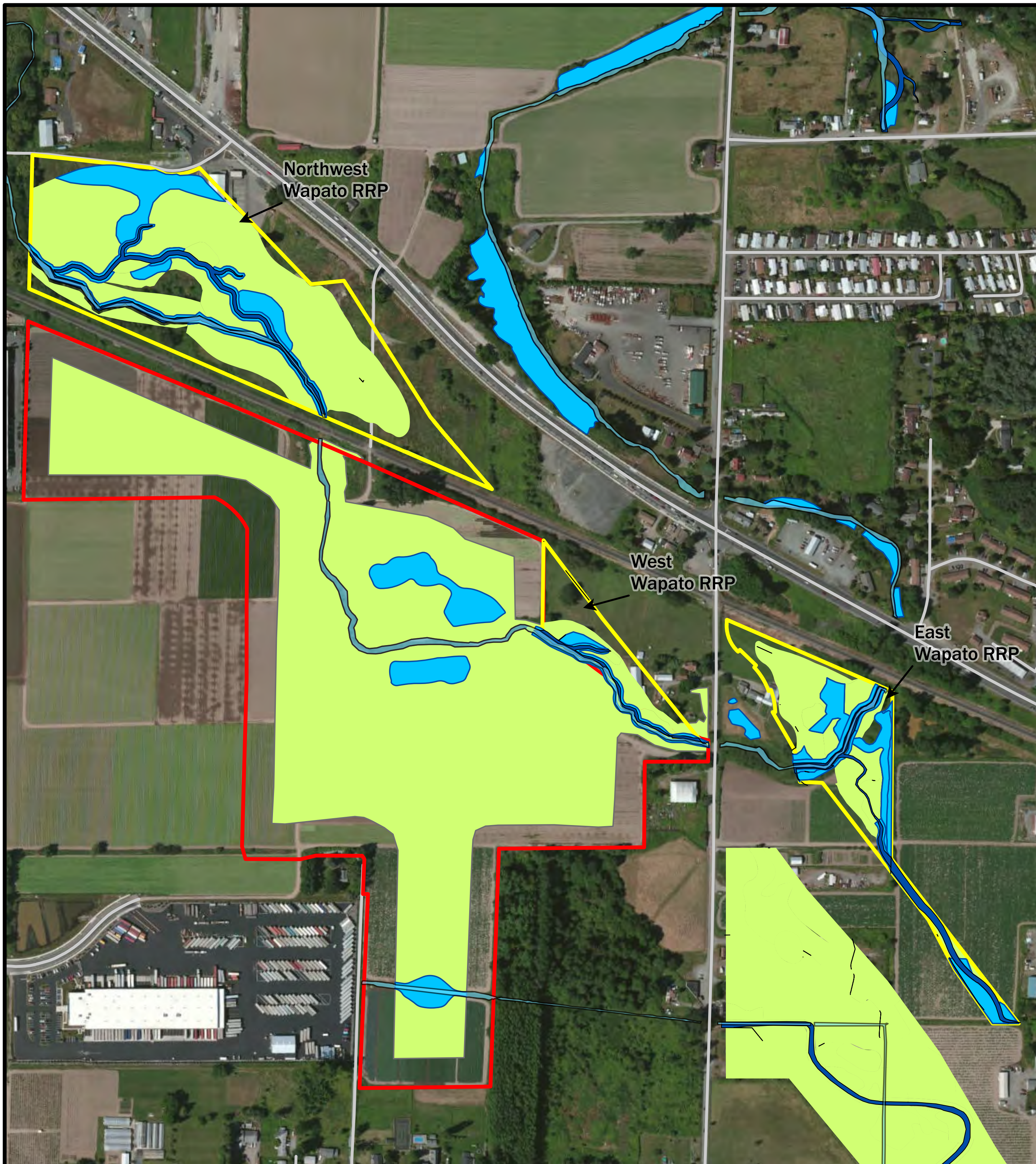

Legend

- Stage 2 RRP Boundaries
- Ponded Depression
- Proposed Stream
- Proposed Wetland
- Delineated Stream
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-19.
Ponded Depressions for Wapato RRP Sites.

N

0 260 520 1,040
Feet

HERRERA

ESRI, Aerial (2022)

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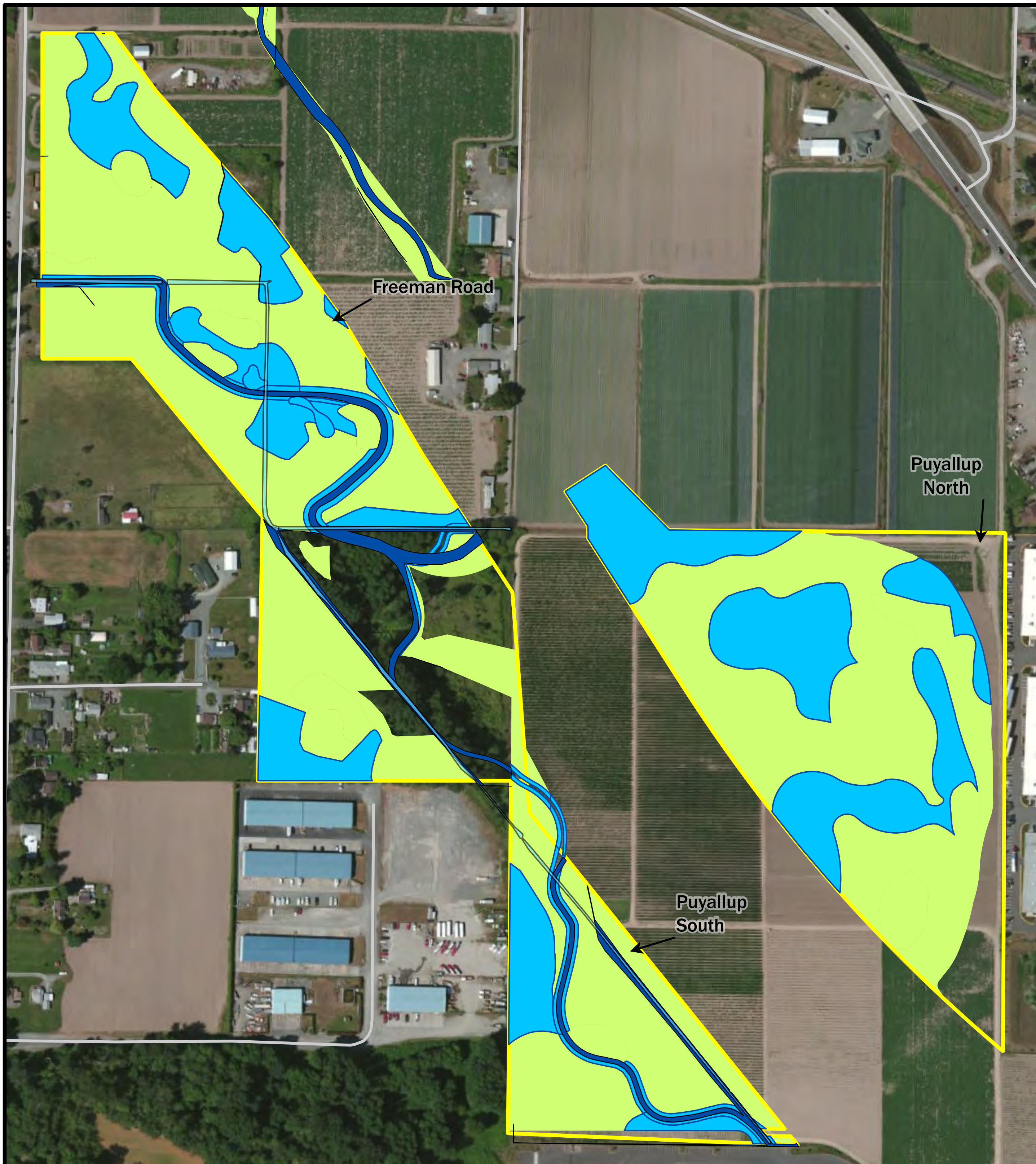

Legend

- Stage 2 RRP Boundaries
- Ponded Depression
- Proposed Stream
- Proposed Wetland
- Delineated Stream
- Existing Mitigations Sites by PTOI and Other Agencies

Figure D-20.
Ponded Depressions for Puyallup Basin Sites.

N

0 185 370 740 Feet

HERRERA

ESRI, Aerial (2022)

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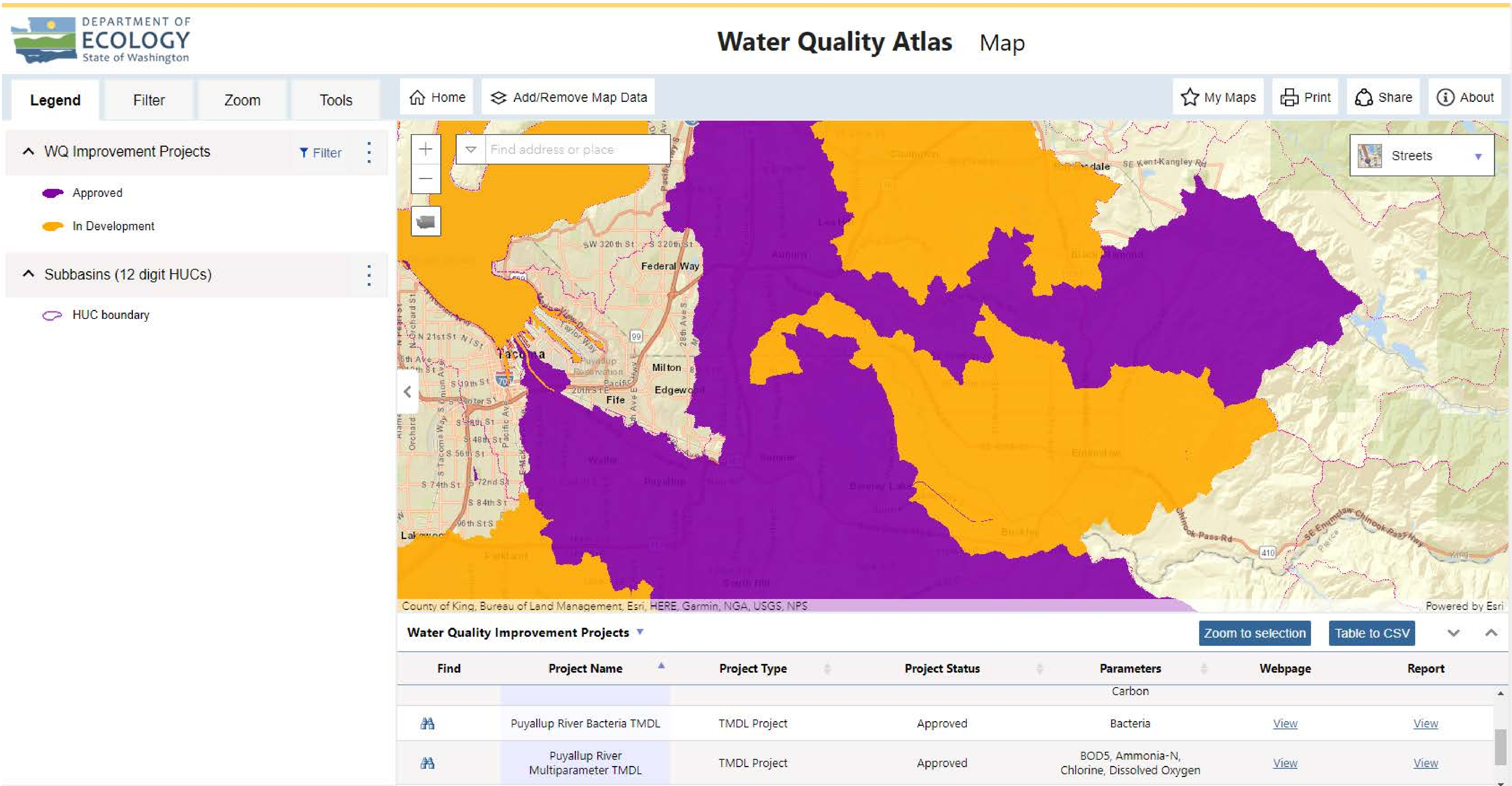

Figure D-21.
TMDLs in the Stage 2 Area.

Appendix E

Grading, Habitat, and Planting Plans

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DATE	8/15/2023				
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DESIGNED BY	R. TAYLOR				
ENTERED BY	T. PRESCOTT				
CHECKED BY	K. FORESTER				
PROJ. ENGR.	C. SODERQUIST				
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY	

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State Department of Transportation

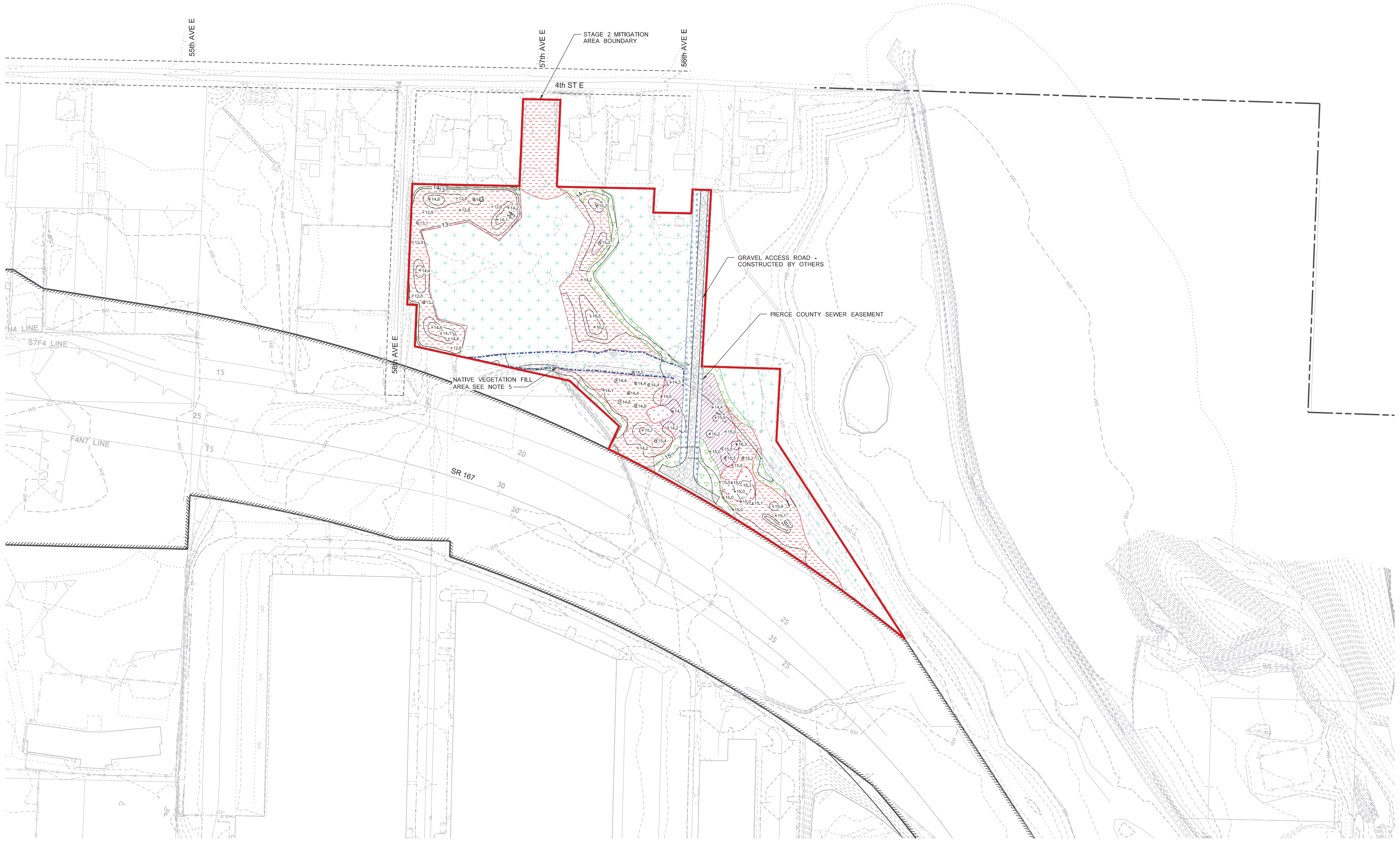
SR 167
I-5 TO SR 161
NEW EXPRESSWAY

MITIGATION PLAN KEY MAP

PLAN REF NO
RRP01

SHEET
OF
SHEETS

0 50 100
SCALE IN FEET



LOWER HYLEBOS ADDITION

PLANTING LEGEND:*

- FORESTED WETLAND (PFO) DECIDUOUS DOMINANT
- NATIVE VEGETATION PROTECTION ZONE
- EMERGENT WETLAND (PEM)
- SCRUB SHRUB WETLAND (PSS)
- RIPARIAN BUFFER FOREST
- ROADSIDE WET MEADOW SEEDING AREA

*NOTE: PLAN HATCH ROTATION VARIES PER SHEET DUE TO DIFFERENT ORIENTATIONS OF NORTH ARROW

LEGEND:

PROPOSED

- RIGHT OF WAY / LIMITED ACCESS
- 505 ROADWAY ALIGNMENT
- CUT / FILL LINE
- 13 CONTOURS (1FT)
- +14.50 SPOT ELEVATIONS
- RRP AREAS
- NATIVE VEGETATION FILL AREA, SEE NOTE 5
- PIERCE COUNTY SEWER EASEMENT

NOTES:

1. REFER TO RRP10 FOR PLANT ZONE DESCRIPTIONS.
2. SANITARY SEWER LINE SHALL HAVE A MINIMUM 3' SOIL COVER.
3. CONNECT WETLAND HYDROLOGY VIA CULVERT WHEN ACCESS ROAD IS DEVELOPED.
4. NATIVE VEGETATION PROTECTION ZONES WITHIN THE LOWER HYLEBOS ADDITION ARE DOMINATED BY NATIVE TREE CANOPY WITH INVASIVE OR DECLINING UNDERSTORY SPECIES. RESTORATION WITHIN THESE AREAS WILL REQUIRE REMOVAL OF INVASIVE VEGETATION IN A MANNER THAT PROTECTS NATIVE TREE ROOT SYSTEMS AND PROVIDES NATIVE REVEGETATION WITHIN THE UNDERSTORY.
5. THE NATIVE VEGETATION FILL AREA IS A DRAINAGE FEATURE/DEPRESSION DOMINATED WITH MATURE ALDER AND WILLOW SPECIES. INVASIVE VEGETATION SHOULD BE REMOVED FROM THIS AREA PRIOR TO GRADING. THE EXISTING DEPRESSION SHALL BE FILLED BY DEPOSITING FILL MATERIAL OVER THE EXISTING NATIVE TREES AND SHRUBS IN A MANNER THAT PRESERVES THESE WOODY SPECIES AND ALLOWS THE OPPORTUNITY FOR STEMS TO ROOT AND RESPROUT. ACCESS ROADS FOR GRADING ON EITHER SIDE OF THE DRAINAGE FEATURE SHOULD BE MINIMIZED TO PRESERVE EXISTING WOODY SPECIES TO THE MAXIMUM EXTENT PRACTICAL.

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DESIGNED BY	R. TAYLOR
ENTERED BY	T. PRESCOTT
CHECKED BY	K. FORESTER
PROJ. ENGR.	C. SODERQUIST
REGIONAL ADM.	J. WHITE

REVISION	DATE	BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

MITIGATION PLAN

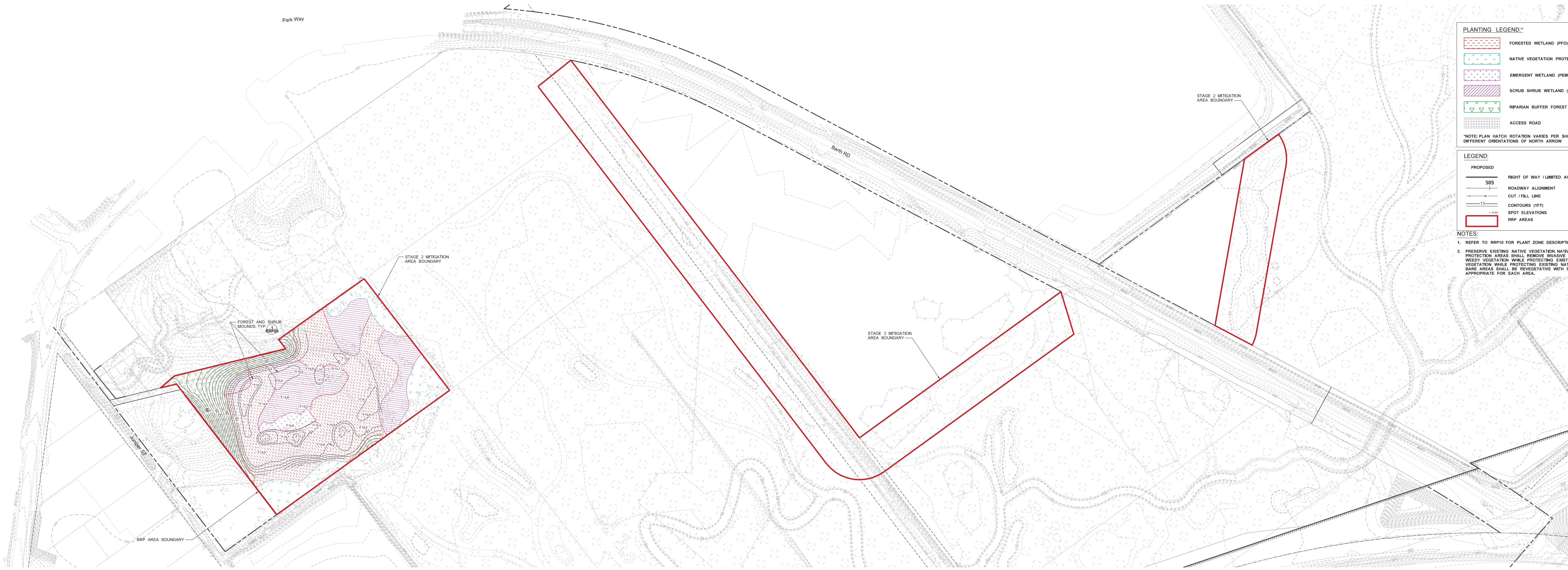
PLAN REF NO RRP02

SHEET OF SHEETS

UPPER HYLEBOS NORTH ADDITION

UPPER HYLEBOS ADDITION

LOWER SURPRISE LAKE TRIB ADDITION



PLANTING LEGEND:*

- FORESTED WETLAND (PFO) DECIDUOUS DOMINANT
- NATIVE VEGETATION PROTECTION ZONE
- EMERGENT WETLAND (PEM)
- SCRUB SHRUB WETLAND (PSS)
- RIPARIAN BUFFER FOREST
- ACCESS ROAD

*NOTE: PLAN HATCH ROTATION VARIES PER SHEET DUE TO DIFFERENT ORIENTATIONS OF NORTH ARROW

LEGEND:

PROPOSED

- RIGHT OF WAY / LIMITED ACCESS
- 505 ROADWAY ALIGNMENT
- CUT / FILL LINE
- 13 CONTOURS (1FT)
- +14.50 SPOT ELEVATIONS
- RRP AREAS

NOTES:

1. REFER TO RRP10 FOR PLANT ZONE DESCRIPTIONS.
2. PRESERVE EXISTING NATIVE VEGETATION. NATIVE VEGETATION PROTECTION AREAS SHALL REMOVE INVASIVE AND NON-NATIVE WEEDY VEGETATION WHILE PROTECTING EXISTING NATIVE VEGETATION WHILE PROTECTING EXISTING NATIVE VEGETATION. BARE AREAS SHALL BE REVEGETATIVE WITH SPECIES APPROPRIATE FOR EACH AREA.

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PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

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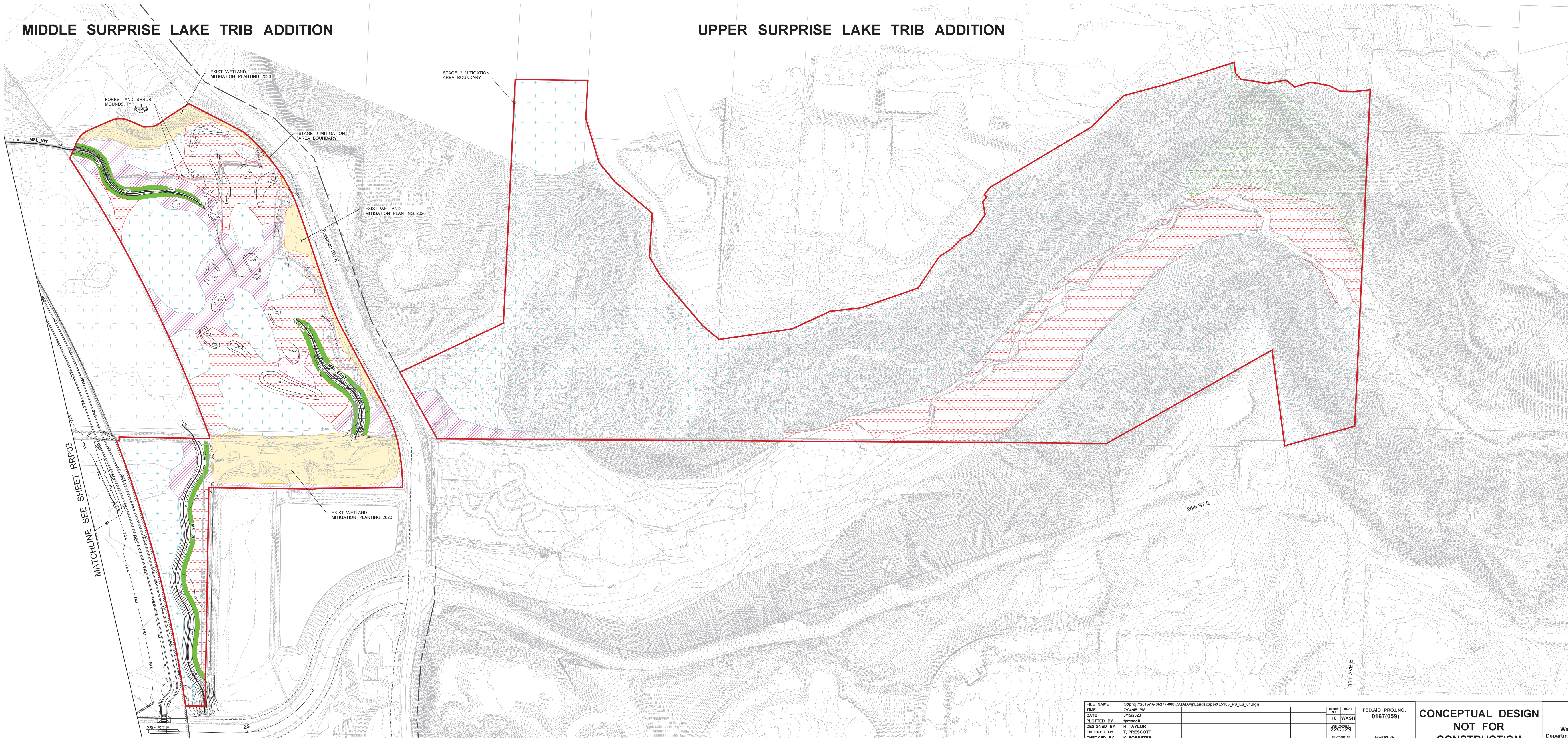
SR 167
I-5 TO SR 161
NEW EXPRESSWAY

MITIGATION PLAN

PLAN REF NO RRP03
SHEET
OF
SHEETS



0 50 100
SCALE IN FEET

N

PLANTING LEGEND:*

- FORESTED WETLAND (PFO) DECIDUOUS DOMINANT
- NATIVE VEGETATION PROTECTION ZONE
- EMERGENT WETLAND (PEM)
- SCRUB SHRUB WETLAND (PSS)
- RIPARIAN BUFFER FOREST
- AQUATIC VEGETATION
- DENSE HEDGEROW 2 RRP09
- EXISTING WETLAND MITIGATION PLANTING

*NOTE: PLAN HATCH ROTATION VARIES PER SHEET DUE TO DIFFERENT ORIENTATIONS OF NORTH ARROW

LEGEND:

PROPOSED

- RIGHT OF WAY / LIMITED ACCESS
- 505 ROADWAY AND STREAM ALIGNMENT
- CUT / FILL LINE
- 13 CONTOURS (1FT)
- +14.50 SPOT ELEVATIONS
- RRP AREAS

NOTES:

1. REFER TO RRP10 FOR PLANT ZONE DESCRIPTIONS.
2. PRESERVE EXISTING NATIVE VEGETATION. NATIVE VEGETATION PROTECTION AREAS SHALL REMOVE INVASIVE AND NON-NATIVE WEEDY VEGETATION WHILE PROTECTING EXISTING NATIVE VEGETATION. BARE AREAS SHALL BE REVEGETATED WITH SPECIES APPROPRIATE FOR EACH AREA.
3. IN THE UPPER SURPRISE LAKE TRIBUTARY ADDITION SITE, GRADING SHALL ONLY OCCUR IN SCRUB SHRUB PLANTING AREA. THE REMAINDER OF THE SITE SHALL NOT BE DRIVEN UPON AND SHALL NOT HAVE SOIL COMPACTED IN ANY WAY.

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REGIONAL ADM.	J. WHITE

REVISION	DATE	BY

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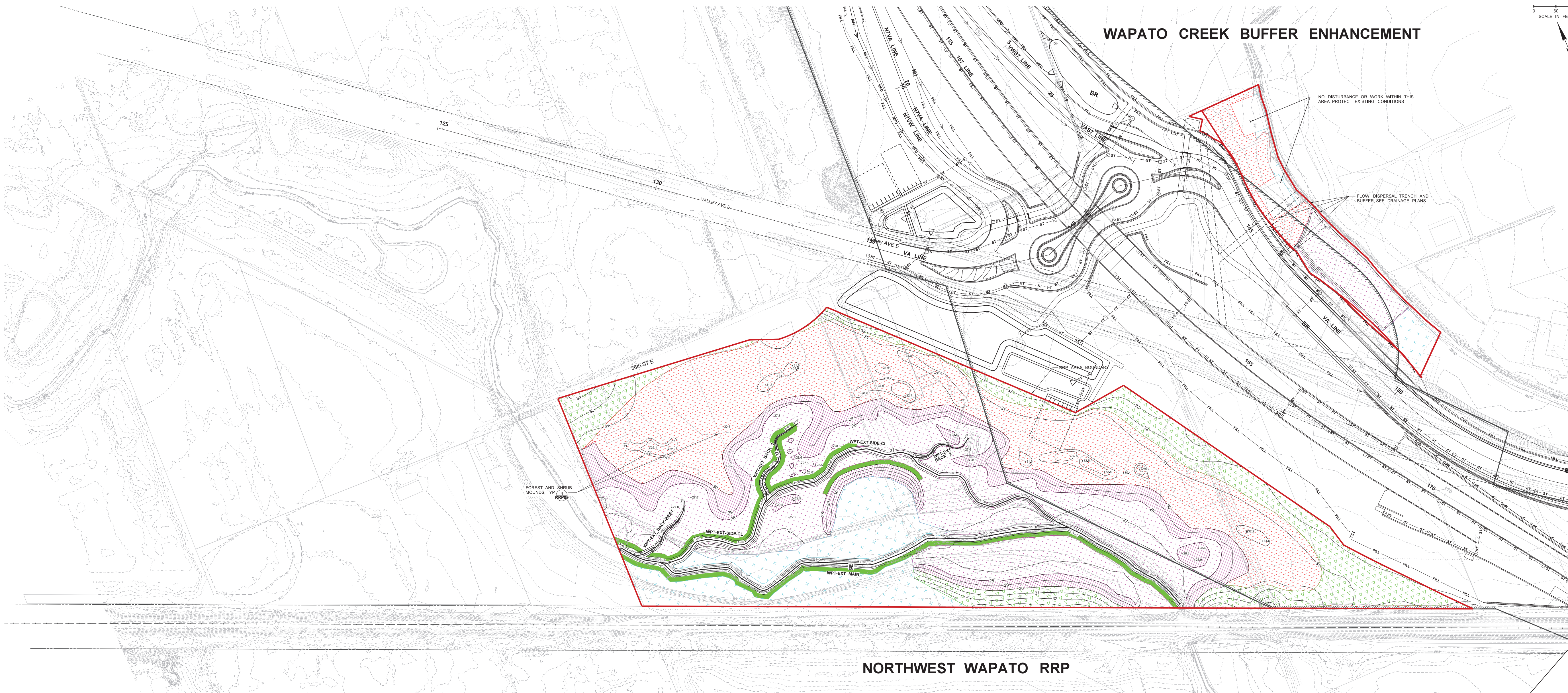
NEW EXPRESSWAY

MITIGATION PLAN

PLAN REF NO RRP04
SHEET OF SHEETS



0 50 100
SCALE IN FEET

PLANTING LEGEND:*

- FORESTED WETLAND (PFO) DECIDUOUS DOMINANT
- NATIVE VEGETATION PROTECTION ZONE
- EMERGENT WETLAND (PEM)
- SCRUB SHRUB WETLAND (PSS)
- RIPARIAN BUFFER FOREST
- AQUATIC VEGETATION
- DENSE HEDGEROW 2 RRP09

*NOTE: PLAN HATCH ROTATION VARIES PER SHEET DUE TO DIFFERENT ORIENTATIONS OF NORTH ARROW

LEGEND:

PROPOSED

- RIGHT OF WAY / LIMITED ACCESS
- 505 ROADWAY AND STREAM ALIGNMENT
- CUT / FILL LINE
- 13 CONTOURS (1FT)
- +14.50 SPOT ELEVATIONS
- RRP AREAS

NOTES:

1. REFER TO RRP10 FOR PLANT ZONE DESCRIPTIONS.
2. PRESERVE EXISTING NATIVE VEGETATION. NATIVE VEGETATION PROTECTION AREAS SHALL REMOVE INVASIVE AND NON-NATIVE WEEDY VEGETATION WHILE PROTECTING EXISTING NATIVE VEGETATION. BARE AREAS SHALL BE REVEGETATED WITH SPECIES APPROPRIATE FOR EACH AREA.

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REGIONAL ADM.	J. WHITE

REVISION | DATE | BY

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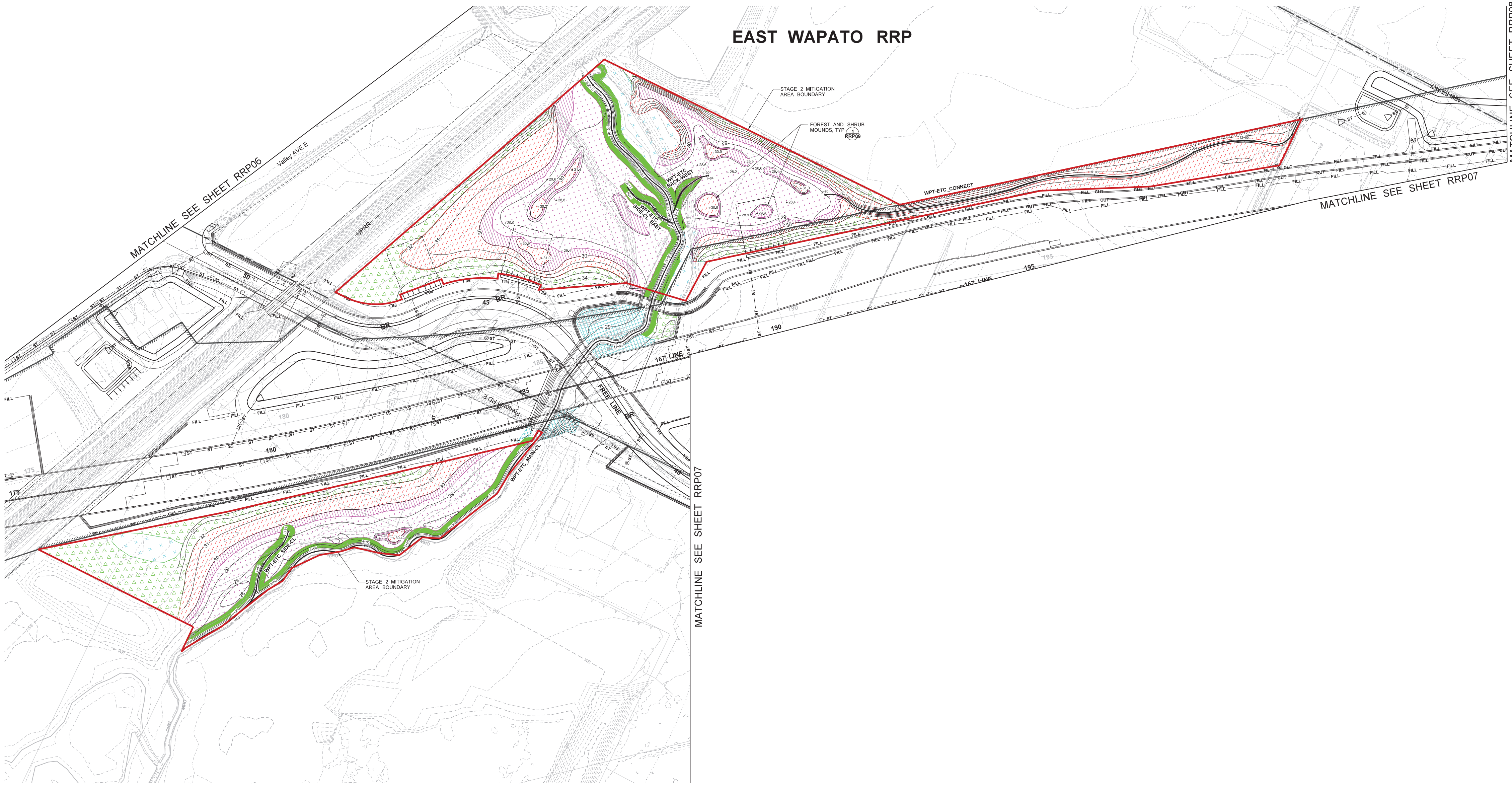
SR 167
I-5 TO SR 161
NEW EXPRESSWAY

MITIGATION PLAN

PLAN REF NO RRP05

SHEET OF SHEETS



0 50 100
SCALE IN FEET

PLANTING LEGEND:*

- FORESTED WETLAND (PFO) DECIDUOUS DOMINANT
- NATIVE VEGETATION PROTECTION ZONE
- EMERGENT WETLAND (PEM)
- SCRUB SHRUB WETLAND (PSS)
- RIPARIAN BUFFER FOREST
- AQUATIC VEGETATION
- DENSE HEDGEROW 2/RRP09
- BEAVER DETERRENT ZONE (PSS)

*NOTE: PLAN HATCH ROTATION VARIES PER SHEET DUE TO DIFFERENT ORIENTATIONS OF NORTH ARROW

LEGEND:

PROPOSED

- RIGHT OF WAY / LIMITED ACCESS
- 505 ROADWAY AND STREAM ALIGNMENT
- CUT / FILL LINE
- 13 CONTOURS (1FT)
- +14.50 SPOT ELEVATIONS
- RRP AREAS

NOTES:

1. REFER TO RRP10 FOR PLANT ZONE DESCRIPTIONS.
2. PRESERVE EXISTING NATIVE VEGETATION. NATIVE VEGETATION PROTECTION AREAS SHALL REMOVE INVASIVE AND NON-NATIVE WEEDY VEGETATION WHILE PROTECTING EXISTING NATIVE VEGETATION. BARE AREAS SHALL BE REVEGETATED WITH SPECIES APPROPRIATE FOR EACH AREA.

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PROJ. ENGR.	C. SODERQUIST			
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SR 167
I-5 TO SR 161
NEW EXPRESSWAY

MITIGATION PLAN

PLAN REF NO RRP06
SHEET OF SHEETS

PLANTING LEGEND:*

- FORESTED WETLAND (PFO) DECIDUOUS DOMINANT
- NATIVE VEGETATION PROTECTION ZONE
- EMERGENT WETLAND (PEM)
- SCRUB SHRUB WETLAND (PSS)
- AQUATIC VEGETATION
- DENSE HEDGEROW 2 RRP09
- BEAVER DETERRENT ZONE (PSS)
- TURTLE MOUND

*NOTE: PLAN HATCH ROTATION VARIES PER SHEET DUE TO DIFFERENT ORIENTATIONS OF NORTH ARROW

LEGEND:

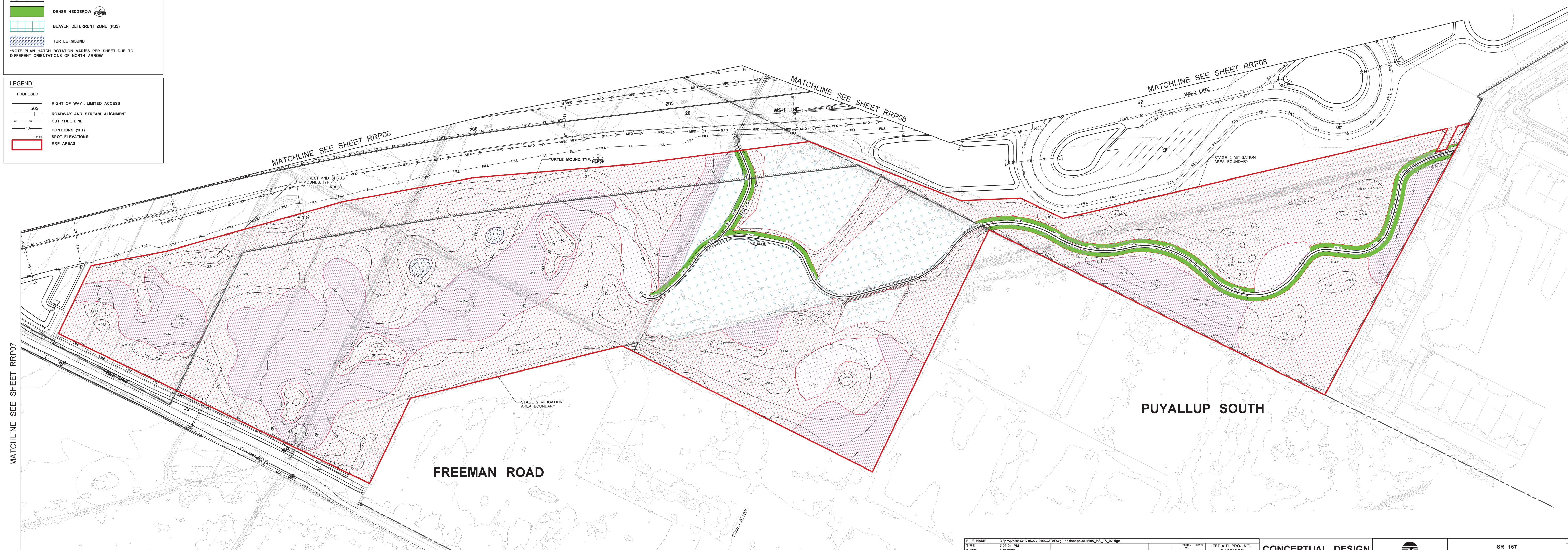
PROPOSED

- RIGHT OF WAY / LIMITED ACCESS
- 505 ROADWAY AND STREAM ALIGNMENT
- CUT / FILL LINE
- 13 CONTOURS (1FT)
- +14.50 SPOT ELEVATIONS
- RRP AREAS

NOTES:

1. REFER TO RRP10 FOR PLANT ZONE DESCRIPTIONS.
2. PRESERVE EXISTING NATIVE VEGETATION. NATIVE VEGETATION PROTECTION AREAS SHALL REMOVE INVASIVE AND NON-NATIVE WEEDY VEGETATION WHILE PROTECTING EXISTING NATIVE VEGETATION. BARE AREAS SHALL BE REVEGETATED WITH SPECIES APPROPRIATE FOR EACH AREA.

0 50 100
SCALE IN FEET



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DESIGNED BY	R. TAYLOR						
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CHECKED BY	K. FORESTER						
PROJ. ENGR.	C. SODERQUIST						
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SR 167
I-5 TO SR 161
NEW EXPRESSWAY

MITIGATION PLAN

PLAN REF NO RRP07

SHEET OF SHEETS

PUYALLUP NORTH

0 50 100
SCALE IN FEET

PLANTING LEGEND:*

- FORESTED WETLAND (PFO) DECIDUOUS DOMINANT
- EMERGENT WETLAND (PEM)
- SCRUB SHRUB WETLAND (PSS)
- RIPARIAN BUFFER FOREST

*NOTE: PLAN HATCH ROTATION VARIES PER SHEET DUE TO DIFFERENT ORIENTATIONS OF NORTH ARROW

LEGEND:

PROPOSED

- RIGHT OF WAY / LIMITED ACCESS
- 505 ROADWAY AND STREAM ALIGNMENT
- CUT / FILL LINE
- 13 CONTOURS (1FT)
- +14.50 SPOT ELEVATIONS
- RRP AREAS

NOTES:

1. REFER TO RRP10 FOR PLANT ZONE DESCRIPTIONS.

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REGION NO.	STATE	FED.AID PROJ.NO.
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SR 167
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NEW EXPRESSWAY

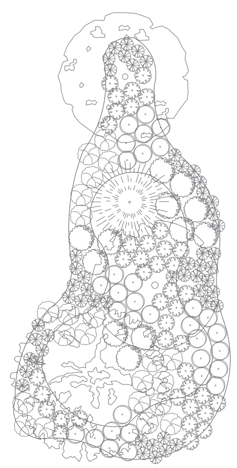
MITIGATION PLAN

PLAN REF NO RRP08

SHEET OF SHEETS

DESIGN CRITERIA:

1. FOREST AND SHRUB MOUNDS SHALL BE INTEGRATED THROUGHOUT WETLAND AREAS TO ADD SITE MICROTOPOGRAPHY AND PROVIDE LANDSCAPE VARIABILITY.
2. MOUNDS ARE INTENDED TO MAINTAIN WETLAND CONDITIONS, BUT ALLOW FOR GREATER POTENTIAL FOR TREE AND SHRUB ESTABLISHMENT. INCREASED TREE AND SHRUB CANOPY WILL PROVIDE SITE SHADING, WEED COMPETITION, AND ALSO SUPPLY A CONTINUOUS NATIVE TREE AND SHRUB SEED SOURCE. MOUND VEGETATION WILL BE EITHER PALUSTRINE FORESTED WETLAND (PF0) AND/OR SCRUB SHRUB WETLAND (PSS).
3. FOREST AND SHRUB MOUNDS SHALL BE VARIABLE IN SIZE, SHAPE, AND HAVE A VARIETY OF SOLAR ASPECTS IN ORDER TO ENCOURAGE VARIATION IN VEGETATION ESTABLISHMENT.
4. MOUNDS SHALL HAVE VARIABLE SIDE SLOPES AND APPEAR NATURAL IN FORM.
5. MOUND HEIGHTS SHALL BE A MINIMUM OF 1 FOOT IN HEIGHT AND A MAXIMUM OF 3 FEET IN HEIGHT.

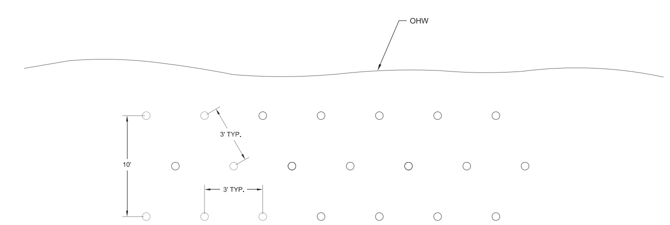


PLAN VIEW

ELEVATION (TYP)

FOREST AND SHRUB MOUNDS 1 -

SCALE: NTS



NOTES:
1. PLANT HEDGEROW MINIMUM 3 ROWS DEEP.
2. THE FIRST ROW OF PLANTS SHOULD BE OFFSET 2-3 FEET FROM ORDINARY HIGH WATER.

PLAN VIEW- DENSE HEDGEROW PLANTING LAYOUT 2 -

SCALE: NTS

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SR 167
I-5 TO SR 161
NEW EXPRESSWAY

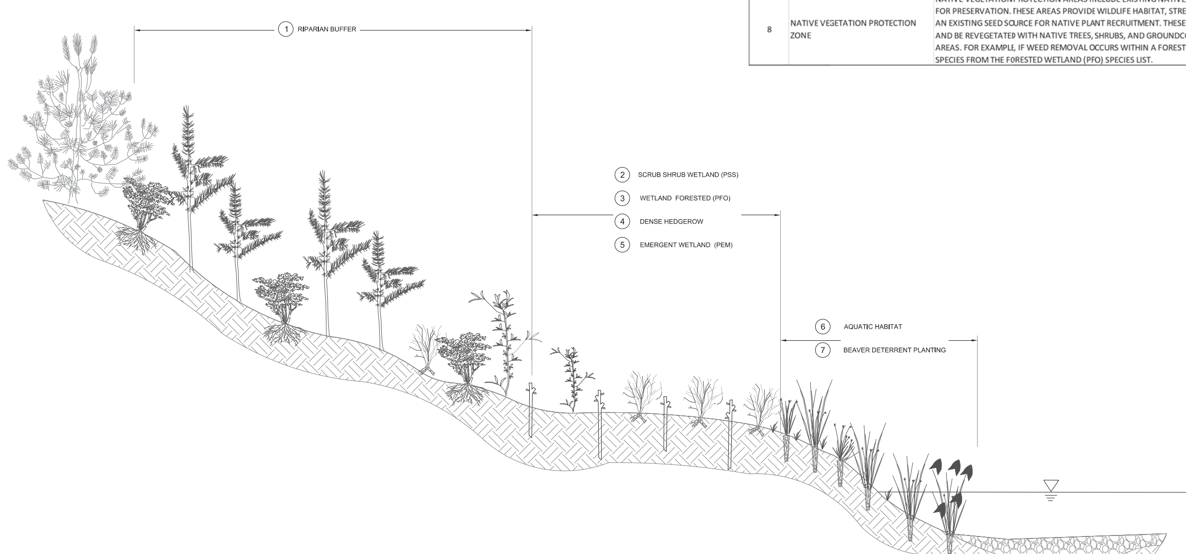
MITIGATION DETAILS

PLAN REF NO RRP09

SHEET OF SHEETS

PLANTING NOTES:

1. TREES SHALL BE PLANTED AN AVERAGE OF 10 FEET ON CENTER
2. SHRUBS SHALL BE PLANTED AN AVERAGE OF 4 FEET ON CENTER
3. LIVE STAKES AND GROUNDCOVERS SHALL BE PLANTED AN AVERAGE OF 3 FEET ON CENTER
4. BLACK COTTONWOOD (POPULUS BALSAMIFERA) SHALL BE PLANTED A MINIMUM OF 150 FEET FROM EDGE OF ROADWAY AND ANY SURROUNDING STRUCTURES (HOMES, WAREHOUSES, BUSINESSES, ETC.).
5. BIG LEAF MAPLE (ACER MACROPHYLLUM) SHALL BE PLANTED A MINIMUM OF 80 FEET FROM EDGE OF ROADWAY AND ANY SURROUNDING STRUCTURES (HOMES, WAREHOUSES, BUSINESSES, ETC.).
6. RED ALDER (ALNUS RUBRA) AND POPULUS BALSAMIFERA SHALL BE PLANTED A MINIMUM OF 60 FEET FROM EDGE OF ROADWAY AND ANY SURROUNDING STRUCTURES (HOMES, WAREHOUSES, BUSINESSES, ETC.).



PLANT ZONE DETAIL

SCALE: NTS

3
-

ZONE ID	PLANTING ZONE	DESCRIPTION AND PURPOSE
1	RIPARIAN BUFFER FOREST	RIPARIAN BUFFER FOREST PLANTING SHALL CONSIST OF NATIVE TREE, SHRUB AND GROUNDCOVER SPECIES THAT PROVIDE SHADE AND INCREASE SPECIES DIVERSITY FOR ADDED HABITAT VALUE. GROUNDCOVER PLANTING SHALL BE LESS SIGNIFICANT WITHIN RIPARIAN PLANTING ZONES.
2	SCRUB SHRUB WETLAND (PSS)	SCRUB SHRUB WETLAND (PSS) AREAS SHALL BE A DOMINANT PLANT COMMUNITY WITHIN THE RRP. THIS COMMUNITY SHALL CONSIST OF SHRUBS AND SMALL TREES, AS WELL AS LIMITED GROUNDCOVER UNDERSTORY PLANTING.
3	FORESTED WETLAND (PFO)	FORESTED WETLAND (PFO) AREAS SHALL BE A DOMINANT PLANT COMMUNITY WITHIN THE RRP LANDSCAPE MATRIX. FORESTED AREAS ARE MEANT TO ESTABLISH ADDITIONAL SHADE AND PROVIDE LARGE CANOPY STRATA FOR HABITAT.
4	DENSE HEDGEROW	DENSE PLANTING OF NATIVE TREE AND SHRUB SPECIES THAT WILL QUICKLY CREATE STREAM SHADE AND COMPETE WITH REED CANARYGRASS AND OTHER INVASIVE VEGETATION.
5	EMERGENT WETLAND (PEM)	EMERGENT WETLAND (PEM) AREAS SHALL BE INCLUDED IN PATCHES SURROUNDED BY WETLAND FOREST AND WETLAND SHRUB AREAS IN ORDER TO MINIMIZE EXPOSURE OF THESE AREAS TO WEED SOURCES AND DISTURBANCE VECTORS. A MINIMUM OF 5 PERCENT OF THE RIPARIAN RESTORATION AREA SHOULD BE WETLAND EMERGENT PLANTING IN ORDER TO PROVIDE HABITAT FOR SPECIES THAT RELY ON THIS PLANT COMMUNITY.
6	AQUATIC VEGETATION	AQUATIC VEGETATION IS INCLUDED WITHIN LOW LYING BENCHED AREAS ADJACENT TO STREAM CHANNELS AND WITHIN BACKWATER CHANNEL AREAS WHERE PERMANENT INUNDATION SUPPORTS AQUATIC HABITAT. AQUATIC VEGETATION SHALL BE PLANTED WITHIN THE FIRST 50 TO 100 FEET OF THE BACKWATER CHANNEL AREAS WHERE PERMANENT INUNDATION SUPPORTS AQUATIC HABITAT.
7	BEAVER DETERRENT PLANTING	THIS PLANTING PALETTE IS INTENDED TO CREATE HABITAT AREAS THAT DISCOURAGE BEAVER ACTIVITY. WILLOW, DOGWOOD, CASCARA, AND SHORE PINE SPECIES SHOULD BE PLANTED IN GROUPINGS SURROUNDED BY 2 TO 3 DENSELY PLANTED LAYERS OF SPIREA AND NINEBARK. SPIREA AND NINEBARK SHALL BE TRIANGULARLY SPACED AND ARRANGED TO CREATE A LIVING WALL AROUND GROUPINGS OF OTHER NATIVE SPECIES.
8	NATIVE VEGETATION PROTECTION ZONE	NATIVE VEGETATION PROTECTION AREAS INCLUDE EXISTING NATIVE, MATURE TREES AND SHRUBS IDENTIFIED AS IMPORTANT FOR PRESERVATION. THESE AREAS PROVIDE WILDLIFE HABITAT, STREAM AND WETLAND SHADE, WEED COMPETITION, AND AN EXISTING SEED SOURCE FOR NATIVE PLANT RECRUITMENT. THESE AREAS SHALL HAVE INVASIVE VEGETATION REMOVED AND BE REVEGETATED WITH NATIVE TREES, SHRUBS, AND GROUNDCOVER THAT ALIGN WITH THE HABITAT TYPE IN THOSE AREAS. FOR EXAMPLE, IF WEED REMOVAL OCCURS WITHIN A FORESTED WETLAND, NATIVE REVEGETATION SHALL CONSIST OF SPECIES FROM THE FORESTED WETLAND (PFO) SPECIES LIST.

