City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

Stormwater Site Plan
Puget Sound Energy
Operational Training Center
325 Todd Road NW
Puyallup, Washington

Tax Parcel Numbers:
04202-11030

Prepared For:
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Prepared By:
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February 2024

FREELAND
& ASSOCIATES
CIVIL ENGINEERS

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ENGINEER'S DECLARATION

"I, Miles McEathron, a Professional Engineer registered in the State of Washington as a Civil Engineer, do hereby declare that the Puget Sound Energy Operational Training Center Stormwater Site Plan dated February 2024 was prepared by, or under my personal supervision, and that said Report was prepared in accordance with generally accepted engineering practices. I hereby affirm that, to the best of my knowledge, information and belief, subject Report was prepared in full compliance with the 2019 Washington State Department of Ecology Stormwater Management Manual for Western Washington (2019 DOE SWMM), City of Puyallup Municipal Code 21.10.040, and all Technical Standards adopted there under.

MILES PATRICK MCEATHRON
49494
02/09/2024

Miles McEathron
WA P.E. #49494

This report is not intended to be a final site plan for this project or any individual proposed improvements, and is not intended for use as part of any review of critical area. Existing drainage and site conditions or improvements not mentioned are beyond the scope of this report.

STORMWATER SITE PLAN

The Stormwater Site Plan (SSP) is the comprehensive report containing all of the technical information and analysis necessary for regulatory agencies to evaluate the proposed development for compliance with stormwater requirements.

Existing Conditions Summary

The project site is located at 325 Todd Road NW, Puyallup, WA 98231. The site is one tax parcel (Tax Parcel Number 04202-11030) which totals approximately 6.17 acres of land and forms a triangular shape. The subject parcel is owned by Puget Sound Energy, Inc. The site is bordered by Todd Road NW to the south, 4th Street NW to the west and Union Pacific Railroad to the northeast. State Route 161 lies east of the site. Refer to *Figure 1 – Vicinity Map* for the project location.

The City of Puyallup Comprehensive Plan designation of the site is Light Manufacturing/Warehousing (LM/W). The City of Puyallup zoning designation of the site is Limited Manufacturing (ML). Adjacent land uses vary and include single-family residential (north), product distribution centers (south/southeast), and vacant land (west).

Much of the east half of the site is surfaced with gravel and used as an equipment storage yard for PSE vehicles, materials, and equipment. Two gated driveway entrances access the gravel yard from Todd Road NW. For security purposes, the gravel yard is lined with barbed wire fencing. Vegetation in the east half of the parcel consists of evergreen trees, shrubbery, and perimeter grass. The western half of the site is undeveloped and vegetated with grasses and scattered trees. Overall site topography is generally flat. Refer to *Figure 2 – Aerial Photograph* for the existing site conditions.

The site is within North Puyallup basin on City of Puyallup drainage basin mapping. However, based on correspondence with City staff, there is a basin boundary between Wapato Creek and Puyallup River which appears to generally follow the north edge of Todd Road NW. Rainwater landing on Todd Road NW sheet flows to the gutter pan on the south side of the road for collection in catch basins. Runoff routed through the conveyance system on the south side of Todd Road NW is pumped to a regional stormwater management facility located at N Meridian and Spencer Road. From this pond, runoff ultimately leads to Puyallup River. Rainwater landing north of Todd

Road NW roadway surface will sheet flow to a separate storm drain conveyance system on the north side of the roadway. Runoff routed through the conveyance system on the north side of Todd Road NW is directed west in a ditch and culvert system to Wapato Creek, approximately 650 lineal feet away.

See *Offsite Analysis* section of this report for further description of the existing drainage system downstream from the project.

Critical Areas

A wetland exists on the western edge of the project limits adjacent to 4th Street NW. Per the Wetland, Stream, and Fish and Wildlife Habitat Assessment prepared by Soundview Consultants, LLC (dated April 2023), the wetland has no buffer or mitigation required for wetland impacts. The wetland will be protected during construction and remain in place. Unmapped off-site wetlands exist to the west of the project site across 4th Street NW.