EMERGENT WETLAND (PEM) SPECIES LIST

SCIENTIFIC NAME	COMMON NAME	WETLAND STATUS
SHRUBS		
KALMIA MICROPHYLLA VAR. OCCIDENTALIS	WESTERN BOG LAUREL	OBL
GRASSES, SEDGES, RUSHES, AND AQUATIC SPECIES		
ARGENTINA EGDEDII SSP EGEDII	PACIFIC SILVERWEED	OBL
CAMASSIA QUAMASH	COMMON CAMAS	FACW
CAMASSIA LEICHTLINII	GREAT CAMAS	FACW
CAREX DEWEYANA	DEWEY SEDGE	FAC
CAREX LENTICULARIS	SHORE SEDGE	OBL
CAREX OBNUPTA	SLOUGH SEDGE	OBL
CAREX PACHYSTACHYA	CHAMISSO'S SEDGE	FAC
CAREX STIPATA	AWLFRUIT SEDGE	OBL
DESCHAMPSIA CESPITOSA	TUFTED HAIR GRASS	FACW
ELEOCHARIS PALUSTRIS	COMMON SPIKERUSH	OBL
ERIOPHORUM CHAMISSONIS	CHAMISSO'S COTTONGRASS	OBL
FESTUCA RUBRA	RED FESCUE	FAC
GLYCERIA ELATA	TALL MANNAGRASS	FACW
HORDEUM BRACHYANTHERUM	MEADOW BARLEY	FACW
JUNCUS BALTICUS	BALTIC RUSH	FACW
JUNCUS EFFUSUS VAR PACIFICUS	PACIFIC RUSH	FACW
JUNCUS ENSIFOLIUS	DAGGERLEAF RUSH	FACW
JUNCUS TENUIS	SLENDER RUSH	FAC
SCIRPUS MICROCARPUS	SMALLFRUIT BULRUSH	OBL
SCHOENOPLECTUS ACUTUS	HARDSTEM BULRUSH	OBL
SCHOENOPLECTUS AMERICANUS (SCIRPUS PUNGENS)	THREE-SQUARE BULRUSH	OBL
URTICA DIOICA	STINGING NETTLE	FAC

AQUATIC VEGETATION SPECIES LIST

SCIENTIFIC NAME	COMMON NAME	WETLAND STATUS
SHRUBS		
KALMIA MICROPHYLLA VAR. OCCIDENTALIS	WESTERN SWAMP LAUREL	OBL
GROUNDCOVER		
ARGENTINA EGEDII SSP. EGEDII	PACIFIC SILVERWEED	OBL
BOLBOSCHOENUS MARITIMUS	SEACOAST TUBEROUS BULRU	OBL
CAREX LENTICULARIS	LAKESHORE SEDGE	OBL
CAREX LYNGBYEI	LYNGBYE'S SEDGE	OBL
CAREX OBNUPTA	SLOUGH SEDGE	OBL
CAREX STIPATA	AWL-FRUIT SEDGE	OBL
ELEOCHARIS PALUSTRIS	COMMON SPIKERUSH	OBL
ERIOPHORUM CHAMISSONIS	CHAMISSO'S COTTONGRASS	OBL
JUNCUS ENSIFOLIUS	DAGGERLEAF RUSH	FACW
SAGITTARIA LATIFOLIA	WAPATO	OBL
SCIRPUS MICROCARPUS	SMALLFRUIT BULRUSH	OBL
SCHOENOPLECTUS ACUTUS	HARDSTEM BULRUSH	OBL
SCHOENOPLECTUS AMERICANUS (SCIRPUS PUNGENS)	THREE-SQUARE BULRUSH	OBL

DENSE HEDGEROW SPECIES LIST

SCIENTIFIC NAME	COMMON NAME	WETLAND STATUS
TREES		
ALNUS RUBRA	RED ALDER	FAC
FRAXINUS LATIFOLIA	OREGON ASH	FACW
SHRUBS		
CORNUS SERICEA	REDOSIER DOGWOOD	FACW
LONICERA INVOLUCRATA	TWINBERRY	FAC
PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	FACW
ROSA NUTKANA	NOOTKA ROSE	FAC
SALIX HOOKERIANA	SALIX HOOKERIANA	FACW
SALIX PROLIXA (SALIX CORDATA VAR. MACKENZIEANA)	MACKENZIE'S WILLOW	OBL
SALIX SITCHENSIS	SITKA WILLOW	FACW
SPIRAEA DOUGLASII SSP. DOUGLASII	WESTERN SPIREA	FACW

NOTES:
FRAXINUS LATIFOLIA SHOULD BE PLANTED IN LOWER QUANTITIES DUE TO THE THREAT FROM EMERALD ASH BORERS. SMALL QUANTITIES OF THE SPECIES SHOULD BE INSTALLED THROUGHOUT THE DENSE HEDGEROW.

SCRUB SHRUB WETLAND (PSS) SPECIES LIST

SCIENTIFIC NAME	COMMON NAME	WETLAND STATUS
DECIDUOUS TREES		
CRATAEGUS DOUGLASII	BLACK HAWTHORN	FAC
SHRUBS		
CORNUS SERICEA	REDOSIER DOGWOOD	FACW
KALMIA MICROPHYLLA VAR. OCCIDENTALIS	WESTERN SWAMP LAUREL	OBL
LONICERA INVOLUCRATA	TWINBERRY HONEYSUCKLE	FAC
OPLOPANAX HORRIDUS	DEVIL'S CLUB	FAC
PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	FACW
RIBES BRACTEOSUM	STINK CURRANT	FAC
RIBES LACUSTRE	PRICKLY CURRANT	FAC
ROSA NUTKANA	NOOTKA ROSE	FAC
ROSA PISOCARPA	CLUSTERED ROSE	FAC
RUBUS SPECTABILIS	SALMONBERRY	FAC
SALIX HOOKERIANA	DUNE WILLOW	FACW
SALIX LUCIDA SSP. LASIANDRA	PACIFIC WILLOW	FACW
SALIX PROLIXA (SALIX CORDATA VAR MACKENZIEANA)	MACKENZIES WILLOW	OBL
SALIX SCOULERIANA	SCOULER'S WILLOW	FAC
SALIX SITCHENSIS	SITKA WILLOW	FACW
SPIRAEA DOUGLASII SSP. DOUGLASII	WESTERN SPIREA	FACW
VACCINIUM CAESPITOSUM	DWARF BILBERRY	FAC
VACCINIUM ULIGINOSUM	BOG BLUEBERRY	FACW
VIBURNUM EDULE	HIGHBUSH CRANBERRY	FACW
GRASSES, SEDGES, RUSHES, AND AQUATIC SPECIES		
BOLBOSCHOENUS MARITIMUS	SEACOAST TUBEROUS BULRUSH	OBL
CAREX OBNUPTA	SLOUGH SEDGE	OBL
CAREX PACHYSTACHYA	CHAMISSO'S SEDGE	FAC
GEUM MACROPHYLLUM	LARGELEAF AVENS	FAC
JUNCUS PATENS	SPREADING RUSH	FACW
JUNCUS TENUIS	SLENDER RUSH	FAC
SCIRPUS MICROCARPUS	SMALLFRUIT BULRUSH	OBL
SCHOENOPLECTUS ACUTUS	HARDSTEM BULRUSH	OBL
SCHOENOPLECTUS AMERICANUS (SCIRPUS PUNGENS)	THREE-SQUARE BULRUSH	OBL
URTICA DIOICA	STINGING NETTLE	FAC

NOTES:
-SPIRAEA DOUGLASII SHALL BE PLANTED IN SMALL QUANTITIES IN ORDER TO PREVENT IT FROM BECOMING A DOMINANT SPECIES AND TO PRESERVE SPECIES DIVERSTY.

-LIVE STAKES PLANTING ZONES SHALL CONSIST OF A MINIMUM OF THREE DIFFERENT WILLOW SPECIES AND DOGWOOD LIVE STAKES FROM THIS PLANT PALETTE.

BEAVER DETERRENT ZONE SPECIES LIST

SCIENTIFIC NAME	COMMON NAME	WETLAND STATUS
CONIFERS		
PINUS CONTORTA VAR. CONTORTA	SHORE PINE	FAC
DECIDUOUS TREES		
FRANGULA PURSHIANA	CASCARA BUCKTHORN	FAC
SHRUBS		
CORNUS SERICEA	REDOSIER DOGWOOD	FACW
PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	FACW
SALIX LUCIDA SSP. LASIANDRA	PACIFIC WILLOW	FACW
SALIX PROLIXA (SALIX CORDATA VAR MACKENZIEANA)	MACKENZIES WILLOW	OBL
SALIX SCOULERIANA	SCOULER'S WILLOW	FAC
SALIX SITCHENSIS	SITKA WILLOW	FACW
SAMBUCUS RACEMOSA	RED ELDERBERRY	FACU
SPIRAEA DOUGLASII SSP. DOUGLASII	WESTERN SPIREA	FACW

ROADSIDE WET MEADOW SEED MIX - ESTIMATED PLS POUNDS PER ACRE - 80.31

Scientific name	Common Name	Target Seeds Per Square Foot	% of Species Composition Within Mix	Estimated PLS Pounds/Species
ACHILLEA MILLEFOLIUM	COMMON YARROW	3%	3%	0.06
ELYMUS GLAUCUS	BLUE WILDRYE	25%	25%	11.24
FESTUCA RUBRA VAR RUBRA	RED FESCUE	18%	18%	0.83
GEUM MACROPHYLLUM	LARGE-LEAVED AVENS	2%	2%	0.13
HORDEUM VULGARE VAR. POCO	POCO BARELY	18%	18%	67.23
KOELERIA MACRANTHA	PRAIRIE JUNEGRASS	16%	16%	0.53
POA PALUSTRIS	FOWL BLUEGRASS	18%	18%	0.30

FORESTED WETLAND (PFO) SPECIES LIST

SCIENTIFIC NAME	COMMON NAME	WETLAND STATUS
CONIFERS		
THUJA PLICATA	WESTERN REDCEDAR	FAC
DECIDUOUS TREES		
ALNUS RUBRA	RED ALDER	FAC
FRANGULA PURSHIANA	CASCARA BUCKTHORN	FAC
FRAXINUS LATIFOLIA	OREGON ASH	FACW
MALUS FUSCA	OREGON CRABAPPLE	FACW
POPULUS BALSAMIFERA SSP. TRICHOCARPA	BLACK COTTONWOOD	FACW
POPULUS TREMULOIDES	QUAKING ASPEN	FACU
SHRUBS		
HOLODISCUS DISCOLOR	OCEANSPRAY	FACU
LONICERA INVOLUCRATA	TWINBERRY HONEYSUCKLE	FAC
OPLOPANAX HORIDUS	DEVIL'S CLUB	FAC
PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	FACW
RIBES BRACTEOSUM	STINK CURRANT	FAC
RIBES LACUSTRE	PRICKLY CURRANT	FAC
ROSA NUTKANA	NOOTKA ROSE	FAC
ROSA PISOCARPA	CLUSTERED ROSE	FAC
RUBUS SPECTABILIS	SALMONBERRY	FAC
SALIX HOOKERIANA	DUNE WILLOW	FACW
SALIX LUCIDA SSP. LASIANDRA	PACIFIC WILLOW	FACW
SALIX SCOULERIANA	SCOULER'S WILLOW	FAC
SALIX SITCHENSIS	SITKA WILLOW	FACW
SAMBUCUS NIGRA SSP. CERULEA	BLUE ELDERBERRY	FAC
SPIRAEA DOUGLASII SSP. DOUGLASII	WESTERN SPIREA	FACW
VACCINIUM ULIGINOSUM	BOG BLUEBERRY	FACW
VIBURNUM EDULE	HIGHBUSH CRANBERRY	FACW
GROUNDCOVERS, GRASSES, SEDGES, RUSHES, AND AQUATIC SPECIES		
GLYCERIA ELATA	TALL MANNAGRASS	FACW
HORDEUM BRACHYANTHERUM	MEADOW BARLEY	FACW
JUNCUS EFFUSUS VAR PACIFICUS	PACIFIC RUSH	FACW
JUNCUS PATENS	SPREADING RUSH	FACW
URTICA DIOICA	STINING NETTLE	FAC

NOTES:
SPIRAEA DOUGLASII SHALL BE PLANTED IN SMALL QUANTITIES IN ORDER TO PREVENT IT FROM BECOMING A DOMINANT SPECIES AND TO PRESERVE SPECIES DIVERSITY.

TURTLE MOUND SPECIES LIST (PEM)

SCIENTIFIC NAME	COMMON NAME	WETLAND STATUS
GRASSES, SEDGES, RUSHES, AND AQUATIC SPECIES		
CAREX DEWEYANA	DEWEY SEDGE	FAC
CAREX OBNUPTA	SLOUGH SEDGE	OBL
DESCHAMPSIA CESPITOSA	TUFTED HAIR GRASS	FACW
ELEOCHARIS PALUSTRIS	COMMON SPIKERUSH	OBL
FESTUCA IDAHOENSIS SSP ROEMERI	ROEMER'S FESCUE	FACU
JUNCUS TENUIS	SLENDER RUSH	FAC
PLECTRITIS CONGESTA	SEA BLUSH	FACU
POTENTILLA GRACILIS	NORTHWEST CINQUEFOIL	FAC
RANUNCULUS OCCIDENTALIS	WESTERN BUTTERCUP	NA
RANUNCULUS UNCINATUS	WOODLAND BUTTERCUP	FAC
SCIRPUS MICROCARPUS	SMALLFRUIT BULRUSH	OBL

RIPARIAN BUFFER FOREST SPECIES LIST

SCIENTIFIC NAME	COMMON NAME	WETLAND STATUS
CONIFERS		
CHAMAECYPARIS NOOTKATENSIS	ALASKA CEDAR	FAC
PICEA SITCHENSIS	SITKA SPRUCE	FAC
PINUS CONTORTA VAR. CONTORTA	SHORE PINE	FAC
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	FACU
THUJA PLICATA	WESTERN RED CEDAR	FAC
DECIDUOUS TREES		
ACER CIRCINATUM	VINE MAPLE	FAC
ACER MACROPHYLLUM	BIGLEAF MAPLE	FACU
ALNUS RUBRA	RED ALDER	FAC
ALNUS VIRIDIS SSP SINUATA	SITKA ALDER	FACW
CORNUS NUTTALLII	PACIFIC DOGWOOD	FACU
CRATAEGUS DOUGLASII	BLACK HAWTHORN	FAC
FRANGULA PURSHIANA	CASCARA BUCKTHORN	FAC
FRAXINUS LATIFOLIA	OREGON ASH	FACW
MALUS FUSCA	OREGON CRABAPPLE	FACW
POPULUS BALSAMIFERA SSP. TRICHOCARPA	BLACK COTTONWOOD	FAC
POPULUS TREMULOIDES	QUAKING ASPEN	FACU
PRUNUS EMARGINATA	BITTER CHERRY	FACU
SHRUBS		
AMELANCHIER ALNIFOLIA	SASKATOON SERVICEBERRY	FACU
CORNUS SERICEA	REDOSIER DOGWOOD	FACW
CORYLUS CORNUTA	BEAKED HAZELNUT	FACU
GAULTHERIA SHALLON	SALAL	FACU
HOLODISCUS DISCOLOR	OCEANSPRAY	FACU
LONICERA INVOLUCRATA	TWINBERRY HONEYSUCKLE	FAC
MAHONIA AQUIFOLIUM	OREGON GRAPE	FACU
MAHONIA NERVOSA	CASCADE BARBERRY	FACU
MAHONIA REPENS	CREEPING BARBERRY	UPL
OEMLERIA CERASIFORMIS	INDIAN PLUM	FACU
OPLOPANAX HORRIDUS	DEVIL'S CLUB	FAC
PHILADELPHUS LEWISII	LEWIS' MOCK ORANGE	NL
RIBES SANGUINEUM	RED FLOWERING CURRANT	FACU
ROSA GYMNOCARPA	DWARF ROSE	FACU
ROSA NUTKANA	NOOTKA ROSE	FAC
ROSA PISOCARPA	CLUSTERED ROSE	FAC
RUBUS LEUCODERMIS	BLACKCAP RASPBERRY	FACU
RUBUS SPECTABILIS	SALMONBERRY	FAC
RUBUS PARVIFLORUS	THIMBLEBERRY	FACU
SALIX LUCIDA SSP. LASIANDRA	PACIFIC WILLOW	FACW
SALIX SCOULERIANA	SCOULER'S WILLOW	FAC
SAMBUCUS RACEMOSA	RED ELDERBERRY	FACU
SAMBUCUS NIGRA SSP. CERULEA	BLACK ELDERBERRY	FAC
SYMPHORICARPOS ALBUS	SNOWBERRY	FACU
VACCINIUM CAESPITOSUM	DWARF BILBERRY	FAC
VACCINIUM OVATUM	CALIFORNIA HUCKLEBERRY	FACU
VACCINIUM PARVIFOLIUM	RED HUCKLEBERRY	FACU
VIBURNUM OPULUS VAR AMERICANUM	AMERICAN CRANBERRY	NL
GROUNDCOVERS, GRASSES, SEDGES, RUSHES, AND AQUATIC SPECIES		
ACHILLEA MILLEFOLIUM	YARROW	FACU
ARCTOSTAPHYLOS UVA-URSI	KINNICKINNICK	FACU
CAREX DEWEYANA	DEWEY SEDGE	FAC
DICENTRA FORMOSA	PACIFIC BLEEDING HEART	NL
FESTUCA RUBRA	RED FESCUE	FAC
FRAGARIA CHILOENSIS	COASTAL STRAWBERRY	FACU
IRIS TENAX	OREGON IRIS	FAC
POLYSTICHUM MUNITUM	SWORD FERN	FACU
URTICA DIOICA	STINGING NETTLE	FAC

NOTES:
CHAMAECYPARIS NOOTKATENSIS AND PINUS CONTORTA ARE INCLUDED FOR USE WHERE RIPARIAN BUFFERS ARE WITHIN 100 FEET OF ROADWAYS TO ALLOW INCORPORATION OF EVERGREEN CANOPY WITHIN AREAS WHERE TALLER CANOPY SPECIES POSE A RISK TO ROADWAYS. PSEUDOTSUGA MENZIESII SHOULD BE PLANTED IN SMALLER QUANTITIES DUE TO SIGNIFICANT DIE BACK OF THIS SPECIES IN RECENT YEARS. CONSIDER SOURCING SEED STOCK FROM REGIONS THAT ALIGN WITH FUTURE CLIMATE WARMING PREDICTIONS.

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DESIGNED BY	R. TAYLOR
ENTERED BY	T. PRESCOTT
CHECKED BY	K. FORESTER
PROJ. ENGR.	C. SODERQUIST
REGIONAL ADM.	J. WHITE

REVISION | DATE | BY

REGION NO. 10 | STATE WASH | FED.AID PROJ.NO. 0167(059)
JOB NUMBER 22C529
CONTRACT NO.
LOCATION NO. XL5105

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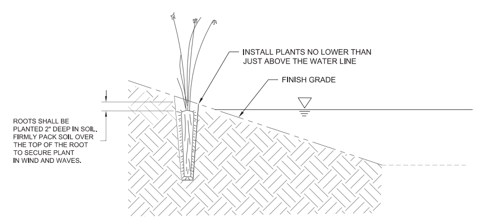
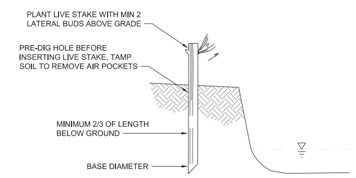


AQUATIC PLANTING NOTES:

1. PLANTING SHALL OCCUR MID - LATE SPRING, AFTER EARLY SPRING FLOODS.
2. WHEN PLANT MATERIAL ARRIVES ONSITE IT SHALL BE PLANTED AS SOON AS POSSIBLE.
3. KEEP AQUATIC PLANTS SHADED, COOL, AND MOIST AT ALL TIMES PRIOR TO PLANTING. AT NO TIME SHALL AQUATIC PLANTS BE EXPOSED AND ALLOWED TO DRY OUT.
4. AQUATIC PLANTS SHALL BE INSTALLED 3' O.C.

DETAIL - AQUATIC VEGETATION PLANTING 4 / -

SCALE: NTS

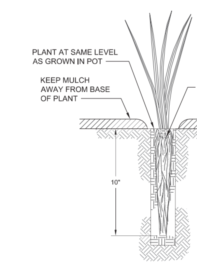


LIVE STAKE NOTES:

1. SOAK WILLOW STAKES IN WATER FOR 24 HOURS PRIOR TO PLANTING.
2. BASAL END OF LIVE STAKES SHOULD BE 0.5-1.5 INCHES IN DIAMETER AND AT LEAST 4 FEET IN LENGTH.
3. ALL STAKES SHOULD BE SINGLE STEMMED AND STRAIGHT, WITH NO MAJOR CROOKS OR BENDS. PRUNING OF STAKES SHALL ONLY OCCUR AT ENDS OF MATERIAL.
4. KEEP LIVE STAKES COVERED, COOL, AND MOIST AT ALL TIMES PRIOR TO PLANTING. AT NO TIME SHOULD LIVE STAKES BE EXPOSED AND ALLOWED TO DRY OUT.
5. WHEN PLANTING ON STREAM BANKS, ANGLE APICAL END OF STAKES SLIGHTLY DOWNSTREAM.
6. MULCH TO BE PLACED ONLY IN RIPARIAN BUFFER AND UPLAND PLANTING AREAS.

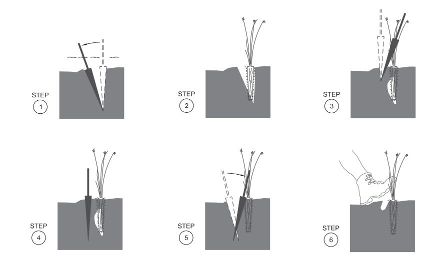
DETAIL - LIVE STAKE PLANTING 5 / -

SCALE: NTS



PLUG NOTES:

1. PLACE MULCH AT 3" DEPTH ONLY IN RIPARIAN BUFFER AND UPLAND PLANTING AREAS.



PLANTING PROCEDURE STEPS

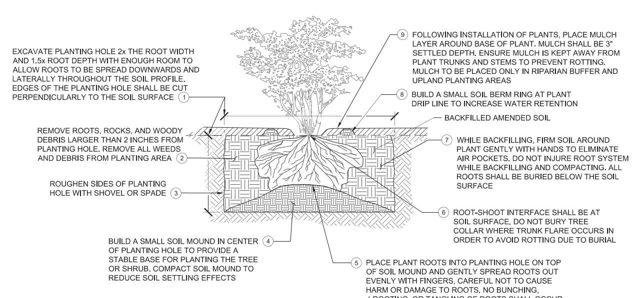
1. INSERT THE DIBBLE, OR SHOVEL, STRAIGHT DOWN INTO THE SOIL TO THE FULL DEPTH OF THE BLADE AND PULL BACK ON THE HANDLE TO OPEN THE PLANTING HOLE. (DO NOT ROCK THE SHOVEL BACK AND FORTH AS THIS CAUSES SOIL IN THE PLANTING HOLE TO BE COMPACTED, INHIBITING ROOT GROWTH.)
2. REMOVE THE DIBBLE, OR SHOVEL, AND PUSH THE SEEDLING ROOTS DEEP INTO THE PLANTING HOLE. PULL THE SEEDLING BACK UP TO THE CORRECT PLANTING DEPTH (THE ROOT COLLAR SHOULD BE 1 TO 3 INCHES BELOW THE SOIL SURFACE). GENTLY SHAKE THE SEEDLING TO ALLOW THE ROOTS TO STRAIGHTEN OUT. DO NOT TWIST OR SPIN THE SEEDLING OR LEAVE THE ROOTS J-ROOTED.
3. INSERT THE DIBBLE, OR SHOVEL, SEVERAL INCHES IN FRONT OF THE SEEDLING AND PUSH THE BLADE HALFWAY INTO THE SOIL. TWIST AND PUSH THE HANDLE FORWARD TO CLOSE THE TOP OF THE SLIT TO HOLD THE SEEDLING IN PLACE.
4. PUSH THE SHOVEL DOWN TO THE FULL DEPTH OF THE BLADE.
5. PULL BACK ON THE HANDLE TO CLOSE THE BOTTOM OF THE PLANTING HOLE. THEN PUSH FORWARD TO CLOSE THE TOP, ELIMINATING AIR POCKETS AROUND THE ROOT.
6. REMOVE THE DIBBLE, OR SHOVEL, AND CLOSE AND FIRM UP THE OPENING WITH YOUR HEEL. BE CAREFUL TO AVOID DAMAGING THE SEEDLING.

NOTES:

1. IF SOIL IS SOFT ENOUGH TO INSERT 10" PLUG INTO SOIL WITH A GLOVED HAND , THE USE OF A DIBBLE BAR IS NOT NECESSARY.
2. ALL ROOTS MUST BE SNUGLY PLACED WITHIN SOIL. THE PLANTS SHOULD STAY IN THE SOIL WHEN LIGHTLY TUGGED.

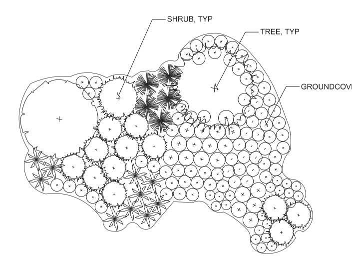
DETAIL - EMERGENT IN STANDING WATER PLANTING 8 / -

SCALE: NTS



DETAIL - BARE ROOT TREE OR SHRUB PLANTING 6 / -

SCALE: NTS



PLANTING LAYOUT NOTES:

1. PLANT GROUNDCOVERS, SHRUBS, AND TREES AS SHOWN ON PLAN. GROUNDCOVERS AND SHRUBS SHALL BE IN CLUSTERS OF UNEVEN NUMBERS (E.G. THREE, FIVE, SEVEN, ETC.)
2. PLANTS SHALL BE ARRANGED SO THAT AS THEY MATURE, THEY GROW IN TO MASSINGS AND FULLY COVER THE SOIL SURFACE.
3. IN RIPARIAN BUFFER AND UPLAND PLANTING AREAS, PROVIDE A 3 FOOT RADIUS MULCH-ONLY AREA AROUND EACH TREE AND A 2 FOOT RADIUS MULCH-ONLY AREA AROUND EACH SHRUB.

DETAIL - PLANTING LAYOUT 7 / -

SCALE: NTS

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DESIGNED BY	K. FORESTER				
ENTERED BY	T. PRESCOTT				
CHECKED BY	K. FORESTER				
PROJ. ENGR.	C. SODERQUIST				
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY	

REGION NO.	STATE	FED.AID PROJ.NO.
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JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

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MITIGATION DETAILS

PLAN REF NO RRP11

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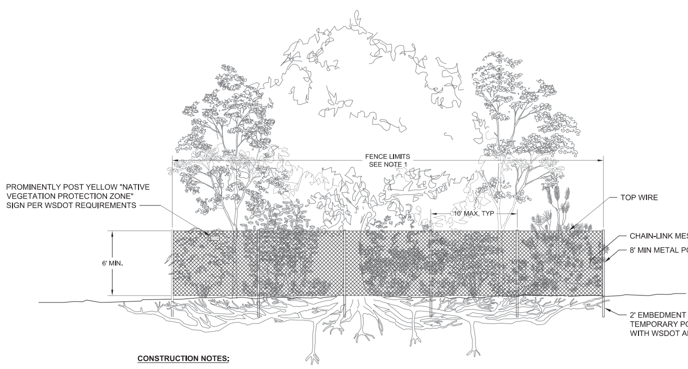
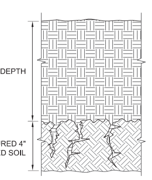


CONSTRUCTION NOTES:

1. MAXIMIZE BUFFER BETWEEN FENCE LINE AND PLANT COMMUNITY FOR NATIVE VEGETATION PROTECTION ZONES. WHERE POSSIBLE, PLACE FENCING OUTSIDE OF THE ROOT PROTECTION ZONE (RPZ) FOR TREES. RPZ IS DEFINED AS AREA EQUAL TO A 1.5-FOOT RADIUS FROM THE BASE OF THE TREE'S TRUNK FOR EACH 1-INCH OF THE TREE'S DIAMETER AT 4.5 FEET ABOVE GRADE (DIAMETER AT BREAST HEIGHT: DBH).

DETAIL - NATIVE VEGETATION PROTECTION FENCING 10 / -

SCALE: NTS



DESIGN CRITERIA:

1. SOIL CONSTRUCTION GOAL IS TO HAVE MINIMUM DEPTH OF 12 INCHES OF PLANTABLE SOIL ABLE TO SUPPORT HEALTHY GROWTH OF NATIVE PLANTS.
2. REMOVAL OF REED CANARY GRASS AND ALL OTHER TARGET WEEDS SHALL OCCUR PRIOR TO EARTHWORK, SOIL STOCKPILING, AND SOIL PREPARATION PRIOR TO AMENDMENT.
3. SOIL AMENDMENTS FOR THE RIPARIAN RESTORATION PROGRAM WILL BE DETERMINED BY THE SOIL TESTING RESULTS AND OUTLINED IN THE SOIL MANAGEMENT PLAN.
4. SOIL AMENDMENTS SHALL FOLLOW TECHNICAL REQUIREMENTS IN SECTION 2.15.

DETAIL - SOIL PREPARATION PRIOR TO PLANTING 11 / -

SCALE: NTS

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PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

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MITIGATION DETAILS

PLAN REF NO RRP12

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PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

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CONTRACT NO.		LOCATION NO. XL5105

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HABITAT PLAN KEY MAP

PLAN REF NO HPL01

SHEET OF SHEETS

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SCALE IN FEET

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LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ALIGNMENT
	CUT FILL	CUT / FILL LINE
		STREAM THALWEG
		CONTOURS (1FT)
		NATIVE VEGETATION FILL AREA
		STAGE 2 MITIGATION AREA BOUNDARY
		GRAVEL ACCESS ROAD - CONSTRUCTED BY OTHERS
		NATIVE VEGETATION PROTECTION ZONE
		LARGE WOODY MATERIAL
		BRUSH PILE 6 HPL10
		PERCH TREE 8 HPL10

NOTES:

1. SEE MITIGATION PLAN DOCUMENT AND TECHNICAL REQUIREMENTS SECTIONS 2.15 AND 2.30 FOR HABITAT FEATURE REQUIREMENTS.

LOWER HYLEBOS ADDITION

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PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

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NOT FOR
CONSTRUCTION

Washington State
Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

HABITAT PLAN

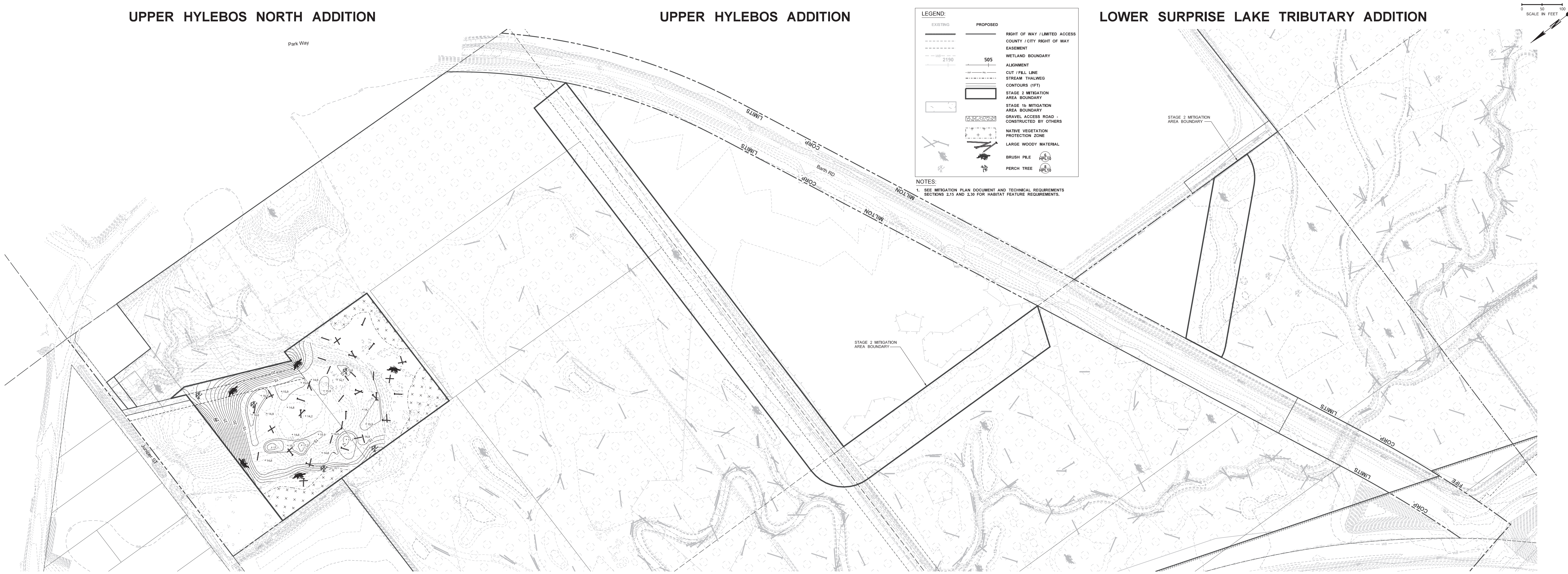
PLAN REF NO
HPL02

SHEET
OF
SHEETS

UPPER HYLEBOS NORTH ADDITION

UPPER HYLEBOS ADDITION

LOWER SURPRISE LAKE TRIBUTARY ADDITION



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DATE	8/16/2023			
PLOTTED BY	tprescott			
DESIGNED BY	R. TAYLOR			
ENTERED BY	T. PRESCOTT			
CHECKED BY	K. FORESTER			
PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

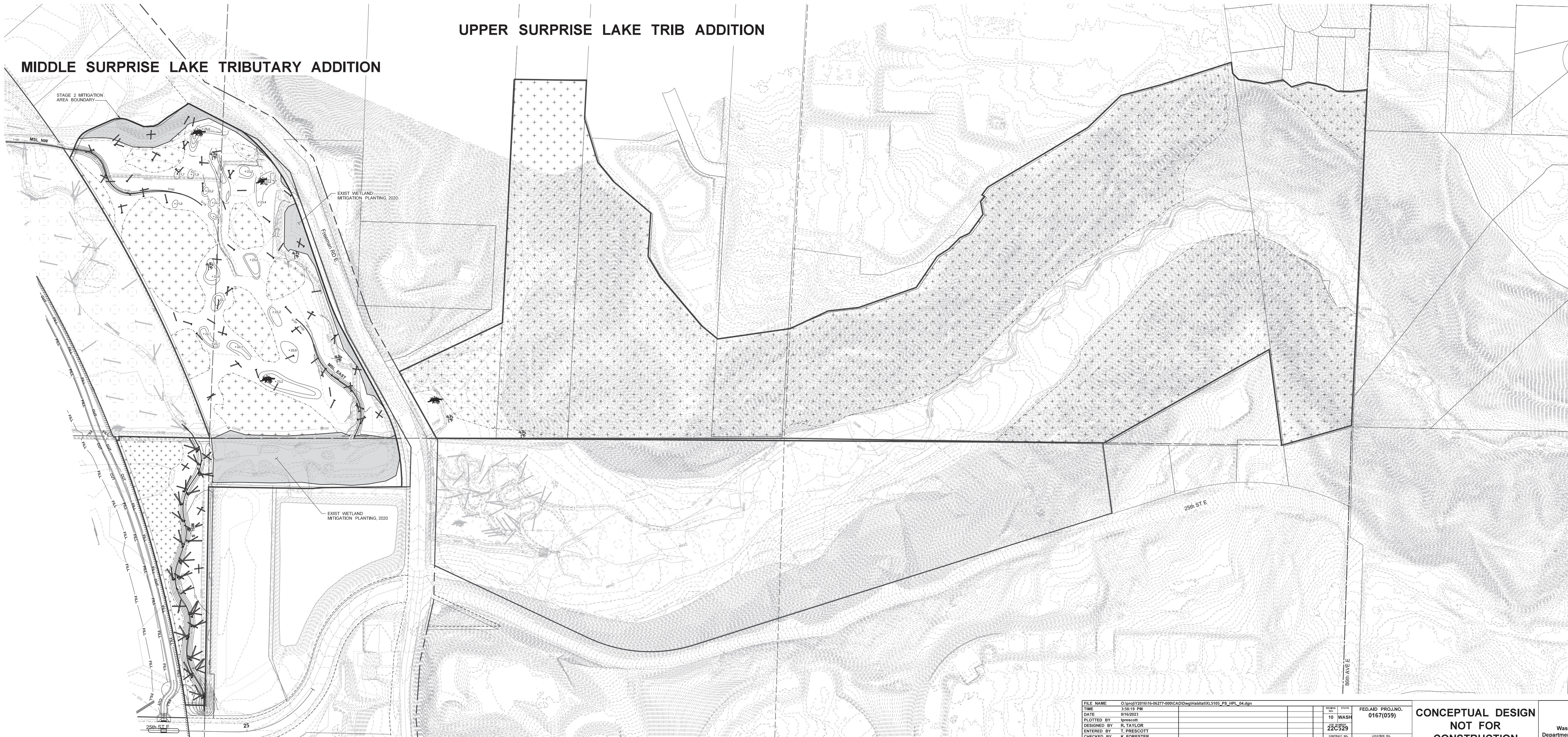
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

HABITAT PLAN

PLAN REF NO HPL03

SHEET OF SHEETS



LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ALIGNMENT
	CUT FILL	CUT / FILL LINE
		STREAM THALWEG
		CONTOURS (1FT)
		STAGE 2 MITIGATION AREA BOUNDARY
		STAGE 1b MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE
		EXIST WETLAND MITIGATION PLANTING, 2020
		LARGE WOODY MATERIAL
		BRUSH PILE 6/HPL10
		PERCH TREE 8/HPL10

NOTES:

1. SEE MITIGATION PLAN DOCUMENT AND TECHNICAL REQUIREMENTS SECTIONS 2.15 AND 2.30 FOR HABITAT FEATURE REQUIREMENTS.
2. NO HEAVY EQUIPMENT SHALL BE ALLOWED WITHIN THE UPPER SURPRISE LAKE TRIBUTARY ADDITION SITE. ONLY LOW GROUND PRESSURE EQUIPMENT MAY BE USED FOR WEED CONTROL OUTSIDE OF THE NATIVE VEGETATION PROTECTION ZONE AT THE SOUTHEAST CORNER OF THE UPPER SURPRISE LAKE TRIBUTARY ADDITION SITE.

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DATE	8/16/2023
PLOTTED BY	tprescott
DESIGNED BY	R. TAYLOR
ENTERED BY	T. PRESCOTT
CHECKED BY	K. FORESTER
PROJ. ENGR.	C. SODERQUIST
REGIONAL ADM.	J. WHITE

REVISION	DATE	BY

REGION NO. 10 | STATE WASH | JOB NUMBER 22C529 | CONTRACT NO.

FED.AID PROJ.NO. 0167(059)

LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

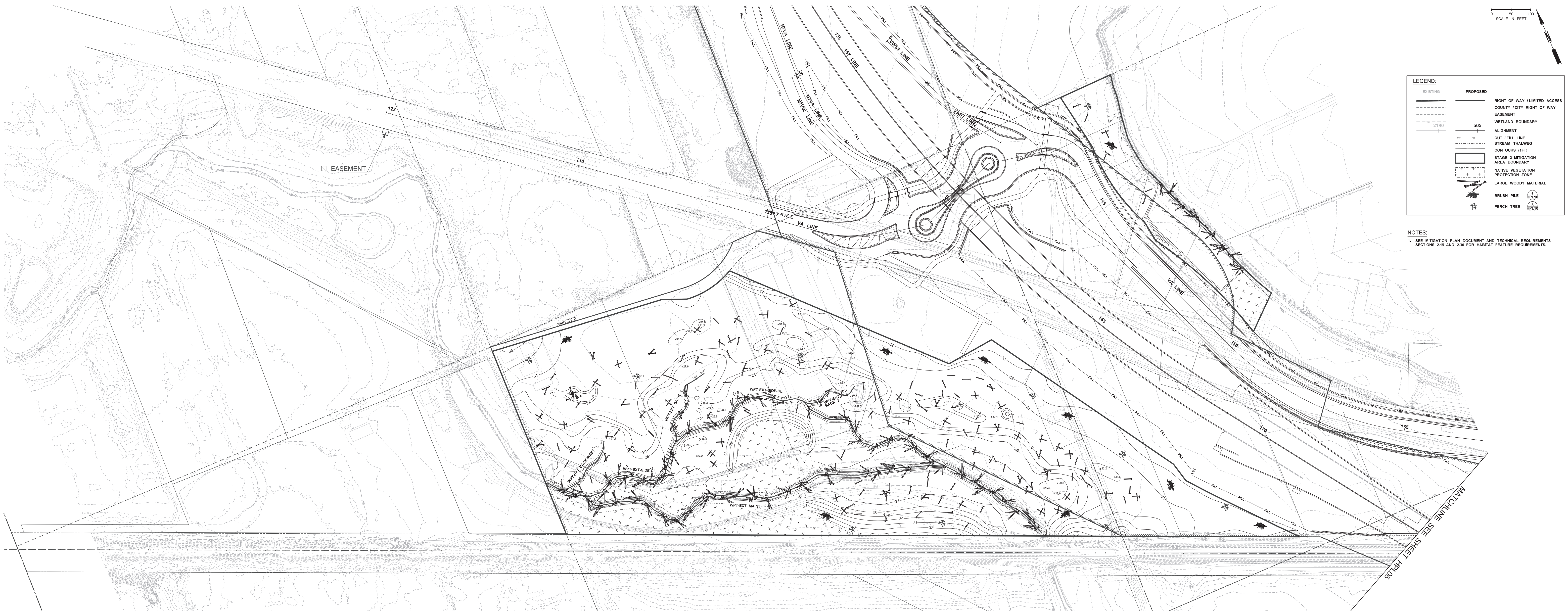
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

HABITAT PLAN

PLAN REF NO HPL04

SHEET OF SHEETS



LEGEND:

EXISTING	PROPOSED	
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		COUNTY / CITY RIGHT OF WAY
		EASEMENT
WB		WETLAND BOUNDARY
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	CUT FILL	CUT / FILL LINE
		STREAM THALWEG
		CONTOURS (1FT)
		STAGE 2 MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE
		LARGE WOODY MATERIAL
		BRUSH PILE 6 / HPL10
		PERCH TREE 8 / HPL10

NOTES:

1. SEE MITIGATION PLAN DOCUMENT AND TECHNICAL REQUIREMENTS SECTIONS 2.15 AND 2.30 FOR HABITAT FEATURE REQUIREMENTS.

NORTHWEST WAPATO RRP

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DESIGNED BY	R. TAYLOR			
ENTERED BY	T. PRESCOTT			
CHECKED BY	K. FORESTER			
PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

REGION NO. 10 STATE WASH
JOB NUMBER 22C529
CONTRACT NO.
FED.AID PROJ.NO. 0167(059)
LOCATION NO. XL5105

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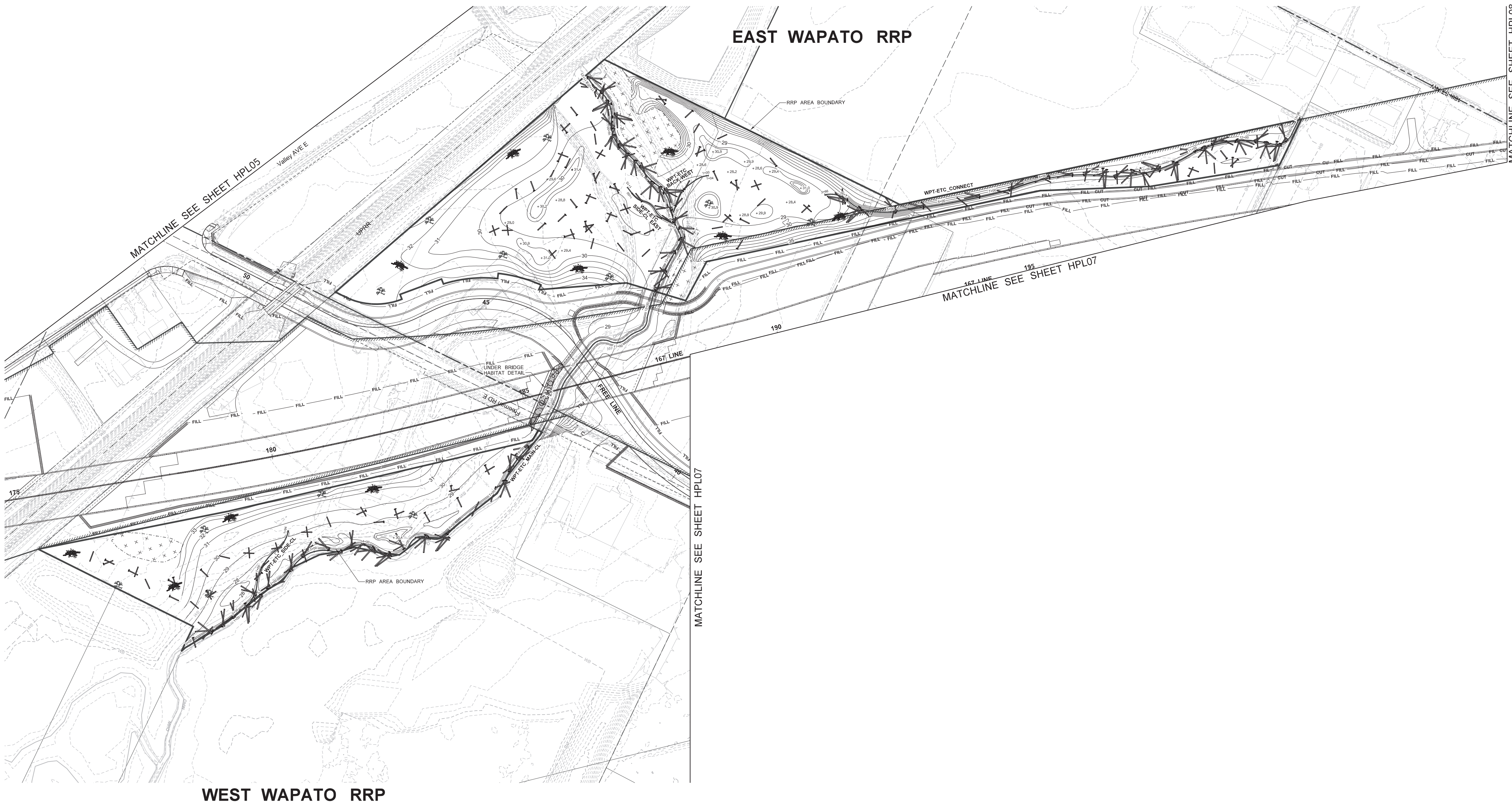
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

HABITAT PLAN

PLAN REF NO HPL05

SHEET OF SHEETS



LEGEND:

EXISTING	PROPOSED	
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		COUNTY / CITY RIGHT OF WAY
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ALIGNMENT
	CUT FILL	CUT / FILL LINE
		STREAM THALWEG
		CONTOURS (1FT)
		STAGE 2 MITIGATION AREA BOUNDARY
		UNDER BRIDGE HABITAT DETAIL 10 HPL10
		NATIVE VEGETATION PROTECTION ZONE
		LARGE WOODY MATERIAL
		BRUSH PILE 6 HPL10
		PERCH TREE 8 HPL10

NOTES:

1. SEE MITIGATION PLAN DOCUMENT AND TECHNICAL REQUIREMENTS SECTIONS 2.15 AND 2.30 FOR HABITAT FEATURE REQUIREMENTS.

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DESIGNED BY	R. TAYLOR
ENTERED BY	T. PRESCOTT
CHECKED BY	K. FORESTER
PROJ. ENGR.	C. SODERQUIST
REGIONAL ADM.	J. WHITE

REVISION | DATE | BY

REGION NO. 10 | STATE WASH | FED.AID PROJ.NO. 0167(059)

JOB NUMBER 22C529

CONTRACT NO.

LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

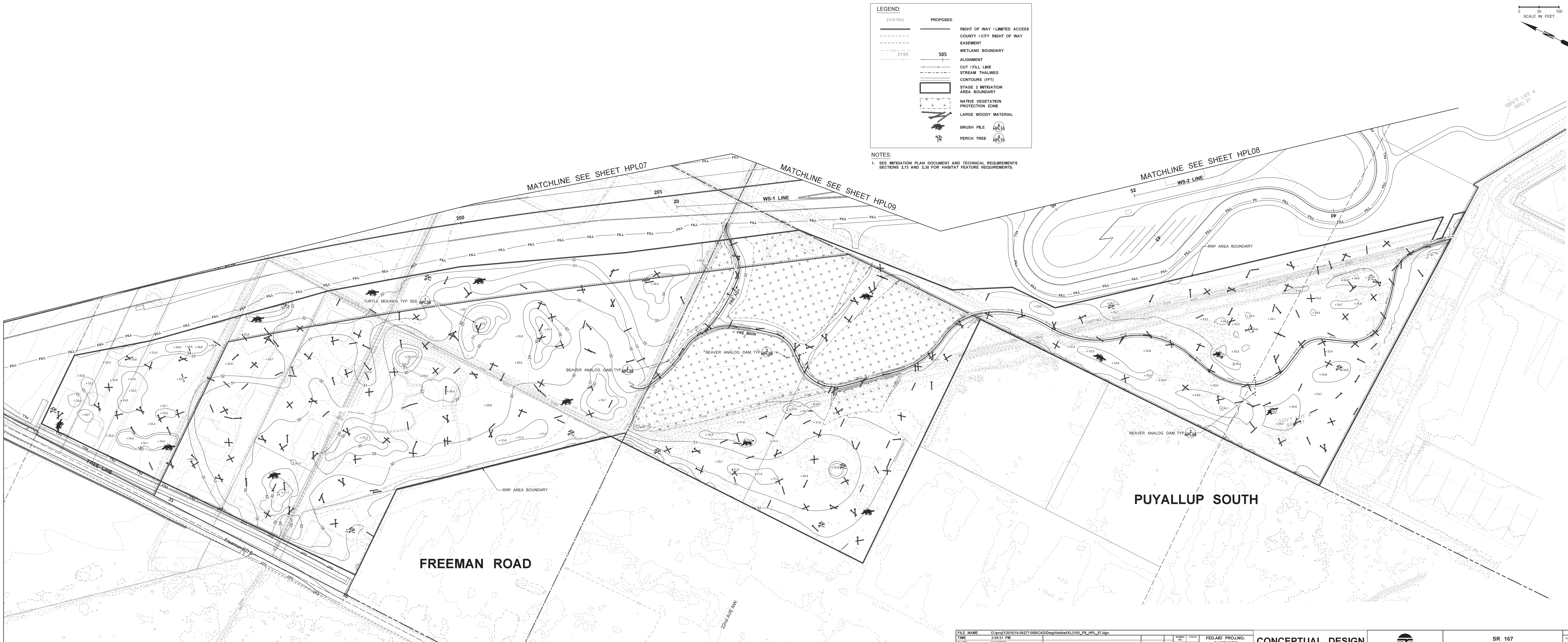
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

HABITAT PLAN

PLAN REF NO HPL06

SHEET OF SHEETS



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ENTERED BY	T. PRESCOTT				
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PROJ. ENGR.	C. SODERQUIST				
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY	

REGION NO. 10 | STATE WASH | JOB NUMBER 22C529 | CONTRACT NO.

FED.AID PROJ.NO. 0167(059)

LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State Department of Transportation

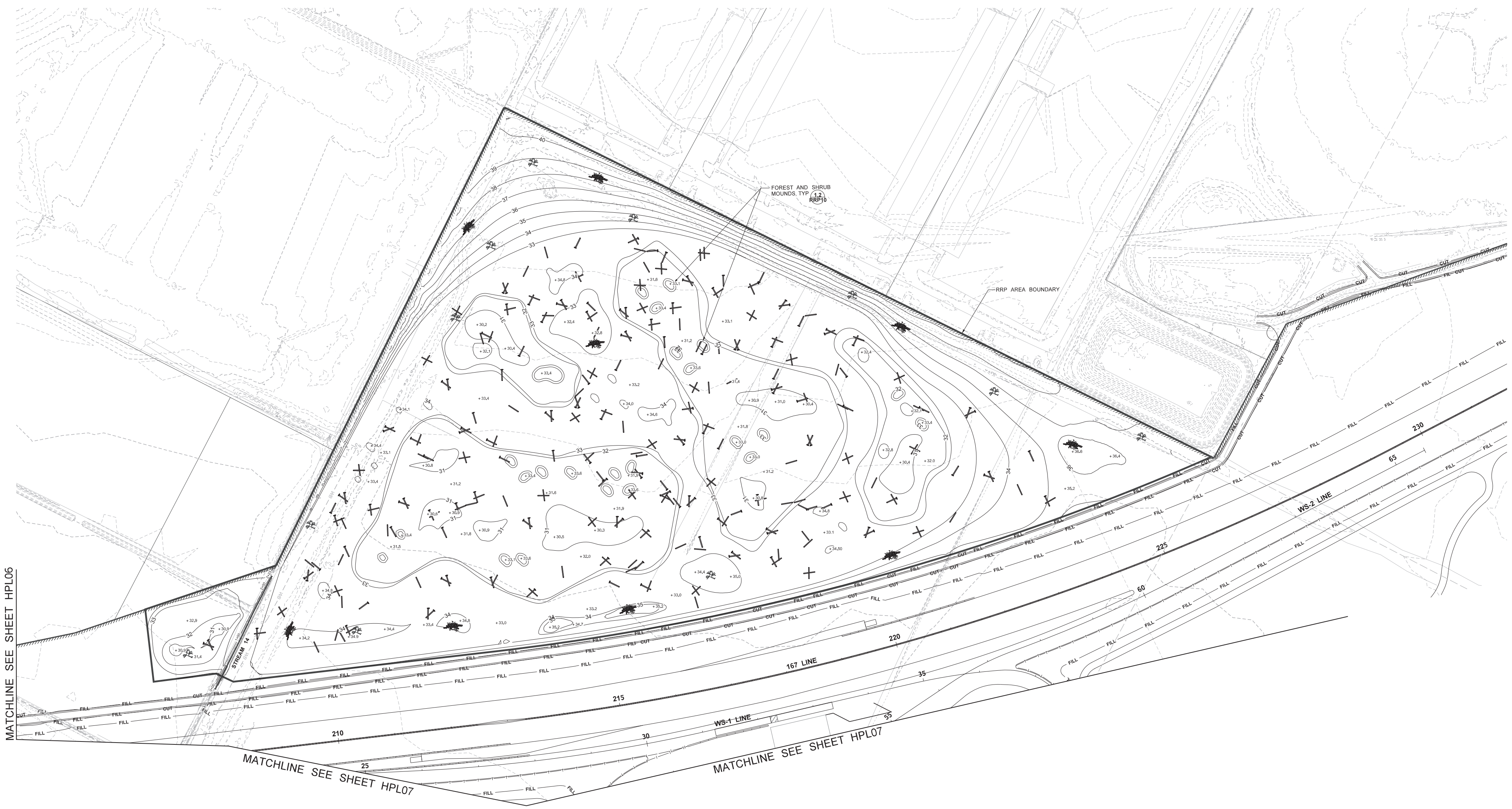
SR 167
I-5 TO SR 161
NEW EXPRESSWAY

HABITAT PLAN

PLAN REF NO HPL07

SHEET OF SHEETS

PUYALLUP NORTH



0 50 100
SCALE IN FEET

LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ALIGNMENT
	CUT FILL	CUT / FILL LINE
		STREAM THALWEG
		CONTOURS (1FT)
		STAGE 2 MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE
		LARGE WOODY MATERIAL
		BRUSH PILE 6 HPL10
		PERCH TREE 8 HPL10

NOTES:

1. SEE MITIGATION PLAN DOCUMENT AND TECHNICAL REQUIREMENTS SECTIONS 2.15 AND 2.30 FOR HABITAT FEATURE REQUIREMENTS.

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DESIGNED BY	R. TAYLOR				
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CHECKED BY	K. FORESTER				
PROJ. ENGR.	C. SODERQUIST				
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY	

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

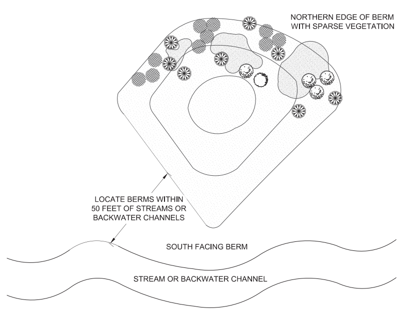
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

HABITAT PLAN

PLAN REF NO HPL08

SHEET OF SHEETS



TURTLE NESTING MOUNDS - PLAN VIEW

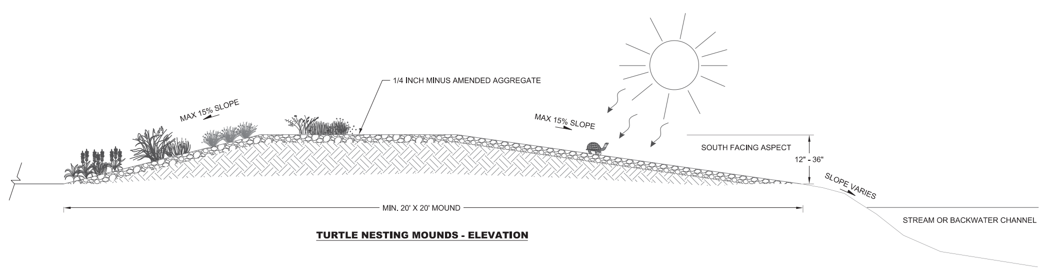
DESIGN CRITERIA:

1. PRESERVE AND REUSE NATIVE (ON-SITE) SOIL TO PREVENT INTRODUCTION OF WEED SPECIES AND SOIL MICROBES, IF SOIL MEETS SPECIFICATION.
2. TURTLE MOUNDS SHALL HAVE GREATEST AREA OF MOUND WITH SOUTH OR SOUTHWEST FACING SOLAR ASPECT. TURTLE EGGS RELY ON WARMTH OF SOLAR EXPOSURE TO SUCCESSFULLY MATURE AND HATCH.
3. MOUNDS SHALL BE BARE OR SPARSELY VEGETATED ALONG SOUTH FACING ASPECTS. NORTH FACING SOLAR ASPECTS SHALL BE SPARSELY VEGETATED WITH SPECIES FROM THE TURTLE MOUND PLANTING PALETTE (SEE ABOVE). PREFERRED PLANTS FOR TURTLE MOUND AREAS HAVE A MAXIMUM HEIGHT OF 24 INCHES.
4. A MINIMUM OF 2 MOUNDS SHALL BE PLACED WITHIN THE MITIGATION SITES. SEE CONTRACT DRAWINGS FOR RECOMMENDED LOCATIONS.
5. MOUNDS SHALL BE LOCATED TO MAXIMIZE THE BUFFER FOR NESTING AND BASKING HABITAT STRUCTURES. PLACE MOUNDS AS FAR FROM ROADWAYS, TRAILS, AND DEVELOPED AREAS AS POSSIBLE.
6. MINIMIZE HUMAN-RELATED DISTURBANCES TO TURTLE SITES DURING THE NESTING (MAY AND JUNE) AND OVERWINTERING SEASONS (OCTOBER THROUGH MARCH).

RECOMMENDED TURTLE NESTING SOIL / SUBSTRATE MIX

SOIL / SUBSTRATE MIX	PERCENT OF TOTAL MIX
FINE CLAY	25 OR LESS
LOAM	25
SAND	25 - 50
SMALL AGGREGATE	25 OR LESS

* USE OF NATIVE ON-SITE SOILS IS PREFERABLE TO PREVENT INTRODUCTION OF DIFFERENT WEEDS AND SOILS MICROBES. IDEAL AGGREGATE (GRAVEL) SIZE IS $\frac{1}{8}$" INCH TO $\frac{3}{4}$" MINUS ROUNDED. THE PURPOSE OF THE AGGREGATE IS TO AID IN WEED SUPPRESSION.

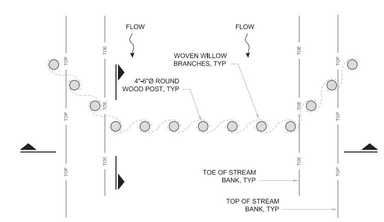


TURTLE NESTING MOUNDS - ELEVATION

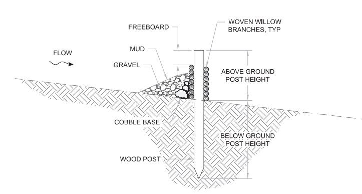
TURTLE NESTING MOUNDS

SCALE: NTS

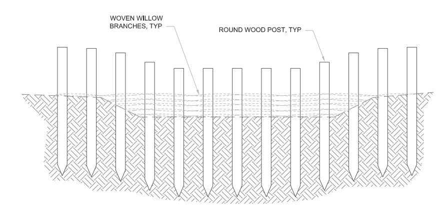
1
-



PLAN



SECTION A

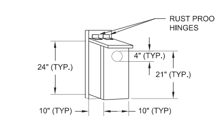


SECTION B

BEAVER ANALOG

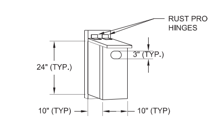
SCALE: NTS

2
HPL07



PILEATED WOODPECKER/ SCREECH OWL/ KESTREL NEST BOX

1. MOUNT ON A TREE AT THE EDGE OF A FORESTED AREA OR ON A POST IN AN OPEN AREA MINIMUM 20' HIGH.
2. PILEATED WOODPECKERS PREFER NESTING BOXES ON MATURE LIVE/DEAD TREES INSTEAD OF POLES.
3. PILEATED WOODPECKER NEST BOXES DO NOT REQUIRE PREDATOR GUARDS
4. NEST MUST BE COMPLETELY FILLED AND TAMPED WITH WOOD CHIPS (NOT SAWDUST) TO MIMIC THEIR NATURALLY EXCAVATED NEST CAVITIES AND PROVIDE PROTECTION TO EGGS AND CHICKS.
5. PILEATED WOODPECKER NESTING OCCURS MAY THROUGH MID-JULY.
6. SPACE 330' BETWEEN NEST BOX LOCATIONS.



WOOD DUCK NEST BOX

1. MOUNT 4'-6' ABOVE GROUND ON WOOD POSTS NEAR PONDS AND WHERE VEGETATION PROVIDES COVER FOR DUCKLINGS TO TRAVEL TO WATER.
2. PLACE WITHIN 100' OF WATER.
3. PROTECT WITH 3' WIDE CONE PREDATOR GUARDS AROUND THE POST.
4. PLACE 3"-4" OF WOOD CHIPS (NOT SAWDUST) IN THE BOXES.
5. STAPLE $\frac{1}{4}$" MESH HARDWARE CLOTH FROM FLOOR TO BOTTOM OF HOLE TO HELP DUCKLINGS CLIMB OUT. BEND OVER ANY SHARP EDGES.
6. DO NOT MOUNT WOOD DUCK BOXES IN TREES, OR CLOSE TO TREES WHERE SQUIRRELS CAN LEAP ONTO BOXES.

GENERAL NEST BOX NOTES

1. BOX DIMENSIONS SHOWN REFER TO INTERIOR DIMENSIONS.
2. NEST BOXES SHALL BE PRE-FABRICATED OF CEDAR OR PINE WOOD STOCK THAT IS ROUGH CUT ON BOTH SIDES AND GOUGED ON INTERIOR OF WOOD WITH HAMMER CLAW OR EQUIVALENT SO BIRDS CAN GRIP INTERIOR AND EXTERIOR SURFACES.
3. LUMBER SHOULD BE MINIMUN $\frac{3}{4}$" THICK FOR ADEQUATE INSULATION.
4. DRILL OR CUT 4-5 $\frac{3}{8}$" - $\frac{1}{2}$" DIAMETER DRAINAGE HOLES IN THE FLOOR. DRILL TWO 5/8" DIAM. VENTILATION HOLES ON EACH SIDE JUST UNDER THE ROOF.
5. NEST BOXES SHOULD BE THOROUGHLY CLEANED AFTER THE BROOD REARING SEASON IS PAST (BY OTHERS).
6. REMOVE LOW OVERHANGING BRANCHES AROUND NEST.
7. NEST BOXES SHOULD BE SOUTH OR EAST FACING.
8. NEST BOXES SHALL NOT HAVE EXTERIOR PERCHES.
9. ALL FASTENERS INCLUDING SCREWS, NAILS AND HINGES SHOULD BE RUST-PROOF.
10. NEST BOX SHOULD NOT BE TREATED WITH GREEN PRESERVATIVE, WHICH IS POISONOUS TO BIRDS.
11. NEST BOX SHOULD NOT BE PAINTED ON THE INSIDE OR OUTSIDE.
12. THERE SHALL BE A MINIMUM 0F (2) NESTING BOXES OF EITHER TYPE PER SITE.

DETAIL - NEST BOXES

SCALE: NTS

3
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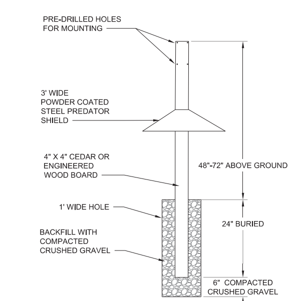
WOOD DUCK POLE MOUNT NOTES

1. WOOD SHALL BE CEDAR, OR NON-TOXIC, WATERPROOF ENGINEERED MATERIAL MADE FROM RECYCLED HDPE AND FIBERGLASS.



DETAIL - WOOD POLE MOUNT FOR DUCK BOXES

SCALE: NTS

4
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DESIGNED BY	R. TAYLOR			
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REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

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CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State
Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

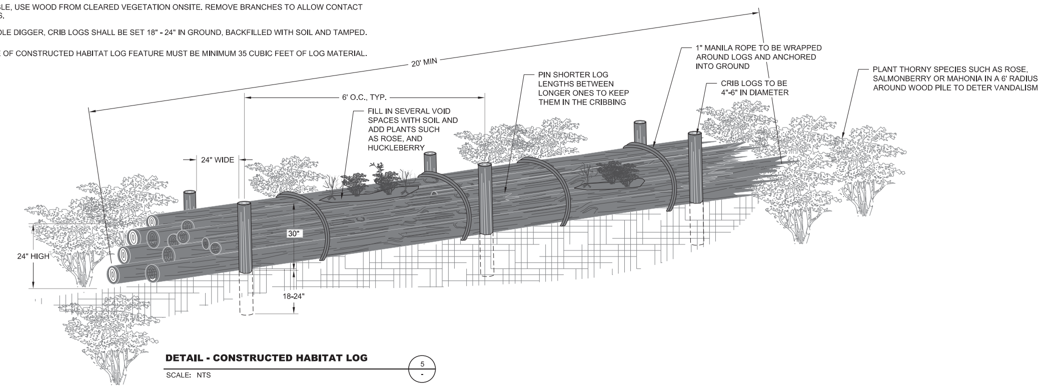
HABITAT DETAILS

PLAN REF NO
HPL09

SHEET
OF
SHEETS

CONSTRUCTED HABITAT LOG NOTES

1. UP TO MAXIMUM 10 PERCENT OF ALL HABITAT LOGS MAY BE CONSTRUCTED HABITAT LOG.
2. USE CRIBBING TO STAKE OUT THE DIMENSIONS FOR THE CONSTRUCTED LOG. THE NUMBER OF STAKES USED WILL DEPEND ON THE LENGTH OF LOG STRUCTURE BEING BUILT AND THE MATERIALS USED. LAY THE SMALL DIAMETER POLES PARALLEL TO EACH OTHER IN THE CRIBBING TO SHORE UP THE LOG.
3. CONSTRUCTED LOGS SHALL BE 20 TO 30 FEET LONG AND ABOUT 2 FEET WIDE. PILES AND LOGS CAN GO IN AREAS WITH DIFFERENT SUN EXPOSURE OR VEGETATION TYPES.
4. WHERE POSSIBLE, USE WOOD FROM CLEARED VEGETATION ONSITE. REMOVE BRANCHES TO ALLOW CONTACT BETWEEN LOGS.
5. USING POST HOLE DIGGER, CRIB LOGS SHALL BE SET 18" - 24" IN GROUND, BACKFILLED WITH SOIL AND TAMPED.
6. TOTAL VOLUME OF CONSTRUCTED HABITAT LOG FEATURE MUST BE MINIMUM 35 CUBIC FEET OF LOG MATERIAL.



DETAIL - CONSTRUCTED HABITAT LOG

SCALE: NTS

5
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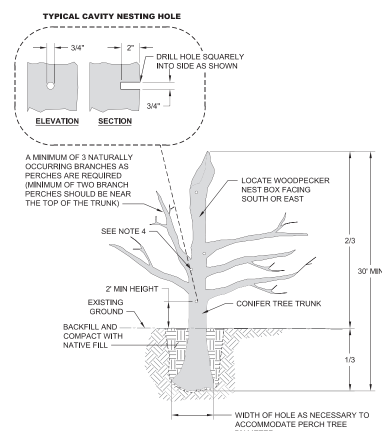
PERCH TREE NOTES

1. INSTALL PERCH TREES IN UPLAND AREAS AND RIPARIAN BUFFERS.
2. INSTALL MINIMUM OF THREE PERCH TREES PER ACRE IN UPLAND AND RIPARIAN BUFFER AREAS. EXISTING PERCH TREES COUNT TOWARDS TOTAL PERCH TREE TOTAL.
3. DO NOT TREAT TREES WITH ANY PRESERVATIVES, STAINS, OR CHEMICAL TREATMENTS.
4. INSTALL CAVITY NESTING HOLES. DRILL 16 HOLES TOTAL. STAGGER HOLES AT DIFFERENT ELEVATIONS AROUND THE ENTIRE PERIMETER OF THE TREE RANGING IN HEIGHT FROM 2' TO 8' ABOVE GRADE. EVENLY DISPERSE HOLES ALONG THE HEIGHT OF THE TREE.
5. A MINIMUM OF 75 PERCENT OF BARK SHALL BE INTACT WITH A PREDATOR GUARD ENCIRCLING STEM.



PERCH TREE DETAIL

SCALE: NTS

8
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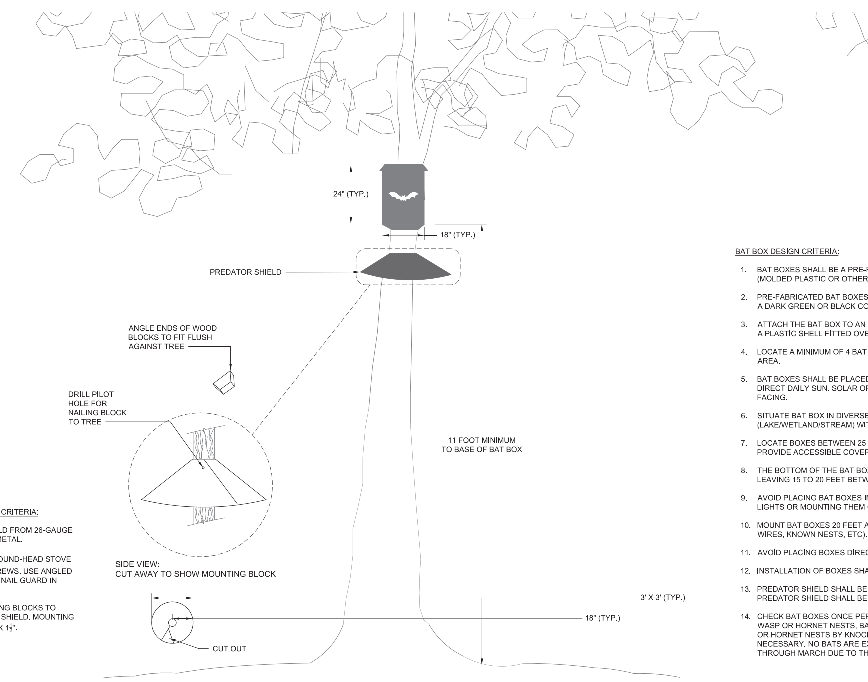

PREDATOR SHIELD DESIGN CRITERIA:

1. CUT PREDATOR SHIELD FROM 26-GAUGE GALVANIZED SHEET METAL.
2. JOIN SIDES WITH $\frac{1}{4}$" ROUND-HEAD STOVE BOLTS OR METAL SCREWS. USE ANGLED WOODEN BLOCKS TO NAIL GUARD IN PLACE.
3. USE 3 WOOD MOUNTING BLOCKS TO SUPPORT PREDATOR SHIELD. MOUNTING BLOCKS SHALL BE 4" X 1$\frac{1}{2}$".

BAT BOX DESIGN CRITERIA:

1. BAT BOXES SHALL BE A PRE-FABRICATED, LOW MAINTENANCE, WEATHER-PROOF (MOLDED PLASTIC OR OTHER MATERIAL).
2. PRE-FABRICATED BAT BOXES ARE TYPICALLY 24 INCHES BY 18 INCHES. BOXES SHALL BE A DARK GREEN OR BLACK COLOR, WITH A MINIMUM OF 4-CHAMBERS.
3. ATTACH THE BAT BOX TO AN EXISTING TREE OR PERCH TREE WITH 4 LAG SCREWS, WITH A PLASTIC SHELL FITTED OVER THEM FOR WEATHER PROTECTION.
4. LOCATE A MINIMUM OF 4 BAT BOXES THROUGHOUT RIPARIAN RESTORATION PROJECT AREA.
5. BAT BOXES SHALL BE PLACED IN AREAS THAT RECEIVE A MINIMUM OF SIX HOURS OF DIRECT DAILY SUN. SOLAR ORIENTATION SHALL BE EAST-SOUTHEAST, OR SOUTH FACING.
6. SITUATE BAT BOX IN DIVERSE HABITAT WITH WOODED AREAS AND SLOW-MOVING WATER (LAKE/WETLAND/STREAM) WITHIN ¼ MILE.
7. LOCATE BOXES BETWEEN 25 FEET TO 50 FEET FROM HEAVY FOREST CANOPY, TO PROVIDE ACCESSIBLE COVER FROM PREDATORS.
8. THE BOTTOM OF THE BAT BOX SHALL BE A MINIMUM OF 11 FEET FROM THE GROUND. LEAVING 15 TO 20 FEET BETWEEN GROUND SURFACE AND BOTTOM OF BAT BOX IS IDEAL.
9. AVOID PLACING BAT BOXES IN WINDY LOCATIONS. AVOID PLACING BOXES NEAR BRIGHT LIGHTS OR MOUNTING THEM ON SHINY METAL SURFACES.
10. MOUNT BAT BOXES 20 FEET AWAY FROM NEAREST PREDATOR PERCHES (OVERHEAD WIRES, KNOWN NESTS, ETC).
11. AVOID PLACING BOXES DIRECTLY ADJACENT TO ROADWAYS.
12. INSTALLATION OF BOXES SHALL OCCUR IN EARLY SPRING.
13. PREDATOR SHIELD SHALL BE PLACED AROUND SUPPORTING POLES BELOW THE HOUSES. PREDATOR SHIELD SHALL BE 26-GAUGE SHEET METAL CONE WITH 18" RADIUS.
14. CHECK BAT BOXES ONCE PER YEAR FOR SIGNS OF DETERIORATION, WASP OR HORNET NESTS, BAT PREDATION OR HUMAN INTERFERENCE. REMOVE WASP OR HORNET NESTS BY KNOCKING OUT OF BAT BOX DURING DORMANT SEASON AS NECESSARY. NO BATS ARE EXPECTED TO USE ROOSTS AS HABITAT FROM OCTOBER THROUGH MARCH DUE TO THEIR MIGRATION AND HIBERNATION HABITS.

PRE-FABRICATED BAT BOX INSTALLATION

SCALE: NTS

9
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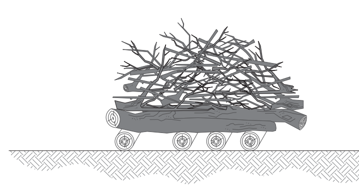
BRUSH PILE CONSTRUCTION NOTES:

1. LAY DOWN LARGEST LOGS OR TRUNKS (AT LEAST 4 INCHES IN DIAMETER) AS FOUNDATION OF BRUSH PILE. ROSE BUSHES AND THORNY SPECIES SHOULD BE MIXED IN TO BOTTOM LAYER WHEN POSSIBLE TO DETER PREDATORS.
2. PILE LARGE BRANCHES LOOSELY ON TOP OF LARGE LOGS.
3. CONTINUE BUILDING UP BRUSH PILE IN SUCCESSIVE LAYERS TO A MINIMUM DEPTH OF 18 INCHES, LEAVING OPEN POCKETS AND CAVITIES BETWEEN LAYERS. DO NOT PACK BRANCHES AND BRUSH TIGHTLY TOGETHER.
4. CREATE A MINIMUM OF 2 BRUSH PILES PER ACRE, SPACED AT A MINIMUM OF 150 FEET APART.
5. BRUSH PILES SHALL BE A MINIMUM OF 6 TO 8 FEET WIDE
6. PLACE BRUSH PILES OUTSIDE OF MAX. 2-YEAR FLOOD WATER SURFACE ELEVATION.
7. AVOID USING GREEN (RECENTLY PRUNED) DOUGLAS FIR OR PONDEROSA PINE BOUGHS IN THE PILE FROM JANUARY TO AUGUST TO AVOID ATTRACTING UNDESIRABLE BEETLES.



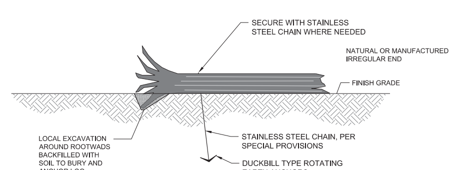
DETAIL - BRUSH PILE

SCALE: NTS

6
-

FLOODPLAIN LOGS DESIGN NOTES:

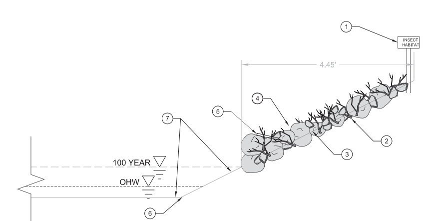
1. LARGE WOOD MATERIAL (LWM) SHALL BE SCATTERED RANDOMLY THROUGHOUT RRP SITES.
2. LWM MAY BE OF VARYING SIZES AND SPECIES, WITH A MINIMUM OF 18 INCHES DIAMETER AT BREAST HEIGHT AND 20 FEET LONG. SMALL AND SHORTER STEMS AND BRANCHES CAN BE USED FOR BRUSH PILES.
3. LWM SHALL HAVE 75 PERCENT TIGHTLY ADHERED BARK AND LIE ROUGHLY HORIZONTAL ON THE GROUND.
4. THE PORTION OF THE LOG THAT LIES ON THE SOIL SHALL BE LONGITUDINALLY V-NOTCHED THREE INCHES DEEP TO CREATE SMALL MAMMAL TUNNELS AND PROMOTE FUNGAL GROWTH.
5. INCLUDE ROOT WADS ON STEMS WHEN POSSIBLE.
6. SINGLE STEMS WITHOUT ROOTWADS SHOULD BE ASSOCIATED WITH OTHER LOGS, ROCK PILES, OR HABITAT STRUCTURES RATHER THAN INDIVIDUALLY DISTRIBUTED.



FLOODPLAIN LOGS

SCALE: NTS

7
-



UNDER BRIDGE HABITAT DETAIL

SCALE: NTS

UNDER BRIDGE HABITAT NOTES:

1. OPTIONAL EDUCATIONAL SIGNAGE FOR VISITORS.
2. FIRMLY ANCHOR TREE BRANCHES BETWEEN ROCKS WITH END IN THE SOIL. MINIMUM 1" TO MAXIMUM 4" DIAMTER AND MAXIMUM 6' LENGTH. MINIMUM OF ONE BRANCH EVERY SQUARE YARD RANDOMLY PLACED ABOVE 100 YEAR FLOOD ELEVATION. NO WOOD TO BE PLACED BELOW THE 100 YEAR WATER SURFACE ELEVATION.
3. CREVICES FOR WILDLIFE WITH SIZE OPENINGS VARYING FOR ANIMAL REFUGE.
4. 2 TO 3 LAYERS OF MINIMUM 3” ROCK TO 1-MAN BOULDERS. AT LEAST 1/2 OF THE 1-MAN SHALL BE EMBEDDED INTO THE SLOPE TO STABILIZE THE ROCK SURFACE.
5. ANCHOR HOLLOW, BIODEGRADABLE TUBES (BAMBOO OR SIMILAR MATERIAL) BETWEEN ROCKS FOR ARACHNID TUNNELS.
6. KEY BOTTOM COURSE OF ROCK INTO TOE OF SLOPE TO STABILIZE THE ROCK POSITION. ROCK SHALL BE EMBEDDED INTO UNDERLYING SOIL AT LEAST 1/3 OF ROCK DIAMETER.
7. DESIGN GRADE.

10
-

FILE NAME	O:\proj\Y2016\16-06277-000\CAD\Dwg\Habitat\XL5105_PS_HPL_10.dgn
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DATE	8/16/2023
PLOTTED BY	tprescott
DESIGNED BY	R. TAYLOR
ENTERED BY	T. PRESCOTT
CHECKED BY	K. FORESTER
PROJ. ENGR.	C. SODERQUIST
REGIONAL ADM.	J. WHITE

REVISION	DATE	BY

REGION NO. 10 | STATE WASH | FED.AID PROJ.NO. 0167(059)

JOB NUMBER 22C529

CONTRACT NO.

LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

HABITAT DETAILS

PLAN REF NO HPL10

SHEET OF SHEETS


UPPER HYLEBOS NORTH ADDITION
UPPER HYLEBOS ADDITION
LOWER SURPRISE LAKE TRIBUTARY ADDITION
3
UPPER SURPRISE LAKE TRIBUTARY ADDITION
4
MIDDLE SURPRISE LAKE TRIBUTARY ADDITION
2
LOWER HYLEBOS ADDITION
WAPATO CREEK BUFFER ENHANCEMENT
NORTHWEST WAPATO RRP
5
EAST WAPATO RRP
6
WEST WAPATO RRP
PUYALLUP NORTH
8
7
FREEMAN ROAD
PUYALLUP SOUTH
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TIME 7:19:38 PM
DATE 8/15/2023
PLOTTED BY tprescott
DESIGNED BY G. KAYSER
ENTERED BY T. PRESCOTT
CHECKED BY K. FORESTER
PROJ. ENGR. C. SODERQUIST
REGIONAL ADM. J. WHITE
REVISION
DATE
BY
REGION NO. 10
STATE WASH
JOB NUMBER 22C529
CONTRACT NO.
FED.AID PROJ.NO. 0167(059)
LOCATION NO. XL5105
CONCEPTUAL DESIGN NOT FOR CONSTRUCTION
Washington State Department of Transportation
SR 167
I-5 TO SR 161
NEW EXPRESSWAY
STREAM PLAN KEY MAP
PLAN REF NO SPL01
SHEET
OF
SHEETS

LOWER HYLEBOS ADDITION

0 50 100
SCALE IN FEET

N

LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		PROPERTY LINE
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ROADWAY ALIGNMENT
	CUT FILL	CUT / FILL LINE
	505	STREAM ALIGNMENT
30		CONTOURS (1FT)
		NATIVE VEGETATION FILL ZONE
	+15.00	SPOT ELEVATIONS
		GRAVEL ACCESS ROAD - CONSTRUCTED BY OTHERS
		STAGE 2 MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE

DESIGN INTENT:

1. THE LOWER HYLEBOS ADDITION SITE WILL PROTECT EXISTING FORESTED WETLANDS AND RIPARIAN EDGES WHILE GRADING DOWN ADJACENT LANDSCAPE TO MAXIMIZE WETLAND CREATION. EXISTING FOREST AREAS HAVE LITTLE TO NO NATIVE UNDERSTORY VEGETATION AND WILL REQUIRE SIGNIFICANT UNDERSTORY RESTORATION.

2. THE PIERCE COUNTY SEWER EASEMENT RUNS THROUGH THE EASTERN HALF OF THE SITE, BISECTING WETLAND CREATION AREAS. THE SEWER EASEMENT WILL REQUIRE GRAVEL SURFACE DRIVEWAYS AND A MINIMUM OF 3 FEET COVER FROM TOP OF SEWER LINE TO GRAVEL SURFACE. IN ORDER TO MAINTAIN HYDROLOGIC CONNECTIVITY BETWEEN WETLAND AREAS, DESIGN SHOULD CONSIDER GRAVEL BEDDING MATERIAL UNDER THE TOP COURSE OF ROAD SURFACING THAT ALLOWS HYPORHEIC CONNECTIVITY OF WETLAND HYDROLOGY.

NOTES:

1. SEE STAGE 2 MITIGATION AND WETLAND MITIGATION PLAN SHEETS FOR NATIVE PROTECTION ZONE BOUNDARY.

2. NO GRADING OR HEAVY MACHINERY WITHIN NATIVE VEGETATION PROTECTION ZONE BOUNDARY.

3. THE NATIVE VEGETATION FILL AREA IS A DRAINAGE FEATURE/DEPRESSION DOMINATED WITH MATURE ALDER AND WILLOW SPECIES. INVASIVE VEGETATION SHOULD BE REMOVED FROM THIS AREA PRIOR TO GRADING. THE EXISTING DEPRESSION SHALL BE FILLED BY DEPOSITING FILL MATERIAL OVER EXISTING NATIVE TREES AND SHRUBS IN A MANNER THAT PRESERVES THESE WOODY SPECIES AND ALLOWS THE OPPORTUNITY FOR STEMS TO ROOTS AND RESPOUT. ACCESS ROADS FOR GRADING ON EITHER SIDE OF THE DRAINAGE FEATURE SHOULD BE MINIMIZED TO PRESERVE EXISTING WOODY SPECIES TO THE MAXIMUM EXTENT PRACTICAL.

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PLOTTED BY	tprescott			
DESIGNED BY	G. KAYSER			
ENTERED BY	T. PRESCOTT			
CHECKED BY	K. FORESTER			
PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM PLAN

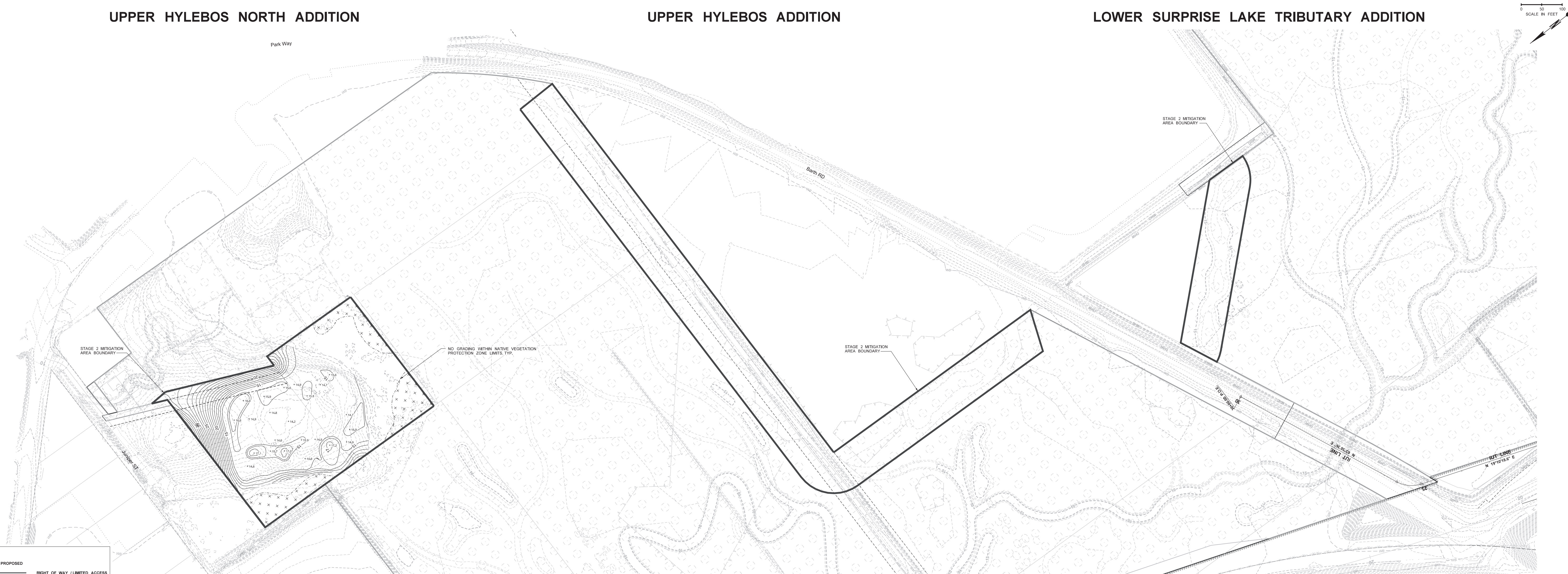
PLAN REF NO
SPL02

SHEET
OF
SHEETS

UPPER HYLEBOS NORTH ADDITION

UPPER HYLEBOS ADDITION

LOWER SURPRISE LAKE TRIBUTARY ADDITION



LEGEND:

EXISTING | PROPOSED

RIGHT OF WAY / LIMITED ACCESS
COUNTY / CITY RIGHT OF WAY
PROPERTY LINE
EASEMENT
WETLAND BOUNDARY
ROADWAY ALIGNMENT
CUT / FILL LINE
STREAM ALIGNMENT
CONTOURS (1FT)
SPOT ELEVATIONS
STAGE 1b MITIGATION AREA BOUNDARY
STAGE 2 MITIGATION AREA BOUNDARY
NATIVE VEGETATION PROTECTION ZONE

DESIGN INTENT:

1. THE UPPER HYLEBOS NORTH ADDITION SITE WILL PROTECT EXISTING WETLANDS AND RIPARIAN EDGES WHILE GRADING DOWN ADJACENT LANDSCAPE TO MAXIMIZE WETLAND CREATION.

NOTES:

1. SEE RRP AND WETLAND MITIGATION PLAN SHEETS FOR NATIVE PROTECTION ZONE BOUNDARY.
2. NO GRADING OR HEAVY MACHINERY WITHIN NATIVE VEGETATION PROTECTION ZONE BOUNDARY.

FILE NAME	O:\proj\Y2016\16-06277-000\CAD\Dwg\Stream Restorartion\XL5105_PS_SPL_03.dgn
TIME	7:22:40 PM
DATE	8/15/2023
PLOTTED BY	tprescott
DESIGNED BY	G. KAYSER
ENTERED BY	T. PRESCOTT
CHECKED BY	K. FORESTER
PROJ. ENGR.	C. SODERQUIST
REGIONAL ADM.	J. WHITE

REVISION | DATE | BY

REGION NO. 10 | STATE WASH | JOB NUMBER 22C529 | CONTRACT NO.

FED.AID PROJ.NO. 0167(059)

LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

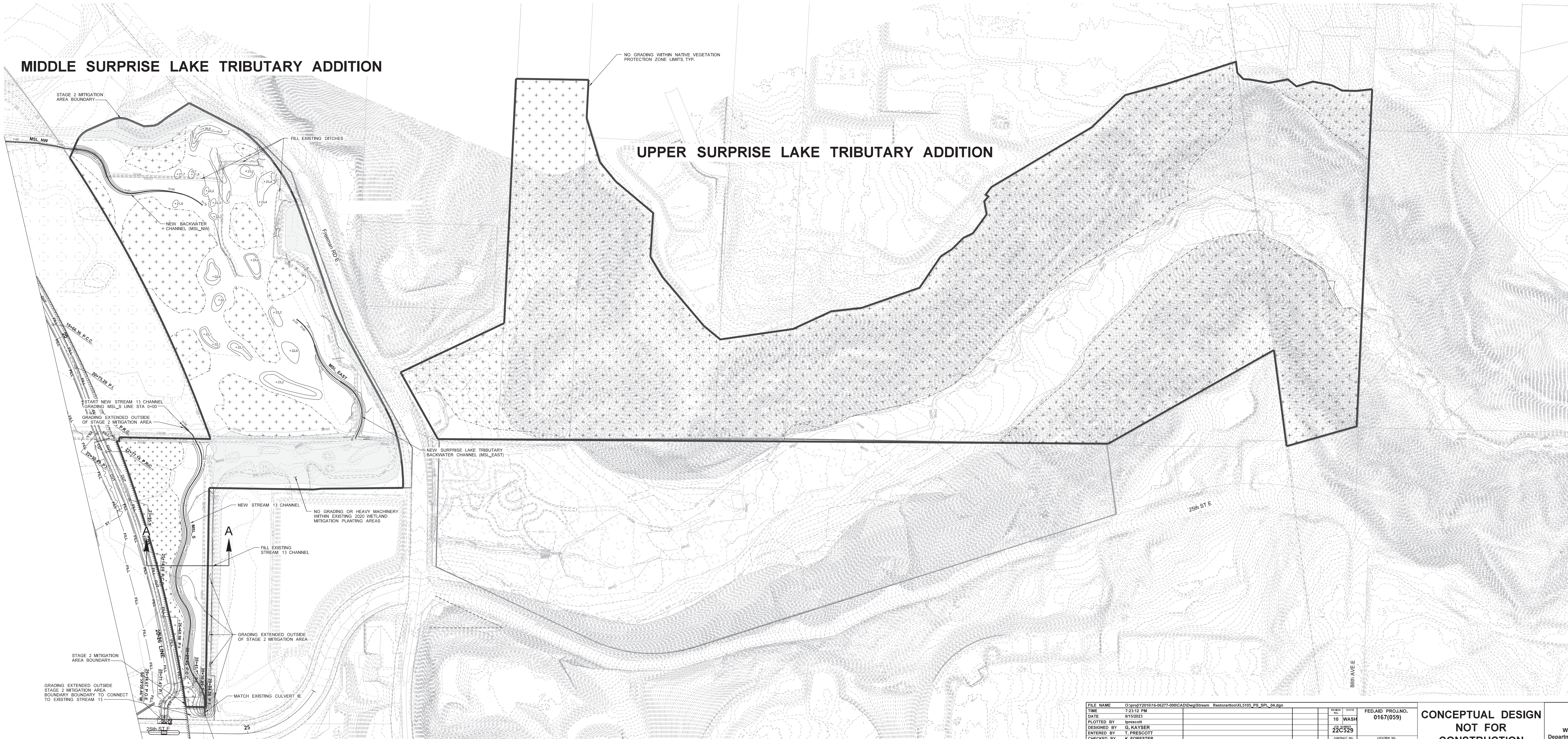
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM PLAN

PLAN REF NO SPL03

SHEET OF SHEETS



LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		PROPERTY LINE
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ROADWAY ALIGNMENT
	CUT FILL	CUT / FILL LINE
	505	STREAM ALIGNMENT
30		CONTOURS (1FT)
	+ 15.00	SPOT ELEVATIONS
		STAGE 1b MITIGATION AREA BOUNDARY
		STAGE 2 MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE
		EXISTING WETLAND MITIGATION PLANTING

DESIGN INTENT:

1. THE UPPER SURPRISE LAKE TRIBUTARY SITE INCLUDES EXISTING MATURE FOREST AND PREDOMINANTLY NATIVE UNDERSTORY. NO HEAVY EQUIPMENT SHALL BE USED IN THE RESTORATION OF THIS SITE, AND GRADING SHALL ONLY OCCUR AS SHOWN ON THE PLANS. SITE ENHANCEMENT SHALL INVOLVE THE USE OF HAND TOOLS FOR INVASIVE SPECIES REMOVAL AND NATIVE REVEGETATION SHALL BE PLANTED IN BARE AREAS TO INCREASE SPECIES DIVERSITY AND NATIVE COVER.

2. IN AREAS IMPACTED BY STORMWATER OUTFALLS OR DAMAGED FROM EROSION, NATIVE REVEGETATION WILL BE REQUIRED. IN CASES OF EXTREME EROSION, AT THE DISCRETION OF THE ENGINEER, THE STORMWATER OUTFALL WILL BE ALTERED TO INCREASE ENERGY DISPERSION OF THE OUTLET. IT SHOULD BE NOTED THAT THE PROPERTIES UPSTREAM OF THIS SITE HAVE UNDERSTORY VEGETATION DOMINATED BY HIMALAYAN BLACKBERRY, IVY, AND OTHER INVASIVE OR NUISANCE SPECIES.

3. THE SOUTHWESTERN PORTION OF THE SITE CONNECTS TO THE STAGE 1B UPPER SURPRISE LAKE TRIBUTARY RESTORATION AREA AND IS THE ONLY AREA DOMINATED BY REED CANARY GRASS. EQUIPMENT MAY BE APPROPRIATE FOR WEED REMOVAL IN THIS SMALL PORTION OF THE SITE.

NOTES:

1. SEE RRP AND WETLAND MITIGATION PLAN SHEETS FOR NATIVE PROTECTION ZONE BOUNDARY.

2. NO GRADING OR HEAVY MACHINERY WITHIN NATIVE VEGETATION PROTECTION ZONE BOUNDARY.

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TIME	7:23:12 PM			
DATE	8/15/2023			
PLOTTED BY	tprescott			
DESIGNED BY	G. KAYSER			
ENTERED BY	T. PRESCOTT			
CHECKED BY	K. FORESTER			
PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

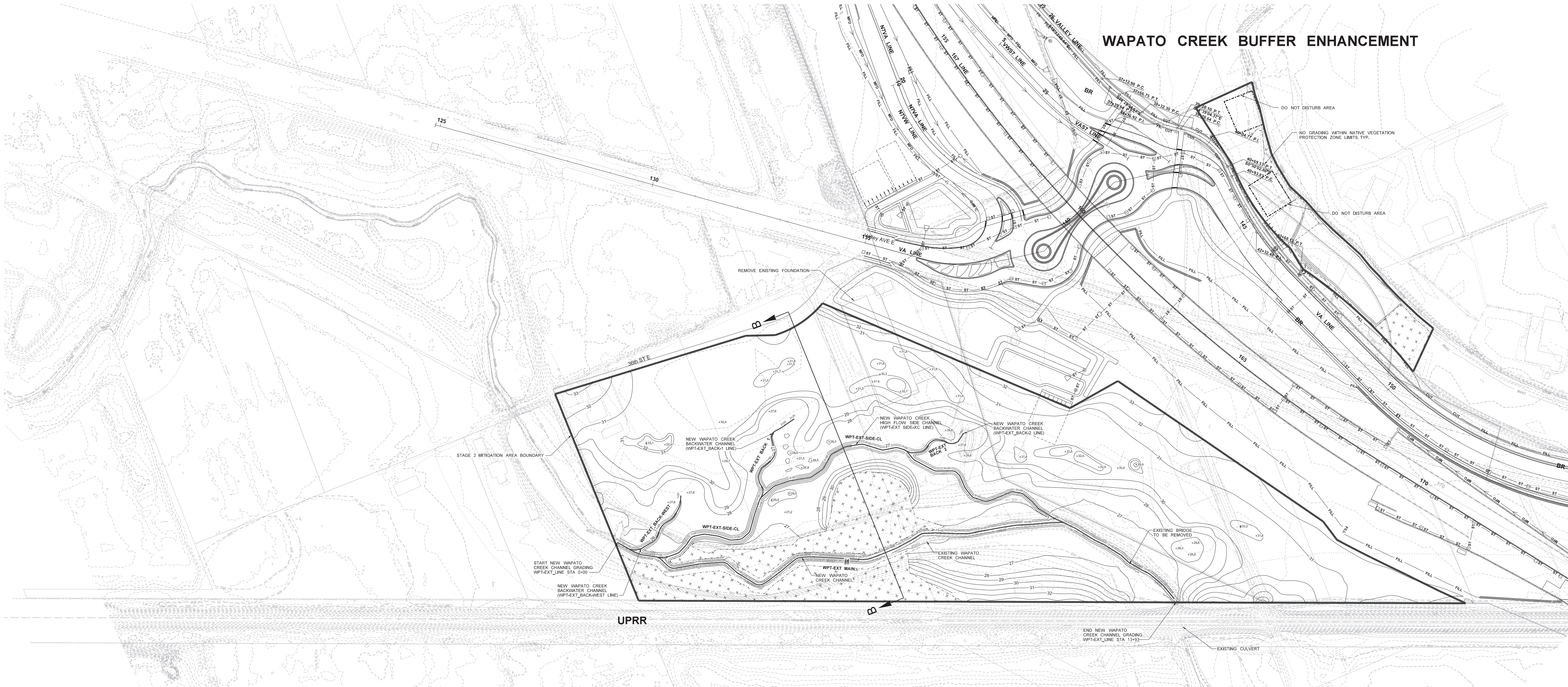
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM PLAN

PLAN REF NO SPL04

SHEET OF SHEETS



LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		PROPERTY LINE
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ROADWAY ALIGNMENT
	CUT FILL	CUT / FILL LINE
	505	STREAM ALIGNMENT
30		CONTOURS (1FT)
		DO NOT DISTURB AREA
	+15.00	SPOT ELEVATIONS
		STAGE 1b MITIGATION AREA BOUNDARY
		STAGE 2 MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE

DESIGN INTENT:

1. THE GOAL OF THE NORTHWEST WAPATO SITE IS TO IMPROVE THE EXISTING STREAM CHANNEL CONFIGURATION AS WELL AS CREATE A HIGH FLOW SIDE CHANNEL FOR FISH REARING WHILE MAINTAINING NECESSARY FLOWS IN THE MAIN CHANNEL. THE ADJACENT UPLAND AREAS WILL BE GRADED TO MAXIMIZE WETLAND CREATION AND FLOODPLAIN AREA. NATIVE VEGETATION PROTECTION AREAS ARE MARKED TO SAFEGUARD LARGE PATCHES OF EXISTING NATIVE TREES AND SHRUBS ADJACENT TO THE STREAM CHANNEL.
2. THE GOAL OF THE WAPATO CREEK BUFFER ENHANCEMENT SITE IS TO REMOVE INVASIVE VEGETATION AND RESTORE WITH NATIVE VEGETATION.
3. SITE GRADING NEEDS TO ENSURE NO DOWNSTREAM RISE WHILE BALANCING WETLAND CREATION. GRADING SHOULD BE REFINED BASED ON ADDITIONAL GROUNDWATER DATA TO ENSURE SITE GOALS ARE MET.

NOTES:

1. SEE RRP AND WETLAND MITIGATION PLAN SHEETS FOR NATIVE PROTECTION ZONE BOUNDARY.
2. NO GRADING OR HEAVY MACHINERY WITHIN NATIVE VEGETATION PROTECTION ZONE BOUNDARY.

FILE NAME	O:\proj\Y2016\16-06277-000\CAD\Dwg\Stream Restorartion\XL5105_PS_SPL_05.dgn			
TIME	7:23:51 PM			
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PLOTTED BY	tprescott			
DESIGNED BY	G. KAYSER			
ENTERED BY	T. PRESCOTT			
CHECKED BY	K. FORESTER			
PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

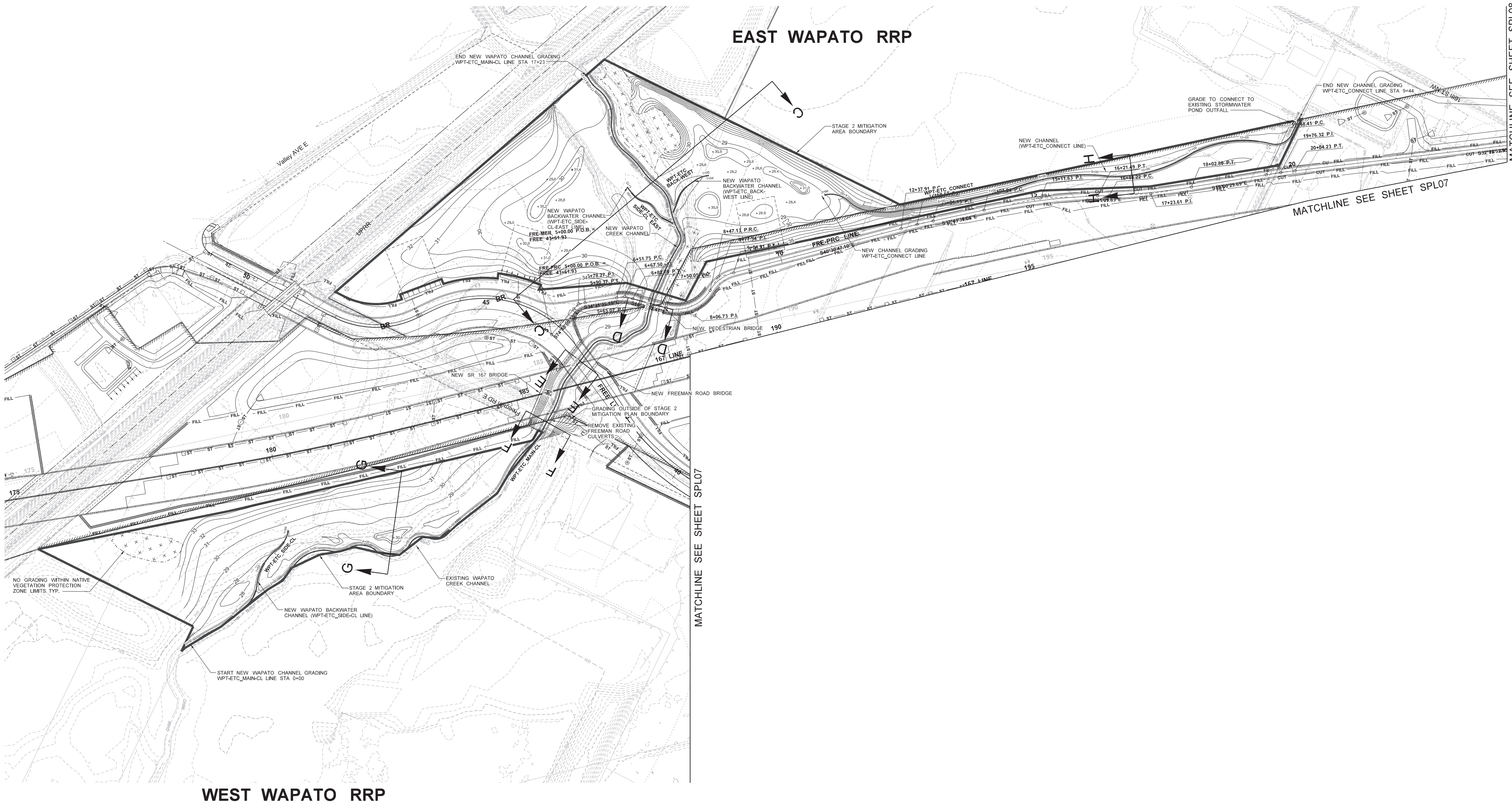
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM PLAN

PLAN REF NO SPL05

SHEET OF SHEETS



0 50 100
SCALE IN FEET

LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		PROPERTY LINE
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ROADWAY ALIGNMENT
	CUT FILL	CUT / FILL LINE
	505	STREAM ALIGNMENT
30		CONTOURS (1FT)
	+15.00	SPOT ELEVATIONS
		STAGE 1b MITIGATION AREA BOUNDARY
		STAGE 2 MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE

DESIGN INTENT:

1. EAST WAPATO RRP WILL RECONFIGURE THE STREAM CHANNEL TO IMPROVE CONDITIONS FOR SALMON MIGRATION AND REARING. EXISTING MATURE VEGETATION WILL BE PRESERVED, AT KEY LOCATIONS, WHERE NOTED IN THE PLANS. GRADING WILL FOCUS ON LOWERING THE LANDSCAPE ADJACENT TO STREAMS TO MAXIMIZE WETLAND CREATION AND FLOODPLAIN RECONNECTION. MICROTOPOGRAPHY, A SERIES OF HUMMOCKS, SHOULD BE DISPERSED THROUGHOUT THE WETLAND AREA. FLOW FROM POND 13 WILL BE ROUTED INTO THE WAPATO BASIN VIA A DISPERSION CHANNEL. THIS WILL ALLOW FOR INFILTRATION AND PROVIDE WETLANDS WITH HYDROLOGY.
2. WEST WAPATO RRP WILL IMPROVE STREAM CHANNEL CONDITIONS, MAXIMIZE WETLAND CREATION, AND LIMIT DISTURBANCE TO THE ADJACENT PUYALLUP TRIBAL ENHANCEMENT PROPERTY, BY FOCUSING STREAM REGRADING MAINLY ON THE RIGHT BANK IMPROVEMENTS.