The site is located within a critical aquifer recharge area. These areas have a critical recharging effect on groundwater and are essential for maintaining public water supplies. To protect groundwater, stormwater runoff from pollution generating surfaces will be treated using bioretention cells prior to exposing runoff to native soils for infiltration. Infiltration has been deemed infeasible on a large-scale basis, however, exposure to native soils for infiltration will be provided to the maximum extent feasible. Based on a Critical Aquifer Recharge Areas Evaluation prepared by Terra Associates, Inc. (dated June 2023), the planned site development will not result in significant adverse impacts to the water quality or recharge of the aquifer. In addition, the on-site water quality and discharge to existing storm system would adequately mitigate any potential adverse impacts to the current on-site groundwater recharge and support of downgradient surface water features and wetlands.

According to Pierce County PublicGIS, the site is not located in floodways or regulated floodplains. City of Puyallup – Critical Areas App shows no flooding hazards within the property. The site is within a volcanic hazard area as shown on USGS Mount Rainier Lahar Hazard Map, dated November 9, 2016. In addition, the site is mapped as having a high susceptibility to soil liquefaction as shown on the Washington Department of Natural Resources Natural Hazards Single-Topic Map. Refer to the project's geotechnical report for additional information.

Project Overview

Project improvements consist of a new operational training facility (OTC) to support Puget Sound Energy. Approximately 34,000 square feet in size, the primary OTC building will be constructed in the central region of the site. The proposed building will contain a combination of offices, laboratories, storage, mechanical, and instructional spaces. An outdoor training space with field areas, work-related structures, enclosed spaces, and covered areas will be located to the west of the proposed building. Parking for employees and visitors will be located to the east of the proposed building. Associated improvements include fencing, utility extensions and connections, and stormwater management facilities.

Frontage improvements will be provided along Todd Road NW including curb, gutter, planter strip and sidewalk. A right-of-way dedication will be necessary along Todd Road NW. As part of this project an Alternate Methods Request (AMR) will propose no improvements to 4th Street NW. Per correspondence with City staff, if no access is proposed to 4th Street NW from the project site then frontage improvements will not be necessary along 4th Street NW. Access to the site will be provided through two driveways entrances on Todd Road NW.

Stormwater will be managed on site with a detention pond east of the parking lot. On-site pollution generating surfaces will be conveyed to bioretention cells for stormwater treatment prior to detention.

Stormwater dispersion and infiltration systems were analyzed for use with this project. Full dispersion of stormwater runoff is not feasible due to limited area for flow path lengths. Per geotechnical analysis, infiltration should not be relied on to manage stormwater runoff on a whole scale basis due to shallow groundwater and fine-grained soils. Even though infiltration is infeasible, the design will maximize stormwater contact will the ground and promote the potential for infiltration to the maximum extent feasible. Refer to *Minimum Requirement #6 Runoff Treatment* and *Minimum Requirement #7 Flow Control* within this report for further discussion about the applicable stormwater management requirements and the *Calculations* section for the specific design of the facilities.

Onsite Soils Analysis

According to the Natural Resource Conservation System Online Soil Survey (NRCS), soils on site are mapped as a combination of Sultan silt loam, Puyallup fine sandy loam, and Pilchuck fine sand.

Soil horizons, consisting of these soil types, is typically deposited by alluvial processed in the form of floodplains and derived from alluvium deposited by the Puyallup River. The Sultan series is classified as hydrologic group ‘C/D’ which consists of soils with low infiltration rates and high runoff potential when thoroughly wetted. The Puyallup and Pilchuck series are classified as hydrologic group ‘A’ which includes soils with high infiltration rates and low runoff potential when thoroughly wetted. Refer to *Figure 3a-c Soils Map* for the regional soil mapping.

Onsite Soils Testing

A geotechnical evaluation of the site was conducted by Terra Associates Inc. in November 2022. The purpose of the evaluation was to identify soil and groundwater conditions, geologic hazards, and provide geotechnical recommendations related to site preparation and grading.

During the field assessment, thirteen (13) test borings were advanced to depths ranging from approximately 10 to 30 feet below existing site grades. Subsurface conditions generally consisted of native alluvial sediments composed of alternating and interbedded layers of soft to stiff silt to clayey silt, and very loose to medium dense sand to silty sand. The site is underlain by a regional groundwater table residing in the alluvial sediments. Groundwater was encountered at depths of approximately 4.5 feet below existing grades in the western portion of the site and 10 feet below existing grades in the eastern portion of the site at the time of soil exploration in November, 2022. Two groundwater monitoring wells were installed in the east portion of the site from December 2022 through March 2023. Seasonal high groundwater was recorded at a depth of 7.2 feet below ground surface (groundwater elevation of 39) at Boring B-13 and a depth of 8 feet below ground surface (groundwater elevation of 38.8) at Boring B11.

The geotechnical consultant concluded infiltration is not feasible to manage stormwater runoff on a whole scale basis due to shallow groundwater and fine-grained silt soils. A copy of the complete Terra Associates report dated December 2022 and subsequent memorandums are provided in the *Appendix* section of this SSP for reference.

Offsite Analysis

Runoff discharged from the proposed stormwater management facility will connect to the municipal storm system at a catch basin in the intersection of Todd Road NW and 4th Street NW. A 12-inch storm drain line will route runoff west for outfall to Todd Road NW roadside ditch. The roadside ditch routes runoff approximately 500 lineal feet west for discharge to Wapato Creek.

Downstream from the project site, the entire drainage system is owned and maintained by the City of Puyallup. Using topographic maps, City of Puyallup Stormwater System Mapping, field investigation, and the City of Puyallup Comprehensive Stormwater Plan, no erosion or flooding problems have been identified within 1/4 mile from the project site. Based on correspondence with City of Puyallup staff, there are no reports of flooding or capacity issues in the vicinity. However, staff did note issues due to groundwater and elevation challenges. Existing issues due to groundwater or elevation challenges are not anticipated to be aggravated due to the project because flow rates leaving the site will be reduced.

The proposed project will provide stormwater flow control and is not anticipated to affect capacity of existing conveyance systems downstream from the site under normal mitigated working conditions. In the event an overflow from the stormwater facility does occur, there will be an overflow structure directing runoff to drainage structures in Todd Road NW. If stormwater spills out from drainage structures, runoff will flow over stabilized surfaces into Todd Road NW roadside gutter pan. Overflow runoff will travel west toward the existing downstream roadside ditch.

Receiving Water Analysis

Stormwater runoff from the project site drains to Wapato Creek. Wapato Creek is listed as an impaired water body in Department of Ecology's Water Quality Assessment 303(d) list for Washington. According to the department's online Assessment tool, Wapato Creek is listed for Bacteria (category 5), and Dissolved Oxygen (category 5). See Table 1 below for the full list of impairments and *Figure 5 - Water Quality Assessment Map* for additional information.

Table 1
DOE Water Quality Assessment

Name	Parameter	Medium	Category	Assessment ID
Wapato Creek	Bacteria	Water	5	17110019020852
Wapato Creek	Dissolved Oxygen	Water	5	17110019020852

Proposed commercial development as part of this project is not expected to create new pollutant sources as all pollution generating surfaces will be subject to enhanced stormwater treatment.. No sources of bacteria are known to exist on site or are proposed, and the project will include a connection to the municipal sewer system. Furthermore, chemicals for grounds and landscape maintenance, including detergents, cleaning products, and fertilizers will be stored indoors to prevent contact with stormwater.