NOTES:

1. SEE RRP AND WETLAND MITIGATION PLAN SHEETS FOR NATIVE PROTECTION ZONE BOUNDARY.
2. NO GRADING OR HEAVY MACHINERY WITHIN NATIVE VEGETATION PROTECTION ZONE BOUNDARY.

FILE NAME	O:\proj\Y2016\16-06277-000\CAD\Dwg\Stream Restorartion\XL5105_PS_SPL_06.dgn			
TIME	7:24:29 PM			
DATE	8/15/2023			
PLOTTED BY	tprescott			
DESIGNED BY	G. KAYSER			
ENTERED BY	T. PRESCOTT			
CHECKED BY	K. FORESTER			
PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM PLAN

PLAN REF NO SPL06

SHEET OF SHEETS

LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		PROPERTY LINE
		EASEMENT
		WETLAND BOUNDARY
2190	505	ROADWAY ALIGNMENT
		CUT / FILL LINE
	505	STREAM ALIGNMENT
30		CONTOURS (1FT)
	+15.00	SPOT ELEVATIONS
		STAGE 1b MITIGATION AREA BOUNDARY
		STAGE 2 MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE

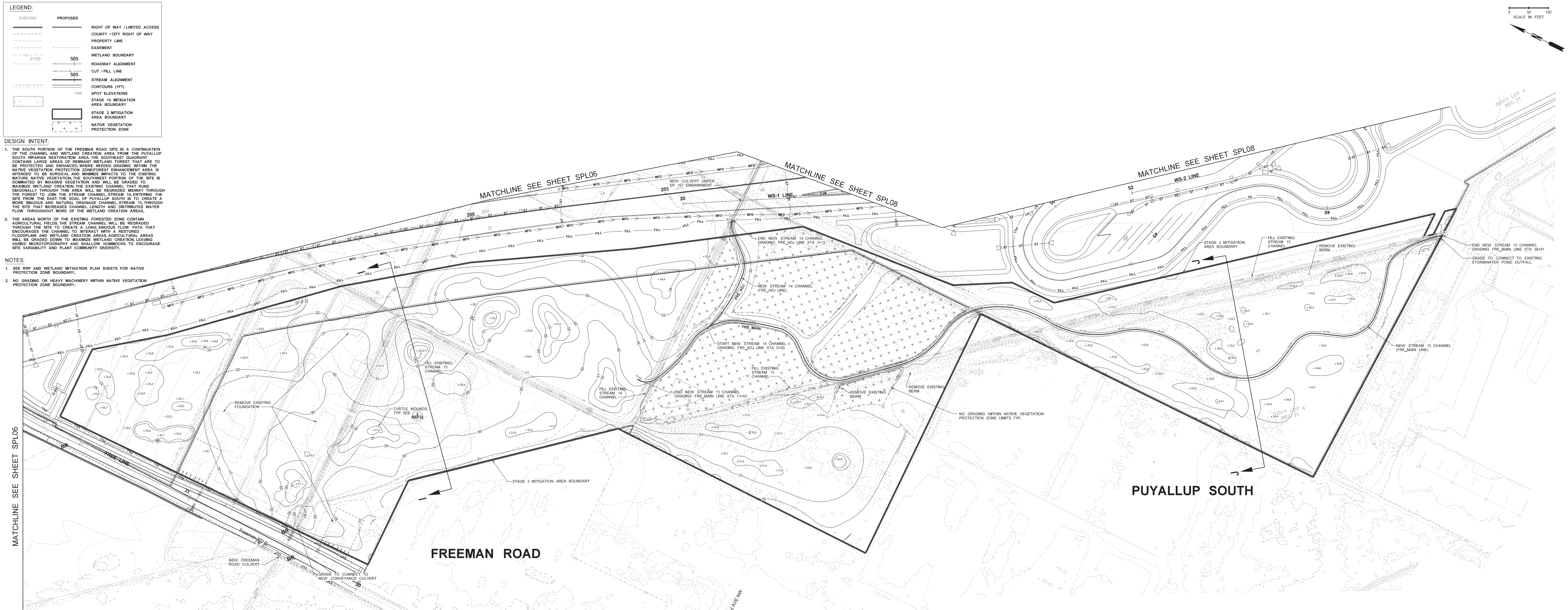
DESIGN INTENT:

1. THE SOUTH PORTION OF THE FREEMAN ROAD SITE IS A CONTINUATION OF THE CHANNEL AND WETLAND CREATION AREA FROM THE PUYALLUP SOUTH RIPARIAN RESTORATION AREA. THE SOUTHEAST QUADRANT CONTAINS LARGE AREAS OF REMNANT WETLAND FOREST THAT ARE TO BE PROTECTED AND ENHANCED, WHERE NEEDED. GRADING WITHIN THE NATIVE VEGETATION PROTECTION ZONE/FOREST ENHANCEMENT AREA IS INTENDED TO BE SURGICAL AND MINIMIZE IMPACTS TO THE EXISTING MATURE NATIVE VEGETATION. THE SOUTHWEST PORTION OF THE SITE IS DOMINATED BY INVASIVE VEGETATION AND WILL BE GRADED TO MAXIMIZE WETLAND CREATION. THE EXISTING CHANNEL THAT RUNS DIAGONALLY THROUGH THIS AREA WILL BE REGRADED MIDWAY THROUGH THE FOREST TO JOIN THE STREAM CHANNEL, STREAM 14, ENTERING THE SITE FROM THE EAST. THE GOAL OF PUYALLUP SOUTH IS TO CREATE A MORE SINUOUS AND NATURAL DRAINAGE CHANNEL, STREAM 15, THROUGH THE SITE THAT INCREASES CHANNEL LENGTH AND DISTRIBUTES WATER FLOW THROUGHOUT MORE OF THE WETLAND CREATION AREAS.

2. THE AREAS NORTH OF THE EXISTING FORESTED ZONE CONTAIN AGRICULTURAL FIELDS. THE STREAM CHANNEL WILL BE REGRADED THROUGH THE SITE TO CREATE A LONG, SINUOUS FLOW PATH THAT ENCOURAGES THE CHANNEL TO INTERACT WITH A RESTORED FLOODPLAIN AND WETLAND CREATION AREAS. AGRICULTURAL AREAS WILL BE GRADED DOWN TO MAXIMIZE WETLAND CREATION, LEAVING VARIED MICROTOPOGRAPHY AND SHALLOW HUMMOCKS TO ENCOURAGE SITE VARIABILITY AND PLANT COMMUNITY DIVERSITY.

NOTES:

1. SEE RRP AND WETLAND MITIGATION PLAN SHEETS FOR NATIVE PROTECTION ZONE BOUNDARY.
2. NO GRADING OR HEAVY MACHINERY WITHIN NATIVE VEGETATION PROTECTION ZONE BOUNDARY.



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DESIGNED BY	G. KAYSER				
ENTERED BY	T. PRESCOTT				
CHECKED BY	K. FORESTER				
PROJ. ENGR.	C. SODERQUIST				
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY	

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State Department of Transportation

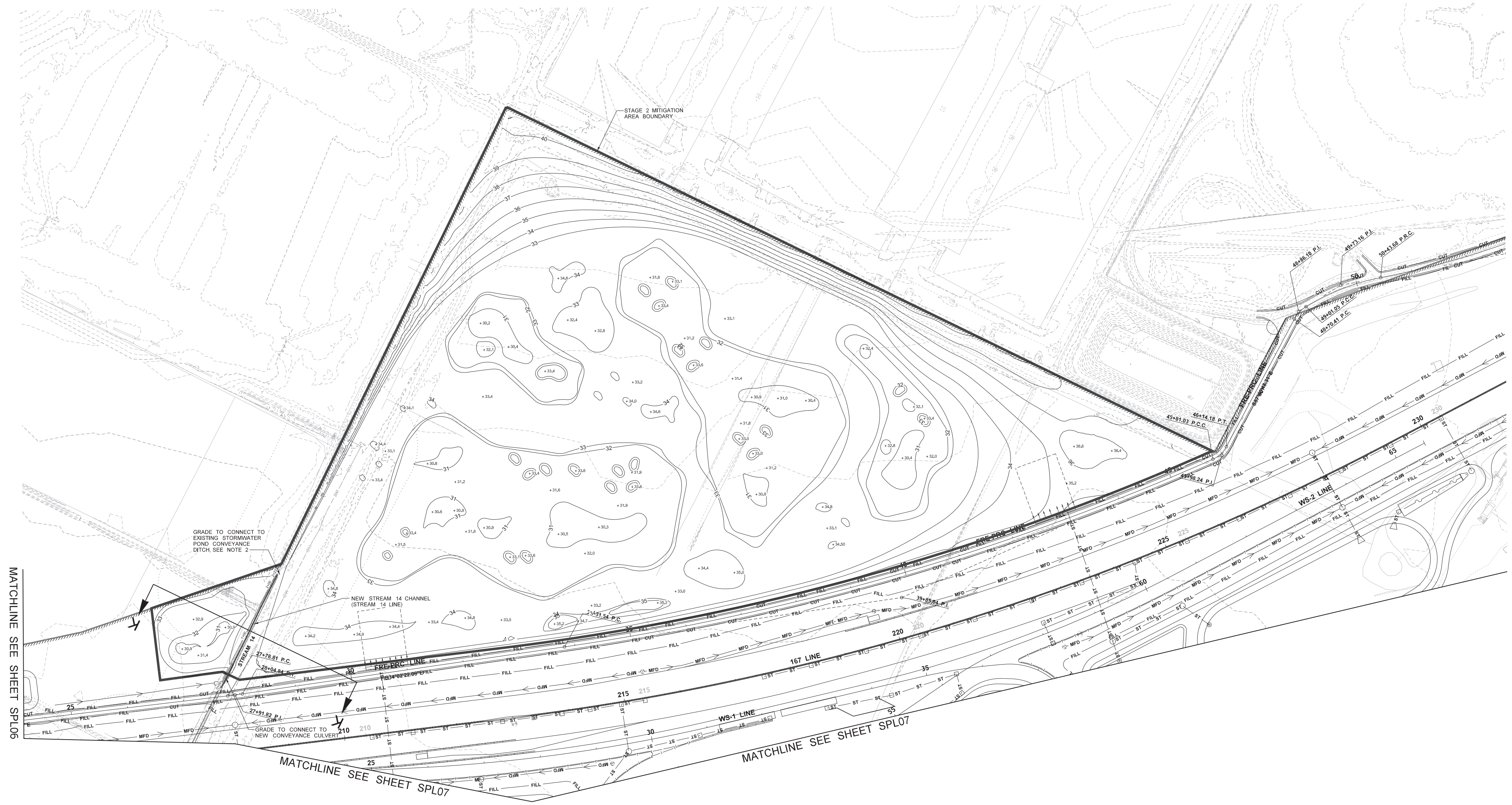
SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM PLAN

PLAN REF NO SPL07

SHEET OF SHEETS

PUYALLUP NORTH



0 50 100
SCALE IN FEET

LEGEND:

EXISTING	PROPOSED	
		RIGHT OF WAY / LIMITED ACCESS
		COUNTY / CITY RIGHT OF WAY
		PROPERTY LINE
		EASEMENT
WB		WETLAND BOUNDARY
2190	505	ROADWAY ALIGNMENT
	CUT FILL	CUT / FILL LINE
	505	STREAM ALIGNMENT
30		CONTOURS (1FT)
	+15.00	SPOT ELEVATIONS
		STAGE 1b MITIGATION AREA BOUNDARY
		STAGE 2 MITIGATION AREA BOUNDARY
		NATIVE VEGETATION PROTECTION ZONE

DESIGN INTENT:

1. THE GOAL OF THE PUYALLUP NORTH SITE IS TO LOWER EXISTING ELEVATIONS TO CREATE DEPRESSIONAL WETLAND CONDITIONS. WETLAND CREATION NEEDS TO BE MAXIMIZED ON SITE WHILE ALSO CREATING NATURAL LANDFORMS. THE SITE WILL CONTAIN VARIED MICROTROPOGRAPHY TO SUPPORT VEGETATION AND HABITAT DIVERSITY. STREAM 14 WILL BE WIDENED SLIGHTLY TO ACCOMMODATE FOR GREATER FLOWS BEFORE FLOWING INTO A CULVERT THAT WILL CROSS UNDER THE NEW SR167 ROADWAY EMBANKMENT AND MAKE ITS WAY INTO THE FREEMAN ROAD SITE AND STREAM 15.

2. CHANNEL 14 MUST BE GRADED IN SUCH A WAY TO CONNECT TO EXISTING STORMWATER POND CONVEYANCE DITCH AND CONVEY THE 100 YEAR RECURRENCE INTERVAL STORM EVENT FLOW WITHIN ITS BANKS WITHOUT OVERTOPPING.

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DATE	8/15/2023
PLOTTED BY	tprescott
DESIGNED BY	G. KAYSER
ENTERED BY	T. PRESCOTT
CHECKED BY	K. FORESTER
PROJ. ENGR.	C. SODERQUIST
REGIONAL ADM.	J. WHITE

REVISION	DATE	BY

REGION NO. 10 | STATE WASH | FED.AID PROJ.NO. 0167(059)
JOB NUMBER 22C529
CONTRACT NO.
LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

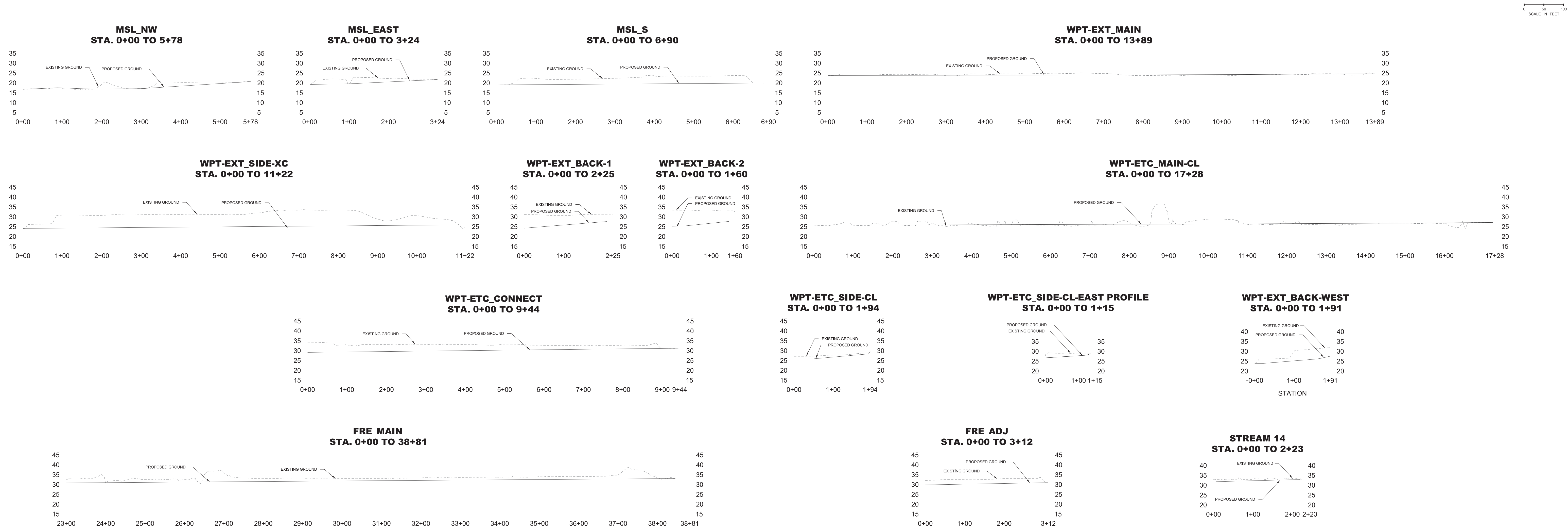
Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM PLAN

PLAN REF NO SPL08

SHEET OF SHEETS



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CHECKED BY	K. FORESTER			
PROJ. ENGR.	C. SODERQUIST			
REGIONAL ADM.	J. WHITE	REVISION	DATE	BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM PROFILES

PLAN REF NO SPL09

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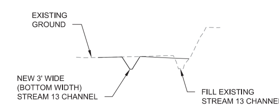

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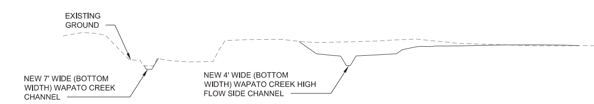

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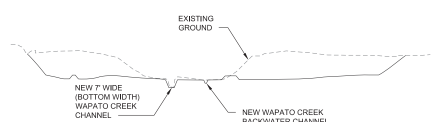

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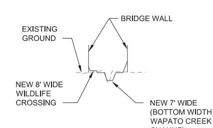

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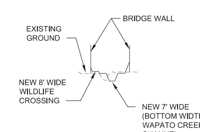

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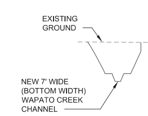

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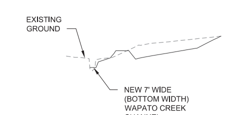

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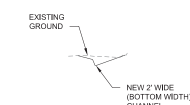

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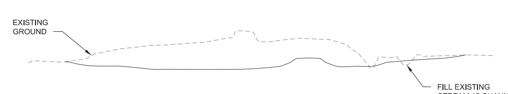

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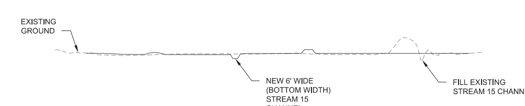

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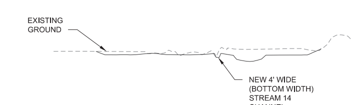

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ENTERED BY	T. PRESCOTT
CHECKED BY	K. FORESTER
PROJ. ENGR.	C. SODERQUIST
REGIONAL ADM.	J. WHITE

REVISION | DATE | BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	0167(059)
JOB NUMBER 22C529		
CONTRACT NO.		LOCATION NO. XL5105

CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

Washington State
Department of Transportation

SR 167
I-5 TO SR 161
NEW EXPRESSWAY

STREAM CROSS SECTIONS

PLAN REF NO
SPL10
SHEET
OF
SHEETS

Appendix F

Groundwater Data

Puget Sound GATEWAY Program

509 5 167

SR 167/I-5 to SR 161 – New Expressway Project – Stage 2

Groundwater Monitoring Program Summary Report Pierce County, Washington

April 28, 2023

Prepared for:
Washington State Department of Transportation
Megaprograms | Puget Sound Gateway Program
SR 167 Completion Project

Through:
WSP USA
1001 Fourth Avenue, Suite 3100 | Seattle, WA

Prepared by:
Innovex Environmental Management, Inc.
Redmond, Washington

WSDOT

Revision History

Date	Revision
4/6/23	Revision 0 – Draft for Internal Review
4/27/23	Revision 1 – Draft for Review
4/28/23	Revision 2 – Final

Certification

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned.

Pamela M Fleming

Prepared by Pamela M. Fleming, Senior Project Geologist

Anna J Jordan

Reviewed by Anna J. Jordan, Supervising Geologist, Program Manager

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Appendix F – Groundwater-Monitoring Well Sampling Field-Data Sheets

1.0 Project Background and Objectives

INNOVEX Environmental Management (INNOVEX) has been tasked to conduct groundwater monitoring for the Washington State Department of Transportation (WSDOT) SR 167 Completion Project Stage 2 (Project). INNOVEX collected and analyzed groundwater from eleven (11) groundwater-monitoring wells (Table 1) to establish the pre-construction baseline for groundwater quality. Acronyms used in this report are presented in Appendix A. The Project location (Site) is shown in Appendix B and the monitoring-well locations are shown in Appendices C and D.

The groundwater-monitoring activities occurred over a two-year period. Four quarterly groundwater-sampling events were completed in September 2021, December 2021, March 2022, and June 2022, followed by two semi-annual groundwater sampling events in Fall 2022 and Spring 2023. The semi-annual sampling events were planned to coincide with the lowest and highest annual groundwater elevations (Fall 2022 and Spring 2023, respectively).

This report summarizes the findings from the six groundwater-monitoring events conducted between September 2021 and March 2023.

2.0 Groundwater-Monitoring Activities

Groundwater samples were collected from the monitoring wells using the low-flow methodology described in Section 2.4. The analytical methods and water-quality criteria (WQC) are summarized below in Sections 2.2 and 2.3, respectively. Field activities were conducted in accordance with the SR 167/I-5 to SR 161 – New Expressway Project – Stage 2 Groundwater Monitoring Sampling and Analysis Plan (SAP) (INNOVEX, 2021). Deviations from the SAP are described below.

2.1 Sampling and Analysis Plan Deviations

The following deviations from the 2021 SAP occurred.

- Previous analytical results from March through September 2022 indicated the detection of several pesticide compounds in analyzed groundwater samples. Therefore, all wells were analyzed again for organochlorine and organophosphorus pesticides in Spring 2023.

- Drawdown in wells H-3P-17, MW-1-21, MW-2-21, MW-3-21, MW-6-21, and MW-7-21 was greater than 0.3 feet. However, at both H-3P-17 and MW-2-21, after approximately 10 minutes the water level stabilized at approximately 0.7 feet below the starting level. MW-1-21 stabilized at approximately 1.9 feet, MW-3-21 at approximately 1.0 feet, and MW-6-21 at approximately 1.7 feet below the starting level. Monitoring well MW-7-21, was purged dry and allowed to recharge. The well was sampled once 80% recharge was reached.

2.2 Analytical Methods

Groundwater samples collected from the 11 monitoring wells were analyzed by the following methods.

- Arsenic and zinc, total and dissolved – EPA Method 200.8
- Volatile organic compounds (VOCs) – EPA Method 8260D
- Organochlorine pesticides – EPA Method 8081B
- Organophosphorus pesticides – EPA Method 8270E
- Semivolatile Organic Compounds (SVOCs) – EPA Method 8270E

2.3 Water Quality Criteria

The water-quality criteria (WQC) for the project were identified using Ecology's Cleanup Levels and Risk Calculation (CLARC). The WQC (applicable Model Toxics Control Act [MTCA] Cleanup Levels, Ecology 1996, and Surface Water Quality Standards) are presented in Tables 2a through 2c.

For groundwater, the analytical results were compared to the MTCA Method A CULs. If Method A CULs were not available, the results were compared to MTCA Method B CULs. Laboratory-analytical results were also compared to the most stringent Surface Water Quality Standards (SWQS) because groundwater is known to seasonally discharge to the surface water within the Puyallup-White River Watershed and Puyallup River Drainage Basin where the Project area is located. The most stringent of the Fresh Water SWQS listed in the CLARC table are presented in Tables 2a through 2c. However, specific SWQS have not been established for the Project.

Additionally, if an Agreed Order with Ecology becomes necessary due to CUL exceedances, Suggested Indicator Levels are provided in Tables 2a through 2c. Indicator Levels are concentrations of potential contaminants above which a water quality violation may occur. The Suggested Indicator Levels are derived from WAC 173-201A or MTCA Cleanup Levels.

2.4 Groundwater Sampling Methods

Groundwater samples were collected using low-flow methodology following the steps described below.

1. The well monument was opened and depth to water measured from the top of the well casing.
2. Low-flow purging was conducted with a peristaltic pump at a nominal flow rate of 500 milliliters (ml) per minute when possible.

3. Water-level drawdown was monitored during low-flow purging of the monitoring wells and did not exceed 0.3 feet below the original static-water level, except for the deviations noted in Section 2.1.

4. Water-quality parameters were measured using a flow-through cell and multiparameter meter. The parameters were recorded every 5 minutes and final measurements are presented in Table 3. The groundwater sample was collected when the field-parameter stabilization criteria shown below were met during three consecutive measurements.

   - Turbidity: +/- 5 percent or below 20 nephelometric turbidity units (NTU)
   - Temperature +/- 3 percent
   - pH +/- 0.1 pH units
   - Specific conductance +/- 10 microsiemens per centimeter (µs/cm) if <1000 µs/cm, +/- 20 if >1000 µs/cm
   - Dissolved oxygen: if < 1 milligram per liter (mg/l) +/- 0.05 mg/l, if >1 mg/l +/- 0.2 mg/l
   - Oxidation reduction potential +/- 10 millivolts (mv)

5. The sample containers were labeled and placed in a cooler with ice and maintained between 2 and 6 degrees Celsius for transport to OnSite Environmental, Inc. (OnSite) under chain-of-custody procedures.

3.0 Analytical Results

Analytical-groundwater data collected from the completed groundwater-monitoring wells are presented in Tables 2a, 2b, 2c, and Appendix C. Additionally, prior carcinogenic polyaromatic hydrocarbon (cPAH) Toxicity Equivalency Quotient (TEQ) calculations are presented in Table 2d. Groundwater-geochemical parameter results from the March 2023 sampling event are presented in Table 3. The laboratory-analytical reports are included in Appendix E. Groundwater-analytical results are summarized below.

3.1 Metals

Samples were submitted for analysis of total and dissolved Arsenic and Zinc. Neither total nor dissolved zinc were detected above the laboratory Practical Quantitation Limits (PQLs) in any of the analyzed samples.

Total arsenic was detected in the samples collected from monitoring wells H-5P-18, H-3P-17, MW-1-21, MW-2-21, MW-3-21, MW-6-21, and MW-7-21 at concentrations ranging from 0.61 to 7.7 micrograms/liter (µg/l). These concentrations exceed the most stringent Fresh Water SWQS of 0.018 µg/l, which is considered protective of human health. Additionally, total arsenic concentrations in samples collected from H-3P-17 and MW-2-21 exceeded the MTCA Method A CUL for groundwater of 5.0 µg/l. However, these concentrations do not exceed the SWQS for chronic exposure protective of fresh-water aquatic life (190 µg/l) or acute exposure protective of fresh-water aquatic life (360 µg/l).

Samples also were filtered by the analytical laboratory to remove particulate matter prior to analysis of dissolved arsenic. Dissolved arsenic was detected in the samples collected from monitoring wells H-5P-18, H-3P-17, MW-1-21, MW-2-21, and MW-6-21 at concentrations ranging from 0.72 to 5.3 µg/l. These concentrations exceed the most stringent Fresh Water SWQS of 0.018 µg/l. Additionally, the dissolved arsenic concentration detected in MW- 2-21 exceeds the applicable MTCA groundwater CUL.

3.2 VOCs

Carbon disulfide was detected in the sample from monitoring well MW-6-21 at concentrations of 0.22 µg/l. This concentration does not exceed the MTCA Method B CUL for groundwater of 800 µg/l. Additionally, a SWQS has not been established for this analyte.

Other VOCs were not detected above the laboratory PQLs in any of the analyzed groundwater samples.

3.3 Pesticides

Organochlorine and organophosphorus pesticides were not detected above the laboratory PQLs in the analyzed groundwater samples.

3.4 SVOCs

SVOCs (including polycyclic aromatic hydrocarbons [PAHs]) were not detected above the laboratory PQLs in the analyzed groundwater samples. However, PQLs for several of the analytes are above the most stringent SWQS levels.

4.0 Groundwater-Flow Direction and Gradient

Shallow groundwater within the project area generally flows to the north-northwest towards Commencement Bay at the approximate gradient of 0.001 feet/foot, consistent with prior calculations. Groundwater-elevation contours and approximate flow direction are shown in Appendix D.

Well B-19-04 was not used in the calculation of groundwater contours as its measured water level was not consistent with groundwater elevations in nearby monitoring wells. As mentioned in previous groundwater monitoring reports, a Hydrogeologic Conditions Assessment report (Assessment) was prepared for the SR 167/I-5 to SR 509 – New Expressway (Stage 1b) Project area by Robinson-Noble in 2020. Potentiometric maps in the Assessment indicate that water levels in B-19-04 have historically been lower than other wells in the project area by as much as four feet. This information is consistent with observations made as part of this groundwater-monitoring program. The Assessment also noted that the average depth to water measurements at B-19-04 were a foot lower during the study period (October 2017 to March 2020) compared to historical data. These consistently lower water elevations suggest a localized influence on groundwater flow, possibly due to the well's proximity to the Puyallup River.

5.0 Data Quality

One duplicate field sample (sample MW-AF) was collected from monitoring well B-19-04-P to evaluate sampling and laboratory-analytical precision. Accordingly, sample MW-AF was submitted for the same analyses as sample B-19-04-P. Analytes were not detected in either sample; therefore, the relative percent difference could not be calculated. However, the lack of detected analytes in either sample suggests an acceptable margin of error.

Laboratory-data reports from OnSite were reviewed by INNOVEX. Laboratory-provided data-quality parameters were reviewed and data qualifiers were applied as necessary. For requested analytes, INNOVEX found the data to be qualified and acceptable for all purposes following evaluation of the quality-control specifications presented in the SAP or equivalent requirements found in the contracted commercial laboratory-analytical methods. Precision, accuracy, representativeness, comparability, and completeness parameters were evaluated for each method.

OnSite followed the most recent versions of the specified analytical methods. Precision was acceptable as demonstrated by the reported matrix spike/matrix spike duplicate (MS/MSD) and laboratory control sample/laboratory control sample duplicate relative percent difference values. Accuracy was also acceptable, as demonstrated by the reported surrogate, MS/MSD, and laboratory-duplicate sample percent recovery values. Samples were collected and field activities were conducted in accordance with the SAP. Deviations from the SAP are listed in Section 2.1.

6.0 Findings

A total of 65 groundwater samples were collected and analyzed from 11 monitoring wells throughout the Project area during six groundwater monitoring events. Four quarterly groundwater monitoring events were conducted in the first year. The quarterly events took place in September 2021, January 2022, March/April 2022, and June 2022. Two semi-annual groundwater monitoring events were conducted in the second year when groundwater levels were anticipated to be at the lowest and highest elevation (August/September 2022 and March 2023, respectively).

To evaluate the groundwater quality for a wide variety of potential contaminants the groundwater samples were analyzed for the following constituents consistent with Ecology Guidance for Petroleum Contaminated Sites (Ecology, 2016):

- Gasoline-range petroleum hydrocarbons – Northwest Total Petroleum Hydrocarbons (NWTPH-Gx)
- Diesel and oil-range petroleum hydrocarbons – NWTPH-Dx (with silica gel cleanup)
- Polychlorinated biphenyls (PCBs) – EPA Method 8020
- VOCs – EPA Method 8260
- Semi-volatile organic compounds (SVOCs) – EPA Method 8270
- Priority pollutant metals (PP-13) total and dissolved – EPA Methods 6010/200.7
- Organochlorine pesticides – EPA Method 8081
- Organophosphorus pesticides – EPA Method 8270
- Chlorinated acid herbicides – EPA Method 8151

As shown in Table 1, the monitoring wells sampled during this investigation had total depths between 17 feet and 35 feet bgs. Shallow groundwater within the Project area generally flows to the northwest, towards Commencement Bay. Groundwater flow gradients for each sampling event were calculated between 0.001 and 0.008 feet/foot.

Our analytical findings from the groundwater monitoring program are outlined below.

1. Results of metals analysis of collected groundwater samples by compound.

    a. Slightly elevated concentrations of arsenic (both total and dissolved) were detected in all sampling events. As discussed in Groundwater Monitoring – Data Report Number 3 (July 18, 2022), the expected background level in the project region is 8.0 µg/l, according to the Natural Background Groundwater Arsenic Concentrations in Washington State, Study Results (Ecology, 2022). This background level exceeds the MTCA Method A Cleanup Level of 5.0 µg/l. Additionally, the Project footprint lies entirely within the Tacoma Smelter Plume. The ASARCO Company operated a major copper smelter in Tacoma for over 100 years, depositing airborne arsenic and heavy metals throughout the region. Surficial soils in the Project area are predicted to contain concentrations of up to 20 mg/kg of arsenic (also exceeding the MTCA Method A CUL). Elevated soil concentrations may contribute to increased concentrations of arsenic in groundwater.

    b. Total zinc was detected at concentrations above the SWQS in samples collected from B-19-04-P and B-9-05-P in the August 2022 sampling event. However, the detected concentrations were not above the MTCA CUL or Suggested Indicator Level. Additionally, dissolved zinc was not detected above the laboratory PQL in the same samples. Subsequent sampling event analysis did not reveal detected concentrations of total or dissolved zinc above the laboratory PQL in samples collected from these monitoring wells.

2. VOCs and pesticides were not detected above the Suggested Indicator Levels, MTCA CULs, or SWQS during any sampling event.

3. Petroleum hydrocarbons and herbicides were not detected above the laboratory PQL in samples analyzed during the Fall and Winter 2021 or Spring 2022 monitoring events. With WSDOT's concurrence, these analyses were removed from the program for subsequent sampling events.

4. Multiple SVOCs (specifically cPAHs) were identified in samples collected from monitoring wells MW-2-21, MW-5-21, and MW-7-21 during the January 2022 sampling event.

    a. Chrysene was detected in the sample collected from MW-2-21 and MW-5-21. However, the detected concentration did not exceed the Suggested Indicator Level, MTCA CUL, or SWQS.

    b. Concentrations of benzo[a]anthracene, benzo(j,k)fluoranthene, and indeno[1,2,3-cd]pyrene were detected in the sample collected from MW-5-21 at concentrations above the Suggested Indicator Levels. Additionally, chrysene, benzo[b]fluoranthene, benzo(a)pyrene, and dibenz(a,h)anthracene were detected at concentrations that exceeded their respective SWQS, but not the Suggested Indicator Levels.

    c. The detected concentration of benzo[b]fluoranthene in the sample collected from MW-7-21 exceeded the SWQS. However, it did not exceed the Suggested Indicator Level or the MTCA CUL.

    d. A Toxicity Equivalency Quotient (TEQ) was calculated for the cPAH detections from each of these samples in accordance with Ecology's Implementation Memorandum Number 10 (Memo 10) as discussed in Groundwater Monitoring – Data Report Number 2 (April 27, 2022). The TEQs are presented in Table 2d. Toxicity Equivalency Factors (TEFs) have been established for each carcinogenic constituent in a cPAH mixture and are used to assess each constituent's carcinogenic potential relative to that of benzo(a)pyrene. The concentrations of each constituent are multiplied by the TEF value and added together to calculate the TEQ. The calculated TEQs do not exceed the Suggested Indicator Level, MTCA CUL, or SWQS.

5. For each monitoring event the laboratory data reports from OnSite were reviewed by INNOVEX. Laboratory provided data quality parameters were reviewed. No data qualifiers were applied. INNOVEX found the analytical results to be acceptable for all purposes following evaluation of the quality control specifications presented in the SAP or equivalent requirements found in the contracted commercial laboratory analytical methods. Precision, accuracy, representativeness, comparability, and completeness parameters were evaluated

for each method. In addition to laboratory control samples, the data were also reviewed for trip temperature and holding time requirements.

7.0 Recommendations

Results of this groundwater sampling program indicate that arsenic (both total and dissolved) is present at concentrations above the applicable SWQS. Additionally, the PQL for total zinc and several cPAH compounds has exceeded the applicable SWQS during one or more of the sampling events. Accordingly, if dewatering becomes necessary during construction, treatment may be required prior to discharge of groundwater to the surface. These concentrations do not prevent discharge to a sanitary sewer system, although the design-builder must obtain necessary permits prior to discharge.

If indications of contaminated soil or groundwater are encountered during redevelopment/construction activities, additional assessment should be completed at that time.

8.0 Disposal of Investigation-Derived Waste

Investigation-derived waste (i.e., purge and decontamination water) from all monitoring wells was containerized by INNOVEX and staged at the WSDOT office at the Fabulich Center in Tacoma. Based on the analytical results (Tables 2a through 2c, Appendix E), metal analytes (specifically total arsenic) were detected above the MTCA Method A CUL. Accordingly, the investigation-derived waste will be properly disposed of offsite by a licensed subcontractor.

9.0 Limitations

This report may not identify all potentially hazardous materials and/or contamination (e.g., petroleum contamination near underground storage tanks) in the Project area. This report is not comprehensive by nature and is not intended to identify all environmental problems or eliminate all risk with the Project. The completed report was limited to the areas sampled, as identified in Tables 2a through 2d and Appendix C.

This report is based on the site conditions, data, and other information available as of the date of the report, and the conclusions herein are applicable only to the time frame in which the report was prepared. Background information used to prepare this report, includes (but is not limited to) site plans and other data provided by WSDOT as well as information that is publicly available on Ecology's website. INNOVEX has relied on this information as furnished and is neither responsible for, nor has confirmed, the accuracy of this information.

No warranty, either express or implied, is made.

10.0 References

INNOVEX, 2021. SR 167/I-5 to SR 161 New Expressway Project – Stage 2 Groundwater Monitoring Sampling and Analysis Plan. September 2021.

INNOVEX, 2022. SR 167/I-5 to SR 161 New Expressway Project – Stage 2 Groundwater Monitoring, Data Report No. 2. April 2022.

INNOVEX, 2022. SR 167/I-5 to SR 161 New Expressway Project – Stage 2 Groundwater Monitoring, Data Report No. 3. July 2022.

Robinson Noble, Inc., SR 167/I-5 to SR 509 – New Expressway Current and Historical Hydrogeologic Conditions Assessment, Groundwater Modeling, and Future Hydrogeologic Conditions Assessment. November 2020.

Washington State Department of Ecology. 1996. Model Toxics Control Act Regulation and Statute. Publication No. 94-06. Revised 2013.

Washington State Department of Ecology. 2016. Guidance for Remediation of Petroleum of Contaminated Sites. Toxics Cleanup Program. Publication No. 10-09-057. June 2016.

Washington State Department of Ecology. 2022. Natural Background Arsenic Concentrations in Washington State, Study Results. Publication No. 14-09-044. January 2022.

TABLES

TABLE 1
Well-Construction Details
SR 167 Completion Project Stage 2 Monitoring Wells

Well Identifier	Well Installation Date	Well Construction Material	Ecology Well ID #	Well Diameter (in.)	Monument Height (ft)*	Top of Monument Elevation (ft)†	Top of Casing Below Monument (ft)*	Top of Casing Elevation (ft)**	Length of Screen (ft)	Depth to Bottom of Well (ft)^
B-19-04	7/7/2004	PVC	AHN-843	1	1.65	43.13	0.20	42.93	10	24.80
B-9-05	1/6/2005	PVC	AHN-878	1	1.96	34.80	0.70	34.10	10	35.25
H-5P-18	1/4/2018	PVC	BKU-806	2	1.71	27.90	0.06	27.84	20	27.82
H-3P-17	12/27/2017	PVC	BKU-801	2	2.13	22.31	0.45	21.86	20	28.60
MW-1-21	12/20/2021	PVC	BNC-644	2	3.01	22.86	0.80	22.06	10	17.15
MW-2-21	12/21/2021	PVC	BNC-648	2	3.15	30.27	0.39	29.88	10	18.42
MW-3-21	12/22/2021	PVC	BNC-649	2	3.18	37.60	0.30	37.30	10	18.25
MW-4-21	12/22/2021	PVC	BNC-650	2	3.20	49.83	0.24	49.59	10	27.95
MW-5-21	12/20/2021	PVC	BNC-645	2	3.39	58.41	0.52	57.89	10	24.80
MW-6-21	12/21/2021	PVC	BNC-647	2	3.13	28.53	0.25	28.28	10	18.25
MW-7-21	12/20/2021	PVC	BNC-646	2	2.97	38.48	0.38	38.10	10	18.20

Notes:
* Based on INNOVEX field measurements.
† Based on WSDOT survey data
** Calculated from WSDOT survey data and INNOVEX field measurements
^ Below top of casing.

TABLE 2a
Laboratory-Analytical Results for Detected Metal and Volatile Organic Compound (VOC) Analytes
SR 167 Completion Project Stage 2 Groundwater Monitoring Program

			Metals								VOCs			
Well ID	Sample Date	Sample ID	Total Arsenic		Dissolved Arsenic		Total Zinc		Dissolved Zinc		Carbon Disulfide		Chloroform	
B-19-04-P	9/30/2021	B-19-04-P	0.50	U	--		28	U	--		0.20	U	0.20	U
	1/4/2022	B-19-04-P	0.50	U	0.50	U	28	U	--		--		--	
	4/1/2022	B-19-04-P	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	6/7/2022	B-19-04	0.50	U	0.50	U	28	U	--		--		--	
	8/31/2022	B-19-04	0.50	U	0.50	U	170		25	U	--		--	
	3/1/2023	B-19-04	0.50	U	0.50	U	25	U	25	U	0.20	U	0.20	U
	3/1/2023	MW-AF	0.50		0.50	U	25	U	25	U	0.20	U	0.20	U
B-9-05-P	9/30/2021	B-9-05-P	0.50	U	--		34		--		0.20	U	0.20	U
	1/4/2022	B-9-05-P	0.50	U	0.50	U	92		--		--		--	
	4/1/2022	B-9-05-P	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	6/7/2022	B-9-05	0.50	U	0.50	U	28	U	--		--		--	
	8/31/2022	B-9-05	0.50	U	0.50	U	110		25	U	--		--	
	3/1/2023	B-9-05-P	0.50	U	0.50	U	25	U	25	U	0.20	U	0.20	U
H-5P-18	9/30/2021	H-5P-18	3.2		--		28	U	--		0.20	U	0.20	U
	1/6/2022	H-5P-18	4.3		1.4		28	U	--		--		--	
	3/23/2022	H-5P-18	3.6		1.2		28	U	--		0.20	U	0.20	U
	6/8/2022	H-5P-18	**5.6**		2.6		28	U	--		--		--	
	9/1/2022	H-5P-18	3.1		0.99		28	U	25	U	--		--	
	3/2/2023	H-5P-18	3.6		1.8		28	U	25	U	0.20	U	0.20	U
H-3P-17	9/30/2021	H-3P-17	4.4		--		28	U	--		0.20	U	0.20	U
	9/30/2021	AA (dup)	4.8		--		28	U	--		0.20	U	0.20	U
	1/5/2022	H-3P-17	1.9		1.5		28	U	--		--		--	
	3/22/2022	H-3P-17	4.2		2.5		28	U	--		0.20	U	0.20	U
	6/8/2022	H-3P-17	**5.2**		4.2		28	U	--		--		--	
	8/31/2022	H-3P-17	**5.1**		0.76		28	U	25	U	--		--	
	3/3/2023	H-3P-17	**5.2**		3.0		28	U	25	U	0.20	U	0.20	U
Suggested Indicator Levels			150[e]		150[e]		1,000[c]		1,000[c]		800[b]*		60[d]	
MTCA Groundwater Cleanup Level †			5[a]		5[a]		4,800[b]		4,800[b]		800[b]		1.40[b]	
Surface Water Quality Standard †			0.018[d]		0.018[d]		100[e]		100[e]		**		60[d]	

TABLE 2a

Laboratory-Analytical Results for Detected Metal and Volatile Organic Compound (VOC) Analytes

SR 167 Completion Project Stage 2 Groundwater Monitoring Program

			Metals								VOCs			
Well ID	Sample Date	Sample ID	Total Arsenic		Dissolved Arsenic		Total Zinc		Dissolved Zinc		Carbon Disulfide		Chloroform	
MW-1-21	1/6/2022	MW-1-21	2.8		0.64		28	U	--		1.7		0.20	U
	3/22/2022	MW-1-21	1.8		1.4		28	U	--		1.1		0.20	U
	6/8/2022	MW-1-21	1.4		1.4		28	U	--		--		--	
	6/8/2022	MW-AD (dup)	1.6		1.4		28	U	--		--		--	
	9/1/2022	MW-1-21	1.9		1.2		28	U	25	U	--		--	
	3/3/2023	MW-1-21	1.1		0.81		28	U	25	U	0.20	U	0.20	U
MW-2-21	1/6/2022	MW-2-21	**5.3**		4.5		28	U	--		0.37		0.20	U
	3/23/2022	MW-2-21	**5.3**		3.4		28	U	--		0.35		0.20	U
	6/8/2022	MW-2-21	**5.4**		**5.00**		28	U	--		--		--	
	9/1/2022	MW-2-21	**6.2**		4.9		28	U	25	U	--		--	
	9/1/2022	MW-AE (dup)	**6.6**		**5.6**		28	U	25	U	--		--	
	3/2/2023	MW-2-21	**7.7**		**5.3**		28	U	25	U	0.20	U	0.20	U
MW-3-21	1/4/2022	MW-3-21	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	4/1/2022	MW-3-21	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	6/7/2022	MW-3-21	0.50	U	0.50	U	28	U	--		--		--	
	8/31/2022	MW-3-21	0.50	U	0.50	U	28	U	25	U	--		--	
	3/2/2023	MW-3-21	0.61		0.50	U	28	U	25	U	0.20	U	0.20	U
MW-4-21	1/5/2022	MW-4-21	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	3/22/2022	MW-4-21	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	6/9/2022	MW-4-21	0.50	U	0.50	U	28	U	--		--		--	
	9/1/2022	MW-4-21	0.50	U	0.50	U	28	U	25	U	--		--	
	3/3/2023	MW-4-21	0.50	U	0.50	U	28	U	25	U	0.20	U	0.20	U
MW-5-21	1/5/2022	MW-5-21	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	1/5/2022	MW-AB (dup)	0.50	U	0.50	U	28	U	--		0.20	U	0.23	
	3/22/2022	MW-5-21	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	3/22/2022	MW-AC (dup)	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	6/7/2022	MW-5-21	0.50	U	0.50	U	28	U	--		--		--	
	8/31/2022	MW-5-21	0.50	U	0.50	U	57		25	U	--		--	
	3/1/2023	MW-5-21	0.50	U	0.50	U	25	U	25	U	0.20	U	0.20	U
Suggested Indicator Levels			150[e]		150[e]		1,000[c]		1,000[c]		800[b*]		60[d]	
MTCA Groundwater Cleanup Level †			5[a]		5[a]		4,800[b]		4,800[b]		800[b]		1.40[b]	
Surface Water Quality Standard †			0.018[d]		0.018[d]		100[e]		100[e]		**		60[d]	

TABLE 2a
Laboratory-Analytical Results for Detected Metal and Volatile Organic Compound (VOC) Analytes
SR 167 Completion Project Stage 2 Groundwater Monitoring Program

			Metals								VOCs			
Well ID	Sample Date	Sample ID	Total Arsenic		Dissolved Arsenic		Total Zinc		Dissolved Zinc		Carbon Disulfide		Chloroform	
MW-6-21	1/6/2022	MW-6-21	3.1		0.8		28	U	--		0.20	U	0.20	U
	3/23/2022	MW-6-21	**5.2**		2.00		28	U	--		0.52		0.20	U
	6/8/2022	MW-6-21	4.00		3.2		28	U	--		--		--	
	9/1/2022	MW-6-21	4.6		0.70		28	U	25	U	--		--	
	3/2/2023	MW-6-21	3.3		0.72		28	U	25	U	0.22		0.20	U
MW-7-21	1/5/2022	MW-7-21	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	3/23/2022	MW-7-21	0.50	U	0.50	U	28	U	--		0.20	U	0.20	U
	6/7/2022	MW-7-21	0.50	U	0.50	U	28	U	--		--		--	
	8/31/2022	MW-7-21	0.50	U	0.50	U	28	U	25	U	--		--	
	3/1/2023	MW-7-21	0.72		0.50	U	25	U	25	U	0.20	U	0.20	U
Suggested Indicator Levels			150[e]		150[e]		1,000[c]		1,000[c]		800[b]*		60[d]	
MTCA Groundwater Cleanup Level †			5[a]		5[a]		4,800[b]		4,800[b]		800[b]		1.40[b]	
Surface Water Quality Standard †			0.018[d]		0.018[d]		100[e]		100[e]		**		60[d]	

Notes:
Complete analytical results are provided in Appendix E of this report.
All values are reported in micrograms per liter (µg/l).

28 U	Analyte not detected above laboratory Practical Quantitation Limit (PQL) shown.
34	Analyte detected above laboratory PQL.
5.6	Detected analyte exceeds the applicable groundwater cleanup level.
3.2	Detected analyte exceeds the applicable surfacewater cleanup standard.
MTCA	Model Toxics Control Act
**	Indicator Level, Cleanup Level, and/or Surface Water Quality Standard not established.
†	Presented values are from Ecology's Cleanup Levels and Risk Calculation (CLARC) data tables as of January 2023.
a	MTCA Method A Groundwater Cleanup Level.
b	MTCA Method B Groundwater Cleanup Level.
c	Surface Water Human Health Fresh Water 40 CFR 131.45.
d	Surface Water Human Health Fresh Water 40 CFR 131.45/CWA 304.
e	Surface Water Aquatic Life Fresh/Chronic 173-201A WAC/CWA 304.
--	not analyzed/not applicable.
dup	field duplicate.

TABLE 2b
Laboratory-Analytical Results for Detected Pesticide Analytes
SR 167 Completion Project Stage 2 Groundwater Monitoring Program

Well ID	Sample Date	Sample ID	Pesticides							
			Organochlorine				Organophosphorus			
			gamma-Chlordane		Endosulfan Sulfate		Monocrotophos		Disulfoton	
B-19-04-P	9/30/2021	B-19-04-P	--		--		--		--	
	1/4/2022	B-19-04-P	--		--		--		--	
	4/1/2022	B-19-04-P	--		--		--		--	
	6/7/2022	B-19-04	0.0048	U	0.0048	U	0.47	U	0.19	U
	8/31/2022	B-19-04	0.0048	U	0.0048	U	0.48	U	0.19	U
	3/1/2023	B-19-04	0.0049	U	0.0049	U	0.47	U	0.19	U
	3/1/2023	MW-AF	0.0048	U	0.0048	U	0.47	U	0.19	U
B-9-05-P	9/30/2021	B-9-05-P	0.0047	U	0.0047	U	0.47	U	0.19	U
	1/4/2022	B-9-05-P	--		--		--		--	
	4/1/2022	B-9-05-P	--		--		--		--	
	6/7/2022	B-9-05	0.0047	U	0.0047	U	0.47	U	0.19	U
	8/31/2022	B-9-05	0.0048	U	0.0048	U	0.48	U	0.19	U
	3/1/2023	B-9-05-P	0.0047	U	0.0047	U	0.47	U	0.19	U
H-5P-18	9/30/2021	H-5P-18	--		--		--		--	
	1/6/2022	H-5P-18	--		--		--		--	
	3/23/2022	H-5P-18	--		--		--		--	
	6/8/2022	H-5P-18	0.0053		0.0048	U	0.47	U	0.19	U
	9/1/2022	H-5P-18	0.0049	U	0.0049	U	0.49	U	0.19	U
	3/2/2023	H-5P-18	0.0051	U	0.0051	U	0.47	U	0.19	U
H-3P-17	9/30/2021	H-3P-17	--		--		--		--	
	9/30/2021	AA (dup)	--		--		--		--	
	1/5/2022	H-3P-17	--		--		--		--	
	3/22/2022	H-3P-17	--		--		--		--	
	6/8/2022	H-3P-17	0.0048	U	0.0048	U	0.48	U	0.19	U
	8/31/2022	H-3P-17	0.0049	U	0.0049	U	0.48	U	0.19	U
	3/3/2023	H-3P-17	0.0051	U	0.0051	U	0.48	U	0.19	U
MW-1-21	1/6/2022	MW-1-21	--		--		--		--	
	3/22/2022	MW-1-21	0.0047	U	0.0076		0.87		0.23	
	6/8/2022	MW-1-21	0.0047	U	0.0057		0.47	U	0.19	U
	6/8/2022	MW-AD (dup)	0.0048	U	0.0079		0.48	U	0.19	U
	9/1/2022	MW-1-21	0.0048	U	0.0082		0.48	U	0.19	U
	3/3/2023	MW-1-21	0.0050	U	0.005	U	0.47	U	0.19	U
MW-2-21	1/6/2022	MW-2-21	--		--		--		--	
	3/23/2022	MW-2-21	--		--		--		--	
	6/8/2022	MW-2-21	0.0049	U	0.0049	U	0.47	U	0.19	U
	9/1/2022	MW-2-21	0.0049	U	0.0049	U	0.48	U	0.19	U
	9/1/2022	MW-AE (dup)	0.0047	U	0.0047	U	0.48	U	0.19	U
	3/2/2023	MW-2-21	0.0047	U	0.0047	U	0.47	U	0.19	U
Suggested Indicator Levels			4.0[b]*		9.00[c]		**		0.64[b]*	
MTCA Groundwater Cleanup Level †			4.0[b]		96.0[b]		**		0.64[b]	
Surface Water Quality Standard †			**		9.00[c]		**		**	

TABLE 2b
Laboratory-Analytical Results for Detected Pesticide Analytes
SR 167 Completion Project Stage 2 Groundwater Monitoring Program

			Pesticides							
			Organochlorine				Organophosphorus			
Well ID	Sample Date	Sample ID	gamma-Chlordane		Endosulfan Sulfate		Monocrotophos		Disulfoton	
MW-3-21	1/4/2022	MW-3-21	--		--		--		--	
	4/1/2022	MW-3-21	--		--		--		--	
	6/7/2022	MW-3-21	0.0048	U	0.0048	U	0.47	U	0.19	U
	8/31/2022	MW-3-21	0.0049	U	0.0049	U	0.48	U	0.19	U
	3/2/2023	MW-3-21	0.0047	U	0.0047	U	0.48	U	0.19	U
MW-4-21	1/5/2022	MW-4-21	--		--		--		--	
	3/22/2022	MW-4-21	--		--		--		--	
	6/9/2022	MW-4-21	0.0048	U	0.0048	U	0.48	U	0.19	U
	9/1/2022	MW-4-21	0.0048	U	0.0048	U	0.48	U	0.19	U
	3/3/2023	MW-4-21	0.0050	U	0.0050	U	0.48	U	0.19	U
MW-5-21	1/5/2022	MW-5-21	--		--		--		--	
	1/5/2022	MW-AB (dup)	--		--		--		--	
	3/22/2022	MW-5-21	--		--		--		--	
	3/22/2022	MW-AC (dup)	--		--		--		--	
	6/7/2022	MW-5-21	0.0048	U	0.0048	U	0.48	U	0.19	U
	8/31/2022	MW-5-21	0.0048	U	0.0048	U	0.48	U	0.19	U
	3/1/2023	MW-5-21	0.0050	U	0.0050	U	0.48	U	0.19	U
MW-6-21	1/6/2022	MW-6-21	--		--		--		--	
	3/23/2022	MW-6-21	--		--		--		--	
	6/8/2022	MW-6-21	0.056		0.0048	U	0.47	U	0.19	U
	9/1/2022	MW-6-21	0.0048	U	0.0048	U	0.48	U	0.19	U
	3/2/2023	MW-6-21	0.0049	U	0.0049	U	0.48	U	0.19	U
MW-7-21	1/5/2022	MW-7-21	--		--		--		--	
	3/23/2022	MW-7-21	--		--		--		--	
	6/7/2022	MW-7-21	0.0047	U	0.0047	U	0.47	U	0.19	U
	8/31/2022	MW-7-21	0.0050	U	0.0050	U	0.50	U	0.20	U
	3/1/2023	MW-7-21	0.0047	U	0.0047	U	0.48	U	0.19	U
Suggested Indicator Levels			4.0[b]*		9.00[c]		**		0.64[b]*	
MTCA Groundwater Cleanup Level †			4.0[b]		96.0[b]		**		0.64[b]	
Surface Water Quality Standard †			**		9.00[c]		**		**	

Notes:
Complete analytical results are provided in Appendix E of this report.
All values are reported in micrograms per liter (µg/l).

0.0048 U	Analyte not detected above laboratory Practical Quantitation Limit (PQL) shown.
0.0053	Analyte detected above laboratory PQL.
MTCA	Model Toxics Control Act
*	No applicable surface water criterion, value is most conservative cleanup level.
**	Indicator Level, Cleanup Level, and/or Surface Water Quality Standard not established.
†	Presented values are from Ecology's Cleanup Levels and Risk Calculation (CLARC) data tables as of January 2023.
b	MTCA Method B Groundwater Cleanup Level.
c	Surface Water Human Health Fresh Water 40 CFR 131.45.
--	not analyzed/not applicable.
dup	field duplicate.

TABLE 2c

Laboratory-Analytical Results for Detected Carcinogenic Polyaromatic Hydrocarbon (cPAH) Analytes

SR 167 Completion Project Stage 2 Groundwater Monitoring Program

Well ID	Sample Date	Sample ID	cPAHs							
			Benzo[g,h,i] perylene	Benzo[a] anthracene	Chrysene	Benzo[b] fluoranthene	Benzo(j,k) fluoranthene	Benzo[a] pyrene	Indeno[1,2,3-cd]pyrene	Dibenz[a,h] anthracene	cPAH TEQ^
B-19-04-P	9/30/2021	B-19-04-P	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	--
	1/4/2022	B-19-04-P	--	--	--	--	--	--	--	--	--
	4/1/2022	B-19-04-P	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	--
	6/7/2022	B-19-04	--	--	--	--	--	--	--	--	--
	8/31/2022	B-19-04	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	--
	3/1/2023	B-19-04	0.0097 U	0.0097 U	0.0097 U	0.0097 U	0.0097 U	0.0097 U	0.0097 U	0.0097 U	--
	3/1/2023	MW-AF	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	--
B-9-05-P	9/30/2021	B-9-05-P	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	--
	1/4/2022	B-9-05-P	--	--	--	--	--	--	--	--	--
	4/1/2022	B-9-05-P	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	--
	6/7/2022	B-9-05	--	--	--	--	--	--	--	--	--
	8/31/2022	B-9-05	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	--
	3/1/2023	B-9-05-P	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	--
H-5P-18	9/30/2021	H-5P-18	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	--
	1/6/2022	H-5P-18	--	--	--	--	--	--	--	--	--
	3/23/2022	H-5P-18	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	0.0098 U	--
	6/8/2022	H-5P-18	--	--	--	--	--	--	--	--	--
	9/1/2022	H-5P-18	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	--
	3/2/2023	H-5P-18	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	--
H-3P-17	9/30/2021	H-3P-17	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	--
	9/30/2021	AA (dup)	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	--
	1/5/2022	H-3P-17	--	--	--	--	--	--	--	--	--
	3/22/2022	H-3P-17	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	--
	6/8/2022	H-3P-17	--	--	--	--	--	--	--	--	--
	8/31/2022	H-3P-17	0.0097 U	0.0097 U	0.0097 U	0.0097 U	0.0097 U	0.0097 U	0.0097 U	0.0097 U	--
	3/3/2023	H-3P-17	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	--
Suggested Indicator Levels			**	0.014[f]	1.40[f]	0.014[f]	0.014[f]	0.1[a]	0.014[f]	0.0014[f]	0.1[a]
MTCA Groundwater Cleanup Level †			**	**	**	**	**	0.1[a]	**	**	0.1[a]
Surface Water Quality Standard †			**	0.00016[c]	0.016[c]	0.00016[c]	0.0016[c]	0.000016[c]	0.00016[c]	0.000016[c]	0.000016[c]

TABLE 2c
Laboratory-Analytical Results for Detected Carcinogenic Polyaromatic Hydrocarbon (cPAH) Analytes
SR 167 Completion Project Stage 2 Groundwater Monitoring Program

Well ID	Sample Date	Sample ID	cPAHs																	
			Benzo[g,h,i] perylene		Benzo[a] anthracene		Chrysene		Benzo[b] fluoranthene		Benzo(j,k) fluoranthene		Benzo[a] pyrene		Indeno[1,2,3-cd]pyrene		Dibenz[a,h] anthracene		cPAH TEQ^	
MW-1-21	1/6/2022	MW-1-21	0.0097	U	0.011	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	--	
	3/22/2022	MW-1-21	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	--	
	6/8/2022	MW-1-21	--		--		--		--		--		--		--		--		--	
	6/8/2022	MW-AD (dup)	--		--		--		--		--		--		--		--		--	
	9/1/2022	MW-1-21	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	--	
	3/3/2023	MW-1-21	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	--	
MW-2-21	1/6/2022	MW-2-21	0.0097	U	0.011	U	0.011		0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0076	
	3/23/2022	MW-2-21	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	--	
	6/8/2022	MW-2-21	--		--		--		--		--		--		--		--		--	
	9/1/2022	MW-2-21	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	--	
	9/1/2022	MW-AE (dup)	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	--	
	3/2/2023	MW-2-21	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	--	
MW-3-21	1/4/2022	MW-3-21	0.0095	U	0.01	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	--	
	4/1/2022	MW-3-21	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	--	
	6/7/2022	MW-3-21	--		--		--		--		--		--		--		--		--	
	8/31/2022	MW-3-21	--		--		--		--		--		--		--		--		--	
	3/2/2023	MW-3-21	0.0094	U	0.0094	U	0.0094	U	0.0094	U	0.0094	U	0.0094	U	0.0094	U	0.0094	U	--	
MW-4-21	1/5/2022	MW-4-21	0.010	U	0.011	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	--	
	3/22/2022	MW-4-21	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	--	
	6/9/2022	MW-4-21	--		--		--		--		--		--		--		--		--	
	9/1/2022	MW-4-21	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	--	
	3/3/2023	MW-4-21	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	--	
MW-5-21	1/5/2022	MW-5-21	0.010	U	0.015		0.015		0.016		0.010	U	0.012		0.010	U	0.010	U	0.017	
	1/5/2022	MW-AB (dup)	0.019		0.067		0.065		0.051		0.026		0.04		0.02		0.0097	U	0.058	
	3/22/2022	MW-5-21	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	--	
	3/22/2022	MW-AC (dup)	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	--	
	6/7/2022	MW-5-21	--		--		--		--		--		--		--		--		--	
	8/31/2022	MW-5-21	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0095	U	--	
	3/1/2023	MW-5-21	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	--	
Suggested Indicator Levels			**		0.014[f]		1.40[f]		0.014[f]		0.014[f]		0.1[a]		0.014[f]		0.0014[f]		0.1[a]	
MTCA Groundwater Cleanup Level †			**		**		**		**		**		0.1[a]		**		**		0.1[a]	
Surface Water Quality Standard †			**		0.00016[c]		0.016[c]		0.00016[c]		0.0016[c]		0.000016[c]		0.00016[c]		0.000016[c]		0.000016[c]	

TABLE 2c

Laboratory-Analytical Results for Detected Carcinogenic Polyaromatic Hydrocarbon (cPAH) Analytes

SR 167 Completion Project Stage 2 Groundwater Monitoring Program

Well ID	Sample Date	Sample ID	cPAHs																	
			Benzo[g,h,i] perylene		Benzo[a] anthracene		Chrysene		Benzo[b] fluoranthene		Benzo(j,k) fluoranthene		Benzo[a] pyrene		Indeno[1,2,3-cd]pyrene		Dibenz[a,h] anthracene		cPAH TEQ^	
MW-6-21	1/6/2022	MW-6-21	0.0098	U	0.011	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	--	
	3/23/2022	MW-6-21	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	0.0097	U	--	
	6/8/2022	MW-6-21	--		--		--		--		--		--		--		--		--	
	9/1/2022	MW-6-21	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	0.0098	U	--	
	3/2/2023	MW-6-21	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	--	
MW-7-21	1/5/2022	MW-7-21	0.0095	U	0.01	U	0.0095	U	0.0099		0.0095	U	0.0095	U	0.0095	U	0.0095	U	0.0077	
	3/23/2022	MW-7-21	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	--	
	6/7/2022	MW-7-21	--		--		--		--		--		--		--		--		--	
	8/31/2022	MW-7-21	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U	--	
	3/1/2023	MW-7-21	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	0.0096	U	--	
Suggested Indicator Levels			**		0.014[f]		1.40[f]		0.014[f]		0.014[f]		0.1[a]		0.014[f]		0.0014[f]		0.1[a]	
MTCA Groundwater Cleanup Level †			**		**		**		**		**		0.1[a]		**		**		0.1[a]	
Surface Water Quality Standard †			**		0.00016[c]		0.016[c]		0.00016[c]		0.0016[c]		0.000016[c]		0.00016[c]		0.000016[c]		0.000016[c]	

Notes:

Complete analytical results are provided in Appendix E of this report.

All values are reported in micrograms per liter (µg/l).

0.010 U Analyte not detected above laboratory Practical Quantitation Limit (PQL) shown.

0.011 Analyte detected above laboratory PQL.

0.016 Detected analyte exceeds the applicable surfacewater cleanup standard.

0.015 Detected analyte exceeds the applicable Suggested Indicator Value.

MTCA Model Toxics Control Act

** Indicator Level, Cleanup Level, and/or Surface Water Quality Standard not established.

^ TEQ Calculations are presented on Table 2d.

† Presented values are from Ecology's Cleanup Levels and Risk Calculation (CLARC) data tables as of January 2023.

a MTCA Method A Groundwater Cleanup Level.

c Surface Water Human Health Fresh Water 40 CFR 131.45.

f Surface Water Human Health Fresh Water 173-201A WAC

-- not analyzed/not applicable.

dup field duplicate.

TABLE 2d

Groundwater Sample Analyses, cPAH Toxicity Equivalency Quotient (TEQ) Calculations

SR 167 Completion Project Stage 2 Groundwater Monitoring Program

Well ID	Sample Date	Sample ID	Benzo[a] anthracene	Chrysene	Benzo[b] fluoranthene	Benzo(j,k) fluoranthene	Benzo[a] pyrene	Indeno[1,2,3-cd]pyrene	Dibenz[a,h] anthracene	TEQ*
Toxicity Equivalency Factor (TEF)^			0.1	0.01	0.1	0.1	1	0.1	0.1	0.1[a]
MW-2-21	1/6/2022	MW-2-21	0.0055	**0.011**	0.0049	0.0049	0.0050	0.0049	0.0049	**0.0076**
MW-5-21	1/5/2022	MW-5-21	**0.015**	**0.015**	**0.016**	0.0050	**0.012**	0.0050	0.0050	**0.017**
	1/5/2022	MW-AB (dup)	**0.067**	**0.065**	**0.051**	**0.026**	**0.040**	**0.020**	0.0049	**0.058**
MW-7-21	1/5/2022	MW-7-21	0.0050	0.0048	**0.0099**	0.0048	0.0048	0.0048	0.0048	**0.0077**

Notes:

Complete analytical results are provided in Appendix E of this report.

All values are reported in micrograms per liter (µg/l).

* TEQ = ([Benzo(a)anthracene]*0.1) + ([Chrysene]*0.01) + ([Benzo(b)fluroanthene]*0.1) + ([Benzo(j,k)fluroanthene]*0.1) + ([Benzo(a)pyrene]*1) + ([Indeno(1,2,3-cd)pyrene]*0.1) + ([Dibenzo(a,h)anthracene]*0.1)

^ TEFs are consensus estimates of compound-specific toxicity relative to the toxicity of an index chemical, in this case, the carcinogenic potential of the analyte is expressed as Benzo(a)pyrene equivalents.

[a] Benzo(a)pyrene Cleanup Level used for Comparison, in accordance with Ecology Implementation Memo No. 10 (2015).

dup field duplicate

0.0055 The analyte was not detected above the laboratory reporting limit. Value presented is equal to half of the reporting limit.

0.011 The analyte was detected above the laboratory reporting limit.

TABLE 3
Water-Quality Parameters
SR 167 Completion Project Stage 2 Monitoring Wells

Water Quality Parameter		Depth to Water below ground surface (ft)*	Temperature (°C)	Conductivity (µs/cm)	Dissolved Oxygen (%)	pH (s.u.)	Total Dissolved Solids (g/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)
Well ID	Sample Date								
B-19-04-P	9/30/2021	17.93	13.2	386.6	5.6	6.37	-	-59.1	4.34
	1/4/2022	16.10	12.18	377	1.9	6.56	0.245	-	5.01
	4/1/2022	15.67	12.6	366	1.9	6.39	-	-31.3	5.8
	6/7/2022	14.98	12.8	395	0.19	6.89	-	-127.1	3.01
	8/31/2022	17.36	13.14	413	1.76	6.92	-	-110.4	6.1
	3/1/2023	17.20	12.2	408.8	1.8	6.37	-	-53	1.66
B-9-05-P	9/30/2021	8.59	11.8	333.9	5.5	6.48	-	-81.1	40.21
	1/4/2022	1.70	10.89	327	3.6	6.7	0.213	-	3.92
	4/1/2022	3.55	11.5	306	2.6	6.47	-	-58	11.4
	6/7/2022	2.70	11.69	323	0.3	6.95	-	-114.7	4.29
	8/31/2022	7.43	12.33	322	1.05	6.98	-	-102.6	5.97
	3/1/2023	5.35	11.5	329.8	1.2	6.38	-	-86.5	14.5
H-5P-18	9/30/2021	2.69	11.8	402.2	5.4	6.51	-	-87.1	16.91
	1/6/2022	0.05	11.07	415	1.6	6.77	0.269	-	-
	3/23/2022	0.74	11.11	450	2.6	6.85	-	-118.5	15.9
	6/8/2022	-0.27	11.84	450	0.19	6.92	-	-117.3	4.82
	9/1/2022	2.75	12.04	454	0.36	7.02	-	-107.1	8.3
	3/2/2023	1.14	11	424	1.3	6.44	-	-78.5	24
H-3P-17	9/30/2021	3.16	12.9	412.6	5.4	6.44	-	-95.4	12.4
	1/5/2022	1.46	11.61	366	1.9	6.7	0.238	-	11.7
	3/22/2022	1.72	12.05	355	3.5	6.84	-	-108	6.33
	6/8/2022	1.00	12.81	415	0.13	6.92	-	-126.4	16
	8/31/2022	4.30	13.84	469	0.5	7.07	-	-123.8	8.02
	3/3/2023	2.57	11.8	445.2	1.2	6.43	-	-69.7	10.2
MW-1-21	1/6/2022	0.27	10.95	790	2.6	8.11	0.513	-	-
	3/22/2022	0.86	11.29	759	2.3	6.64	-	-75.2	22.7
	6/8/2022	-0.12	12.34	770	0.13	6.64	-	-33.9	19.9
	9/1/2022	4.07	14.78	772	0.36	6.71	-	-45.2	26.4
	3/3/2023	1.13	10.3	932	2.8	6.17	-	3.7	30.8
MW-2-21	1/6/2022	2.09	11.81	370	0.7	7.46	0.241	-	-
	3/23/2022	3.19	11.01	355	3	7.5	-	-135.9	14.1
	6/8/2022	1.10	12.06	338	0.17	7.59	-	-133.9	3.93
	9/1/2022	5.50	13.72	303	0.31	7.67	-	-128.5	11.8
	3/2/2023	6.08	11.1	355.1	4	6.98	-	14.4	11.4
MW-3-21	1/4/2022	1.22	9.9	795	71.6	6.72	0.517	-	4.97
	4/1/2022	4.12	9.9	731	90	6.6	-	173.7	8.86
	6/7/2022	1.96	11.42	764	7.12	7.01	-	137.8	1.91
	8/31/2022	7.58	13.51	749	1.29	6.98	-	114.7	3.14
	3/2/2023	4.73	9.6	648.9	49.8	6.58	-	219.3	6.68
MW-4-21	1/5/2022	15.53	12.53	448	1.8	6.42	0.292	-	13.1
	3/22/2022	15.06	12.8	306	5.5	6.58	-	-44.6	11.4
	6/8/2022	12.35	12.88	288	0.36	6.72	-	-56.6	2.5
	9/1/2022	18.15	13.22	289	0.5	6.94	-	-81.4	16.9
	3/3/2023	16.96	12.7	320.8	1.7	6.21	-	39.6	22.3
MW-5-21	1/5/2022	12.66	13.18	270	1.7	6.74	0.176	-	19.8
	3/22/2022	11.32	12.85	337	3.3	6.79	-	-53.9	18
	6/7/2022	9.55	12.45	294	0.14	6.97	-	-74	4.18
	8/31/2022	14.04	14.04	284	2.04	6.95	-	-20.8	39.7
	3/1/2023	14.07	13.5	780	1.5	6.35	-	-42.3	27.1
MW-6-21	1/6/2022	-0.02	10.35	419	1.9	6.88	0.272	-	-
	3/23/2021	0.48	10.2	404	2.2	7.02	-	-153.1	19.3
	6/8/2022	-1.20	11.18	404	0.22	7.12	-	-150.6	17.1
	9/1/2022	5.39	11.69	406	0.48	7.18	-	-140.2	12.5
	3/2/2023	0.96	9.7	453.6	20.9	6.49	-	-97.6	7.9
MW-7-21	1/5/2022	6.08	10.13	730	58.8	6.19	0.475	-	7.83
	3/23/2022	5.55	9.89	641	62.2	6.28	-	62.8	5.26
	6/7/2022	5.16	11.59	620	2.54	6.43	-	149.9	9.89
	8/31/2022	8.86	13.96	569	4.66	6.57	-	175.3	32.4^
	3/1/2023	6.00	10.3	406.2	42.4	6.07	-	29.4	33.7^

Notes:

* = Measured from top of casing and calculated using surveyed top of casing elevation.
ft = feet
°C = degrees Celsius
µs/cm = µs/cm = microsiemens per centimeter
% = percent
s.u. = standard units
g/L = grams per liter
mV = millivolts
NTU = nephelometric turbidity units
\- = parameter not recorded
^ = well pumped dry

APPENDICES

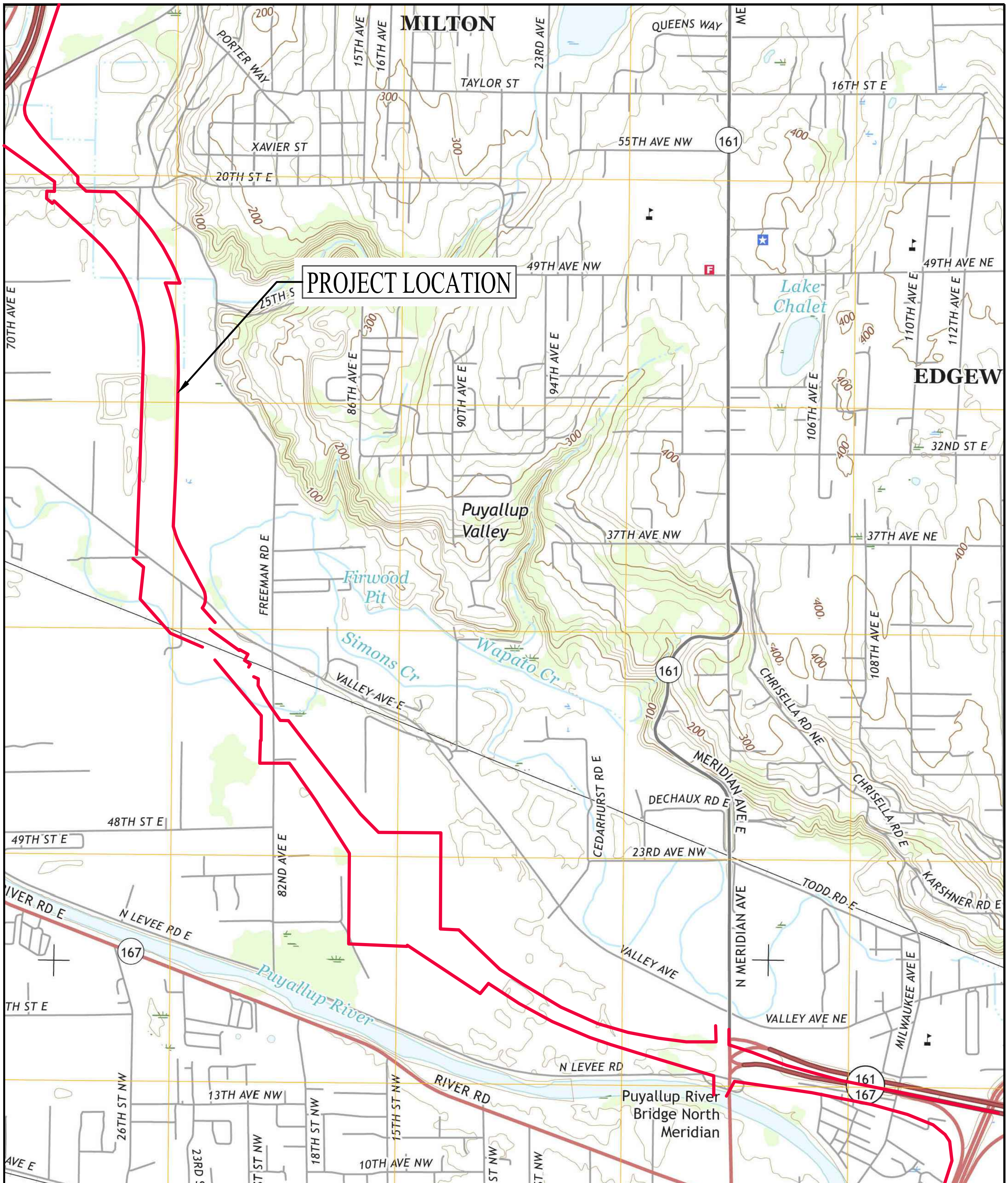
APPENDIX A

ABBREVIATIONS

Assessment – Hydrogeologic Conditions Assessment
CLARC – Cleanup Levels and Risk Calculation
cPAH – carcinogenic polycyclic aromatic hydrocarbons
CUL – Cleanup Level
Ecology – Washington State Department of Ecology
EPA – United States Environmental Protection Agency
INNOVEX – INNOVEX Environmental Management
mg/l – milligrams per liter
ml – milliliter
MS/MSD – matrix spike/matrix spike duplicate
MTCA – Model Toxics Control Act
NWTPH – Northwest Total Petroleum Hydrocarbons
OnSite – OnSite Environmental, Inc.
PAHs – polycyclic aromatic hydrocarbons
PQLs – practical-quantitation limits
Project – SR 167 Completion Project Stage 2
SAP – Sampling and Analysis Plan
Stage 1b – SR 167/I-5 to SR 509 – New Expressway Project
Stage 2 – SR 167/I-5 to SR 161 – New Expressway Project
SWQS – Surface Water Quality Standard
TEF - Toxicity Equivalency Factors
TEQ - Toxicity Equivalency Quotient
µs/cm – microsiemens per centimeter
µg/l – micrograms per liter
VOCs – volatile organic compounds
WQC – water quality criteria
WSDOT – Washington State Department of Transportation

APPENDIX B

PROJECT LOCATION MAP



DESIGNED BY
Innovex Environmental
Anna Jordan
DRAWN BY
ICD
April 25, 2022

0 1000 2000
SCALE IN FEET

N W E S

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

16310 NE 80th St., Suite 300
Redmond, WA 98052
(800) 988-7880

LATTITUDE 47D 14M 38S NORTH
LONGITUDE 122D 20M 12S WEST

US GEOLOGICAL SURVEY - 2017
7.5 MINUTE QUADRANGLE MAP
PUYALLUP, WASHINGTON

APPENDIX B

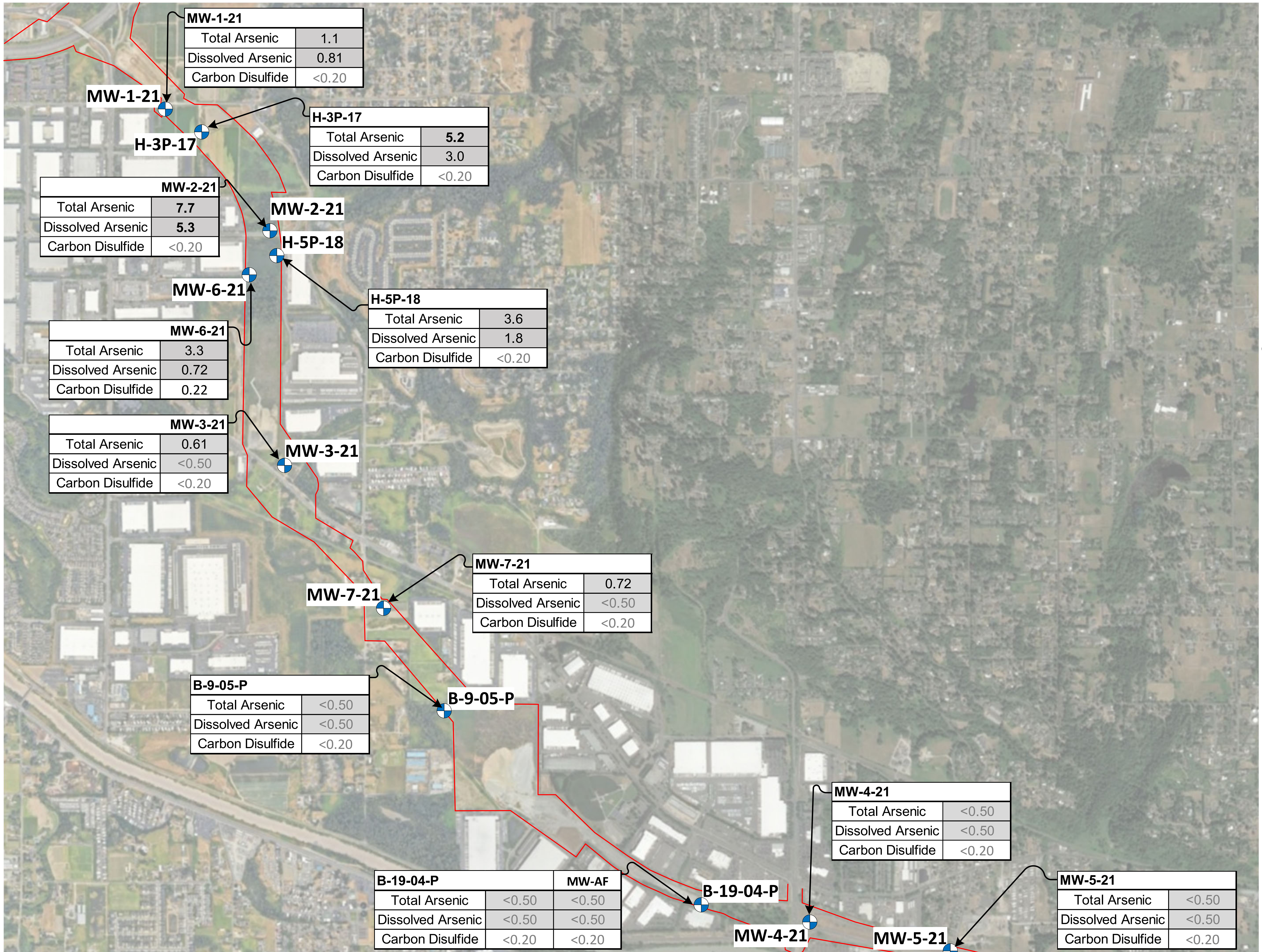
Project Location Map

SR 167/I-5 to SR 161
New Expressway Project
Groundwater Monitoring
Pierce County, WASHINGTON

SR167_SL_STAGE2_3.DWG

APPENDIX C

MONITORING-WELL LOCATION MAP AND DETECTED ANALYTE CONCENTRATIONS



MW-1-21	
Total Arsenic	1.1
Dissolved Arsenic	0.81
Carbon Disulfide	<0.20

H-3P-17	
Total Arsenic	**5.2**
Dissolved Arsenic	3.0
Carbon Disulfide	<0.20

MW-2-21	
Total Arsenic	**7.7**
Dissolved Arsenic	**5.3**
Carbon Disulfide	<0.20

H-5P-18	
Total Arsenic	3.6
Dissolved Arsenic	1.8
Carbon Disulfide	<0.20

MW-6-21	
Total Arsenic	3.3
Dissolved Arsenic	0.72
Carbon Disulfide	0.22

MW-3-21	
Total Arsenic	0.61
Dissolved Arsenic	<0.50
Carbon Disulfide	<0.20

MW-7-21	
Total Arsenic	0.72
Dissolved Arsenic	<0.50
Carbon Disulfide	<0.20

B-9-05-P	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Carbon Disulfide	<0.20

B-19-04-P		MW-AF
Total Arsenic	<0.50	<0.50
Dissolved Arsenic	<0.50	<0.50
Carbon Disulfide	<0.20	<0.20

MW-4-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Carbon Disulfide	<0.20

MW-5-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Carbon Disulfide	<0.20

N

Legend

MW-1-21 Approximate Location of Groundwater Monitoring Wells

Project Footprint

Sample Legend

Sample Name

Contaminant Detected Above MTCA CUL

H-3P-17	
Total Arsenic	**5.2**
Dissolved Arsenic	3.0
Carbon Disulfide	<0.20

Contaminant

Contaminant Detected

Contaminant Not Detected Above Laboratory Reporting Limit

Concentrations are reported in micrograms per liter (µg/L)

Shaded boxes indicate exceedance of applicable Surface Water Quality Standard (SWQS)

0 ft. 900 ft. 1500 ft. 3000 ft.

Scale: 1" = 1,500'

Figure and notations are in color. Black and white copies may not be suitable for use.

Drawing Date: 4/5/2023

APPENDIX C

Monitoring-Well Location Map and Detected Analyte Results

SR167/I-5 to SR 161 New Expressway Project

Groundwater Monitoring Event No. 6

Pierce County, WASHINGTON

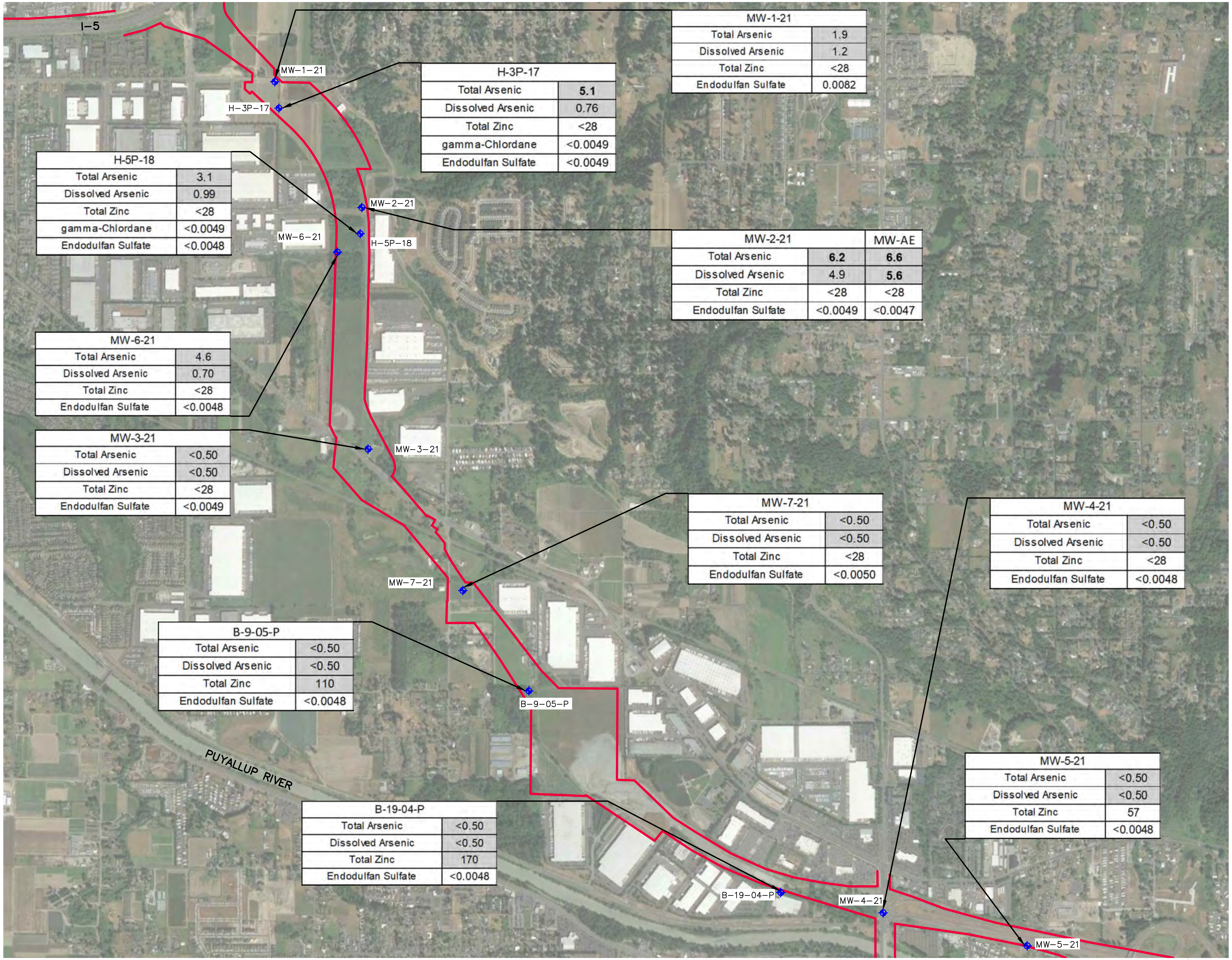
INNOVEX ENVIRONMENTAL MANAGEMENT, INC.

16310 NE 80th St, Suite 104

Redmond, WA 98052

(800)988-7880

Drawing References: 2020 Google Earth Aerial Photograph, WSDOT Provided Mapping, and INNOVEX Measurements



MW-1-21	
Total Arsenic	1.9
Dissolved Arsenic	1.2
Total Zinc	<28
Endodulfan Sulfate	0.0082

H-3P-17	
Total Arsenic	**5.1**
Dissolved Arsenic	0.76
Total Zinc	<28
gamma-Chlordane	<0.0049
Endodulfan Sulfate	<0.0049

H-5P-18	
Total Arsenic	3.1
Dissolved Arsenic	0.99
Total Zinc	<28
gamma-Chlordane	<0.0049
Endodulfan Sulfate	<0.0048

	MW-2-21	MW-AE
Total Arsenic	**6.2**	**6.6**
Dissolved Arsenic	4.9	**5.6**
Total Zinc	<28	<28
Endodulfan Sulfate	<0.0049	<0.0047

MW-6-21	
Total Arsenic	4.6
Dissolved Arsenic	0.70
Total Zinc	<28
Endodulfan Sulfate	<0.0048

MW-3-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	<28
Endodulfan Sulfate	<0.0049

MW-7-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	<28
Endodulfan Sulfate	<0.0050

MW-4-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	<28
Endodulfan Sulfate	<0.0048

B-9-05-P	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	110
Endodulfan Sulfate	<0.0048

MW-5-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	57
Endodulfan Sulfate	<0.0048

B-19-04-P	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	170
Endodulfan Sulfate	<0.0048

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0 750 1500
SCALE IN FEET

LEGEND

PROJECT FOOTPRINT

MW-2-21 APPROXIMATE MONITORING WELL LOCATION

< CONCENTRATION NOT DETECTED ABOVE LABORATORY REPORTING LIMIT.

ALL CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER (μg/L)

SHADED RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE SURFACE WATER QUALITY STANDARD

BOLD RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE GROUNDWATER CLEANUP LEVEL

DESIGNED BY

Innovex Environmental

Pamela Fleming

DRAWN BY

ICD

September 30, 2022

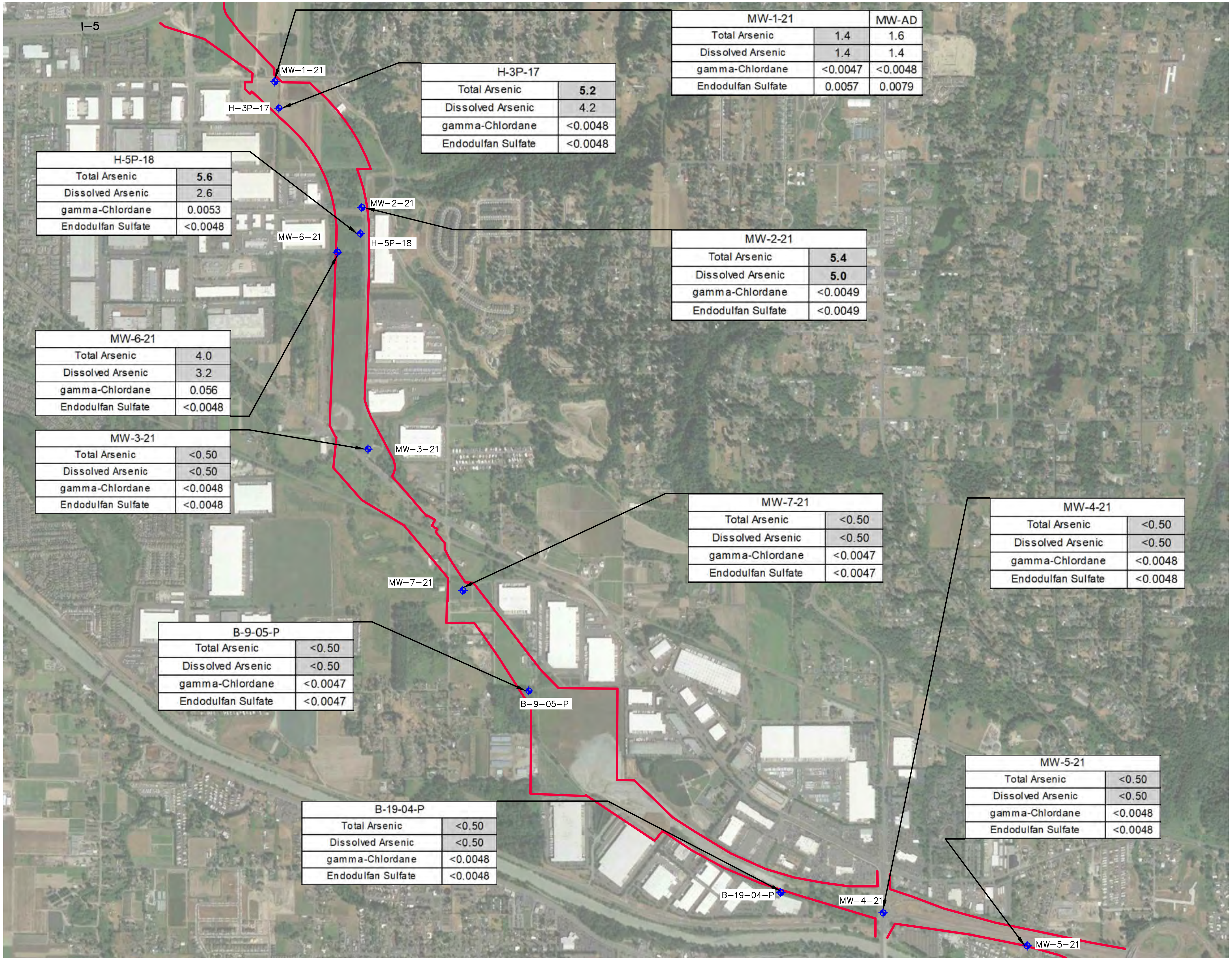
APPENDIX C
Monitoring-Well Location Map and Detected Analyte Results

SR167/I-5 to SR161
New Expressway Project
Groundwater Monitoring
Event No.5
Pierce County, WASHINGTON

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

16310 NE 80th St., Suite 104
Redmond, WA 98052

SR167_STAGE2_22Q3_2.DWG



	MW-1-21	MW-AD
Total Arsenic	1.4	1.6
Dissolved Arsenic	1.4	1.4
gamma-Chlordane	<0.0047	<0.0048
Endodulfan Sulfate	0.0057	0.0079

	H-3P-17
Total Arsenic	**5.2**
Dissolved Arsenic	4.2
gamma-Chlordane	<0.0048
Endodulfan Sulfate	<0.0048

	H-5P-18
Total Arsenic	**5.6**
Dissolved Arsenic	2.6
gamma-Chlordane	0.0053
Endodulfan Sulfate	<0.0048

	MW-2-21
Total Arsenic	**5.4**
Dissolved Arsenic	**5.0**
gamma-Chlordane	<0.0049
Endodulfan Sulfate	<0.0049

	MW-6-21
Total Arsenic	4.0
Dissolved Arsenic	3.2
gamma-Chlordane	0.056
Endodulfan Sulfate	<0.0048

	MW-3-21
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
gamma-Chlordane	<0.0048
Endodulfan Sulfate	<0.0048

	MW-7-21
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
gamma-Chlordane	<0.0047
Endodulfan Sulfate	<0.0047

	MW-4-21
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
gamma-Chlordane	<0.0048
Endodulfan Sulfate	<0.0048

	B-9-05-P
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
gamma-Chlordane	<0.0047
Endodulfan Sulfate	<0.0047

	MW-5-21
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
gamma-Chlordane	<0.0048
Endodulfan Sulfate	<0.0048

	B-19-04-P
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
gamma-Chlordane	<0.0048
Endodulfan Sulfate	<0.0048

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0 750 1500
SCALE IN FEET

LEGEND

PROJECT FOOTPRINT

MW-2-21 APPROXIMATE MONITORING WELL LOCATION

< CONCENTRATION NOT DETECTED ABOVE LABORATORY REPORTING LIMIT.

ALL CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER (µg/L)

SHADED RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE SURFACE WATER QUALITY STANDARD

BOLD RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE MTCA METHOD A GROUNDWATER CLEANUP LEVEL

DESIGNED BY
Innovex Environmental
Pamela Fleming

DRAWN BY
ICD

July 19, 2022

APPENDIX C
Monitoring-Well Location Map and Detected Analyte Results

SR167/I-5 to SR161 New Expressway Project Groundwater Monitoring Event No. 4 Pierce County, WASHINGTON

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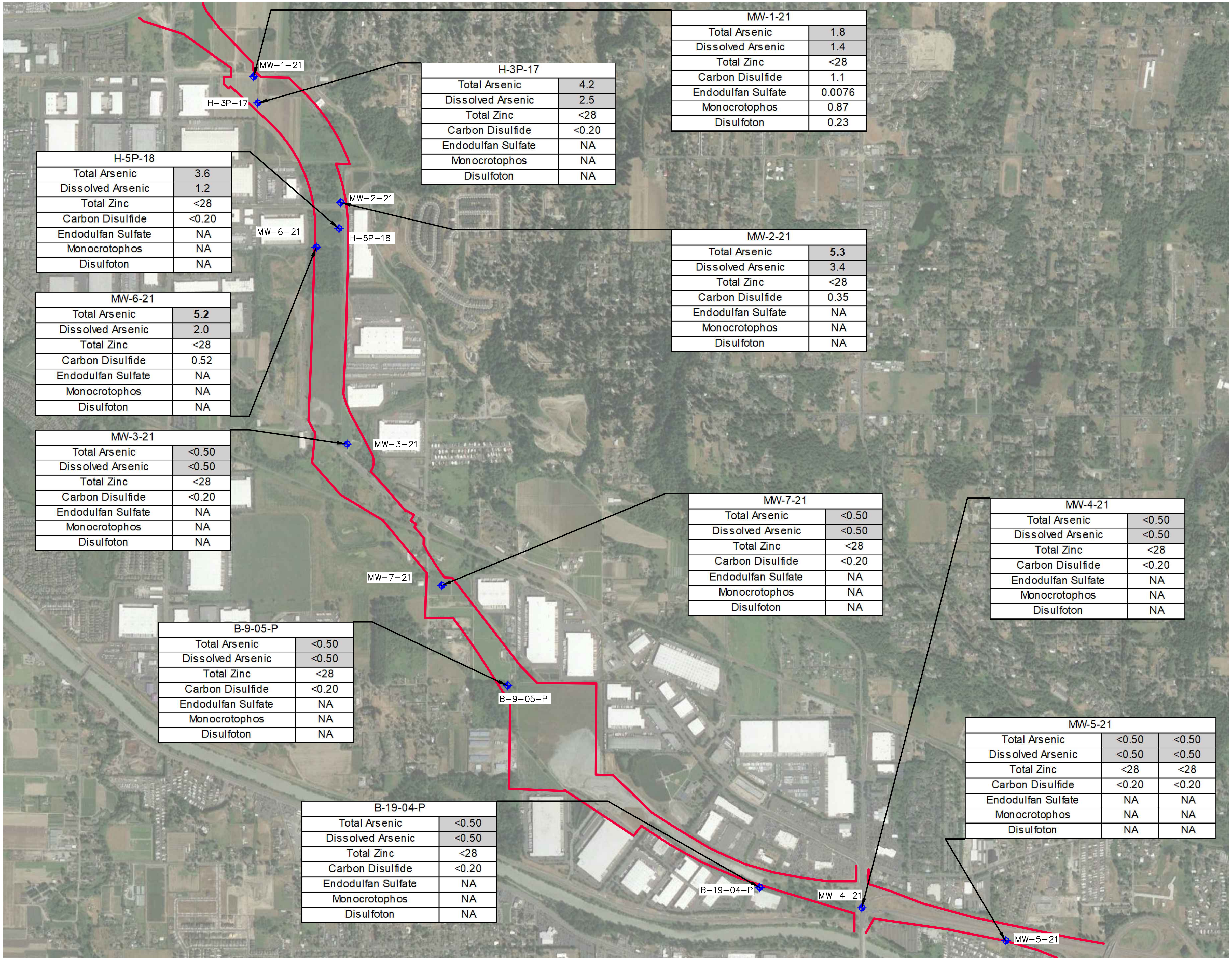
Redmond, WA 98052

SR167_STAGE2_22Q2.DWG



MW-1-21	
Total Arsenic	1.8
Dissolved Arsenic	1.4
Total Zinc	<28
Carbon Disulfide	1.1
Endodulfan Sulfate	0.0076
Monocrotophos	0.87
Disulfoton	0.23

H-3P-17	
Total Arsenic	4.2
Dissolved Arsenic	2.5
Total Zinc	<28
Carbon Disulfide	<0.20
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

H-5P-18	
Total Arsenic	3.6
Dissolved Arsenic	1.2
Total Zinc	<28
Carbon Disulfide	<0.20
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

MW-2-21	
Total Arsenic	**5.3**
Dissolved Arsenic	3.4
Total Zinc	<28
Carbon Disulfide	0.35
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

MW-6-21	
Total Arsenic	**5.2**
Dissolved Arsenic	2.0
Total Zinc	<28
Carbon Disulfide	0.52
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

MW-3-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	<28
Carbon Disulfide	<0.20
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

MW-7-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	<28
Carbon Disulfide	<0.20
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

MW-4-21	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	<28
Carbon Disulfide	<0.20
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

B-9-05-P	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	<28
Carbon Disulfide	<0.20
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

MW-5-21		
Total Arsenic	<0.50	<0.50
Dissolved Arsenic	<0.50	<0.50
Total Zinc	<28	<28
Carbon Disulfide	<0.20	<0.20
Endodulfan Sulfate	NA	NA
Monocrotophos	NA	NA
Disulfoton	NA	NA

B-19-04-P	
Total Arsenic	<0.50
Dissolved Arsenic	<0.50
Total Zinc	<28
Carbon Disulfide	<0.20
Endodulfan Sulfate	NA
Monocrotophos	NA
Disulfoton	NA

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0 750 1500
SCALE IN FEET

LEGEND

PROJECT FOOTPRINT
MW–2–21 APPROXIMATE MONITORING WELL LOCATION
< CONCENTRATION NOT DETECTED ABOVE LABORATORY REPORTING LIMIT.
NA NOT ANALYZED

ALL CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER ($\mu g/L$)

SHADED RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE SURFACE WATER QUALITY STANDARD

BOLD RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE MTCA METHOD A GROUNDWATER CLEANUP LEVEL

DESIGNED BY

Innovex Environmental

Pamela Fleming

DRAWN BY

ICD

May 12, 2022

APPENDIX C
Monitoring-Well Location Map and Detected Analyte Results

SR167/I-5 to SR161 New Expressway Project Groundwater Monitoring Event No. 3 Pierce County, WASHINGTON

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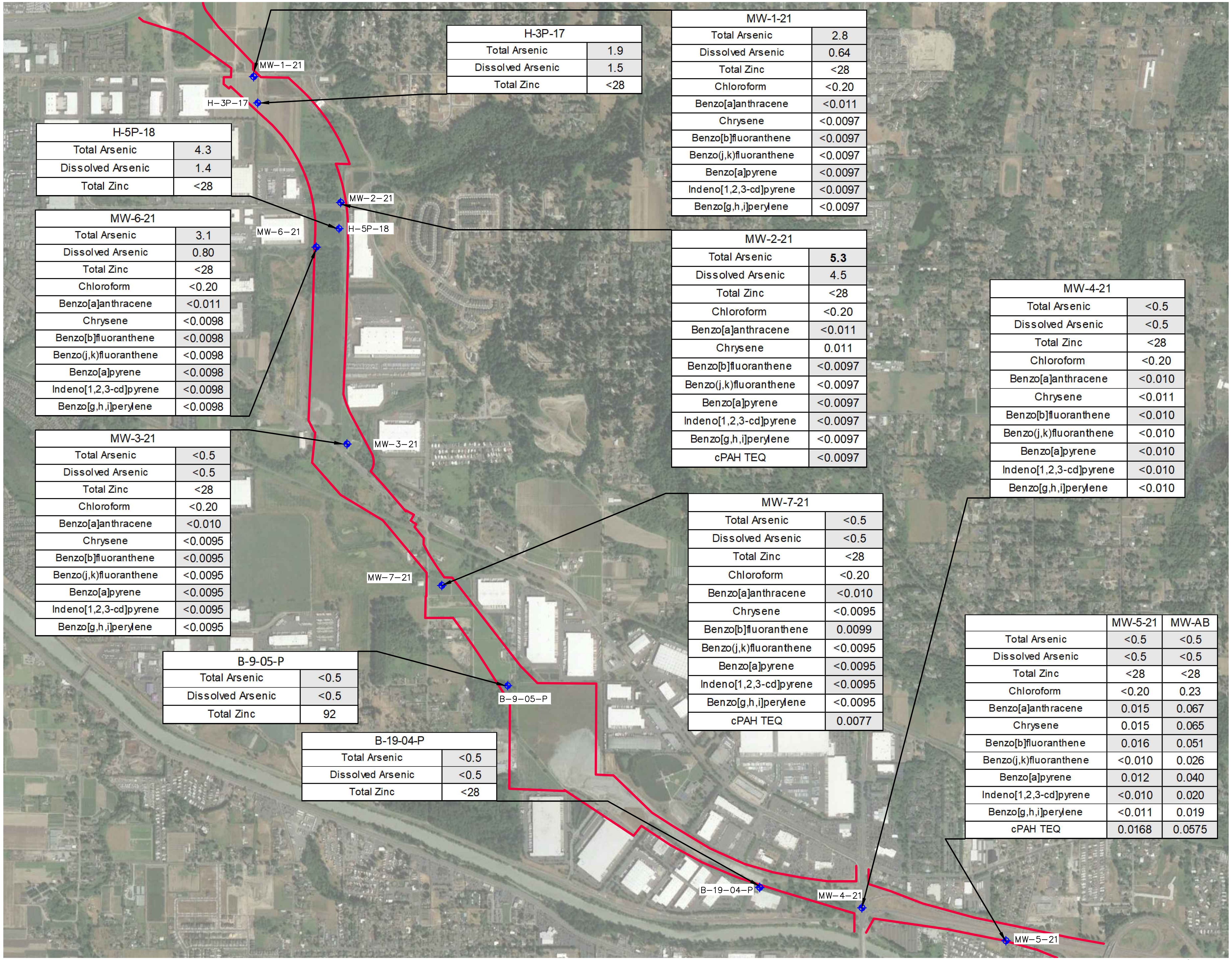
ENVIRONMENTAL MANAGEMENT, INC.