DOE AND CITY OF PUYALLUP MINIMUM REQUIREMENTS

Minimum stormwater management requirements for this project have been determined using Puyallup Municipal Code 21.10.040 and the 2019 Department of Ecology Stormwater Management Manual for Western Washington (2019 DOE SWMM or DOE Manual). With more than 5,000 square feet new plus replaced hard surface area, the project is subject to Minimum Requirements 1 through 9.

MINIMUM REQUIREMENT SUMMARY
NEW DEVELOPMENT

Minimum Requirement		**Not Applicable**	**Variance Requested**	**Standard Requirements Incorporated**	**Comments (Report Section Reference or BMP Identifier)**
#	Description				
1	Preparation of Stormwater Site Plans			✓	
2	Construction Stormwater Pollution Prevention Plan			✓	See "Additional Comments"
3	Source Control of Pollution			✓	
4	Preservation of Natural Drainage Systems and Outfalls			✓	
5	On-Site Stormwater Management			✓	
6	Runoff Treatment			✓	
7	Flow Control			✓	
8	Wetlands Protection			✓	
9	Operation and Maintenance			✓	
#	**Additional Comments**				
2	The Construction SWPPP is included in the civil construction drawings.				

Minimum Requirement #1 - Preparation of Stormwater Site Plans (“SSP”)

This report serves as a Stormwater Site Plan (SSP). All stormwater management systems have been designed according to Department of Ecology (DOE) and City of Puyallup standards.

Minimum Requirement #2 - Construction Stormwater Pollution Prevention Plan (SWPPP)

A SWPPP has been prepared as a separate document. Each of the thirteen elements of a SWPPP must be considered and included in a Construction SWPPP unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the narrative of the SWPPP. The SWPPP shall include, at a minimum, the narrative and copies of Best Management Practice detail sheets that will be utilized as a part of the SWPPP.

During construction, the contractor shall maintain a copy of the SWPPP on site and shall update or modify the SWPPP as necessary for the current conditions on site. The contractor's schedule and available crew, equipment, and materials will be determined after the project is submitted for permits, but prior to the start of construction. Accordingly, some BMPs that have been specified may not be necessary, while other additional BMPs may be required.

This project will disturb more than one acre of soil and will require a Construction General Stormwater NPDES permit from Washington State Department of Ecology. As such, the project shall retain a Certified Erosion and Sediment Control Lead (CESCL) to determine which BMPs are necessary as site conditions change during construction. The contractor and/or CESCL shall add any BMP specifications that have not already been included in the SWPPP prepared by Freeland & Associates, Inc.

Minimum Requirement #3 - Source Control of Pollution

Pollutant sources for commercial projects include vehicular traffic, fertilizers, and other detergents or chemicals typical to building maintenance activities. Pollution will be controlled at the source to the maximum extent possible. All known, available and reasonable source control BMPs have been applied to the design and layout of the site and stormwater plans. The following BMPs have been reviewed for this project:

- S407 BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots
- S410 BMPs for Correcting Illicit Discharges to Storm Drains
- S411 BMPs for Landscaping and Lawn / Vegetation Management
- S417 BMPs for Maintenance of Stormwater Drainage and Treatment Systems

- S421 BMPs for Parking and Storage of Vehicles and Equipment
- S426 BMPs for Sills of Oil and Hazardous Substances
- S427 BMPs for Storage of Liquid, Food Waste, or Dangerous Waste Containers
- S428 BMPs for Storage of Liquids in Permanent Aboveground Tanks
- S442 BMPs for Labeling Storm Drain Inlets on Your Property
- S450 BMPs for Irrigation
- S453 BMPs for Formation of a Pollution Prevention Team
- S454 BMPs for Preventive Maintenance / Good Housekeeping
- S455 BMPs for Spill Prevention and Cleanup
- S456 BMPs for Employee Training
- S457 BMPS for Inspections
- S458 BMPs for Record Keeping

See additional details in the 2019 Department of Ecology Stormwater Management Manual for Western Washington.

https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm

Vehicular traffic is anticipated to be a primary source of potential pollutants. Parking for the project will be located outside of the proposed building footprints and any stormwater runoff from this area will receive stormwater treatment prior to discharge.