16310 NE 80th St., Suite 300
Redmond, WA 98052

SR167_STAGE2_22Q1_7.DWG



H-3P-17	
Total Arsenic	1.9
Dissolved Arsenic	1.5
Total Zinc	<28

MW-1-21	
Total Arsenic	2.8
Dissolved Arsenic	0.64
Total Zinc	<28
Chloroform	<0.20
Benzo[a]anthracene	<0.011
Chrysene	<0.0097
Benzo[b]fluoranthene	<0.0097
Benzo(j,k)fluoranthene	<0.0097
Benzo[a]pyrene	<0.0097
Indeno[1,2,3-cd]pyrene	<0.0097
Benzo[g,h,i]perylene	<0.0097

H-5P-18	
Total Arsenic	4.3
Dissolved Arsenic	1.4
Total Zinc	<28

MW-6-21	
Total Arsenic	3.1
Dissolved Arsenic	0.80
Total Zinc	<28
Chloroform	<0.20
Benzo[a]anthracene	<0.011
Chrysene	<0.0098
Benzo[b]fluoranthene	<0.0098
Benzo(j,k)fluoranthene	<0.0098
Benzo[a]pyrene	<0.0098
Indeno[1,2,3-cd]pyrene	<0.0098
Benzo[g,h,i]perylene	<0.0098

MW-2-21	
Total Arsenic	**5.3**
Dissolved Arsenic	4.5
Total Zinc	<28
Chloroform	<0.20
Benzo[a]anthracene	<0.011
Chrysene	0.011
Benzo[b]fluoranthene	<0.0097
Benzo(j,k)fluoranthene	<0.0097
Benzo[a]pyrene	<0.0097
Indeno[1,2,3-cd]pyrene	<0.0097
Benzo[g,h,i]perylene	<0.0097
cPAH TEQ	<0.0097

MW-4-21	
Total Arsenic	<0.5
Dissolved Arsenic	<0.5
Total Zinc	<28
Chloroform	<0.20
Benzo[a]anthracene	<0.010
Chrysene	<0.011
Benzo[b]fluoranthene	<0.010
Benzo(j,k)fluoranthene	<0.010
Benzo[a]pyrene	<0.010
Indeno[1,2,3-cd]pyrene	<0.010
Benzo[g,h,i]perylene	<0.010

MW-3-21	
Total Arsenic	<0.5
Dissolved Arsenic	<0.5
Total Zinc	<28
Chloroform	<0.20
Benzo[a]anthracene	<0.010
Chrysene	<0.0095
Benzo[b]fluoranthene	<0.0095
Benzo(j,k)fluoranthene	<0.0095
Benzo[a]pyrene	<0.0095
Indeno[1,2,3-cd]pyrene	<0.0095
Benzo[g,h,i]perylene	<0.0095

MW-7-21	
Total Arsenic	<0.5
Dissolved Arsenic	<0.5
Total Zinc	<28
Chloroform	<0.20
Benzo[a]anthracene	<0.010
Chrysene	<0.0095
Benzo[b]fluoranthene	0.0099
Benzo(j,k)fluoranthene	<0.0095
Benzo[a]pyrene	<0.0095
Indeno[1,2,3-cd]pyrene	<0.0095
Benzo[g,h,i]perylene	<0.0095
cPAH TEQ	0.0077

B-9-05-P	
Total Arsenic	<0.5
Dissolved Arsenic	<0.5
Total Zinc	92

B-19-04-P	
Total Arsenic	<0.5
Dissolved Arsenic	<0.5
Total Zinc	<28

	MW-5-21	MW-AB
Total Arsenic	<0.5	<0.5
Dissolved Arsenic	<0.5	<0.5
Total Zinc	<28	<28
Chloroform	<0.20	0.23
Benzo[a]anthracene	0.015	0.067
Chrysene	0.015	0.065
Benzo[b]fluoranthene	0.016	0.051
Benzo(j,k)fluoranthene	<0.010	0.026
Benzo[a]pyrene	0.012	0.040
Indeno[1,2,3-cd]pyrene	<0.010	0.020
Benzo[g,h,i]perylene	<0.011	0.019
cPAH TEQ	0.0168	0.0575

LEGEND

PROJECT FOOTPRINT

B–6–05–P APPROXIMATE MONITORING WELL LOCATION

< CONCENTRATION NOT DETECTED ABOVE LABORATORY REPORTING LIMIT.

ALL CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER (μg/L)

SHADED RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE SURFACE WATER QUALITY STANDARD

BOLD RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE MTCA METHOD A GROUNDWATER CLEANUP LEVEL

DESIGNED BY

Innovex Environmental

Anna Jordan

DRAWN BY

ICD

March 30, 2022

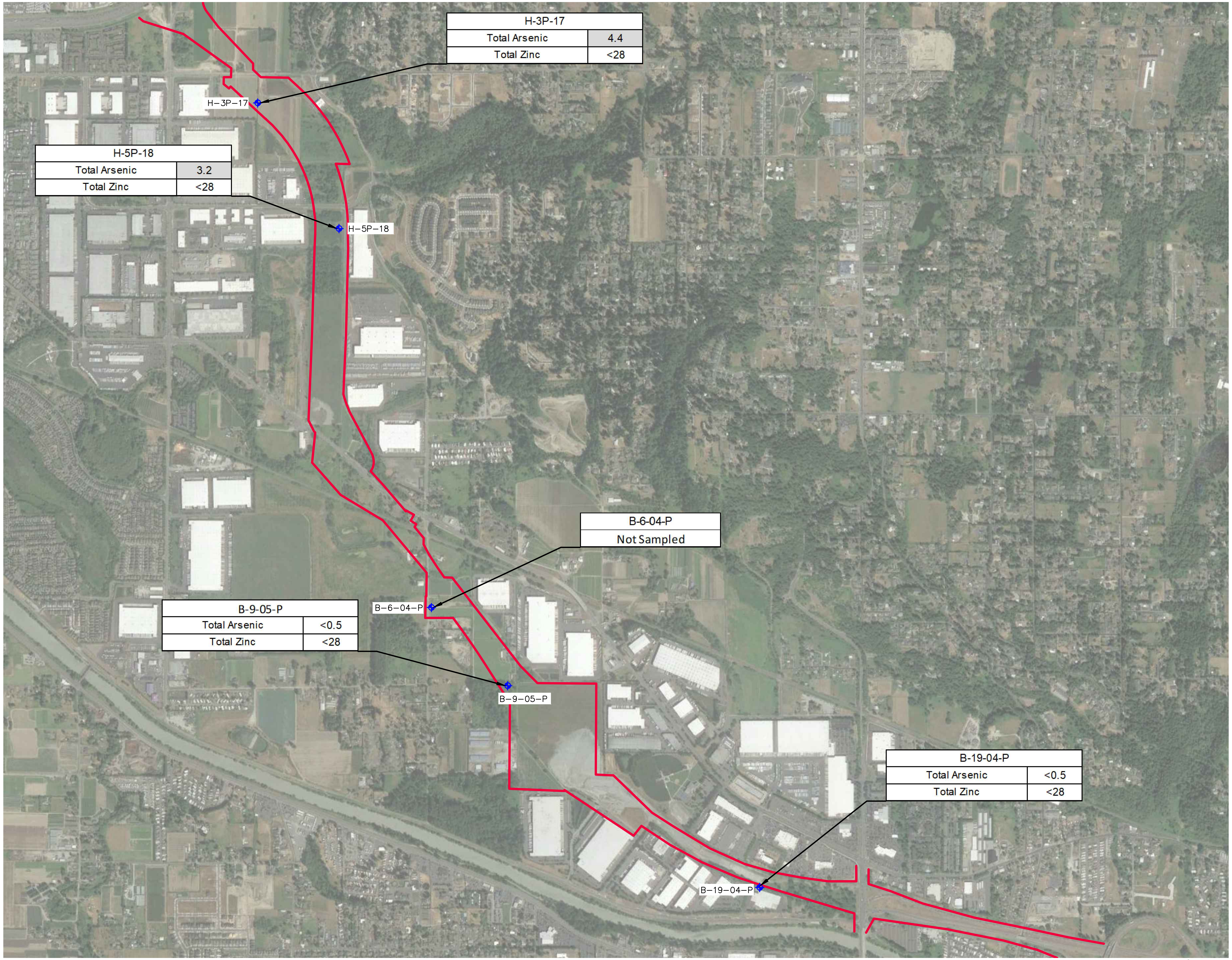
APPENDIX C
Monitoring Well Location Map and Detected Analyte Results

SR167/I-5 to SR161 New Expressway Project Groundwater Monitoring Event No.2 Pierce County, WASHINGTON

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

16310 NE 80th St., Suite 300
Redmond, WA 98052

SR167_STAGE2_22Q1_3.DWG



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SCALE IN FEET

LEGEND

PROJECT FOOTPRINT

B−6−05−P APPROXIMATE MONITORING WELL LOCATION

< CONCENTRATION NOT DETECTED ABOVE LABORATORY REPORTING LIMIT.

ALL CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER (μg/L)

SHADED RESULTS INDICATE AN EXCEEDANCE OF THE APPLICABLE SURFACE WATER QUALITY STANDARD

DESIGNED BY

Innovex Environmental

Anna Jordan

DRAWN BY

ICD

November 17, 2021

APPENDIX C
Monitoring Well Location Map and Detected Analyte Results

SR167/I-5 to SR161
New Expressway Project
Groundwater Monitoring
Event No.1
Pierce County, WASHINGTON

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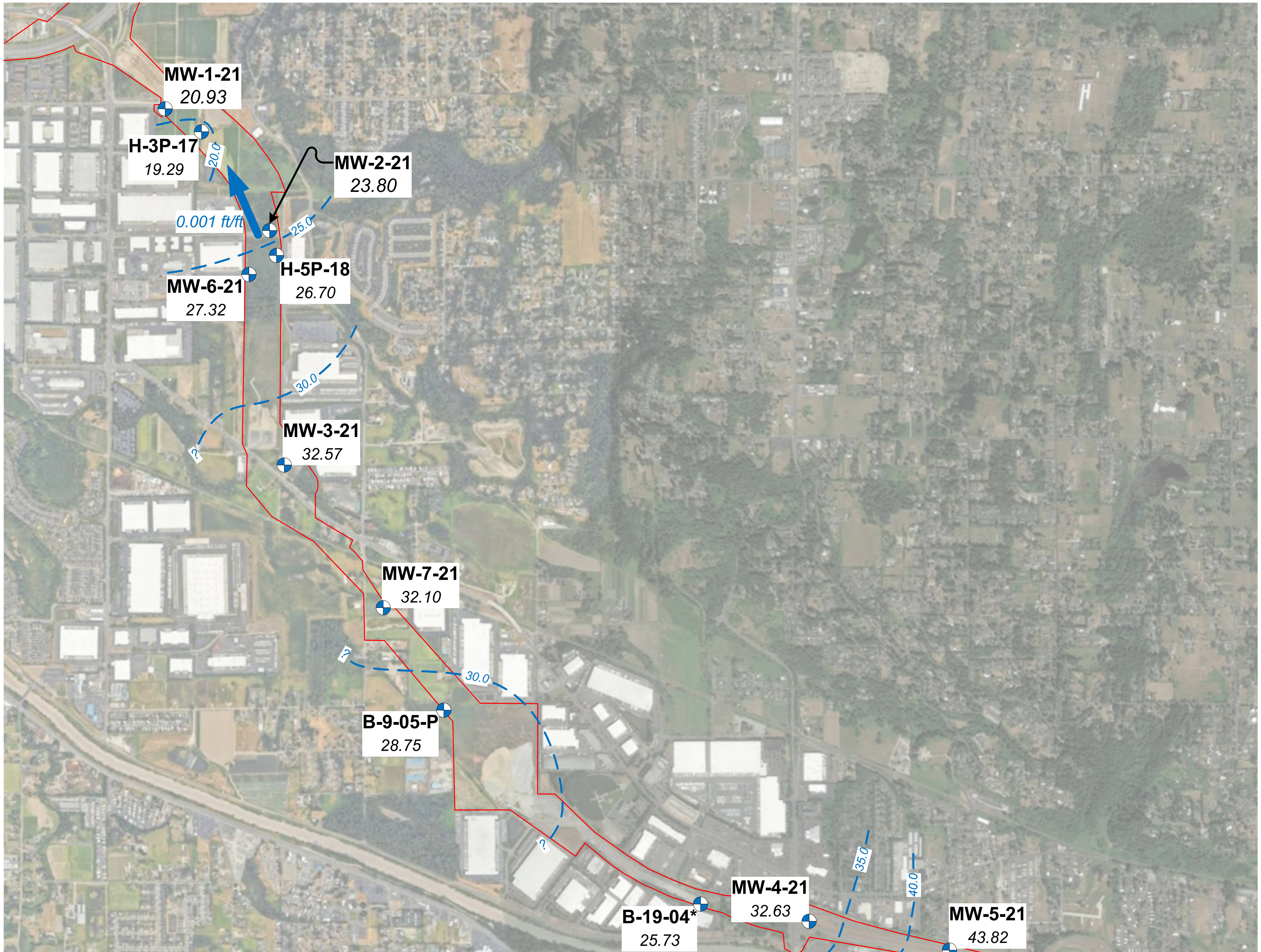
Redmond, WA 98052

SR167_STAGE2_21Q4_4.DWG

APPENDIX D

GROUNDWATER-CONTOUR MAP



N

Legend

MW-1-21
20.93
Approximate Location of Groundwater Monitoring Wells (with *groundwater elevation* in feet)
*Not used in contour calculations

30.0 Inferred groundwater elevation contour (feet)

0.001 ft/ft Inferred groundwater flow direction and gradient (ft/ft)

The contours represent an interpretation of available data, for the indicated date. Site groundwater contours may change with additional measurements and/or data points, weather changes, construction activities, and/or other influences.

0 ft. 900 ft. 1500 ft. 3000 ft.

Scale: 1" = 1,500'

Figure and notations are in color. Black and white copies may not be suitable for use.

Drawing Date: 4/5/2023

APPENDIX D

Groundwater Elevation Contours (March 2023)

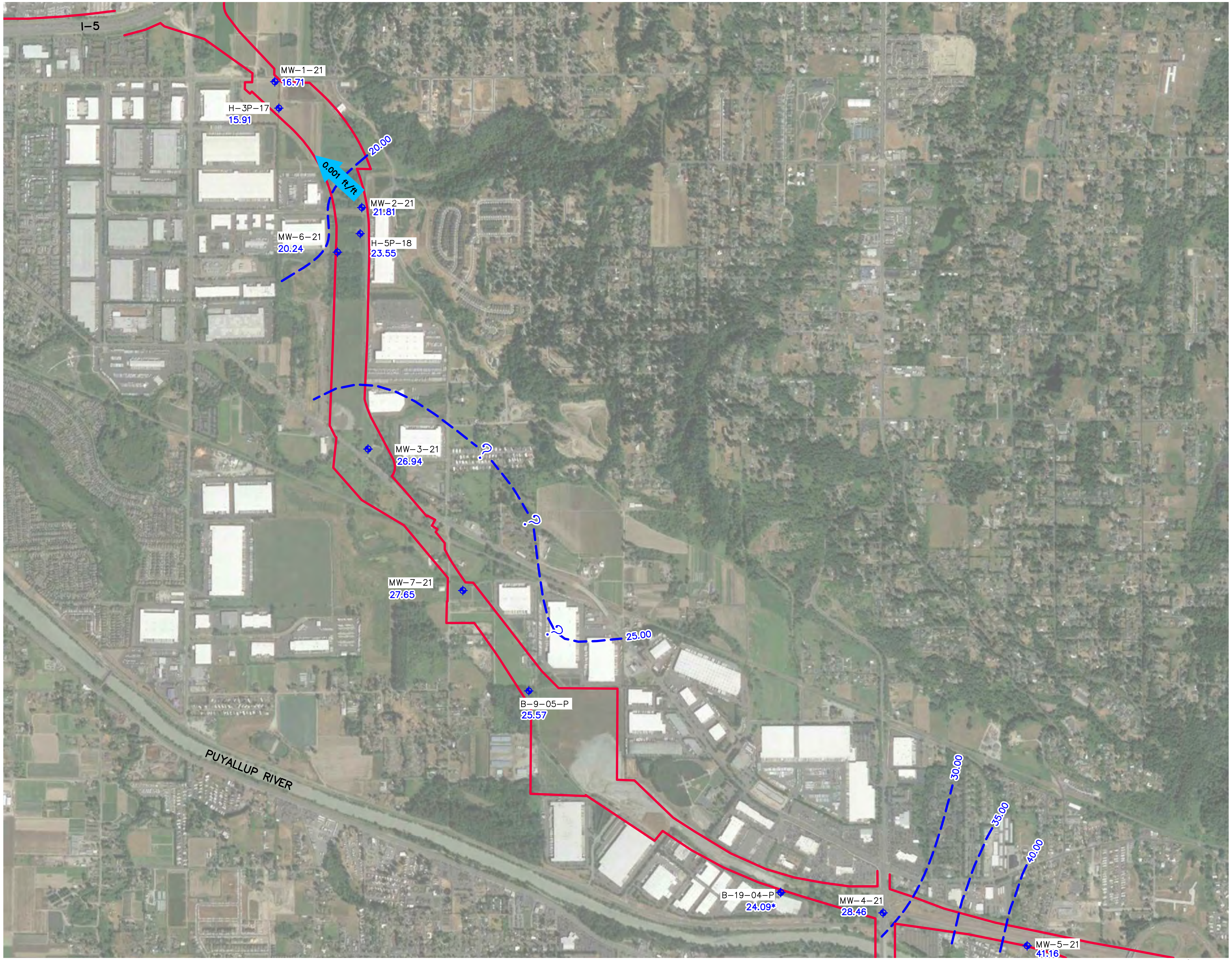
SR167/I-5 to SR 161 New Expressway Project

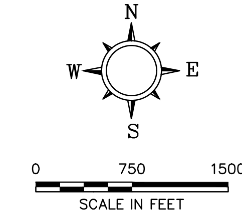
Groundwater Monitoring Event No. 6

Pierce County, WASHINGTON

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.
16310 NE 80th St, Suite 104
Redmond, WA 98052
(800)988-7880

Drawing References: 2020 Google Earth Aerial Photograph, WSDOT Provided Mapping, and INNOVEX Measurements





LEGEND

	PROJECT FOOTPRINT
MW–2–21	APPROXIMATE MONITORING WELL LOCATION
21.81	GROUNDWATER ELEVATION (FEET)
20.00	INFERRED GROUNDWATER ELEVATION CONTOUR LINE (FEET)
	CONTOUR INTERVAL=5.00 FEET
0.001 ft/ft	APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)
*	NOT USED IN CONTOURING

DESIGNED BY
Innovex Environmental
Pamela Fleming
DRAWN BY
ICD
September 30, 2022

APPENDIX D
Groundwater Elevation Contour Map August and September 2022
SR167/I-5 to SR161 New Expressway Project Groundwater Monitoring Event No.5
Pierce County, WASHINGTON

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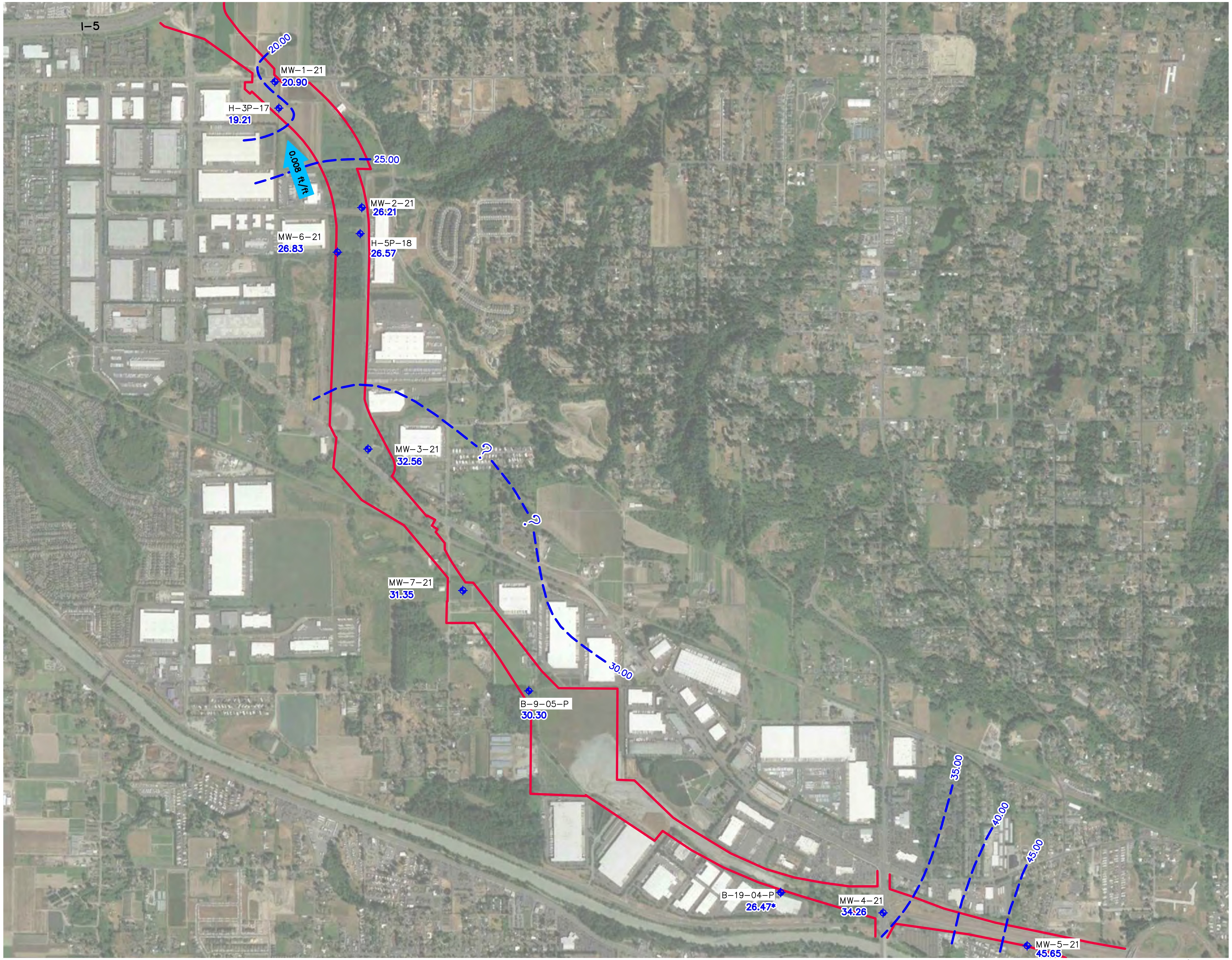
Redmond, WA 98052

SR167_STAGE2_22Q3_2.DWG



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0 750 1500
SCALE IN FEET

LEGEND

	PROJECT FOOTPRINT
MW-2-21	APPROXIMATE MONITORING WELL LOCATION
19.21	GROUNDWATER ELEVATION (FEET)
20.00	INFERRED GROUNDWATER ELEVATION CONTOUR LINE (FEET)
	CONTOUR INTERVAL=5.00 FEET
0.008 ft/ft	APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)
*	NOT USED IN CONTOURING

DESIGNED BY
Innovex Environmental
Pamela Fleming
DRAWN BY
ICD
August 17, 2022

APPENDIX D
Groundwater Elevation Contour Map June 2022

SR167/I-5 to SR161 New Expressway Project Groundwater Monitoring Event No.4 Pierce County, WASHINGTON

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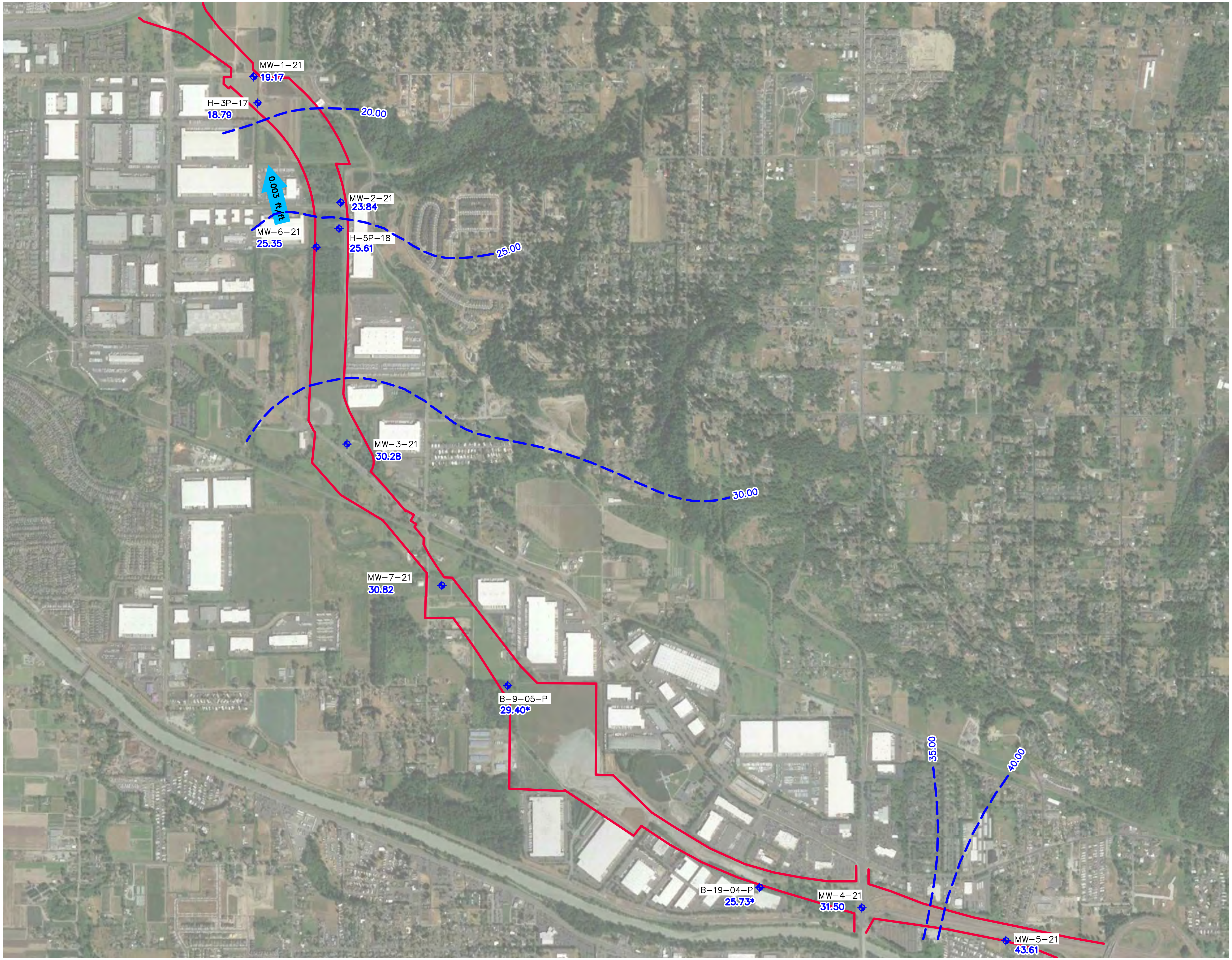
SR167_STAGE2_22Q2_1.DWG



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0 750 1500
SCALE IN FEET

LEGEND

	PROJECT FOOTPRINT
MW–2–21	APPROXIMATE MONITORING WELL LOCATION
19.17	GROUNDWATER ELEVATION (FEET)
20.00	INFERRED GROUNDWATER ELEVATION CONTOUR LINE (FEET)
	CONTOUR INTERVAL=5.00 FEET
0.003 ft/ft	APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)
*	NOT USED IN CONTOURING

DESIGNED BY
Innovex Environmental
Pamela Fleming
DRAWN BY
ICD
May 6, 2022

APPENDIX D
Groundwater Elevation Contour Map March/April 2022

SR167/I-5 to SR161 New Expressway Project Groundwater Monitoring Event No.3 Pierce County, WASHINGTON

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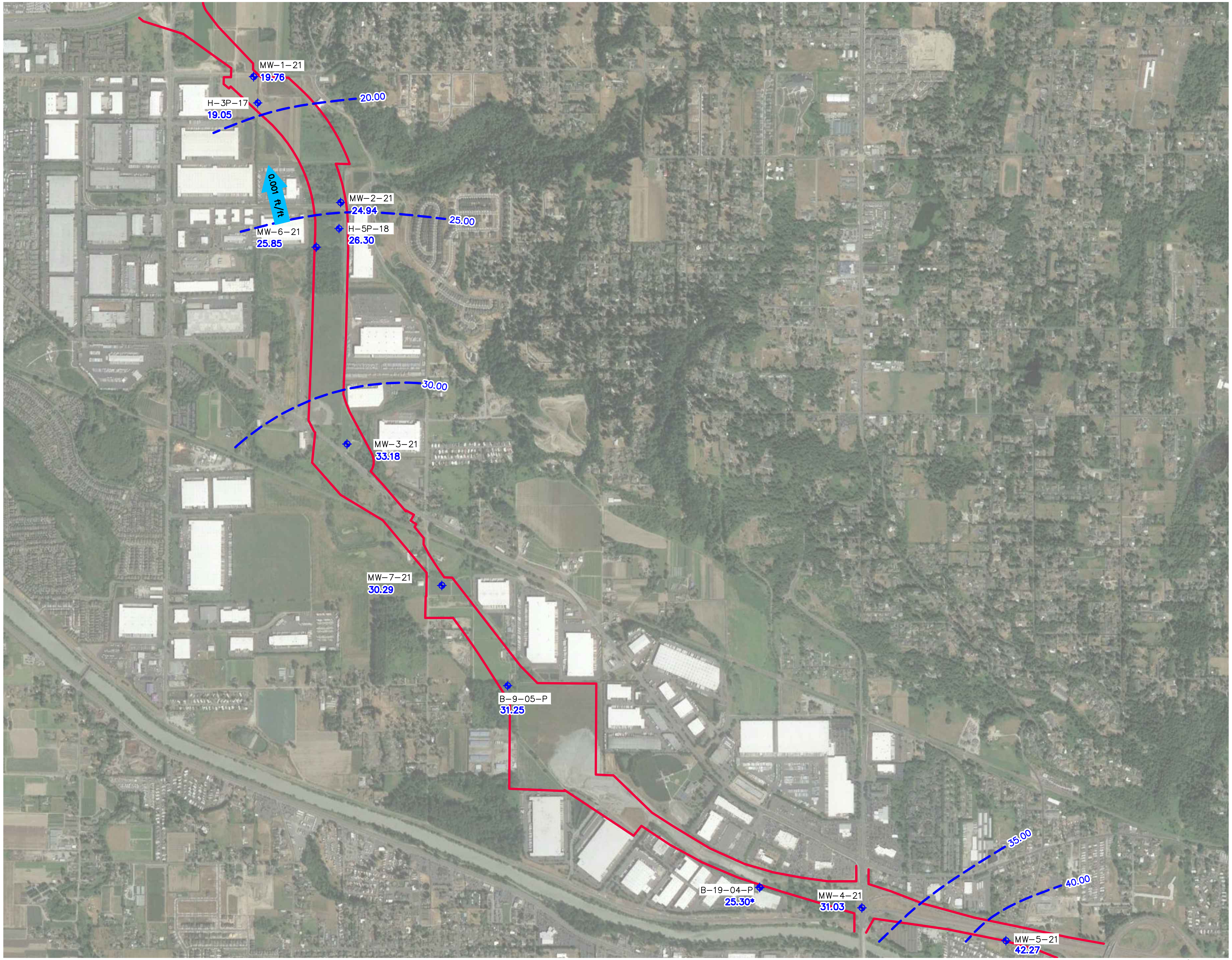
SR167_STAGE2_22Q1_6.DWG



SR167_STAGE2_22Q1_3.DWG

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0 750 1500
SCALE IN FEET

LEGEND

PROJECT FOOTPRINT
B-6-05-P APPROXIMATE MONITORING WELL LOCATION
24.94 GROUNDWATER ELEVATION (FEET)
20.00 INFERRED GROUNDWATER ELEVATION CONTOUR LINE (FEET)
CONTOUR INTERVAL=5.00 FEET
0.001 ft/ft APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)

*B-19-04-P NOT USED TO CALCULATE GW ELEVATION CONTOURS

DESIGNED BY
Innovex Environmental
Anna Jordan
DRAWN BY
ICD
March 30, 2022

APPENDIX D
Groundwater Elevation Contour Map January 2022

SR167/I-5 to SR161 New Expressway Project Groundwater Monitoring Event No.2 Pierce County, WASHINGTON

INNOVEX
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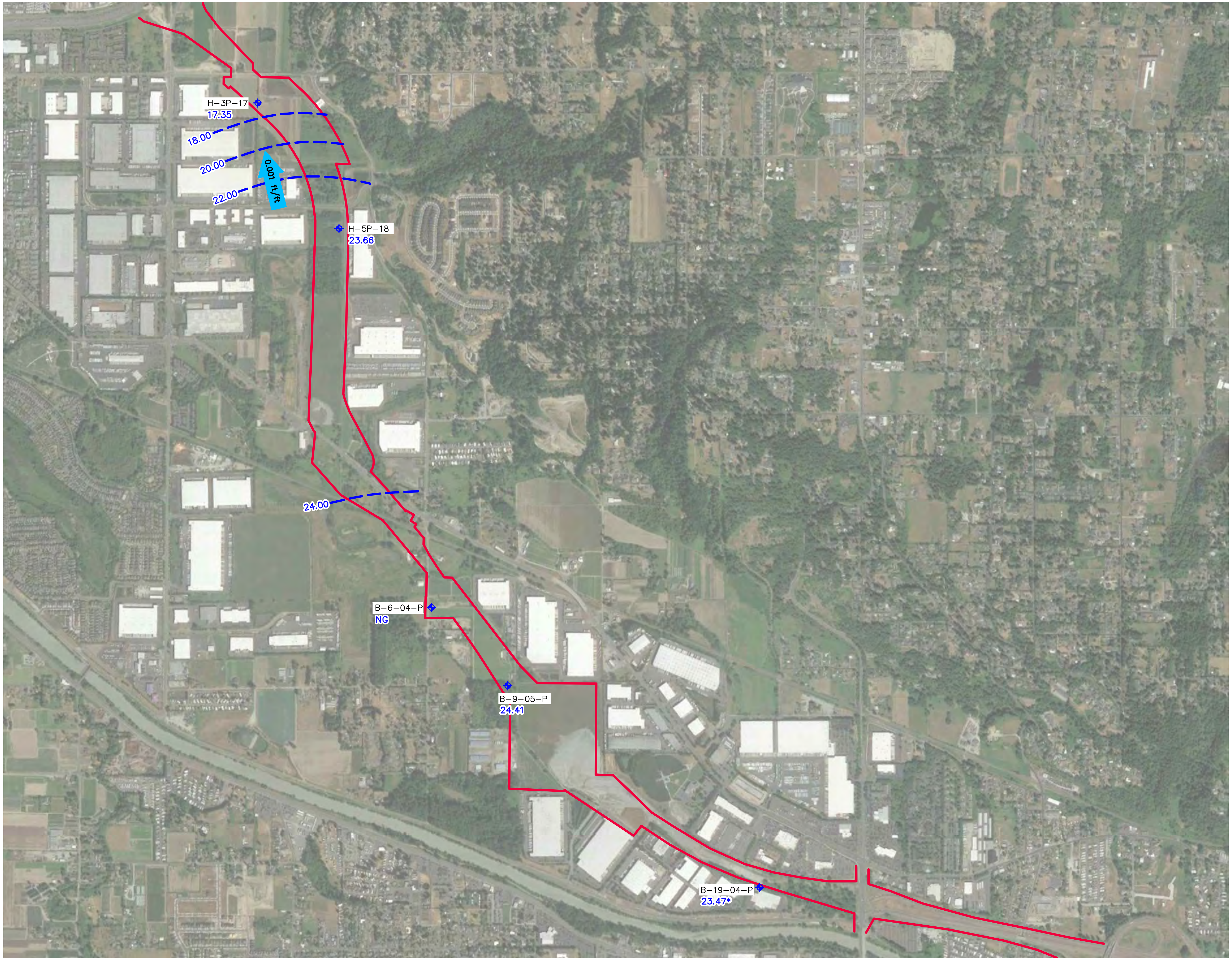
16310 NE 80th St., Suite 300
Redmond, WA 98052



SOURCE: 2020 AERIAL PHOTOGRAPHY; © GOOGLE

N
W E
S

0 750 1500
SCALE IN FEET

LEGEND

(red line)	PROJECT FOOTPRINT
B–6–05–P	APPROXIMATE MONITORING WELL LOCATION
23.66	GROUNDWATER ELEVATION (FEET)
20.00	GROUNDWATER ELEVATION CONTOUR LINE (FEET)
	CONTOUR INTERVAL=2.00 FEET
0.001 ft/ft	APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)
NG	NOT GAUGED
*	B–19–04–P NOT USED TO CALCULATE GROUNDWATER ELEVATION CONTOURS

DESIGNED BY
Innovex Environmental
Anna Jordan
DRAWN BY
ICD
November 17, 2021

APPENDIX D
Groundwater Elevation Contour Map 09/30/2021

SR167/I-5 to SR161 New Expressway Project Groundwater Monitoring Event No.1 Pierce County, WASHINGTON

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.
16310 NE 80th St., Suite 300
Redmond, WA 98052

SR167_STAGE2_21Q4_4.DWG

APPENDIX E

LABORATORY-ANALYTICAL REPORTS

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

March 10, 2023

Pamela Fleming
INNOVEX Environmental Mgt., Inc.
16310 NE 80th Street, Suite 104
Redmond, WA 98052

Re: Analytical Data for Project 30104 - SR 167 Stage 2
Laboratory Reference No. 2303-015

Dear Pamela:

Enclosed are the analytical results and associated quality control data for samples submitted on March 1, 2023.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

Case Narrative

Samples were collected on March 1, 2023 and received by the laboratory on March 1, 2023. They were maintained at the laboratory at a temperature of $2^{o}C$ to $6^{o}C$.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Volatiles EPA 8260D Analysis

The RPD for Methylene Chloride, 2-Butanone, 1,2-Dichloroethane and 1,2,4-Trichlorobenzene is outside the control limits for the Spike Blank/Spike Blank Duplicate. The percent recoveries on both spike blanks are within recovery limits. The method allows for a percentage of the compounds to fall outside of the control limits due to the large number of analytes being spiked.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
page 1 of 2

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-19-04-P**					
Laboratory ID:	03-015-01					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-19-04-P**					
Laboratory ID:	03-015-01					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*95*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
page 1 of 2

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-AF**					
Laboratory ID:	03-015-02					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-AF**					
Laboratory ID:	03-015-02					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*98*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
page 1 of 2

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-5-21**					
Laboratory ID:	03-015-03					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-5-21**					
Laboratory ID:	03-015-03					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*100*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*94*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-9-05-P**					
Laboratory ID:	03-015-04					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-9-05-P**					
Laboratory ID:	03-015-04					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*118*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*95*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-7-21**					
Laboratory ID:	03-015-05					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

Date of Report: March 10, 2023
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-7-21**					
Laboratory ID:	03-015-05					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*106*	*75-127*				
Toluene-d8	*110*	*80-127*				
4-Bromofluorobenzene	*89*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*75-127*				
Toluene-d8	*107*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0306W1									
	SB	SBD	SB	SBD	SB	SBD				
Dichlorodifluoromethane	**8.60**	**9.70**	10.0	10.0	86	97	34-166	12	21	
Chloromethane	**9.41**	**11.1**	10.0	10.0	94	111	63-138	16	18	
Vinyl Chloride	**9.30**	**10.7**	10.0	10.0	93	107	71-135	14	20	
Bromomethane	**8.40**	**9.29**	10.0	10.0	84	93	20-151	10	36	
Chloroethane	**9.95**	**11.1**	10.0	10.0	100	111	76-125	11	20	
Trichlorofluoromethane	**9.82**	**10.7**	10.0	10.0	98	107	75-131	9	19	
1,1-Dichloroethene	**9.69**	**11.1**	10.0	10.0	97	111	78-125	14	19	
Acetone	**9.09**	**10.3**	10.0	10.0	91	103	76-125	12	18	
Iodomethane	**9.15**	**10.5**	10.0	10.0	92	105	10-155	14	40	
Carbon Disulfide	**9.89**	**10.6**	10.0	10.0	99	106	58-129	7	17	
Methylene Chloride	**9.88**	**12.0**	10.0	10.0	99	120	80-120	19	15	L
(trans) 1,2-Dichloroethene	**9.78**	**11.4**	10.0	10.0	98	114	80-125	15	17	
Methyl t-Butyl Ether	**9.66**	**11.1**	10.0	10.0	97	111	80-122	14	15	
1,1-Dichloroethane	**9.84**	**11.5**	10.0	10.0	98	115	80-125	16	17	
Vinyl Acetate	**10.5**	**11.9**	10.0	10.0	105	119	80-131	13	15	
2,2-Dichloropropane	**9.93**	**11.7**	10.0	10.0	99	117	80-146	16	21	
(cis) 1,2-Dichloroethene	**9.91**	**11.5**	10.0	10.0	99	115	80-129	15	17	
2-Butanone	**9.87**	**11.6**	10.0	10.0	99	116	80-129	16	16	L
Bromochloromethane	**10.6**	**11.8**	10.0	10.0	106	118	80-125	11	18	
Chloroform	**9.77**	**11.4**	10.0	10.0	98	114	80-123	15	16	
1,1,1-Trichloroethane	**9.40**	**10.5**	10.0	10.0	94	105	80-123	11	18	
Carbon Tetrachloride	**9.68**	**11.0**	10.0	10.0	97	110	80-126	13	17	
1,1-Dichloropropene	**9.79**	**10.6**	10.0	10.0	98	106	80-126	8	18	
Benzene	**9.80**	**11.5**	10.0	10.0	98	115	80-121	16	16	
1,2-Dichloroethane	**9.19**	**11.0**	10.0	10.0	92	110	80-124	18	15	L
Trichloroethene	**10.9**	**11.6**	10.0	10.0	109	116	80-122	6	18	
1,2-Dichloropropane	**10.2**	**10.9**	10.0	10.0	102	109	80-123	7	15	
Dibromomethane	**11.0**	**12.2**	10.0	10.0	110	122	80-123	10	15	
Bromodichloromethane	**10.7**	**11.5**	10.0	10.0	107	115	80-125	7	15	
(cis) 1,3-Dichloropropene	**10.5**	**11.9**	10.0	10.0	105	119	80-129	13	15	
Methyl Isobutyl Ketone	**10.8**	**11.7**	10.0	10.0	108	117	80-124	8	15	
Toluene	**10.4**	**11.2**	10.0	10.0	104	112	80-120	7	18	
(trans) 1,3-Dichloropropene	**10.7**	**11.6**	10.0	10.0	107	116	80-134	8	17	

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VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL
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Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0306W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1,2-Trichloroethane	**10.6**	**11.4**	10.0	10.0	106	114	77-126	7	20	
Tetrachloroethene	**10.3**	**10.3**	10.0	10.0	103	103	80-124	0	18	
1,3-Dichloropropane	**10.0**	**10.2**	10.0	10.0	100	102	80-120	2	15	
2-Hexanone	**10.5**	**11.0**	10.0	10.0	105	110	80-130	5	16	
Dibromochloromethane	**11.5**	**11.9**	10.0	10.0	115	119	80-128	3	15	
1,2-Dibromoethane	**10.7**	**11.0**	10.0	10.0	107	110	80-127	3	15	
Chlorobenzene	**10.0**	**10.7**	10.0	10.0	100	107	80-120	7	17	
1,1,1,2-Tetrachloroethane	**10.1**	**11.0**	10.0	10.0	101	110	80-125	9	17	
Ethylbenzene	**10.0**	**10.4**	10.0	10.0	100	104	80-125	4	18	
m,p-Xylene	**20.1**	**20.9**	20.0	20.0	101	105	80-127	4	18	
o-Xylene	**9.65**	**10.2**	10.0	10.0	97	102	80-126	6	18	
Styrene	**10.3**	**10.8**	10.0	10.0	103	108	80-130	5	17	
Bromoform	**10.9**	**11.0**	10.0	10.0	109	110	80-130	1	15	
Isopropylbenzene	**10.1**	**10.4**	10.0	10.0	101	104	80-129	3	18	
Bromobenzene	**10.0**	**10.7**	10.0	10.0	100	107	76-128	7	16	
1,1,2,2-Tetrachloroethane	**10.1**	**10.6**	10.0	10.0	101	106	74-130	5	15	
1,2,3-Trichloropropane	**10.7**	**11.6**	10.0	10.0	107	116	71-129	8	25	
n-Propylbenzene	**9.73**	**10.3**	10.0	10.0	97	103	80-129	6	19	
2-Chlorotoluene	**10.3**	**10.4**	10.0	10.0	103	104	80-128	1	18	
4-Chlorotoluene	**9.87**	**10.3**	10.0	10.0	99	103	80-130	4	19	
1,3,5-Trimethylbenzene	**9.77**	**10.4**	10.0	10.0	98	104	80-131	6	18	
tert-Butylbenzene	**9.88**	**10.0**	10.0	10.0	99	100	80-130	1	18	
1,2,4-Trimethylbenzene	**10.2**	**10.6**	10.0	10.0	102	106	80-130	4	18	
sec-Butylbenzene	**10.0**	**10.1**	10.0	10.0	100	101	80-130	1	18	
1,3-Dichlorobenzene	**10.0**	**10.7**	10.0	10.0	100	107	80-126	7	17	
p-Isopropyltoluene	**9.88**	**10.3**	10.0	10.0	99	103	80-132	4	18	
1,4-Dichlorobenzene	**9.85**	**10.8**	10.0	10.0	99	108	80-121	9	17	
1,2-Dichlorobenzene	**10.2**	**11.1**	10.0	10.0	102	111	79-125	8	15	
n-Butylbenzene	**9.92**	**10.4**	10.0	10.0	99	104	80-138	5	19	
1,2-Dibromo-3-chloropropane	**10.7**	**10.7**	10.0	10.0	107	107	73-133	0	15	
1,2,4-Trichlorobenzene	**10.2**	**12.5**	10.0	10.0	102	125	80-139	20	18	L
Hexachlorobutadiene	**9.37**	**10.5**	10.0	10.0	94	105	80-151	11	18	
Naphthalene	**7.90**	**10.0**	10.0	10.0	79	100	68-144	23	25	
1,2,3-Trichlorobenzene	**10.0**	**13.1**	10.0	10.0	100	131	75-146	27	28	
Surrogate:										
Dibromofluoromethane					*94*	*108*	*75-127*			
Toluene-d8					*103*	*106*	*80-127*			
4-Bromofluorobenzene					*99*	*102*	*78-125*			

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-19-04-P**					
Laboratory ID:	03-015-01					
n-Nitrosodimethylamine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-19-04-P**					
Laboratory ID:	03-015-01					
2,4-Dinitrophenol	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	9.7	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*41*	*10 - 81*				
Phenol-d6	*29*	*10 - 86*				
Nitrobenzene-d5	*73*	*27 - 105*				
2-Fluorobiphenyl	*73*	*33 - 100*				
2,4,6-Tribromophenol	*88*	*25 - 124*				
Terphenyl-d14	*78*	*40 - 116*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-AF**					
Laboratory ID:	03-015-02					
n-Nitrosodimethylamine	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-AF**					
Laboratory ID:	03-015-02					
2,4-Dinitrophenol	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	9.6	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.096	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.0096	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.0096	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	4.8	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	0.96	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.0096	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.0096	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.0096	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0096	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.0096	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.0096	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*38*	*10 - 81*				
Phenol-d6	*29*	*10 - 86*				
Nitrobenzene-d5	*69*	*27 - 105*				
2-Fluorobiphenyl	*72*	*33 - 100*				
2,4,6-Tribromophenol	*85*	*25 - 124*				
Terphenyl-d14	*83*	*40 - 116*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-5-21**					
Laboratory ID:	03-015-03					
n-Nitrosodimethylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-5-21**					
Laboratory ID:	03-015-03					
2,4-Dinitrophenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	10	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*45*	*10 - 81*				
Phenol-d6	*31*	*10 - 86*				
Nitrobenzene-d5	*81*	*27 - 105*				
2-Fluorobiphenyl	*78*	*33 - 100*				
2,4,6-Tribromophenol	*90*	*25 - 124*				
Terphenyl-d14	*83*	*40 - 116*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-9-05-P**					
Laboratory ID:	03-015-04					
n-Nitrosodimethylamine	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Pyridine	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Phenol	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Aniline	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroethyl)ether	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2-Chlorophenol	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
1,3-Dichlorobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
1,4-Dichlorobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Benzyl alcohol	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
1,2-Dichlorobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2-Methylphenol (o-Cresol)	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroisopropyl)ether	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
n-Nitroso-di-n-propylamine	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Hexachloroethane	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Nitrobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Isophorone	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2-Nitrophenol	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2,4-Dimethylphenol	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroethoxy)methane	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2,4-Dichlorophenol	**ND**	1.9	EPA 8270E	3-8-23	3-8-23	
1,2,4-Trichlorobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Naphthalene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
4-Chloroaniline	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Hexachlorobutadiene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
4-Chloro-3-methylphenol	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2-Methylnaphthalene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
1-Methylnaphthalene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
Hexachlorocyclopentadiene	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
2,4,6-Trichlorophenol	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2,3-Dichloroaniline	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2,4,5-Trichlorophenol	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2-Chloronaphthalene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2-Nitroaniline	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
1,4-Dinitrobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Dimethylphthalate	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
1,3-Dinitrobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2,6-Dinitrotoluene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
1,2-Dinitrobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Acenaphthylene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
3-Nitroaniline	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-9-05-P**					
Laboratory ID:	03-015-04					
2,4-Dinitrophenol	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
Acenaphthene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
4-Nitrophenol	**ND**	1.9	EPA 8270E	3-8-23	3-8-23	
2,4-Dinitrotoluene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Dibenzofuran	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
2,3,5,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-8-23	3-8-23	
2,3,4,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-8-23	3-8-23	
Diethylphthalate	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
4-Chlorophenyl-phenylether	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
4-Nitroaniline	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Fluorene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
4,6-Dinitro-2-methylphenol	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
n-Nitrosodiphenylamine	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
1,2-Diphenylhydrazine	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
4-Bromophenyl-phenylether	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Hexachlorobenzene	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Pentachlorophenol	**ND**	9.4	EPA 8270E	3-8-23	3-8-23	
Phenanthrene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
Anthracene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
Carbazole	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Di-n-butylphthalate	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
Fluoranthene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
Pyrene	**ND**	0.094	EPA 8270E/SIM	3-8-23	3-8-23	
Butylbenzylphthalate	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
bis-2-Ethylhexyladipate	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
3,3'-Dichlorobenzidine	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
Benzo[a]anthracene	**ND**	0.0094	EPA 8270E/SIM	3-8-23	3-8-23	
Chrysene	**ND**	0.0094	EPA 8270E/SIM	3-8-23	3-8-23	
bis(2-Ethylhexyl)phthalate	**ND**	4.7	EPA 8270E	3-8-23	3-8-23	
Di-n-octylphthalate	**ND**	0.94	EPA 8270E	3-8-23	3-8-23	
Benzo[b]fluoranthene	**ND**	0.0094	EPA 8270E/SIM	3-8-23	3-8-23	
Benzo(j,k)fluoranthene	**ND**	0.0094	EPA 8270E/SIM	3-8-23	3-8-23	
Benzo[a]pyrene	**ND**	0.0094	EPA 8270E/SIM	3-8-23	3-8-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0094	EPA 8270E/SIM	3-8-23	3-8-23	
Dibenz[a,h]anthracene	**ND**	0.0094	EPA 8270E/SIM	3-8-23	3-8-23	
Benzo[g,h,i]perylene	**ND**	0.0094	EPA 8270E/SIM	3-8-23	3-8-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*40*	*10 - 81*				
Phenol-d6	*29*	*10 - 86*				
Nitrobenzene-d5	*71*	*27 - 105*				
2-Fluorobiphenyl	*71*	*33 - 100*				
2,4,6-Tribromophenol	*93*	*25 - 124*				
Terphenyl-d14	*81*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-7-21**					
Laboratory ID:	03-015-05					
n-Nitrosodimethylamine	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Pyridine	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Phenol	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Aniline	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroethyl)ether	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2-Chlorophenol	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
1,3-Dichlorobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
1,4-Dichlorobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Benzyl alcohol	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
1,2-Dichlorobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2-Methylphenol (o-Cresol)	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroisopropyl)ether	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
n-Nitroso-di-n-propylamine	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Hexachloroethane	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Nitrobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Isophorone	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2-Nitrophenol	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2,4-Dimethylphenol	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroethoxy)methane	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2,4-Dichlorophenol	**ND**	1.9	EPA 8270E	3-8-23	3-8-23	
1,2,4-Trichlorobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Naphthalene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
4-Chloroaniline	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Hexachlorobutadiene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
4-Chloro-3-methylphenol	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2-Methylnaphthalene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
1-Methylnaphthalene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
Hexachlorocyclopentadiene	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
2,4,6-Trichlorophenol	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2,3-Dichloroaniline	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2,4,5-Trichlorophenol	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2-Chloronaphthalene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2-Nitroaniline	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
1,4-Dinitrobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Dimethylphthalate	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
1,3-Dinitrobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2,6-Dinitrotoluene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
1,2-Dinitrobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Acenaphthylene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
3-Nitroaniline	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	

Date of Report: March 10, 2023
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Laboratory Reference: 2303-015
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-7-21**					
Laboratory ID:	03-015-05					
2,4-Dinitrophenol	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
Acenaphthene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
4-Nitrophenol	**ND**	1.9	EPA 8270E	3-8-23	3-8-23	
2,4-Dinitrotoluene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Dibenzofuran	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
2,3,5,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-8-23	3-8-23	
2,3,4,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-8-23	3-8-23	
Diethylphthalate	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
4-Chlorophenyl-phenylether	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
4-Nitroaniline	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Fluorene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
4,6-Dinitro-2-methylphenol	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
n-Nitrosodiphenylamine	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
1,2-Diphenylhydrazine	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
4-Bromophenyl-phenylether	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Hexachlorobenzene	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Pentachlorophenol	**ND**	9.6	EPA 8270E	3-8-23	3-8-23	
Phenanthrene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
Anthracene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
Carbazole	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Di-n-butylphthalate	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
Fluoranthene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
Pyrene	**ND**	0.096	EPA 8270E/SIM	3-8-23	3-8-23	
Butylbenzylphthalate	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
bis-2-Ethylhexyladipate	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
3,3'-Dichlorobenzidine	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
Benzo[a]anthracene	**ND**	0.0096	EPA 8270E/SIM	3-8-23	3-8-23	
Chrysene	**ND**	0.0096	EPA 8270E/SIM	3-8-23	3-8-23	
bis(2-Ethylhexyl)phthalate	**ND**	4.8	EPA 8270E	3-8-23	3-8-23	
Di-n-octylphthalate	**ND**	0.96	EPA 8270E	3-8-23	3-8-23	
Benzo[b]fluoranthene	**ND**	0.0096	EPA 8270E/SIM	3-8-23	3-8-23	
Benzo(j,k)fluoranthene	**ND**	0.0096	EPA 8270E/SIM	3-8-23	3-8-23	
Benzo[a]pyrene	**ND**	0.0096	EPA 8270E/SIM	3-8-23	3-8-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0096	EPA 8270E/SIM	3-8-23	3-8-23	
Dibenz[a,h]anthracene	**ND**	0.0096	EPA 8270E/SIM	3-8-23	3-8-23	
Benzo[g,h,i]perylene	**ND**	0.0096	EPA 8270E/SIM	3-8-23	3-8-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*44*	*10 - 81*				
Phenol-d6	*32*	*10 - 86*				
Nitrobenzene-d5	*77*	*27 - 105*				
2-Fluorobiphenyl	*78*	*33 - 100*				
2,4,6-Tribromophenol	*95*	*25 - 124*				
Terphenyl-d14	*88*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

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QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0307W1					
n-Nitrosodimethylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
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Laboratory Reference: 2303-015
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0307W1					
2,4-Dinitrophenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	10	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*45*	*10 - 81*				
Phenol-d6	*32*	*10 - 86*				
Nitrobenzene-d5	*75*	*27 - 105*				
2-Fluorobiphenyl	*70*	*33 - 100*				
2,4,6-Tribromophenol	*86*	*25 - 124*				
Terphenyl-d14	*81*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0308W2					
n-Nitrosodimethylamine	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Pyridine	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Phenol	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Aniline	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroethyl)ether	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2-Chlorophenol	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
1,3-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
1,4-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Benzyl alcohol	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
1,2-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2-Methylphenol (o-Cresol)	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroisopropyl)ether	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
n-Nitroso-di-n-propylamine	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Hexachloroethane	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Nitrobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Isophorone	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2-Nitrophenol	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2,4-Dimethylphenol	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
bis(2-Chloroethoxy)methane	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-8-23	3-8-23	
1,2,4-Trichlorobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Naphthalene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
4-Chloroaniline	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Hexachlorobutadiene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
4-Chloro-3-methylphenol	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
1-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
Hexachlorocyclopentadiene	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
2,4,6-Trichlorophenol	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2,3-Dichloroaniline	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2,4,5-Trichlorophenol	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2-Chloronaphthalene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2-Nitroaniline	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
1,4-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Dimethylphthalate	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
1,3-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2,6-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
1,2-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Acenaphthylene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
3-Nitroaniline	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
QUALITY CONTROL
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0308W2					
2,4-Dinitrophenol	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
Acenaphthene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-8-23	3-8-23	
2,4-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Dibenzofuran	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-8-23	3-8-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-8-23	3-8-23	
Diethylphthalate	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
4-Chlorophenyl-phenylether	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
4-Nitroaniline	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Fluorene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
4,6-Dinitro-2-methylphenol	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
n-Nitrosodiphenylamine	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
1,2-Diphenylhydrazine	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
4-Bromophenyl-phenylether	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Hexachlorobenzene	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Pentachlorophenol	**ND**	10	EPA 8270E	3-8-23	3-8-23	
Phenanthrene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
Anthracene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
Carbazole	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Di-n-butylphthalate	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
Fluoranthene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
Pyrene	**ND**	0.10	EPA 8270E/SIM	3-8-23	3-9-23	
Butylbenzylphthalate	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
bis-2-Ethylhexyladipate	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
3,3'-Dichlorobenzidine	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
Benzo[a]anthracene	**ND**	0.010	EPA 8270E/SIM	3-8-23	3-9-23	
Chrysene	**ND**	0.010	EPA 8270E/SIM	3-8-23	3-9-23	
bis(2-Ethylhexyl)phthalate	**ND**	5.0	EPA 8270E	3-8-23	3-8-23	
Di-n-octylphthalate	**ND**	1.0	EPA 8270E	3-8-23	3-8-23	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-8-23	3-9-23	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-8-23	3-9-23	
Benzo[a]pyrene	**ND**	0.010	EPA 8270E/SIM	3-8-23	3-9-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.010	EPA 8270E/SIM	3-8-23	3-9-23	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270E/SIM	3-8-23	3-9-23	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270E/SIM	3-8-23	3-9-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*52*	*10 - 81*				
Phenol-d6	*38*	*10 - 86*				
Nitrobenzene-d5	*85*	*27 - 105*				
2-Fluorobiphenyl	*81*	*33 - 100*				
2,4,6-Tribromophenol	*101*	*25 - 124*				
Terphenyl-d14	*93*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0307W1									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	**13.9**	**13.6**	40.0	40.0	35	34	16 - 53	2	33	
2-Chlorophenol	**28.5**	**27.7**	40.0	40.0	71	69	42 - 90	3	34	
1,4-Dichlorobenzene	**13.5**	**13.1**	20.0	20.0	68	66	32 - 83	3	34	
n-Nitroso-di-n-propylamine	**14.3**	**14.0**	20.0	20.0	72	70	41 - 99	2	32	
1,2,4-Trichlorobenzene	**14.2**	**14.1**	20.0	20.0	71	71	35 - 91	1	35	
4-Chloro-3-methylphenol	**31.5**	**31.9**	40.0	40.0	79	80	55 - 98	1	22	
Acenaphthene	**14.6**	**14.7**	20.0	20.0	73	74	40 - 96	1	23	
4-Nitrophenol	**17.4**	**18.6**	40.0	40.0	44	47	20 - 77	7	28	
2,4-Dinitrotoluene	**17.3**	**17.5**	20.0	20.0	87	88	50 - 102	1	22	
Pentachlorophenol	**37.9**	**37.8**	40.0	40.0	95	95	46 - 129	0	26	
Pyrene	**15.7**	**16.1**	20.0	20.0	79	81	52 - 105	3	20	
Surrogate:										
2-Fluorophenol					*46*	*46*	*10 - 81*			
Phenol-d6					*34*	*33*	*10 - 86*			
Nitrobenzene-d5					*76*	*76*	*27 - 105*			
2-Fluorobiphenyl					*73*	*74*	*33 - 100*			
2,4,6-Tribromophenol					*84*	*87*	*25 - 124*			
Terphenyl-d14					*79*	*81*	*40 - 116*			
Laboratory ID:	SB0308W2									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	**14.7**	**14.5**	40.0	40.0	37	36	16 - 53	1	33	
2-Chlorophenol	**30.7**	**29.8**	40.0	40.0	77	75	42 - 90	3	34	
1,4-Dichlorobenzene	**14.6**	**13.8**	20.0	20.0	73	69	32 - 83	6	34	
n-Nitroso-di-n-propylamine	**15.2**	**14.6**	20.0	20.0	76	73	41 - 99	4	32	
1,2,4-Trichlorobenzene	**15.2**	**14.7**	20.0	20.0	76	74	35 - 91	3	35	
4-Chloro-3-methylphenol	**33.1**	**32.9**	40.0	40.0	83	82	55 - 98	1	22	
Acenaphthene	**15.1**	**15.1**	20.0	20.0	76	76	40 - 96	0	23	
4-Nitrophenol	**18.4**	**19.4**	40.0	40.0	46	49	20 - 77	5	28	
2,4-Dinitrotoluene	**18.0**	**18.2**	20.0	20.0	90	91	50 - 102	1	22	
Pentachlorophenol	**40.1**	**40.1**	40.0	40.0	100	100	46 - 129	0	26	
Pyrene	**16.1**	**16.6**	20.0	20.0	81	83	52 - 105	3	20	
Surrogate:										
2-Fluorophenol					*50*	*48*	*10 - 81*			
Phenol-d6					*36*	*35*	*10 - 86*			
Nitrobenzene-d5					*81*	*78*	*27 - 105*			
2-Fluorobiphenyl					*77*	*76*	*33 - 100*			
2,4,6-Tribromophenol					*87*	*91*	*25 - 124*			
Terphenyl-d14					*81*	*84*	*40 - 116*			

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-19-04-P**					
Laboratory ID:	03-015-01					
alpha-BHC	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0030	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.0098	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.049	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.049	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*48*	*21-110*				
Decachlorobiphenyl	*85*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-AF**					
Laboratory ID:	03-015-02					
alpha-BHC	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0019	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0029	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.0096	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0048	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.019	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.048	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.048	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*44*	*21-110*				
Decachlorobiphenyl	*82*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-5-21**					
Laboratory ID:	03-015-03					
alpha-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0030	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.010	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*77*	*21-110*				
Decachlorobiphenyl	*83*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-9-05-P**					
Laboratory ID:	03-015-04					
alpha-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0019	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0028	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.0095	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.019	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.047	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.047	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*74*	*21-110*				
Decachlorobiphenyl	*94*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-7-21**					
Laboratory ID:	03-015-05					
alpha-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0019	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0028	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.0095	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.019	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.047	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.047	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*75*	*21-110*				
Decachlorobiphenyl	*87*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
alpha-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0030	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.010	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*56*	*21-110*				
Decachlorobiphenyl	*99*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0306W1										
	SB	SBD	SB	SBD		SB	SBD				
alpha-BHC	**0.0993**	**0.0944**	0.100	0.100	N/A	**99**	**94**	50-113	5	19	
gamma-BHC	**0.106**	**0.102**	0.100	0.100	N/A	**106**	**102**	50-114	4	15	
beta-BHC	**0.0959**	**0.0908**	0.100	0.100	N/A	**96**	**91**	45-110	5	15	
delta-BHC	**0.0991**	**0.0942**	0.100	0.100	N/A	**99**	**94**	40-113	5	15	
Heptachlor	**0.0887**	**0.0816**	0.100	0.100	N/A	**89**	**82**	41-107	8	16	
Aldrin	**0.0809**	**0.0733**	0.100	0.100	N/A	**81**	**73**	39-105	10	15	
Heptachlor epoxide	**0.101**	**0.0944**	0.100	0.100	N/A	**101**	**94**	53-106	7	15	
gamma-Chlordane	**0.0978**	**0.0915**	0.100	0.100	N/A	**98**	**92**	46-110	7	15	
alpha-Chlordane	**0.0881**	**0.0832**	0.100	0.100	N/A	**88**	**83**	46-110	6	15	
4,4'-DDE	**0.0970**	**0.0904**	0.100	0.100	N/A	**97**	**90**	39-129	7	15	
Endosulfan I	**0.0970**	**0.0924**	0.100	0.100	N/A	**97**	**92**	51-109	5	15	
Dieldrin	**0.101**	**0.0959**	0.100	0.100	N/A	**101**	**96**	55-112	5	15	
Endrin	**0.101**	**0.0954**	0.100	0.100	N/A	**101**	**95**	54-119	6	16	
4,4'-DDD	**0.0958**	**0.0902**	0.100	0.100	N/A	**96**	**90**	52-142	6	15	
Endosulfan II	**0.0973**	**0.0910**	0.100	0.100	N/A	**97**	**91**	49-115	7	15	
4,4'-DDT	**0.132**	**0.122**	0.100	0.100	N/A	**132**	**122**	52-136	8	15	
Endrin aldehyde	**0.0795**	**0.0748**	0.100	0.100	N/A	**80**	**75**	39-128	6	15	
Methoxychlor	**0.133**	**0.126**	0.100	0.100	N/A	**133**	**126**	56-156	5	19	
Endosulfan sulfate	**0.110**	**0.102**	0.100	0.100	N/A	**110**	**102**	44-120	8	15	
Endrin ketone	**0.119**	**0.115**	0.100	0.100	N/A	**119**	**115**	45-122	3	15	
Surrogate:											
Tetrachloro-m-xylene						*61*	*48*	*21-110*			
Decachlorobiphenyl						*90*	*83*	*42-113*			

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-19-04-P**					
Laboratory ID:	03-015-01					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*87*	*32-140*				
Triphenyl phosphate	*84*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-AF**					
Laboratory ID:	03-015-02					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*93*	*32-140*				
Triphenyl phosphate	*91*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-5-21**					
Laboratory ID:	03-015-03					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*98*	*32-140*				
Triphenyl phosphate	*93*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-9-05-P**					
Laboratory ID:	03-015-04					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*91*	*32-140*				
Triphenyl phosphate	*87*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-7-21**					
Laboratory ID:	03-015-05					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*72*	*32-140*				
Triphenyl phosphate	*71*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
Dichlorvos(DDVP)	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.14	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*89*	*32-140*				
Triphenyl phosphate	*85*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0306W1									
	SB	SBD	SB	SBD	SB	SBD				
Dichlorvos(DDVP)	**0.718**	**0.750**	1.00	1.00	72	75	50 - 135	4	30	
Mevinphos/Phosdrin	**0.837**	**0.813**	1.00	1.00	84	81	50 - 135	3	30	
Ethoprophos	**0.897**	**0.887**	1.00	1.00	90	89	50 - 135	1	30	
Sulfotepp	**0.840**	**0.801**	1.00	1.00	84	80	50 - 135	5	30	
Phorate	**0.850**	**0.790**	1.00	1.00	85	79	50 - 135	7	30	
Dimethoate	**0.783**	**0.768**	1.00	1.00	78	77	50 - 135	2	30	
Demeton-S	**0.578**	**0.564**	0.700	0.700	83	81	50 - 135	2	30	
Diazinon	**1.00**	**0.872**	1.00	1.00	100	87	50 - 135	14	30	
Disulfoton	**0.834**	**0.737**	1.00	1.00	83	74	50 - 135	12	30	
Parathion-methyl	**1.04**	**0.984**	1.00	1.00	104	98	50 - 135	6	30	
Fenchlorphos/Ronnel	**0.911**	**0.826**	1.00	1.00	91	83	50 - 135	10	30	
Malathion	**0.976**	**0.897**	1.00	1.00	98	90	50 - 135	8	30	
Fenthion	**0.915**	**0.859**	1.00	1.00	92	86	50 - 135	6	30	
Parathion-ethyl	**0.932**	**0.882**	1.00	1.00	93	88	50 - 135	6	30	
Chlorpyrifos/Dursban	**0.900**	**0.850**	1.00	1.00	90	85	50 - 135	6	30	
Trichloronate	**0.894**	**0.802**	1.00	1.00	89	80	50 - 135	11	30	
Stirofos/Tetrachlorvinphos	**1.03**	**0.967**	1.00	1.00	103	97	50 - 135	6	30	
Tokuthion/Prothiofos	**0.944**	**0.840**	1.00	1.00	94	84	50 - 135	12	30	
Fensulfothion	**1.08**	**0.958**	1.00	1.00	108	96	50 - 135	12	30	
Bolstar/Sulprofos	**0.972**	**0.834**	1.00	1.00	97	83	50 - 135	15	30	
EPN	**0.980**	**0.852**	1.00	1.00	98	85	50 - 135	14	30	
Azinphos-methyl/Guthion	**1.32**	**1.26**	1.00	1.00	132	126	50 - 135	5	30	
Coumaphos	**1.23**	**1.07**	1.00	1.00	123	107	50 - 135	14	30	
Surrogate:										
Tributyl phosphate					*98*	*88*	*32-140*			
Triphenyl phosphate					*98*	*89*	*27-136*			

Date of Report: March 10, 2023
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TOTAL METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-19-04-P**					
Laboratory ID:	03-015-01					
Arsenic	**ND**	0.50	EPA 200.8	3-2-23	3-6-23	
Zinc	**ND**	25	EPA 200.8	3-2-23	3-6-23	
Client ID:	**MW-AF**					
Laboratory ID:	03-015-02					
Arsenic	**ND**	0.50	EPA 200.8	3-2-23	3-6-23	
Zinc	**ND**	25	EPA 200.8	3-2-23	3-6-23	
Client ID:	**MW-5-21**					
Laboratory ID:	03-015-03					
Arsenic	**ND**	0.50	EPA 200.8	3-2-23	3-6-23	
Zinc	**ND**	25	EPA 200.8	3-2-23	3-6-23	
Client ID:	**B-9-05-P**					
Laboratory ID:	03-015-04					
Arsenic	**ND**	0.50	EPA 200.8	3-2-23	3-6-23	
Zinc	**ND**	25	EPA 200.8	3-2-23	3-6-23	
Client ID:	**MW-7-21**					
Laboratory ID:	03-015-05					
Arsenic	**0.72**	0.50	EPA 200.8	3-2-23	3-6-23	
Zinc	**ND**	25	EPA 200.8	3-2-23	3-6-23	

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
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TOTAL METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0302WH1					
Arsenic	**ND**	0.50	EPA 200.8	3-2-23	3-2-23	
Zinc	**ND**	25	EPA 200.8	3-2-23	3-2-23	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	03-068-02										
	ORIG	DUP									
Arsenic	**1.77**	**1.32**	NA	NA		NA		NA	29	20	C
Zinc	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	03-068-02										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**98.2**	**96.2**	100	100	1.77	**96**	**94**	75-125	2	20	
Zinc	**113**	**110**	100	100	15.2	**98**	**94**	75-125	3	20	

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

DISSOLVED METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-19-04-P**					
Laboratory ID:	03-015-01					
Arsenic	**ND**	0.50	EPA 200.8	3-1-23	3-2-23	
Zinc	**ND**	25	EPA 200.8	3-1-23	3-2-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-AF**					
Laboratory ID:	03-015-02					
Arsenic	**ND**	0.50	EPA 200.8	3-1-23	3-2-23	
Zinc	**ND**	25	EPA 200.8	3-1-23	3-2-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-5-21**					
Laboratory ID:	03-015-03					
Arsenic	**ND**	0.50	EPA 200.8	3-1-23	3-2-23	
Zinc	**ND**	25	EPA 200.8	3-1-23	3-2-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**B-9-05-P**					
Laboratory ID:	03-015-04					
Arsenic	**ND**	0.50	EPA 200.8	3-1-23	3-2-23	
Zinc	**ND**	25	EPA 200.8	3-1-23	3-2-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-7-21**					
Laboratory ID:	03-015-05					
Arsenic	**ND**	0.50	EPA 200.8	3-1-23	3-2-23	
Zinc	**ND**	25	EPA 200.8	3-1-23	3-2-23	

Date of Report: March 10, 2023
Samples Submitted: March 1, 2023
Laboratory Reference: 2303-015
Project: 30104 - SR 167 Stage 2

DISSOLVED METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0301F2					
Arsenic	**ND**	0.50	EPA 200.8	3-1-23	3-2-23	
Zinc	**ND**	25	EPA 200.8	3-1-23	3-2-23	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	03-016-01										
	ORIG	DUP									
Arsenic	**2.56**	**2.72**	NA	NA		NA		NA	6	20	
Zinc	**26.0**	**31.0**	NA	NA		NA		NA	18	20	
MATRIX SPIKES											
Laboratory ID:	03-016-01										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**87.6**	**86.2**	80.0	80.0	2.56	**106**	**105**	75-125	2	20	
Zinc	**104**	**105**	80.0	80.0	26.0	**98**	**99**	75-125	1	20	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 03-015

Company: Innovex
Project Number: ~~SR~~ 30164
Project Name: SR 167 Stage 2
Project Manager: Pamela Fleming
Sampled by: Pamela Fleming

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ ______ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
1	B-19-04-P	3/1/23	1000	GW	11
2	MW-AF		1259		
3	MW-5-21		1210		
4	B-9-05-P		1400		
5	MW-7-21		1530		

Lab ID	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total ~~RCRA Metals~~ Arsenic, Zinc	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Dissolved As, Zn				% Moisture
1					X			X			X	X		X				X				
2																						
3																						
4																						
5																						

	Signature	Company	Date	Time
Relinquished	[signature]	Innovex	3/1/23	1715
Received	[signature]	OSE	3/1/23	1715
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
lab filtered

Data Package: Standard ☐ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

March 10, 2023

Pamela Fleming
INNOVEX Environmental Mgt., Inc.
16310 NE 80th Street, Suite 104
Redmond, WA 98052

Re: Analytical Data for Project 30104 - SR 167 Stage 2
Laboratory Reference No. 2303-029

Dear Pamela:

Enclosed are the analytical results and associated quality control data for samples submitted on March 2, 2023.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

Case Narrative

Samples were collected on March 2, 2023 and received by the laboratory on March 2, 2023. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Volatiles EPA 8260D Analysis

The RPD for Methylene Chloride, 2-Butanone, 1,2-Dichloroethane and 1,2,4-Trichlorobenzene is outside the control limits for the Spike Blank/Spike Blank Duplicate. The percent recoveries on both spike blanks are within recovery limits. The method allows for a percentage of the compounds to fall outside of the control limits due to the large number of analytes being spiked.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
page 1 of 2

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-21**					
Laboratory ID:	03-029-01					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

Date of Report: March 10, 2023
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VOLATILE ORGANICS EPA 8260D
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-21**					
Laboratory ID:	03-029-01					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*112*	*75-127*				
Toluene-d8	*99*	*80-127*				
4-Bromofluorobenzene	*96*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-6-21**					
Laboratory ID:	03-029-02					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	0.22	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-6-21**					
Laboratory ID:	03-029-02					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*114*	*75-127*				
Toluene-d8	*109*	*80-127*				
4-Bromofluorobenzene	*100*	*78-125*				

Date of Report: March 10, 2023
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2-21**					
Laboratory ID:	03-029-03					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2-21**					
Laboratory ID:	03-029-03					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*117*	*75-127*				
Toluene-d8	*109*	*80-127*				
4-Bromofluorobenzene	*98*	*78-125*				

Date of Report: March 10, 2023
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-5P-18**					
Laboratory ID:	03-029-04					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-5P-18**					
Laboratory ID:	03-029-04					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*114*	*75-127*				
Toluene-d8	*106*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blank**					
Laboratory ID:	03-029-05					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blank**					
Laboratory ID:	03-029-05					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*96*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

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QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
Dichlorodifluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloromethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromomethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Chloroethane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Acetone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Iodomethane	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-6-23	3-6-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Butanone	ND	5.0	EPA 8260D	3-6-23	3-6-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chloroform	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Benzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Trichloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Dibromomethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Toluene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-6-23	3-6-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Hexanone	ND	2.0	EPA 8260D	3-6-23	3-6-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-6-23	3-6-23	
o-Xylene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Styrene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromoform	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
Bromobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-6-23	3-6-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-6-23	3-6-23	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Naphthalene	ND	1.3	EPA 8260D	3-6-23	3-6-23	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260D	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*75-127*				
Toluene-d8	*107*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0306W1									
	SB	SBD	SB	SBD	SB	SBD				
Dichlorodifluoromethane	**8.60**	**9.70**	10.0	10.0	86	97	34-166	12	21	
Chloromethane	**9.41**	**11.1**	10.0	10.0	94	111	63-138	16	18	
Vinyl Chloride	**9.30**	**10.7**	10.0	10.0	93	107	71-135	14	20	
Bromomethane	**8.40**	**9.29**	10.0	10.0	84	93	20-151	10	36	
Chloroethane	**9.95**	**11.1**	10.0	10.0	100	111	76-125	11	20	
Trichlorofluoromethane	**9.82**	**10.7**	10.0	10.0	98	107	75-131	9	19	
1,1-Dichloroethene	**9.69**	**11.1**	10.0	10.0	97	111	78-125	14	19	
Acetone	**9.09**	**10.3**	10.0	10.0	91	103	76-125	12	18	
Iodomethane	**9.15**	**10.5**	10.0	10.0	92	105	10-155	14	40	
Carbon Disulfide	**9.89**	**10.6**	10.0	10.0	99	106	58-129	7	17	
Methylene Chloride	**9.88**	**12.0**	10.0	10.0	99	120	80-120	19	15	L
(trans) 1,2-Dichloroethene	**9.78**	**11.4**	10.0	10.0	98	114	80-125	15	17	
Methyl t-Butyl Ether	**9.66**	**11.1**	10.0	10.0	97	111	80-122	14	15	
1,1-Dichloroethane	**9.84**	**11.5**	10.0	10.0	98	115	80-125	16	17	
Vinyl Acetate	**10.5**	**11.9**	10.0	10.0	105	119	80-131	13	15	
2,2-Dichloropropane	**9.93**	**11.7**	10.0	10.0	99	117	80-146	16	21	
(cis) 1,2-Dichloroethene	**9.91**	**11.5**	10.0	10.0	99	115	80-129	15	17	
2-Butanone	**9.87**	**11.6**	10.0	10.0	99	116	80-129	16	16	L
Bromochloromethane	**10.6**	**11.8**	10.0	10.0	106	118	80-125	11	18	
Chloroform	**9.77**	**11.4**	10.0	10.0	98	114	80-123	15	16	
1,1,1-Trichloroethane	**9.40**	**10.5**	10.0	10.0	94	105	80-123	11	18	
Carbon Tetrachloride	**9.68**	**11.0**	10.0	10.0	97	110	80-126	13	17	
1,1-Dichloropropene	**9.79**	**10.6**	10.0	10.0	98	106	80-126	8	18	
Benzene	**9.80**	**11.5**	10.0	10.0	98	115	80-121	16	16	
1,2-Dichloroethane	**9.19**	**11.0**	10.0	10.0	92	110	80-124	18	15	L
Trichloroethene	**10.9**	**11.6**	10.0	10.0	109	116	80-122	6	18	
1,2-Dichloropropane	**10.2**	**10.9**	10.0	10.0	102	109	80-123	7	15	
Dibromomethane	**11.0**	**12.2**	10.0	10.0	110	122	80-123	10	15	
Bromodichloromethane	**10.7**	**11.5**	10.0	10.0	107	115	80-125	7	15	
(cis) 1,3-Dichloropropene	**10.5**	**11.9**	10.0	10.0	105	119	80-129	13	15	
Methyl Isobutyl Ketone	**10.8**	**11.7**	10.0	10.0	108	117	80-124	8	15	
Toluene	**10.4**	**11.2**	10.0	10.0	104	112	80-120	7	18	
(trans) 1,3-Dichloropropene	**10.7**	**11.6**	10.0	10.0	107	116	80-134	8	17	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

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QUALITY CONTROL
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Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0306W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1,2-Trichloroethane	**10.6**	**11.4**	10.0	10.0	106	114	77-126	7	20	
Tetrachloroethene	**10.3**	**10.3**	10.0	10.0	103	103	80-124	0	18	
1,3-Dichloropropane	**10.0**	**10.2**	10.0	10.0	100	102	80-120	2	15	
2-Hexanone	**10.5**	**11.0**	10.0	10.0	105	110	80-130	5	16	
Dibromochloromethane	**11.5**	**11.9**	10.0	10.0	115	119	80-128	3	15	
1,2-Dibromoethane	**10.7**	**11.0**	10.0	10.0	107	110	80-127	3	15	
Chlorobenzene	**10.0**	**10.7**	10.0	10.0	100	107	80-120	7	17	
1,1,1,2-Tetrachloroethane	**10.1**	**11.0**	10.0	10.0	101	110	80-125	9	17	
Ethylbenzene	**10.0**	**10.4**	10.0	10.0	100	104	80-125	4	18	
m,p-Xylene	**20.1**	**20.9**	20.0	20.0	101	105	80-127	4	18	
o-Xylene	**9.65**	**10.2**	10.0	10.0	97	102	80-126	6	18	
Styrene	**10.3**	**10.8**	10.0	10.0	103	108	80-130	5	17	
Bromoform	**10.9**	**11.0**	10.0	10.0	109	110	80-130	1	15	
Isopropylbenzene	**10.1**	**10.4**	10.0	10.0	101	104	80-129	3	18	
Bromobenzene	**10.0**	**10.7**	10.0	10.0	100	107	76-128	7	16	
1,1,2,2-Tetrachloroethane	**10.1**	**10.6**	10.0	10.0	101	106	74-130	5	15	
1,2,3-Trichloropropane	**10.7**	**11.6**	10.0	10.0	107	116	71-129	8	25	
n-Propylbenzene	**9.73**	**10.3**	10.0	10.0	97	103	80-129	6	19	
2-Chlorotoluene	**10.3**	**10.4**	10.0	10.0	103	104	80-128	1	18	
4-Chlorotoluene	**9.87**	**10.3**	10.0	10.0	99	103	80-130	4	19	
1,3,5-Trimethylbenzene	**9.77**	**10.4**	10.0	10.0	98	104	80-131	6	18	
tert-Butylbenzene	**9.88**	**10.0**	10.0	10.0	99	100	80-130	1	18	
1,2,4-Trimethylbenzene	**10.2**	**10.6**	10.0	10.0	102	106	80-130	4	18	
sec-Butylbenzene	**10.0**	**10.1**	10.0	10.0	100	101	80-130	1	18	
1,3-Dichlorobenzene	**10.0**	**10.7**	10.0	10.0	100	107	80-126	7	17	
p-Isopropyltoluene	**9.88**	**10.3**	10.0	10.0	99	103	80-132	4	18	
1,4-Dichlorobenzene	**9.85**	**10.8**	10.0	10.0	99	108	80-121	9	17	
1,2-Dichlorobenzene	**10.2**	**11.1**	10.0	10.0	102	111	79-125	8	15	
n-Butylbenzene	**9.92**	**10.4**	10.0	10.0	99	104	80-138	5	19	
1,2-Dibromo-3-chloropropane	**10.7**	**10.7**	10.0	10.0	107	107	73-133	0	15	
1,2,4-Trichlorobenzene	**10.2**	**12.5**	10.0	10.0	102	125	80-139	20	18	L
Hexachlorobutadiene	**9.37**	**10.5**	10.0	10.0	94	105	80-151	11	18	
Naphthalene	**7.90**	**10.0**	10.0	10.0	79	100	68-144	23	25	
1,2,3-Trichlorobenzene	**10.0**	**13.1**	10.0	10.0	100	131	75-146	27	28	
Surrogate:										
Dibromofluoromethane					*94*	*108*	*75-127*			
Toluene-d8					*103*	*106*	*80-127*			
4-Bromofluorobenzene					*99*	*102*	*78-125*			

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-21**					
Laboratory ID:	03-029-01					
n-Nitrosodimethylamine	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-21**					
Laboratory ID:	03-029-01					
2,4-Dinitrophenol	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	9.4	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.094	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.0094	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.0094	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	4.7	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	0.94	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.0094	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.0094	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.0094	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0094	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.0094	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.0094	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*42*	*10 - 81*				
Phenol-d6	*29*	*10 - 86*				
Nitrobenzene-d5	*71*	*27 - 105*				
2-Fluorobiphenyl	*70*	*33 - 100*				
2,4,6-Tribromophenol	*84*	*25 - 124*				
Terphenyl-d14	*78*	*40 - 116*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-6-21**					
Laboratory ID:	03-029-02					
n-Nitrosodimethylamine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-6-21**					
Laboratory ID:	03-029-02					
2,4-Dinitrophenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	9.9	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*40*	*10 - 81*				
Phenol-d6	*28*	*10 - 86*				
Nitrobenzene-d5	*68*	*27 - 105*				
2-Fluorobiphenyl	*68*	*33 - 100*				
2,4,6-Tribromophenol	*81*	*25 - 124*				
Terphenyl-d14	*75*	*40 - 116*				

Date of Report: March 10, 2023
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Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2-21**					
Laboratory ID:	03-029-03					
n-Nitrosodimethylamine	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2-21**					
Laboratory ID:	03-029-03					
2,4-Dinitrophenol	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	9.8	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.098	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.0098	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.0098	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	0.98	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.0098	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.0098	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.0098	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0098	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.0098	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.0098	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*40*	*10 - 81*				
Phenol-d6	*29*	*10 - 86*				
Nitrobenzene-d5	*69*	*27 - 105*				
2-Fluorobiphenyl	*70*	*33 - 100*				
2,4,6-Tribromophenol	*83*	*25 - 124*				
Terphenyl-d14	*77*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-5P-18**					
Laboratory ID:	03-029-04					
n-Nitrosodimethylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-5P-18**					
Laboratory ID:	03-029-04					
2,4-Dinitrophenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	10	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*42*	*10 - 81*				
Phenol-d6	*31*	*10 - 86*				
Nitrobenzene-d5	*69*	*27 - 105*				
2-Fluorobiphenyl	*71*	*33 - 100*				
2,4,6-Tribromophenol	*87*	*25 - 124*				
Terphenyl-d14	*77*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0307W1					
n-Nitrosodimethylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
QUALITY CONTROL
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0307W1					
2,4-Dinitrophenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	10	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*45*	*10 - 81*				
Phenol-d6	*32*	*10 - 86*				
Nitrobenzene-d5	*75*	*27 - 105*				
2-Fluorobiphenyl	*70*	*33 - 100*				
2,4,6-Tribromophenol	*86*	*25 - 124*				
Terphenyl-d14	*81*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0307W1									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	**13.9**	**13.6**	40.0	40.0	35	34	16 - 53	2	33	
2-Chlorophenol	**28.5**	**27.7**	40.0	40.0	71	69	42 - 90	3	34	
1,4-Dichlorobenzene	**13.5**	**13.1**	20.0	20.0	68	66	32 - 83	3	34	
n-Nitroso-di-n-propylamine	**14.3**	**14.0**	20.0	20.0	72	70	41 - 99	2	32	
1,2,4-Trichlorobenzene	**14.2**	**14.1**	20.0	20.0	71	71	35 - 91	1	35	
4-Chloro-3-methylphenol	**31.5**	**31.9**	40.0	40.0	79	80	55 - 98	1	22	
Acenaphthene	**14.6**	**14.7**	20.0	20.0	73	74	40 - 96	1	23	
4-Nitrophenol	**17.4**	**18.6**	40.0	40.0	44	47	20 - 77	7	28	
2,4-Dinitrotoluene	**17.3**	**17.5**	20.0	20.0	87	88	50 - 102	1	22	
Pentachlorophenol	**37.9**	**37.8**	40.0	40.0	95	95	46 - 129	0	26	
Pyrene	**15.7**	**16.1**	20.0	20.0	79	81	52 - 105	3	20	
Surrogate:										
2-Fluorophenol					*46*	*46*	*10 - 81*			
Phenol-d6					*34*	*33*	*10 - 86*			
Nitrobenzene-d5					*76*	*76*	*27 - 105*			
2-Fluorobiphenyl					*73*	*74*	*33 - 100*			
2,4,6-Tribromophenol					*84*	*87*	*25 - 124*			
Terphenyl-d14					*79*	*81*	*40 - 116*			

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-21**					
Laboratory ID:	03-029-01					
alpha-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0019	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0028	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.0095	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.019	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.047	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.047	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*78*	*21-110*				
Decachlorobiphenyl	*91*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-6-21**					
Laboratory ID:	03-029-02					
alpha-BHC	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0029	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.0098	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0049	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.049	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.049	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*62*	*21-110*				
Decachlorobiphenyl	*85*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2-21**					
Laboratory ID:	03-029-03					
alpha-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0019	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0028	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.0094	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0047	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.019	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.047	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.047	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*76*	*21-110*				
Decachlorobiphenyl	*100*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-5P-18**					
Laboratory ID:	03-029-04					
alpha-BHC	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0031	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.010	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.051	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.051	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*60*	*21-110*				
Decachlorobiphenyl	*86*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
alpha-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0030	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.010	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*56*	*21-110*				
Decachlorobiphenyl	*99*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0306W1										
	SB	SBD	SB	SBD		SB	SBD				
alpha-BHC	**0.0993**	**0.0944**	0.100	0.100	N/A	**99**	**94**	50-113	5	19	
gamma-BHC	**0.106**	**0.102**	0.100	0.100	N/A	**106**	**102**	50-114	4	15	
beta-BHC	**0.0959**	**0.0908**	0.100	0.100	N/A	**96**	**91**	45-110	5	15	
delta-BHC	**0.0991**	**0.0942**	0.100	0.100	N/A	**99**	**94**	40-113	5	15	
Heptachlor	**0.0887**	**0.0816**	0.100	0.100	N/A	**89**	**82**	41-107	8	16	
Aldrin	**0.0809**	**0.0733**	0.100	0.100	N/A	**81**	**73**	39-105	10	15	
Heptachlor epoxide	**0.101**	**0.0944**	0.100	0.100	N/A	**101**	**94**	53-106	7	15	
gamma-Chlordane	**0.0978**	**0.0915**	0.100	0.100	N/A	**98**	**92**	46-110	7	15	
alpha-Chlordane	**0.0881**	**0.0832**	0.100	0.100	N/A	**88**	**83**	46-110	6	15	
4,4'-DDE	**0.0970**	**0.0904**	0.100	0.100	N/A	**97**	**90**	39-129	7	15	
Endosulfan I	**0.0970**	**0.0924**	0.100	0.100	N/A	**97**	**92**	51-109	5	15	
Dieldrin	**0.101**	**0.0959**	0.100	0.100	N/A	**101**	**96**	55-112	5	15	
Endrin	**0.101**	**0.0954**	0.100	0.100	N/A	**101**	**95**	54-119	6	16	
4,4'-DDD	**0.0958**	**0.0902**	0.100	0.100	N/A	**96**	**90**	52-142	6	15	
Endosulfan II	**0.0973**	**0.0910**	0.100	0.100	N/A	**97**	**91**	49-115	7	15	
4,4'-DDT	**0.132**	**0.122**	0.100	0.100	N/A	**132**	**122**	52-136	8	15	
Endrin aldehyde	**0.0795**	**0.0748**	0.100	0.100	N/A	**80**	**75**	39-128	6	15	
Methoxychlor	**0.133**	**0.126**	0.100	0.100	N/A	**133**	**126**	56-156	5	19	
Endosulfan sulfate	**0.110**	**0.102**	0.100	0.100	N/A	**110**	**102**	44-120	8	15	
Endrin ketone	**0.119**	**0.115**	0.100	0.100	N/A	**119**	**115**	45-122	3	15	
Surrogate:											
Tetrachloro-m-xylene						*61*	*48*	*21-110*			
Decachlorobiphenyl						*90*	*83*	*42-113*			

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-21**					
Laboratory ID:	03-029-01					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.14	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*90*	*32-140*				
Triphenyl phosphate	*88*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-6-21**					
Laboratory ID:	03-029-02					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*105*	*32-140*				
Triphenyl phosphate	*101*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2-21**					
Laboratory ID:	03-029-03					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*88*	*32-140*				
Triphenyl phosphate	*83*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-5P-18**					
Laboratory ID:	03-029-04					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*94*	*32-140*				
Triphenyl phosphate	*91*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
Dichlorvos(DDVP)	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.14	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*89*	*32-140*				
Triphenyl phosphate	*85*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0306W1									
	SB	SBD	SB	SBD	SB	SBD				
Dichlorvos(DDVP)	**0.718**	**0.750**	1.00	1.00	72	75	50 - 135	4	30	
Mevinphos/Phosdrin	**0.837**	**0.813**	1.00	1.00	84	81	50 - 135	3	30	
Ethoprophos	**0.897**	**0.887**	1.00	1.00	90	89	50 - 135	1	30	
Sulfotepp	**0.840**	**0.801**	1.00	1.00	84	80	50 - 135	5	30	
Phorate	**0.850**	**0.790**	1.00	1.00	85	79	50 - 135	7	30	
Dimethoate	**0.783**	**0.768**	1.00	1.00	78	77	50 - 135	2	30	
Demeton-S	**0.578**	**0.564**	0.700	0.700	83	81	50 - 135	2	30	
Diazinon	**1.00**	**0.872**	1.00	1.00	100	87	50 - 135	14	30	
Disulfoton	**0.834**	**0.737**	1.00	1.00	83	74	50 - 135	12	30	
Parathion-methyl	**1.04**	**0.984**	1.00	1.00	104	98	50 - 135	6	30	
Fenchlorphos/Ronnel	**0.911**	**0.826**	1.00	1.00	91	83	50 - 135	10	30	
Malathion	**0.976**	**0.897**	1.00	1.00	98	90	50 - 135	8	30	
Fenthion	**0.915**	**0.859**	1.00	1.00	92	86	50 - 135	6	30	
Parathion-ethyl	**0.932**	**0.882**	1.00	1.00	93	88	50 - 135	6	30	
Chlorpyrifos/Dursban	**0.900**	**0.850**	1.00	1.00	90	85	50 - 135	6	30	
Trichloronate	**0.894**	**0.802**	1.00	1.00	89	80	50 - 135	11	30	
Stirofos/Tetrachlorvinphos	**1.03**	**0.967**	1.00	1.00	103	97	50 - 135	6	30	
Tokuthion/Prothiofos	**0.944**	**0.840**	1.00	1.00	94	84	50 - 135	12	30	
Fensulfothion	**1.08**	**0.958**	1.00	1.00	108	96	50 - 135	12	30	
Bolstar/Sulprofos	**0.972**	**0.834**	1.00	1.00	97	83	50 - 135	15	30	
EPN	**0.980**	**0.852**	1.00	1.00	98	85	50 - 135	14	30	
Azinphos-methyl/Guthion	**1.32**	**1.26**	1.00	1.00	132	126	50 - 135	5	30	
Coumaphos	**1.23**	**1.07**	1.00	1.00	123	107	50 - 135	14	30	
Surrogate:										
Tributyl phosphate					*98*	*88*	*32-140*			
Triphenyl phosphate					*98*	*89*	*27-136*			

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

TOTAL METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-21**					
Laboratory ID:	03-029-01					
Arsenic	**0.61**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	
Client ID:	**MW-6-21**					
Laboratory ID:	03-029-02					
Arsenic	**3.3**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	
Client ID:	**MW-2-21**					
Laboratory ID:	03-029-03					
Arsenic	**7.7**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	
Client ID:	**H-5P-18**					
Laboratory ID:	03-029-04					
Arsenic	**3.6**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
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TOTAL METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0308WM1					
Arsenic	**ND**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	03-020-12										
	ORIG	DUP									
Arsenic	**1.49**	**1.36**	NA	NA		NA		NA	9	20	
Zinc	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	03-020-12										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**106**	**102**	111	111	1.49	**94**	**91**	75-125	4	20	
Zinc	**104**	**98.4**	111	111	ND	**94**	**89**	75-125	6	20	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
Project: 30104 - SR 167 Stage 2

DISSOLVED METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-21**					
Laboratory ID:	03-029-01					
Arsenic	**ND**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-6-21**					
Laboratory ID:	03-029-02					
Arsenic	**0.72**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2-21**					
Laboratory ID:	03-029-03					
Arsenic	**5.3**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-5P-18**					
Laboratory ID:	03-029-04					
Arsenic	**1.8**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Date of Report: March 10, 2023
Samples Submitted: March 2, 2023
Laboratory Reference: 2303-029
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DISSOLVED METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0303F1					
Arsenic	**ND**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	03-029-01										
	ORIG	DUP									
Arsenic	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Zinc	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	03-029-01										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**82.4**	**84.0**	80.0	80.0	ND	**103**	**105**	75-125	2	20	
Zinc	**79.4**	**77.8**	80.0	80.0	ND	**99**	**97**	75-125	2	20	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

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Laboratory Number: 03-029

Company: Innovex
Project Number: 30104
Project Name: SR 167 Stage 2 BU
Project Manager: Pamela Fleming
Sampled by: Pamela Fleming

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ ______ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
1	MW-3-21	3/2/23	0930	GW	11
2	MW-6-21	↓	1245	↓	↓
3	MW-2-21	↓	1345	↓	↓
4	H-SP-18	↓	1545	↓	↓
5	Trip Blank	—	—	W	1

Lab ID	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total ~~MTCA Metals~~ As, Zn	TCLP Metals	HEM (oil and grease) 1664	*Dissolved As, Zn				% Moisture
1					X			X			X	X			X			X				
2					↓			↓			↓	↓			↓			↓				
3					↓			↓			↓	↓			↓			↓				
4					↓			↓			↓	↓			↓			↓				
5					X																	

	Signature	Company	Date	Time
Relinquished	[signature]	Innovex	3/2/23	~~15~~ 5:55pm
Received	[signature]	OSE	3/2/23	5:55pm
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
Bill directly to WSDOT, Courtney Soderquist.

*LAB FILTERED

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

March 10, 2023

Pamela Fleming
INNOVEX Environmental Mgt., Inc.
16310 NE 80th Street, Suite 104
Redmond, WA 98052

Re: Analytical Data for Project 30104 - SR 167 Stage 2
Laboratory Reference No. 2303-043

Dear Pamela:

Enclosed are the analytical results and associated quality control data for samples submitted on March 3, 2023.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

Case Narrative

Samples were collected on March 3, 2023 and received by the laboratory on March 3, 2023. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
page 1 of 2

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4-21**					
Laboratory ID:	03-043-01					
Dichlorodifluoromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromomethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloroethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Acetone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Iodomethane	ND	7.0	EPA 8260D	3-8-23	3-8-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-8-23	3-8-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Butanone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chloroform	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Benzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Trichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Dibromomethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Toluene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4-21**					
Laboratory ID:	03-043-01					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Hexanone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-8-23	3-8-23	
o-Xylene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Styrene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromoform	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Naphthalene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*106*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*95*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-3P-17**					
Laboratory ID:	03-043-02					
Dichlorodifluoromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromomethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloroethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Acetone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Iodomethane	ND	7.0	EPA 8260D	3-8-23	3-8-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-8-23	3-8-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Butanone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chloroform	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Benzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Trichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Dibromomethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Toluene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-3P-17**					
Laboratory ID:	03-043-02					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Hexanone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-8-23	3-8-23	
o-Xylene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Styrene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromoform	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Naphthalene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*95*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

VOLATILE ORGANICS EPA 8260D
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-21**					
Laboratory ID:	03-043-03					
Dichlorodifluoromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromomethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloroethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Acetone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Iodomethane	ND	7.0	EPA 8260D	3-8-23	3-8-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-8-23	3-8-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Butanone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chloroform	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Benzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Trichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Dibromomethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Toluene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
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Project: 30104 - SR 167 Stage 2

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-21**					
Laboratory ID:	03-043-03					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Hexanone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-8-23	3-8-23	
o-Xylene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Styrene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromoform	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Naphthalene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*75-127*				
Toluene-d8	*106*	*80-127*				
4-Bromofluorobenzene	*98*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blank**					
Laboratory ID:	03-043-04					
Dichlorodifluoromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromomethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloroethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Acetone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Iodomethane	ND	7.0	EPA 8260D	3-8-23	3-8-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-8-23	3-8-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Butanone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chloroform	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Benzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Trichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Dibromomethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Toluene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	

Date of Report: March 10, 2023
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Trip Blank**					
Laboratory ID:	03-043-04					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Hexanone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-8-23	3-8-23	
o-Xylene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Styrene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromoform	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Naphthalene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0308W1					
Dichlorodifluoromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloromethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Vinyl Chloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromomethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Chloroethane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Trichlorofluoromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Acetone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Iodomethane	ND	7.0	EPA 8260D	3-8-23	3-8-23	
Carbon Disulfide	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methylene Chloride	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl t-Butyl Ether	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Vinyl Acetate	ND	1.0	EPA 8260D	3-8-23	3-8-23	
2,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Butanone	ND	5.0	EPA 8260D	3-8-23	3-8-23	
Bromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chloroform	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Carbon Tetrachloride	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Benzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Trichloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Dibromomethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromodichloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Methyl Isobutyl Ketone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Toluene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260D	3-8-23	3-8-23	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0308W1					
1,1,2-Trichloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Tetrachloroethene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Hexanone	ND	2.0	EPA 8260D	3-8-23	3-8-23	
Dibromochloromethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromoethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Chlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-8-23	3-8-23	
o-Xylene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Styrene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromoform	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Isopropylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Bromobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichloropropane	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Propylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
2-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
4-Chlorotoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3,5-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
tert-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trimethylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
sec-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,3-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
p-Isopropyltoluene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,4-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
n-Butylbenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Hexachlorobutadiene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
Naphthalene	ND	1.0	EPA 8260D	3-8-23	3-8-23	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260D	3-8-23	3-8-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

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QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0308W1									
	SB	SBD	SB	SBD	SB	SBD				
Dichlorodifluoromethane	**8.46**	**8.62**	10.0	10.0	85	86	34-166	2	21	
Chloromethane	**9.79**	**10.3**	10.0	10.0	98	103	63-138	5	18	
Vinyl Chloride	**9.51**	**9.86**	10.0	10.0	95	99	71-135	4	20	
Bromomethane	**8.42**	**9.26**	10.0	10.0	84	93	20-151	10	36	
Chloroethane	**8.90**	**9.62**	10.0	10.0	89	96	76-125	8	20	
Trichlorofluoromethane	**9.80**	**10.2**	10.0	10.0	98	102	75-131	4	19	
1,1-Dichloroethene	**9.77**	**10.2**	10.0	10.0	98	102	78-125	4	19	
Acetone	**9.17**	**9.16**	10.0	10.0	92	92	76-125	0	18	
Iodomethane	**7.13**	**8.04**	10.0	10.0	71	80	10-155	12	40	
Carbon Disulfide	**10.0**	**10.0**	10.0	10.0	100	100	58-129	0	17	
Methylene Chloride	**9.41**	**9.65**	10.0	10.0	94	97	80-120	3	15	
(trans) 1,2-Dichloroethene	**10.1**	**10.4**	10.0	10.0	101	104	80-125	3	17	
Methyl t-Butyl Ether	**9.97**	**10.5**	10.0	10.0	100	105	80-122	5	15	
1,1-Dichloroethane	**10.0**	**10.2**	10.0	10.0	100	102	80-125	2	17	
Vinyl Acetate	**10.4**	**10.4**	10.0	10.0	104	104	80-131	0	15	
2,2-Dichloropropane	**11.3**	**11.8**	10.0	10.0	113	118	80-146	4	21	
(cis) 1,2-Dichloroethene	**10.3**	**10.6**	10.0	10.0	103	106	80-129	3	17	
2-Butanone	**9.94**	**9.77**	10.0	10.0	99	98	80-129	2	16	
Bromochloromethane	**9.97**	**10.4**	10.0	10.0	100	104	80-125	4	18	
Chloroform	**9.99**	**10.3**	10.0	10.0	100	103	80-123	3	16	
1,1,1-Trichloroethane	**9.91**	**10.1**	10.0	10.0	99	101	80-123	2	18	
Carbon Tetrachloride	**9.49**	**9.90**	10.0	10.0	95	99	80-126	4	17	
1,1-Dichloropropene	**9.98**	**10.2**	10.0	10.0	100	102	80-126	2	18	
Benzene	**9.80**	**10.1**	10.0	10.0	98	101	80-121	3	16	
1,2-Dichloroethane	**9.91**	**10.3**	10.0	10.0	99	103	80-124	4	15	
Trichloroethene	**10.0**	**10.4**	10.0	10.0	100	104	80-122	4	18	
1,2-Dichloropropane	**9.84**	**9.81**	10.0	10.0	98	98	80-123	0	15	
Dibromomethane	**10.0**	**10.4**	10.0	10.0	100	104	80-123	4	15	
Bromodichloromethane	**9.78**	**10.3**	10.0	10.0	98	103	80-125	5	15	
(cis) 1,3-Dichloropropene	**10.3**	**10.6**	10.0	10.0	103	106	80-129	3	15	
Methyl Isobutyl Ketone	**9.63**	**9.86**	10.0	10.0	96	99	80-124	2	15	
Toluene	**8.68**	**8.98**	10.0	10.0	87	90	80-120	3	18	
(trans) 1,3-Dichloropropene	**10.2**	**10.8**	10.0	10.0	102	108	80-134	6	17	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
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Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0308W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1,2-Trichloroethane	**9.38**	**9.84**	10.0	10.0	94	98	77-126	5	20	
Tetrachloroethene	**10.2**	**10.9**	10.0	10.0	102	109	80-124	7	18	
1,3-Dichloropropane	**9.50**	**10.1**	10.0	10.0	95	101	80-120	6	15	
2-Hexanone	**9.71**	**10.0**	10.0	10.0	97	100	80-130	3	16	
Dibromochloromethane	**10.3**	**10.9**	10.0	10.0	103	109	80-128	6	15	
1,2-Dibromoethane	**9.79**	**10.3**	10.0	10.0	98	103	80-127	5	15	
Chlorobenzene	**9.63**	**10.2**	10.0	10.0	96	102	80-120	6	17	
1,1,1,2-Tetrachloroethane	**10.2**	**10.5**	10.0	10.0	102	105	80-125	3	17	
Ethylbenzene	**9.81**	**10.3**	10.0	10.0	98	103	80-125	5	18	
m,p-Xylene	**19.2**	**20.4**	20.0	20.0	96	102	80-127	6	18	
o-Xylene	**9.58**	**10.2**	10.0	10.0	96	102	80-126	6	18	
Styrene	**10.2**	**10.7**	10.0	10.0	102	107	80-130	5	17	
Bromoform	**10.1**	**10.5**	10.0	10.0	101	105	80-130	4	15	
Isopropylbenzene	**10.2**	**10.6**	10.0	10.0	102	106	80-129	4	18	
Bromobenzene	**9.62**	**10.3**	10.0	10.0	96	103	76-128	7	16	
1,1,2,2-Tetrachloroethane	**9.44**	**10.3**	10.0	10.0	94	103	74-130	9	15	
1,2,3-Trichloropropane	**8.45**	**9.12**	10.0	10.0	85	91	71-129	8	25	
n-Propylbenzene	**9.74**	**10.4**	10.0	10.0	97	104	80-129	7	19	
2-Chlorotoluene	**9.86**	**10.6**	10.0	10.0	99	106	80-128	7	18	
4-Chlorotoluene	**9.92**	**10.6**	10.0	10.0	99	106	80-130	7	19	
1,3,5-Trimethylbenzene	**9.86**	**10.7**	10.0	10.0	99	107	80-131	8	18	
tert-Butylbenzene	**9.67**	**10.4**	10.0	10.0	97	104	80-130	7	18	
1,2,4-Trimethylbenzene	**9.73**	**10.5**	10.0	10.0	97	105	80-130	8	18	
sec-Butylbenzene	**9.99**	**10.8**	10.0	10.0	100	108	80-130	8	18	
1,3-Dichlorobenzene	**9.65**	**10.5**	10.0	10.0	97	105	80-126	8	17	
p-Isopropyltoluene	**9.95**	**10.8**	10.0	10.0	100	108	80-132	8	18	
1,4-Dichlorobenzene	**9.58**	**10.5**	10.0	10.0	96	105	80-121	9	17	
1,2-Dichlorobenzene	**9.64**	**10.4**	10.0	10.0	96	104	79-125	8	15	
n-Butylbenzene	**10.4**	**11.3**	10.0	10.0	104	113	80-138	8	19	
1,2-Dibromo-3-chloropropane	**9.54**	**9.69**	10.0	10.0	95	97	73-133	2	15	
1,2,4-Trichlorobenzene	**10.1**	**11.2**	10.0	10.0	101	112	80-139	10	18	
Hexachlorobutadiene	**10.1**	**11.0**	10.0	10.0	101	110	80-151	9	18	
Naphthalene	**9.03**	**10.8**	10.0	10.0	90	108	68-144	18	25	
1,2,3-Trichlorobenzene	**9.19**	**10.6**	10.0	10.0	92	106	75-146	14	28	
Surrogate:										
Dibromofluoromethane					*106*	*105*	*75-127*			
Toluene-d8					*103*	*103*	*80-127*			
4-Bromofluorobenzene					*102*	*100*	*78-125*			