Secondary sources of pollutants include garbage and recycling enclosures and landscape areas. Garbage and recycling will be collected in individual covered bins in an enclosure with a roof. The garbage enclosure will drain to sanitary sewer as required by City of Puyallup. To minimize landscaping maintenance and to reduce potential erosion, BMP T5.13 will be applied to all landscaped areas to promote healthy plants and appropriate groundcover.

An additional source of pollution is oil from the substation area. Transformers in the substation area contain around 4,000 gallons of mineral oil used as an insulating medium within transformers. Transfer of oil into the transformer is a manned process with spill response equipment and drip pans. The transfer of oil is only when moving a transformer to or from the site, which is expected to be less than once a year. A Spill Prevention Control and Countermeasure Plan (SPCC Plan) will be prepared and in place for the oil filled operational equipment and oil storage containers. Secondary containment will also be provided to satisfy EPA requirements (Code of Federal Regulations title 40, Chapter 1). Containment will consist of a concrete curb perimeter and geosynthetic clay liner (bentonite clay encapsulated between geotextiles) to seal the bottom of the containment. An oil stop valve operating on the specific gravity difference between oil and water will be in a grate inlet structure leaving the containment area. If oil is collected in the grate inlet, the float on the oil stop valve will sink, shutting off any discharge from the structure. Containment will provide volume for 110% of the largest storage volume. Under normal operation, discharge from the containment area will pass runoff through an oil/water separator and drains to stormwater. The containment is there to keep oil onsite in the event of a large spill.

Minimum Requirement #4 - Preservation of Natural Drainage Systems and Outfalls

The entire project site is contained within the Wapato Creek drainage basin. No stormwater diversions are proposed as a part of this project. Drainage patterns will be maintained by collecting stormwater which will then drain to the municipal storm drain system. The outfall of the municipal storm drain system outfalls to Wapato Creek which appears to ultimately outfall to Commencement Bay.

Minimum Requirement #5 - On-site Stormwater Management

“Projects shall employ On-site Stormwater Management BMPs to infiltrate, disperse, and retain stormwater runoff onsite to the maximum extent feasible without causing flooding or erosion impacts. On-site Stormwater Management BMPs shall be designed and provided in accordance with the Ecology Manual."

As a project triggering Minimum Requirements #1 through #9, and a project that is inside City of Puyallup Urban Growth Area (UGA), this project may use On-site Stormwater Management BMPs from List #2 for all surfaces within each type of surface in List #2 or demonstrate compliance with LID Performance Standards. This project will meet the requirements outlined in List #2 to the maximum extent feasible.

Projects choosing to utilize List #2 of the 2019 DOE Manual to meet requirements for Minimum Requirement #5 - On-site Stormwater Management must consider the BMPs in the order listed for each type of surface. The first BMP that is considered feasible must be used on the site. No other On-site Stormwater Management BMPs are necessary for that surface. The following table identifies all required BMPs in List #2 and if they are feasible or infeasible. Separate tables have been provided for on-site and off-site analysis as requested by City of Puyallup.

TABLE 3a - MINIMUM REQUIREMENT #5: LIST #2

ON-SITE ANALYSIS

#	Minimum Requirement	Feasible	Infeasible	Criteria Comments
#	**Lawn & Landscaped Area**			
1	Post-Construction Soil Quality and Depth - BMP T5.13	✓		This BMP will be applied to all areas outside of roofs or hard surfaces disturbed during construction.
#	**Roofs**			
1	Full Dispersion - BMP T5.30 Full Infiltration - BMP T5.10A		✓	Full Dispersion: Infeasible due to impervious coverage and insufficient flow path length due to proximity to property lines from impervious surfaces. Full Infiltration: Infiltration trenches per the DOE Manual shall be 100 lineal foot maximum trench length with 6 feet separation between trenches. This site does not provide enough footprint area due to setbacks, utilities, planting islands (with silva cells), shallow groundwater and poorly draining soils to infiltrate the roof area. In addition, the DOE Manual states that silt soils have a hydraulic conductivity that is too small for adequate infiltration and are infeasible for downspout trenches.
2	Bioretention – BMP T5.70		✓	Infeasible due to native soil infiltration rates less than 0.3 inches per hour per DOE Manual.
3	Downspout Dispersion BMP T5.10B		✓	Infeasible due to impervious coverage and insufficient flow path length due to proximity to property lines from impervious surfaces. One location in the northwest corner of the property does have proper flow path length, however, this location is approximately 250 feet from the roof area and would require complicated routing through the outdoor training area of the site to reach. In addition, there is a bioretention cell along the west perimeter of the outdoor training area that conflicts with routing storm drains through.
4	Perforated Stub-out Connection BMP T5.10C		✓	Per DOE Manual perforated stub outs are to be located between roof downspouts and a stub out to the local drainage system. This BMP is not intended for sites that need to meet Minimum Requirement #7. All runoff needs to be routed to the flow control

				system prior to discharge to the local drainage system.
#	**Other Hard Surfaces**			
1	Full Dispersion BMP T5.30		✓	Infeasible due to impervious coverage and insufficient flow path length due to proximity to property lines from impervious surfaces.
2	Permeable Pavement - BMP T5.15		✓	Infeasible due to native soil infiltration rates less than 0.3 inches per hour per DOE Manual. In addition, a large portion of the site is covered with existing gravel. Per the DOE Manual permeable pavement is infeasible where replacing existing impervious surfaces.
3	Bioretention – BMP T5.70		✓	Infeasible due to native soil infiltration rates less than 0.3 inches per hour per DOE Manual.
4	Sheet Flow Dispersion BMP T5.12 Concentrated Flow Dispersion BMP T5.11		✓	Infeasible due to impervious coverage and insufficient flow path length due to proximity to property lines from impervious surfaces.

As noted previously in this report, stormwater dispersion and infiltration systems were analyzed for use with this project. Fully dispersing stormwater runoff from on-site improvements is infeasible due to a large quantity of proposed impervious surfaces and limited flow dispersion pathways. Infiltration potential of the site was also considered; however, poorly draining soils and high groundwater render infiltration infeasible. Stormwater from the development will be managed with a stormwater flow control pond and bioretention cells for treatment. This design will maximize stormwater contact will the ground and promote the potential for infiltration to the maximum extent feasible. Outfall for the stormwater detention system will be the City of Puyallup municipal storm system.

TABLE 3b - MINIMUM REQUIREMENT #5: LIST #2

OFF-SITE ANALYSIS

Minimum Requirement		Feasible	Infeasible	Criteria Comments
#	**Lawn & Landscaped Area**			
1	Post-Construction Soil Quality and Depth - BMP T5.13	✓		This BMP will be applied to all areas outside of roofs or hard surfaces disturbed during construction.
#	**Roofs**			
1	Full Dispersion - BMP T5.30 Full Infiltration - BMP T5.10A		✓	There are no roof areas as part of the off-site area.
2	Bioretention – BMP T5.70		✓	There are no roof areas as part of the off-site area.
3	Downspout Dispersion BMP T5.10B		✓	There are no roof areas as part of the off-site area.
4	Perforated Stub-out Connection BMP T5.10C		✓	There are no roof areas as part of the off-site area.
#	**Other Hard Surfaces**			
1	Full Dispersion BMP T5.30		✓	Infeasible due to insufficient flow path length. The off-site work includes planter strip and sidewalk with no suitable dispersion path.
2	Permeable Pavement - BMP T5.15		✓	Infeasible due to native soil infiltration rates less than 0.3 inches per hour per DOE Manual. In addition, a large portion of the off-site sidewalk is covered with existing gravel. Per the DOE Manual permeable pavement is infeasible where replacing existing impervious surfaces.
3	Bioretention – BMP T5.70		✓	Infeasible due to native soil infiltration rates less than 0.3 inches per hour per DOE Manual.
4	Sheet Flow Dispersion BMP T5.12 Concentrated Flow Dispersion BMP T5.11		✓	Infeasible due to insufficient flow path length. The off-site work includes planter strip and sidewalk with no suitable dispersion path.