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4-21**					
Laboratory ID:	03-043-01					
n-Nitrosodimethylamine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4-21**					
Laboratory ID:	03-043-01					
2,4-Dinitrophenol	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	1.9	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	9.7	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.097	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	0.97	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.0097	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*38*	*10 - 81*				
Phenol-d6	*29*	*10 - 86*				
Nitrobenzene-d5	*64*	*27 - 105*				
2-Fluorobiphenyl	*70*	*33 - 100*				
2,4,6-Tribromophenol	*94*	*25 - 124*				
Terphenyl-d14	*85*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-3P-17**					
Laboratory ID:	03-043-02					
n-Nitrosodimethylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-3P-17**					
Laboratory ID:	03-043-02					
2,4-Dinitrophenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	10	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*34*	*10 - 81*				
Phenol-d6	*27*	*10 - 86*				
Nitrobenzene-d5	*57*	*27 - 105*				
2-Fluorobiphenyl	*64*	*33 - 100*				
2,4,6-Tribromophenol	*83*	*25 - 124*				
Terphenyl-d14	*76*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-21**					
Laboratory ID:	03-043-03					
n-Nitrosodimethylamine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-21**					
Laboratory ID:	03-043-03					
2,4-Dinitrophenol	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	9.9	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.099	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	4.9	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	0.99	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.0099	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*39*	*10 - 81*				
Phenol-d6	*29*	*10 - 86*				
Nitrobenzene-d5	*66*	*27 - 105*				
2-Fluorobiphenyl	*69*	*33 - 100*				
2,4,6-Tribromophenol	*88*	*25 - 124*				
Terphenyl-d14	*78*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0307W1					
n-Nitrosodimethylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pyridine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Phenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Aniline	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzyl alcohol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylphenol (o-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroisopropyl)ether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
(3+4)-Methylphenol (m,p-Cresol)	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
n-Nitroso-di-n-propylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachloroethane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Nitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Isophorone	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitrophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dimethylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis(2-Chloroethoxy)methane	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dichlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
1,2,4-Trichlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Naphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Chloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobutadiene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chloro-3-methylphenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
1-Methylnaphthalene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Hexachlorocyclopentadiene	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
2,4,6-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3-Dichloroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,4,5-Trichlorophenol	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Chloronaphthalene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,4-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dimethylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
1,3-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,6-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Dinitrobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthylene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
3-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0307W1					
2,4-Dinitrophenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Acenaphthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4-Nitrophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,4-Dinitrotoluene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Dibenzofuran	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
2,3,5,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
2,3,4,6-Tetrachlorophenol	**ND**	2.0	EPA 8270E	3-7-23	3-7-23	
Diethylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Chlorophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Nitroaniline	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Fluorene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
4,6-Dinitro-2-methylphenol	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
n-Nitrosodiphenylamine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
1,2-Diphenylhydrazine	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
4-Bromophenyl-phenylether	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Hexachlorobenzene	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Pentachlorophenol	**ND**	10	EPA 8270E	3-7-23	3-7-23	
Phenanthrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Anthracene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Carbazole	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Di-n-butylphthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Fluoranthene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Pyrene	**ND**	0.10	EPA 8270E/SIM	3-7-23	3-7-23	
Butylbenzylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
bis-2-Ethylhexyladipate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
3,3'-Dichlorobenzidine	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Benzo[a]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Chrysene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
bis(2-Ethylhexyl)phthalate	**ND**	5.0	EPA 8270E	3-7-23	3-7-23	
Di-n-octylphthalate	**ND**	1.0	EPA 8270E	3-7-23	3-7-23	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[a]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Indeno[1,2,3-cd]pyrene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270E/SIM	3-7-23	3-7-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorophenol	*45*	*10 - 81*				
Phenol-d6	*32*	*10 - 86*				
Nitrobenzene-d5	*75*	*27 - 105*				
2-Fluorobiphenyl	*70*	*33 - 100*				
2,4,6-Tribromophenol	*86*	*25 - 124*				
Terphenyl-d14	*81*	*40 - 116*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

SEMIVOLATILE ORGANICS EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0307W1									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	**13.9**	**13.6**	40.0	40.0	35	34	16 - 53	2	33	
2-Chlorophenol	**28.5**	**27.7**	40.0	40.0	71	69	42 - 90	3	34	
1,4-Dichlorobenzene	**13.5**	**13.1**	20.0	20.0	68	66	32 - 83	3	34	
n-Nitroso-di-n-propylamine	**14.3**	**14.0**	20.0	20.0	72	70	41 - 99	2	32	
1,2,4-Trichlorobenzene	**14.2**	**14.1**	20.0	20.0	71	71	35 - 91	1	35	
4-Chloro-3-methylphenol	**31.5**	**31.9**	40.0	40.0	79	80	55 - 98	1	22	
Acenaphthene	**14.6**	**14.7**	20.0	20.0	73	74	40 - 96	1	23	
4-Nitrophenol	**17.4**	**18.6**	40.0	40.0	44	47	20 - 77	7	28	
2,4-Dinitrotoluene	**17.3**	**17.5**	20.0	20.0	87	88	50 - 102	1	22	
Pentachlorophenol	**37.9**	**37.8**	40.0	40.0	95	95	46 - 129	0	26	
Pyrene	**15.7**	**16.1**	20.0	20.0	79	81	52 - 105	3	20	
Surrogate:										
2-Fluorophenol					*46*	*46*	*10 - 81*			
Phenol-d6					*34*	*33*	*10 - 86*			
Nitrobenzene-d5					*76*	*76*	*27 - 105*			
2-Fluorobiphenyl					*73*	*74*	*33 - 100*			
2,4,6-Tribromophenol					*84*	*87*	*25 - 124*			
Terphenyl-d14					*79*	*81*	*40 - 116*			

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4-21**					
Laboratory ID:	03-043-01					
alpha-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0030	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.010	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*50*	*21-110*				
Decachlorobiphenyl	*87*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**H-3P-17**					
Laboratory ID:	03-043-02					
alpha-BHC	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0031	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.010	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0051	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.051	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.051	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*68*	*21-110*				
Decachlorobiphenyl	*85*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-21**					
Laboratory ID:	03-043-03					
alpha-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0030	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.010	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*70*	*21-110*				
Decachlorobiphenyl	*86*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
alpha-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
gamma-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
beta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
delta-BHC	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Heptachlor	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Aldrin	ND	0.0020	EPA 8081B	3-6-23	3-6-23	
Heptachlor epoxide	ND	0.0030	EPA 8081B	3-6-23	3-6-23	
gamma-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
alpha-Chlordane	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDE	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan I	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Dieldrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDD	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endosulfan II	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
4,4'-DDT	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin aldehyde	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Methoxychlor	ND	0.010	EPA 8081B	3-6-23	3-6-23	
Endosulfan sulfate	ND	0.0050	EPA 8081B	3-6-23	3-6-23	
Endrin ketone	ND	0.020	EPA 8081B	3-6-23	3-6-23	
Toxaphene	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Tech Chlordane	ND	0.050	EPA 8081B	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control limits*				
Tetrachloro-m-xylene	*56*	*21-110*				
Decachlorobiphenyl	*99*	*42-113*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOCHLORINE
PESTICIDES EPA 8081B
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0306W1										
	SB	SBD	SB	SBD		SB	SBD				
alpha-BHC	**0.0993**	**0.0944**	0.100	0.100	N/A	**99**	**94**	50-113	5	19	
gamma-BHC	**0.106**	**0.102**	0.100	0.100	N/A	**106**	**102**	50-114	4	15	
beta-BHC	**0.0959**	**0.0908**	0.100	0.100	N/A	**96**	**91**	45-110	5	15	
delta-BHC	**0.0991**	**0.0942**	0.100	0.100	N/A	**99**	**94**	40-113	5	15	
Heptachlor	**0.0887**	**0.0816**	0.100	0.100	N/A	**89**	**82**	41-107	8	16	
Aldrin	**0.0809**	**0.0733**	0.100	0.100	N/A	**81**	**73**	39-105	10	15	
Heptachlor epoxide	**0.101**	**0.0944**	0.100	0.100	N/A	**101**	**94**	53-106	7	15	
gamma-Chlordane	**0.0978**	**0.0915**	0.100	0.100	N/A	**98**	**92**	46-110	7	15	
alpha-Chlordane	**0.0881**	**0.0832**	0.100	0.100	N/A	**88**	**83**	46-110	6	15	
4,4'-DDE	**0.0970**	**0.0904**	0.100	0.100	N/A	**97**	**90**	39-129	7	15	
Endosulfan I	**0.0970**	**0.0924**	0.100	0.100	N/A	**97**	**92**	51-109	5	15	
Dieldrin	**0.101**	**0.0959**	0.100	0.100	N/A	**101**	**96**	55-112	5	15	
Endrin	**0.101**	**0.0954**	0.100	0.100	N/A	**101**	**95**	54-119	6	16	
4,4'-DDD	**0.0958**	**0.0902**	0.100	0.100	N/A	**96**	**90**	52-142	6	15	
Endosulfan II	**0.0973**	**0.0910**	0.100	0.100	N/A	**97**	**91**	49-115	7	15	
4,4'-DDT	**0.132**	**0.122**	0.100	0.100	N/A	**132**	**122**	52-136	8	15	
Endrin aldehyde	**0.0795**	**0.0748**	0.100	0.100	N/A	**80**	**75**	39-128	6	15	
Methoxychlor	**0.133**	**0.126**	0.100	0.100	N/A	**133**	**126**	56-156	5	19	
Endosulfan sulfate	**0.110**	**0.102**	0.100	0.100	N/A	**110**	**102**	44-120	8	15	
Endrin ketone	**0.119**	**0.115**	0.100	0.100	N/A	**119**	**115**	45-122	3	15	
Surrogate:											
Tetrachloro-m-xylene						*61*	*48*	*21-110*			
Decachlorobiphenyl						*90*	*83*	*42-113*			

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4-21**					
Laboratory ID:	03-043-01					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*91*	*32-140*				
Triphenyl phosphate	*91*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

**ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM**

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-3P-17**					
Laboratory ID:	03-043-02					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.48	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*93*	*32-140*				
Triphenyl phosphate	*88*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-21**					
Laboratory ID:	03-043-03					
Dichlorvos(DDVP)	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.13	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.47	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.19	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*95*	*32-140*				
Triphenyl phosphate	*93*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0306W1					
Dichlorvos(DDVP)	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Mevinphos/Phosdrin	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Ethoprophos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Monocrotophos	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Naled	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Sulfotepp	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Phorate	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Dimethoate	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Demeton-S	**ND**	0.14	EPA 8270E/SIM	3-6-23	3-6-23	
Diazinon	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Disulfoton	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-methyl	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Fenchlorphos/Ronnel	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Malathion	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Fenthion	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Parathion-ethyl	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Chlorpyrifos/Dursban	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Trichloronate	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Stirofos/Tetrachlorvinphos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Tokuthion/Prothiofos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Merphos&Merphos-oxone	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Fensulfothion	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Bolstar/Sulprofos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
EPN	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Azinphos-methyl/Guthion	**ND**	0.50	EPA 8270E/SIM	3-6-23	3-6-23	
Coumaphos	**ND**	0.20	EPA 8270E/SIM	3-6-23	3-6-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Tributyl phosphate	*89*	*32-140*				
Triphenyl phosphate	*85*	*27-136*				

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

ORGANOPHOSPHORUS
PESTICIDES EPA 8270E/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0306W1									
	SB	SBD	SB	SBD	SB	SBD				
Dichlorvos(DDVP)	**0.718**	**0.750**	1.00	1.00	72	75	50 - 135	4	30	
Mevinphos/Phosdrin	**0.837**	**0.813**	1.00	1.00	84	81	50 - 135	3	30	
Ethoprophos	**0.897**	**0.887**	1.00	1.00	90	89	50 - 135	1	30	
Sulfotepp	**0.840**	**0.801**	1.00	1.00	84	80	50 - 135	5	30	
Phorate	**0.850**	**0.790**	1.00	1.00	85	79	50 - 135	7	30	
Dimethoate	**0.783**	**0.768**	1.00	1.00	78	77	50 - 135	2	30	
Demeton-S	**0.578**	**0.564**	0.700	0.700	83	81	50 - 135	2	30	
Diazinon	**1.00**	**0.872**	1.00	1.00	100	87	50 - 135	14	30	
Disulfoton	**0.834**	**0.737**	1.00	1.00	83	74	50 - 135	12	30	
Parathion-methyl	**1.04**	**0.984**	1.00	1.00	104	98	50 - 135	6	30	
Fenchlorphos/Ronnel	**0.911**	**0.826**	1.00	1.00	91	83	50 - 135	10	30	
Malathion	**0.976**	**0.897**	1.00	1.00	98	90	50 - 135	8	30	
Fenthion	**0.915**	**0.859**	1.00	1.00	92	86	50 - 135	6	30	
Parathion-ethyl	**0.932**	**0.882**	1.00	1.00	93	88	50 - 135	6	30	
Chlorpyrifos/Dursban	**0.900**	**0.850**	1.00	1.00	90	85	50 - 135	6	30	
Trichloronate	**0.894**	**0.802**	1.00	1.00	89	80	50 - 135	11	30	
Stirofos/Tetrachlorvinphos	**1.03**	**0.967**	1.00	1.00	103	97	50 - 135	6	30	
Tokuthion/Prothiofos	**0.944**	**0.840**	1.00	1.00	94	84	50 - 135	12	30	
Fensulfothion	**1.08**	**0.958**	1.00	1.00	108	96	50 - 135	12	30	
Bolstar/Sulprofos	**0.972**	**0.834**	1.00	1.00	97	83	50 - 135	15	30	
EPN	**0.980**	**0.852**	1.00	1.00	98	85	50 - 135	14	30	
Azinphos-methyl/Guthion	**1.32**	**1.26**	1.00	1.00	132	126	50 - 135	5	30	
Coumaphos	**1.23**	**1.07**	1.00	1.00	123	107	50 - 135	14	30	
Surrogate:										
Tributyl phosphate					*98*	*88*	*32-140*			
Triphenyl phosphate					*98*	*89*	*27-136*			

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

TOTAL METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4-21**					
Laboratory ID:	03-043-01					
Arsenic	**ND**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-3P-17**					
Laboratory ID:	03-043-02					
Arsenic	**5.2**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-21**					
Laboratory ID:	03-043-03					
Arsenic	**1.1**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

TOTAL METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0308WM1					
Arsenic	**ND**	0.50	EPA 200.8	3-8-23	3-8-23	
Zinc	**ND**	28	EPA 200.8	3-8-23	3-8-23	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	03-020-12										
	ORIG	DUP									
Arsenic	**1.49**	**1.36**	NA	NA		NA		NA	9	20	
Zinc	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	03-020-12										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**106**	**102**	111	111	1.49	**94**	**91**	75-125	4	20	
Zinc	**104**	**98.4**	111	111	ND	**94**	**89**	75-125	6	20	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

DISSOLVED METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4-21**					
Laboratory ID:	03-043-01					
Arsenic	**ND**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**H-3P-17**					
Laboratory ID:	03-043-02					
Arsenic	**3.0**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-21**					
Laboratory ID:	03-043-03					
Arsenic	**0.81**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Date of Report: March 10, 2023
Samples Submitted: March 3, 2023
Laboratory Reference: 2303-043
Project: 30104 - SR 167 Stage 2

DISSOLVED METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0303F1					
Arsenic	**ND**	0.50	EPA 200.8	3-3-23	3-8-23	
Zinc	**ND**	25	EPA 200.8	3-3-23	3-8-23	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	03-029-01										
	ORIG	DUP									
Arsenic	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Zinc	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	03-029-01										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**82.4**	**84.0**	80.0	80.0	ND	**103**	**105**	75-125	2	20	
Zinc	**79.4**	**77.8**	80.0	80.0	ND	**99**	**97**	75-125	2	20	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.

Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 03-043

Company: Innovex
Project Number: 30164
Project Name: SR 167 Stg2 BU
Project Manager: Pamela Fleming
Sampled by: Pamela Fleming

Turnaround Request (in working days)
(Check One)
- [ ] Same Day
- [ ] 1 Day
- [ ] 2 Days
- [ ] 3 Days
- [x] Standard (7 Days)
- [ ] ______ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
1	MW-4-21	3/3/23	1115	GW	11
2	H-3P-17	↓	1215	↓	11
3	MW-1~~8~~-21	↓	1330	↓	11
4	Trip Blank	↓	—		4

Lab ID	NWTPH-HCID	NWTPH-Gx/BTEX (8021 ☐ 8260 ☐)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total ~~MTCA Metals~~ As & Zn	TCLP Metals	HEM (oil and grease) 1664	Dissolved As/Zn				% Moisture
1					X			X			X	X			X			X				
2					X			X			X	X			X			X				
3					X			X			X	X			X			X				
4					X																	

	Signature	Company	Date	Time
Relinquished	[signature]	INNOVEX	3/3/2023	1500
Received	[signature]	OSE	3/3/23	1500
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
~~Fie~~ Lab filter
Bill to WSDOT, Courtney Sodergren WSA

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

APPENDIX F

GROUNDWATER-MONITORING WELL SAMPLING FIELD-DATA SHEETS

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: B-19-04-P

Date: 3/1/23

Employee: PMF, KKH

Owner/Location (Site): WSDOT

Monument Condition: Good

Monument Secured: Yes

Water in Monument: No

Well Cap Condition: —

Well Cap Locked: —

Well Cap Under Pressure: —

Well Casing Condition: Good

Measuring Point (MP): TOC

MP Above/Below Top of Monument (feet): 0.2'

Monument Height (feet): 1.65'

Casing Diameter & Type: 1" PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/1/23

Sample No.: B-19-04-P
Samplers Name: PMF KKH

Purge Equipment:
____ Bailer: Disposable or Acrylic
____ 12 v. Pump -
____ Submersible Pump
✓ Peristaltic Pump

Sample Equipment:
____ Bailer: Disposable or Acrylic
____ 12 v. Pump -
____ Submersible Pump
✓ Peristaltic Pump

Analyses Requested: | **Number and Types of Bottle Used:**

Start @0915

Well Number: B-19-04-P
Well Diameter: 1" **with Casing Volume of:**
Casing Height: ____ to ground surface
Depth to Water: 18.65 TOC — 2" = (0.16 Gallon/Feet)
Well Depth: 24.8 BGS or TOC — 4" = (0.65 Gallon/Feet)
Height W-Column: ____ feet (well depth - depth to water) — 5" = (1.02 Gallon/Feet)
Volume in Well: ____ gallons (casing volume x height) — 6" = (1.47 Gallon/Feet)
Gallons to purge: ____ gallons (volume x 3) — 8" = (2.61 Gallon/Feet)

Lab: ____ **Transportation:** ____

Purge Rate: 0.5 Lpm

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. ~~(ppm)~~ %	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
0920	2.5L	12° C	407.4	5.4	6.27	51.6	3.60 Clear	18.69
0925	5L	12.1°C	407.3	3.4	6.35	15.1	3.36 Clear	"
0930	7.5L	12.1	407.1	2.4	6.38	-6.0	34.6 Clear	18.68
0935	10L	12.2	407.3	2.2	6.37	-23.7	2.19 "	18.67
0940	12.5L	12.0	407.1	2.0	6.38	-34.1	1.77 "	"
0945	15L	12.1	408.3	1.9	6.37	-42.9	1.95 "	"
0950	17.5L	12.1	409.1	1.8	6.37	-48.0	1.60 "	18.68
0955	20L	12.2	408.8	1.8	"	-53.0	1.66	~~18.6~~ 18.67

Wait for 80% well volume recovery prior to sampling.
Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = ____ x 0.8 = ____ - (Well Depth) ____ = Depth to water

Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Sample Well

Time: 1000 Sample ID: B-19-04-P Depth: 20'

Comments: MW-AF collected here as well

Well Condition:

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: B-9-05-P

Date: 3/1/2023

Employee: KLH, PF

Owner/Location (Site): WSDOT

Monument Condition: good

Monument Secured: yes

Water in Monument: no

Well Cap Condition: no cap

Well Cap Locked: —

Well Cap Under Pressure: —

Well Casing Condition: good

Measuring Point (MP): TOC

MP Above/Below Top of Monument (feet): 0.7 ft

Monument Height (feet): 1.96 ft

Casing Diameter & Type: 1-inch PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/1/23

Sample No.: B-9-05-P

Samplers Name: PMF, KGH

Purge Equipment:

- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Sample Equipment:

- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Analyses Requested: **Number and Types of Bottle Used:**

Well Number: ____________

Casing Height: ____________ to ground surface

Depth to Water: 6.61 TOC

Well Depth: 35.25 BGS or TOC

Height W-Column: ____________ feet (well depth - depth to water)

Volume in Well: ____________ gallons (casing volume x height)

Gallons to purge: ____________ gallons (volume x 3)

Well Diameter: _____ **with Casing Volume of:**

2" = (0.16 Gallon/Feet)
4" = (0.65 Gallon/Feet)
5" = (1.02 Gallon/Feet)
6" = (1.47 Gallon/Feet)
8" = (2.61 Gallon/Feet)

Lab: ____________ **Transportation:** ____________

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O.% ~~(ppm)~~	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
1325	2.5	11.4	336.6	4.0	6.09	-21.3	clear 12.8	6.62
1330	5	11.4	331.7	2.6	6.21	-49.0	clear 1.62 ~~23.5~~	6.62
1335	7.5	11.5	331.3	2.0	6.30	-64.8	clear 14.6	6.63
1340	10	11.4	330.3	1.7	6.36	-75.2	clear 16.9	6.63
1345	12.5	11.4	330.3	1.4	6.38	-82.9	clear, 17.3	6.62
1350	15	11.5	329.8	1.2	6.38	-86.5	clear, 14.5	6.62

Wait for 80% well volume recovery prior to sampling.

Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = ______ x 0.8 = ______ - (Well Depth) ______ = Depth to water

Time: ______ 1st measured depth to water, ____________ feet below TOC. Is well within 80% of original well casing volume: Yes _____ No_____

Time: ______ 1st measured depth to water, ____________ feet below TOC. Is well within 80% of original well casing volume: Yes _____ No_____

Time: ______ 1st measured depth to water, ____________ feet below TOC. Is well within 80% of original well casing volume: Yes _____ No_____

Sample Well

Time: 1400 Sample ID: B-9-05-P Depth: Sample depth ~20 ft.

Comments: ____________

Well Condition: ____________

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: H-SP18

Date: 3/2/23

Employee: PMF KKH

Owner/Location (Site): WSDOT

Monument Condition: Good

Monument Secured: Yes

Water in Monument: NO

Well Cap Condition: —

Well Cap Locked: —

Well Cap Under Pressure: —

Well Casing Condition: Good

Measuring Point (MP): ToC

MP Above/Below Top of Monument (feet): .06'

Monument Height (feet): 1.71

Casing Diameter & Type: 2" PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/2/23

Sample No.: H-5P-18

Samplers Name: PMF KKH

Purge Equipment:
- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Sample Equipment:
- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Analyses Requested: | **Number and Types of Bottle Used:**

Well Number: H-5P-18

Well Diameter: ~~2"~~ 2" ~~4"~~ with Casing Volume of:

Casing Height: ______ to ground surface

Depth to Water: 2.79 TOC

Well Depth: 27.82 BGS or TOC

Height W-Column: ______ feet (well depth - depth to water)

Volume in Well: ______ gallons (casing volume x height)

Gallons to purge: ______ gallons (volume x 3)

2" = (0.16 Gallon/Feet)
4" = (0.65 Gallon/Feet)
5" = (1.02 Gallon/Feet)
6" = (1.47 Gallon/Feet)
8" = (2.61 Gallon/Feet)

Lab:

Transportation:

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. ~~(ppm)~~ %	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
1505	2.5	10.7	410.5	4.8	6.34	-19.4	19.6 Clear	2.82
1510	5	10.8	413.2	2.8	6.37	-40.2	30.0 Clear	2.81
1515	7.5	10.8	415.2	2.2	6.40	-53.6	26.6 Clear	2.82
1520	10	10.9	419.0	1.5	6.42	-65.9	23.0 Clear	"
1525	12.5	10.9	421.3	1.4	6.44	-74.1	23.3 Clear	"
1530	15	11.0	424.0	1.3	6.44	-78.5	24.0 "	"

Wait for 80% well volume recovery prior to sampling.
Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = ______ x 0.8 = ______ - (Well Depth) ______ = Depth to water

Time: ______ 1st measured depth to water, ______ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: ______ 1st measured depth to water, ______ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: ______ 1st measured depth to water, ______ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Sample Well

Time: 1545 Sample ID: H-5P-18 Depth: 20'

Comments

Well Condition:

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ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #:	H-3P-17
Date:	3/13/23
Employee:	PMF & KKH
Owner/Location (Site):	WSDOT
Monument Condition:	Good
Monument Secured:	Good
Water in Monument:	No
Well Cap Condition:	—
Well Cap Locked:	—
Well Cap Under Pressure:	—
Well Casing Condition:	Good
Measuring Point (MP):	TOC
MP Above/Below Top of Monument (feet):	.45'
Monument Height (feet):	2.13'
Casing Diameter & Type:	2" PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

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ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/13/23

Sample No.: H-3P-17

Samplers Name:

Purge Equipment:
_____ Bailer: Disposable or Acrylic
_____ 12 v. Pump -
_____ Submersible Pump
✓ Peristaltic Pump

Sample Equipment:
_____ Bailer: Disposable or Acrylic
_____ 12 v. Pump -
✓ Submersible Pump
✓ Peristaltic Pump

Analyses Requested: | **Number and Types of Bottle Used:**

Well Number: H-3P-17

Well Diameter: _____ **with Casing Volume of:**

Casing Height: _____ to ground surface

Depth to Water: 4.25 TOC

Well Depth: 28.6 BGS or TOC

Height W-Column: _____ feet (well depth - depth to water)

Volume in Well: _____ gallons (casing volume x height)

Gallons to purge: _____ gallons (volume x 3)

2" = (0.16 Gallon/Feet)
4" = (0.65 Gallon/Feet)
5" = (1.02 Gallon/Feet)
6" = (1.47 Gallon/Feet)
8" = (2.61 Gallon/Feet)

Lab:

Transportation:

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. % ~~(ppm)~~	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
1135	2.5	11.7	387.4	6.5	6.24	39.2	46.4 clear brown	4.91
1140	5	11.7	400.8	4.0	6.16	30.0	26.8 clear brown	4.96
1145	7.5	11.6	421.6	2.4	6.30	1.4	19.1 clear	4.98
1150	10	11.6	426.5	1.9	6.39	-26.4	17.4 clear	5.01
1155	12.5	11.7	430.5	1.8	6.40	-41.3	12.8 clear	"
1200	15	11.7	440.3	1.2	6.42	-57.8	10.8 clear	"
1205	17.5	11.8	445.2	1.2	6.43	-69.7	10.2	4.98

Wait for 80% well volume recovery prior to sampling.
Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = _____ x 0.8 = _____ - (Well Depth) _____ = Depth to water

Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Sample Well

Time: 1215 Sample ID: H-3P-17 Depth: 26'

Comments

Well Condition:

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: MW-1-21

Date: 3/13/23

Employee: PMF KKH

Owner/Location (Site): WSDOT

Monument Condition: Good

Monument Secured: Yes

Water in Monument: NO

Well Cap Condition: Good

Well Cap Locked: No

Well Cap Under Pressure: NO

Well Casing Condition: Good

Measuring Point (MP): TOC

MP Above/Below Top of Monument (feet): 0.80'

Monument Height (feet): 3.01'

Casing Diameter & Type: 2" PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/3/23

Sample No.: MW-1-21

Samplers Name: JMF, KKH

Purge Equipment:
- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Sample Equipment:
- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Analyses Requested: | **Number and Types of Bottle Used:**

Well Number: MW-1-21

Well Diameter: ____ **with Casing Volume of:**

Casing Height: ________ to ground surface

Depth to Water: 3.34 TOC — 2" = (0.16 Gallon/Feet)

Well Depth: 17.15 BGS or TOC — 4" = (0.65 Gallon/Feet)

Height W-Column: ________ feet (well depth - depth to water) — 5" = (1.02 Gallon/Feet)

Volume in Well: ________ gallons (casing volume x height) — 6" = (1.47 Gallon/Feet)

3.4

Gallons to purge: ________ gallons (volume x 3) — 8" = (2.61 Gallon/Feet)

Lab: ________ **Transportation:** ________

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. % ~~(ppm)~~	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
1245	2.5	10.1	1224	7.5	6.15	-0.2	41.7, Clear	5.10
1250	5	10.1	1135	5.1	6.14	0.6	40.0, clear	5.16
1255	7.5	10.1	1066	3.9	6.14	1.8	40.0, clear	5.19
1300	10	10.2	993	3.1	6.14	~~[illegible]~~	37.4, clear	5.22
1305	12.5	10.3	932	2.8	6.17	3.7	30.8, clear	5.24
1310	15							

Wait for 80% well volume recovery prior to sampling.

Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = ________ x 0.8 = ________ - (Well Depth) ________ = Depth to water

Time: ____ 1st measured depth to water, ________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No ____

Time: ____ 1st measured depth to water, ________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No ____

Time: ____ 1st measured depth to water, ________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No ____

Sample Well

Time: 1330 Sample ID: MW-1-21 Depth: 16'

Comments

Well Condition:

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ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: MW-2-21

Date: 3/2/23

Employee: PMF KKH

Owner/Location (Site): WSDOT

Monument Condition: Good

Monument Secured: Yes

Water in Monument: NO

Well Cap Condition: Good

Well Cap Locked: No

Well Cap Under Pressure: No

Well Casing Condition: Good

Measuring Point (MP): TOC

MP Above/Below Top of Monument (feet): 0.39'

Monument Height (feet): 3.15

Casing Diameter & Type: 2"PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

INNOVEX ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/2/23

Sample No.: MW-2-21
Samplers Name: PMF KKH

Purge Equipment:
___ Bailer: Disposable or Acrylic
___ 12 v. Pump -
___ Submersible Pump
✓ Peristaltic Pump

Sample Equipment:
___ Bailer: Disposable or Acrylic
___ 12 v. Pump -
___ Submersible Pump
✓ Peristaltic Pump

Analyses Requested:

Number and Types of Bottle Used:

Well Number: MW-2-21
Well Diameter: _____ **with Casing Volume of:**
Casing Height: _____ to ground surface
Depth to Water: 8.84 TOC — 2" = (0.16 Gallon/Feet)
Well Depth: 18.42 BGS or TOC — 4" = (0.65 Gallon/Feet)
Height W-Column: _____ feet (well depth - depth to water) — 5" = (1.02 Gallon/Feet)
Volume in Well: _____ gallons (casing volume x height) — 6" = (1.47 Gallon/Feet)
Gallons to purge: _____ gallons (volume x 3) — 8" = (2.61 Gallon/Feet)
Lab:
Transportation:
Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. ~~(ppm)~~ %	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
1200	2.5	10.8	293.6	3.6	6.79	167.7	101, clear chunks	8.61
1205	5	10.8	338.0	3.0	6.69	140.4	70.1 "	9.50
1210	10	11.0	371.8	2.5	6.84	98.4	40.0 clear	9.36
1215	12.5	11.1	372.6	2.8	6.92	67.1	22.2 "	9.49
1220	15	11.1	362.7	2.9	6.97	49.9	17.4 clear	9.52
1225	17.5	11.2	353.0	3.5	6.98	32.1	14.8 "	"
1230	20	11.1	355.1	4.0	6.98	14.4	11.4 "	9.59

Wait for 80% well volume recovery prior to sampling.
Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = _____ x 0.8 = _____ - (Well Depth) _____ = Depth to water

Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Sample Well

Time: 1245 Sample ID: MW-2-21 Depth: 15'

Comments

Well Condition:

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ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: MW-3-21

Date: 3/2/23

Employee: PMF ~~#~~ KRH

Owner/Location (Site): WS DOT

Monument Condition: Good

Monument Secured: Yes

Water in Monument: NO

Well Cap Condition: Good

Well Cap Locked: ~~No~~

Well Cap Under Pressure: NO

Well Casing Condition: Good

Measuring Point (MP): TOC

MP Above/Below Top of Monument (feet): .300

Monument Height (feet): 3.18

Casing Diameter & Type: 2" PVC

Additional Comments:

Picked up extra locks from inside monument.

*Make sure we have a photo of well inside of monument

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/2/23

Sample No.: MW-3-21

Samplers Name: PMF KNH

Purge Equipment:
_____ Bailer: Disposable or Acrylic
_____ 12 v. Pump -
_____ Submersible Pump
✓ Peristaltic Pump

Sample Equipment:
_____ Bailer: Disposable or Acrylic
_____ 12 v. Pump -
_____ Submersible Pump
✓ Peristaltic Pump

Analyses Requested: **Number and Types of Bottle Used:**

Well Number: MW-3-21 **Well Diameter:** _____ **with Casing Volume of:**

Casing Height: _____ to ground surface

Depth to Water: 7.61 TOC — 2" = (0.16 Gallon/Feet)

Well Depth: 18.25 BGS or TOC — 4" = (0.65 Gallon/Feet)

Height W-Column: _____ feet (well depth - depth to water) — 5" = (1.02 Gallon/Feet)

Volume in Well: _____ gallons (casing volume x height) — 6" = (1.47 Gallon/Feet)

Gallons to purge: _____ gallons (volume x 3) — 8" = (2.61 Gallon/Feet)

Lab: _____ **Transportation:** _____

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. (ppm) %	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
0900	2.5	9.5	598.4	58.4	6.65	216.5	5.49 Clear	8.62
0905	5	9.4	611.1	54.5	6.64	217.2	12.8 "	8.59
0910	7.5	9.5	619.9	51.8	6.61	217.9	15.9 "	8.60
0915	10	9.4	632.9	50.8	6.60	218.7	12.9 "	8.63
0920	12.5	9.6	648.9	49.8	6.58	219.3	6.68 "	8.62

Wait for 80% well volume recovery prior to sampling.
Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = _____ x 0.8 = _____ - (Well Depth) _____ = Depth to water

Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: _____ 1st measured depth to water, _____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Sample Well

Time: 0930 Sample ID: MW-3-21 Depth: 15'

Comments

Well Condition:

INNOVEX
ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: ~~M4~~ MW-4-21

Date: 3/3/23

Employee: KLH / PF

Owner/Location (Site): WSDOT

Monument Condition: good

Monument Secured: yes

Water in Monument: no

Well Cap Condition: Good

Well Cap Locked: no

Well Cap Under Pressure: no

Well Casing Condition: good

Measuring Point (MP): TOC

MP Above/Below Top of Monument (feet): 0.24 ft

Monument Height (feet): 3.20'

Casing Diameter & Type: 2-inch PVC

Additional Comments:
Well cap was off of casing in monument

*Make sure we have a photo of well inside of monument

INNOVEX ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/13/23

Sample No.: MW-4-21

Samplers Name: PMF, KKH

Purge Equipment:
- ___ Bailer: Disposable or Acrylic
- ___ 12 v. Pump -
- ___ Submersible Pump
- ✓ Peristaltic Pump

Sample Equipment:
- ___ Bailer: Disposable or Acrylic
- ___ 12 v. Pump -
- ___ Submersible Pump
- ✓ Peristaltic Pump

Analyses Requested: | **Number and Types of Bottle Used:**

Well Number: MW-4-21

Well Diameter: _____ **with Casing Volume of:**

Casing Height: ________ to ground surface

Depth to Water: 19.92 TOC — 2" = (0.16 Gallon/Feet)

Well Depth: 27.95 BGS or TOC — 4" = (0.65 Gallon/Feet)

Height W-Column: ________ feet (well depth - depth to water) — 5" = (1.02 Gallon/Feet)

Volume in Well: ________ gallons (casing volume x height) — 6" = (1.47 Gallon/Feet)

Gallons to purge: ________ gallons (volume x 3) — 8" = (2.61 Gallon/Feet)

Lab: ________ **Transportation:** ________

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. % (ppm)	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
0925	2.5	12.6	320.9	4.1	6.02	118.8	15.4, clear	20.03
0930	5	12.6	324.3	4.2	6.11	93.6	69.2 "	"
0935	7.5	12.6	318.9	2.5	6.15	80.3	48.8, Clear	20.02
0940	10	12.7	322.7	2.7	6.15	69.7	41.4, Clear	20.02
0945	12.5	12.7	~~322~~ 322.9	2.3	6.18	61.5	40.5, clear	20.02
0950	15	12.9	321.3	2.4	6.16	53.5	30.2, clear	20.01
0955	17.7	12.7	323.2	2.0	6.20	45.8	29.3, clear	20.01
1000	20	12.7	320.8	1.7	6.21	39.6	22.3, clear	20.01

Wait for 80% well volume recovery prior to sampling.

Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = ______ x 0.8 = ______ - (Well Depth) ______ = Depth to water

Time: ____ 1st measured depth to water, ________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Time: ____ 1st measured depth to water, ________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Time: ____ 1st measured depth to water, ________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Sample Well

Time: 1015 Sample ID: MW-4-21 Depth: 23

Comments

Well Condition:

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ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: MW-5-21

Date: 3/1/23

Employee: PMF KKH

Owner/Location (Site): WSDOT

Monument Condition: Good

Monument Secured: Yes

Water in Monument: NO

Well Cap Condition: Good

Well Cap Locked: ~~NA~~ No

Well Cap Under Pressure: NO

Well Casing Condition: Good

Measuring Point (MP): TOC

MP Above/Below Top of Monument (feet): 0.52'

Monument Height (feet): 3.39'

Casing Diameter & Type: 2" PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

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ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/1/23

Sample No.: MW-5-21
Samplers Name: PMF, KKH

Purge Equipment:
____ Bailer: Disposable or Acrylic
____ 12 v. Pump -
____ Submersible Pump
✓ Peristaltic Pump

Sample Equipment:
____ Bailer: Disposable or Acrylic
____ 12 v. Pump -
____ Submersible Pump
✓ Peristaltic Pump

Analyses Requested:

Number and Types of Bottle Used:

Well Number: ____
Casing Height: ____ to ground surface
Depth to Water: 16.94 TOC
Well Depth: 24.80 BGS or TOC
Height W-Column: ____ feet (well depth - depth to water)
Volume in Well: ____ gallons (casing volume x height)
Gallons to purge: ____ gallons (volume x 3)

Well Diameter: ____ **with Casing Volume of:**
6
2" = (0.16 Gallon/Feet)
4" = (0.65 Gallon/Feet)
5" = (1.02 Gallon/Feet)
6" = (1.47 Gallon/Feet)
8" = (2.61 Gallon/Feet)

Lab:
Transportation:

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. % ~~(ppm)~~	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
1125	2.5	13.4	567.9	10.2	6.41	-14.2	cloudy, 315	16.92
1130	5	13.4	711	3.5	6.40	-27.5	cloudy, 278	16.93
1135	7.5	13.4	730	2.4	6.40	-32.9	cloudy, 174	16.93
1140	10	13.5	741	1.8	6.40	-37.0	cloudy, 117	16.92
1145	12.5	13.4	754	1.7	6.41	-40.0	cloudy, 77.5	16.92
1150	15	13.6	724	1.5	6.41	-42.3	cloudy, 65.7	16.92
1155	17.5	13.4	733	1.6	6.38	-42.1	cloudy, 44.2	16.93
1200	20	13.4	731	1.6	6.36	-41.7	cloudy, 34.3	16.92
1205	22.5	13.5	780	1.5	~~6~~ 6.35	-42.3	cloudy, 27.1	16.92

Wait for 80% well volume recovery prior to sampling.
Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = ____ x 0.8 = ____ - (Well Depth) ____ = Depth to water

Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Sample Well

Time: 1210 Sample ID: MW-5-21 Depth: 20'

Comments

Well Condition:

a

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ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #:	MW-6-21
Date:	3/2/23
Employee:	PMF KKH
Owner/Location (Site):	WSDOT
Monument Condition:	good
Monument Secured:	yes
Water in Monument:	no
Well Cap Condition:	good
Well Cap Locked:	yes
Well Cap Under Pressure:	no
Well Casing Condition:	good
Measuring Point (MP):	toc
MP Above/Below Top of Monument (feet):	0.25ft
Monument Height (feet):	3.13'
Casing Diameter & Type:	2-inch PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

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ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/2/23

Sample No.: MW-6-21
Samplers Name: PMF KKH

Purge Equipment:
- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Sample Equipment:
- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Analyses Requested:	**Number and Types of Bottle Used:**

Well Number: MW-6-21
Well Diameter: _____ **with Casing Volume of:**

Casing Height: ________ to ground surface
Depth to Water: 3.84 TOC
Well Depth: 18.25 BGS or TOC
Height W-Column: ________ feet (well depth - depth to water)
Volume in Well: ________ gallons (casing volume x height)
Gallons to purge: ________ gallons (volume x 3)

2" = (0.16 Gallon/Feet)
4" = (0.65 Gallon/Feet)
5" = (1.02 Gallon/Feet)
6" = (1.47 Gallon/Feet)
8" = (2.61 Gallon/Feet)

Lab: ________ **Transportation:** ________

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. % ~~(ppm)~~	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
1325	2.5	9.3	452.0	4.2	6.35	-64.3	4.65, Clear	5.27
1330	5	9.3	454.5	21.8	6.39	-82.9	~~5.37~~, clear, 7.94	5.37
1335	7.5	9.6	453.3	23.0	6.48	-94.5	8.73, "	5.40
1340	10	9.7	453.6	20.9	6.49	-97.6	clear, 7.90	5.49

Wait for 80% well volume recovery prior to sampling.
Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = ______ x 0.8 = ______ - (Well Depth) ______ = Depth to water

Time: _____ 1st measured depth to water, __________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: _____ 1st measured depth to water, __________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____
Time: _____ 1st measured depth to water, __________ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No____

Sample Well

Time: 1345 Sample ID: MW-6-21 Depth: 15'

Comments

Well Condition:

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ENVIRONMENTAL MANAGEMENT, INC.

Well Condition Checklist

Well #: MW-7-21

Date: 3/1/23

Employee: PMF KKH

Owner/Location (Site): WSDOT

Monument Condition: Good

Monument Secured: Yes

Water in Monument: NO

Well Cap Condition: Good

Well Cap Locked: —

Well Cap Under Pressure: NO

Well Casing Condition: Good

Measuring Point (MP): TOC

MP Above/Below Top of Monument (feet): .3.8'

Monument Height (feet): 2.97'

Casing Diameter & Type: 2" PVC

Additional Comments:

*Make sure we have a photo of well inside of monument

INNOVEX ENVIRONMENTAL MANAGEMENT, INC.

GROUNDWATER MONITORING WELL SAMPLING FIELD DATA SHEET

Date: 3/1/23

Sample No.: MW-7-21

Samplers Name: PMF KKH

Purge Equipment:
- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Sample Equipment:
- ____ Bailer: Disposable or Acrylic
- ____ 12 v. Pump -
- ____ Submersible Pump
- ✓ Peristaltic Pump

Analyses Requested: **Number and Types of Bottle Used:**

Well Number: MW-7-21 **Well Diameter:** ____ **with Casing Volume of:**

Casing Height: ____ to ground surface

Depth to Water: 8.59 TOC — 2" = (0.16 Gallon/Feet)

Well Depth: 18.20 BGS or TOC — 4" = (0.65 Gallon/Feet)

Height W-Column: ____ feet (well depth - depth to water) — 5" = (1.02 Gallon/Feet)

Volume in Well: ____ gallons (casing volume x height) — 6" = (1.47 Gallon/Feet)

Gallons to purge: ____ gallons (volume x 3) — 8" = (2.61 Gallon/Feet)

Lab: **Transportation:**

Purge Rate:

Time (24 hr.)	Volume Purged (Liters)	Temperature (°C)	Conductivity (us/cm)	D.O. (~~ppm~~ %)	pH	ORP (mV)	Turbidity: Color - Fines	Depth to Water (TOC)
1445	2.5	10.2	392.0	58.9	6.18	26.2	clear, 66.0	10.51
1450	5	10.1	405.0	~~50.2~~ 58.2	5.92	27.5	clear, 89.4	11.87
1455	7.5	10.2	407.2	52.9	6.02	25.0	clear, 28.3	13.09
1500	10	10.2	401.9	69.4	6.08	25.7	clear, 33.2	13.10
1505	12.5	10.3	425.0	67.8	6.10	25.5	clear, 21.00	13.60
1525	15	10.3	406.2	42.4	6.07	29.4	clear 33.7	11.62

Wait for 80% well volume recovery prior to sampling.

Calculate depth to water (from TOC), for 80% well volume recovery:

Calculate 80% of orginal well volume:

Original Height of Water Column = ~~8.59~~ 9.61 x 0.8 = 7.688 - (Well Depth) 18.20 = Depth to water -10.51

Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No ____

Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No ____

Time: ____ 1st measured depth to water, ____ feet below TOC. Is well within 80% of original well casing volume: Yes ____ No ____

Sample Well

Time: 1530 Sample ID: MW-7-21 Depth: 15'

Comments: Stopped for recharge

Well Condition:

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Appendix G

Stage 2 Long-Term Management Plan

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Puget Sound GATEWAY Program

509 5 167

SR 167 Completion Project

Technical Memorandum: Long-Term Management Plan: SR 167 Completion Project, Stage 2: SR 167/I-5 to SR 161 – New Expressway Project

DRAFT
August 21, 2023

Submitted by:
Washington State Department of Transportation
Megaprograms | Puget Sound Gateway Program | SR 167 Completion Project

Through:
WSP USA
1001 Fourth Avenue, Suite 3100 | Seattle, Washington 98154 | 206-382-5200

Prepared by:
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100 | Seattle, Washington 98121 | 206-441-9080

WSDOT

Contents

Tables

Figures

Purpose

As described in the mitigation plan for the SR 167 Completion Project, Stage 2: SR 167/I-5 to SR 161 – New Expressway Project (Stage 2), unavoidable permanent and long-term temporary wetland impacts will be offset by constructing several onsite, in-kind permittee-responsible mitigation sites (WSDOT 2023). Monitoring and maintenance requirements for the 10-year period following construction is outlined in the mitigation plan. WSDOT will ensure the long-term protection of wetland, stream, and buffer areas in the Stage 2 mitigation sites thorough implementation of this Long-Term Management (LTM) Plan that becomes effective after the 10-year monitoring period.

Mitigation Site Background

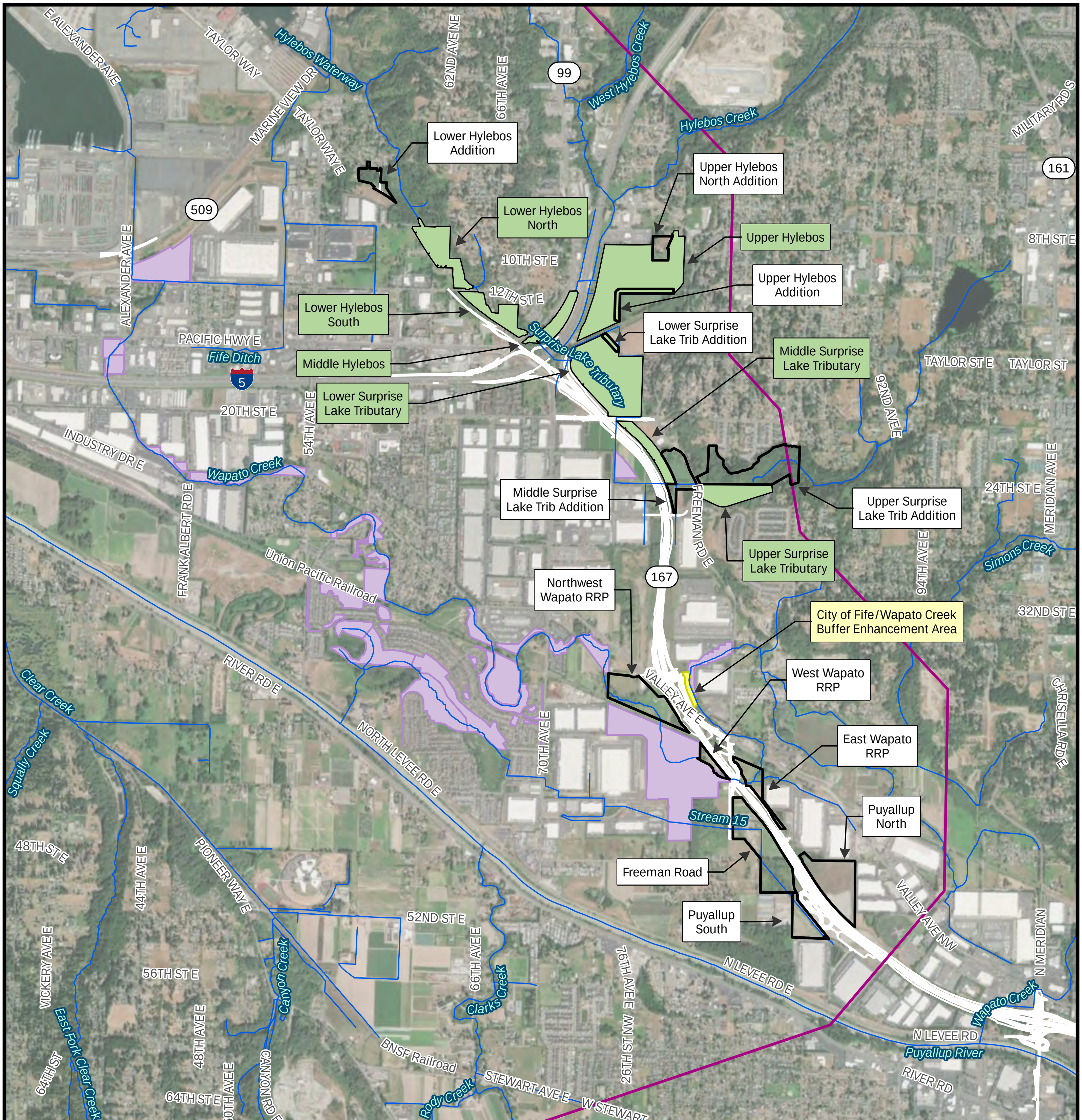
There are 12 Stage 2 mitigation sites distributed throughout the Hylebos Creek, Wapato Creek, and Puyallup River basins and various Pierce County jurisdictions (Table 1; Figure 1). Stage 2 mitigation will expand portions of the Hylebos Riparian Restoration Program (RRP) constructed as part of the Stage 1b project; and re-establish, rehabilitate, and enhance wetlands, streams, and buffers within the other mitigation sites.

Table 1. Summary Information of Stage 2 Mitigation Sites.

Site Group	Site Name	Basin	Jurisdiction	Total Site Area (acres)[b]
Hylebos Basin Sites	Upper Surprise Lake Tributary Addition[a]	Hylebos Creek	Edgewood	28.09
	Middle Surprise Lake Tributary Addition[a]	Hylebos Creek	Fife	10.58
	Lower Surprise Lake Tributary Addition[a]	Hylebos Creek	Fife	1.06
	Upper Hylebos Addition[a]	Hylebos Creek	Pierce County	4.10
	Upper Hylebos North Addition[a]	Hylebos Creek	Pierce County	6.73
	Lower Hylebos Addition	Hylebos Creek	Fife	4.99
Wapato RRP Sites	East Wapato RRP	Wapato Creek	Puyallup	6.58
	West Wapato RRP	Wapato Creek	Fife	2.83
	Northwest Wapato RRP	Wapato Creek	Fife	19.42
Puyallup River Basin Sites	Puyallup North	Puyallup River	Puyallup	20.82
	Puyallup South	Puyallup River	Puyallup	8.42
	Freeman Road	Puyallup River	Puyallup	27.51
			Total	**141.13**

[a] Site is an additional area to a Hylebos RRP (Stage 1b) mitigation site.

[b] Area includes both credit generating and non-credit generating (i.e., perimeter buffer) areas.



Legend

- Mitigation Site (Stage 2)
- Mitigation Site (Stage 1b)
- PTOI Boundary
- Existing Mitigations Sites by PTOI and Other Agencies
- City of Fife/Wapato Creek Buffer Enhancement Area
- Stage 2 Alignment (white line)
- Stream (Pierce County)

Figure G-1.
SR-167 Stage 2 Mitigation Sites.

0 0.2 0.4 0.8 Miles

HERRERA
Science + Planning + Design
Esri Imagery (2023)

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LTM Requirements

WSDOT will install fencing as necessary to protect the sites. Signs identifying mitigation site boundaries will be placed a minimum of every 100 feet around the perimeter of all sites. The LTM plan will be implemented for a minimum of 10 years, beginning at the end of the required 10-year compliance monitoring period, or when performance standards are met. WSDOT is the party responsible for LTM and will provide the necessary funding through legislatively approved funds and budget requests. Site inspections will occur annually and will be reported in years 1, 4, 7, and 10 following the end of the mitigation site compliance monitoring period. Inspection frequency may be increased to protect site integrity at sites with more immediate management issues that need to be addressed.

Objectives

The primary goal of the LTM plan is to support the wetland, aquatic, and riparian functions that were developed on each site. LTM monitoring period will address two main objectives:

1. Objective 1: Maintain site integrity
2. Objective 2: Maintain native scrub-shrub and forested vegetation cover in all planted areas

Site Inspections and Routine Management Actions

During annual inspections, WSDOT will evaluate site conditions and conduct routine management actions such as trash removal, sign and structure maintenance, weed control, and minor replanting. The LTM objectives listed above will be assessed to determine if additional actions and/or contingency measures are needed to ensure the site remains in compliance with the LTM requirements.

The following list identifies possible inspection activities and routine management actions.

- Inspect, repair, or replace all site perimeter fencing and signage as necessary.
- Remove all litter within the mitigation sites, especially along unit boundaries. Inspect all access points for unauthorized dumping of refuse.
- Inspect sites for unauthorized points of entry and camping.
- Monitor sites for Class A and Class B noxious weeds and others as required by RCW 17.10 Noxious Weed law and WAC 16-750 State Noxious Weed List and use appropriate weed control actions to control as required (NWCB 2023).

Contingency Measures

If WSDOT believes significant corrective actions or contingency measures are necessary, an adaptive management strategy will be developed that assesses the probable cause of changes and proposed actions and contingency measures to correct deficiencies. A list of possible actions and contingency measures that may be required is provided in Table 2. It is expected that site inspections and site-specific observations will inform necessary actions or contingency measures in order to meet the primary goal of the LTM. The list in Table 2 is therefore not a comprehensive list.

Table 2. LTM Objectives and Possible Contingency Measures.

LTM Objective	Contingency Measures
Maintain site integrity.	• Increase frequency of site inspection and fence repair • Discourage site access and remove encampments as needed to protect the natural conditions of the sites
Maintain native scrub-shrub and forested vegetation cover in all planted areas.	• Eradicate non-designated weeds as needed • Re-plant bare/disturbed areas (i.e., vandalized areas, or areas cleared of nonnative vegetation) with native vegetation

Inspection Reporting

Routine site management actions will be described in annual inspection documentation. The LTM Inspection Reports will be submitted to the U.S. Army Corps of Engineers, the Washington State Department of Ecology, and the Puyallup Tribe of Indians. Reports will include qualitative assessments of LTM requirements using a combination of onsite field documentation and in-office review of recent aerial imagery, and will include:

- A summary of the results of required inspections and/or assessments.
- The presence and condition of fencing, signage, trash, vandalism, and evidence of trespass.
- The locations of any regulated invasive, and non-regulated invasive species that may require follow-up treatment measures.
- Estimated cover of native, regulated invasive, and non-regulated invasive vegetation in all planting areas to ensure the dominance of native species and to provide appropriate contingency measures.
- A summary of adaptive management actions implemented in the time elapsed since the last LTM reporting period.
- A summary of adaptive management actions planned in response to the results of the current LTM inspection and/or assessment.

References

NWCB. 2023. Washington State Noxious Weed List 2021. Washington State Noxious Weed Control Board. Accessed March 1, 2023. <https://www.nwcb.wa.gov/printable-noxious-weed-list>.

WSDOT. 2023. Draft Stage 2 Mitigation Plan. SR 167 Completion Project, Stage 2 SR 167/I-5 to SR 161 – New Expressway Project. Washington State Department of Transportation SR 167 Completion Project, Puget Sound Gateway Program. September 2022.