As noted previously in this report, stormwater dispersion and infiltration systems were analyzed for use with this project. Fully dispersing stormwater runoff from off-site improvements is infeasible due to the limited flow dispersion pathway available. Infiltration potential for off-site work was also considered; however, poorly draining soils and high groundwater render infiltration infeasible. Stormwater from the off-site work will be managed with collection and conveyance to the City of Puyallup municipal storm system.

Minimum Requirement #6 - Runoff Treatment

Proposed new pollution-generating surfaces include all portions of the proposed drive lanes and parking areas within the project. These areas will create more than 5,000 square feet of pollution-generating hard surfaces (PGHS) and will require a stormwater treatment system.

Enhanced treatment will be provided for proposed on-site PGHS using bioretention cells. Refer to Stormwater Treatment – Bioretention Cells narrative in the *Calculations* section of this report for further discussion on design.

Minimum Requirement #7 - Flow Control

This project will create more than 10,000 square feet of effective impervious surface and, therefore, must provide stormwater flow control. A flow control system will be designed for flow rates leaving the site to match predevelopment conditions.

The proposed flow control system will be a stormwater pond located in the eastern portion of the project. The system will provide flow control for the project site to mimic runoff from a forested condition for all new and replaced hard surfaces and converted pervious surfaces. Outfall from the flow control system will discharge to municipal storm systems within Todd Road NW. Refer to Flow Control narrative in the *Calculations* section of this report for further discussion on volume and design of the flow control facility.

Minimum Requirement #8 - Wetlands Protection

A wetland is located on the western edge of the property. The wetland will remain in place and be protected during construction using appropriate construction BMPs. The 2019 DOE Manual flow chart for determining wetland protection level requirements was used to determine appropriate protection levels. Refer to Figure 9 for a copy of the flow chart. General protection and protection from pollutants will be provided in accordance with the DOE Manual as well as measures provided in the wetland report.

In addition to the on-site wetland, there is an unmapped off-site wetland downstream of the project site. A separate flow chart for determining wetland protection level requirements for the off-site wetland was used to determine appropriate protection levels. Assuming worst-case conditions, the flow path leads to providing general protection, protection from pollutants, and wetland hydroperiod protection (Method 2). As with the on-site wetland, general protection and protection from pollutants will be provided using construction stormwater BMPs, avoiding physical impacts, and providing enhanced stormwater treatment prior to discharge from the site. In addition, a hydroperiod analysis following Method 2 as outlined in Volume I, Section I-C.4 of the DOE Manual has been prepared using WWHM 2012 software and is provided in the *Calculations* section of this report.

Minimum Requirement #9 - Operation & Maintenance

Proposed storm drainage improvements consist of a series of catch basins, pipes, flow control, and treatment systems. A separate operations and maintenance manual has been prepared for the proposed storm drainage improvements. The manual contains a description of the facilities, what the facilities do, and how they work. The manual also identifies and describes maintenance tasks for each component of the facilities and the required frequency of each task. Refer to the *Stormwater Operations and Maintenance Manual* prepared by Freeland & Associates, Inc. for further detail regarding maintenance tasks and frequencies.

FIGURES

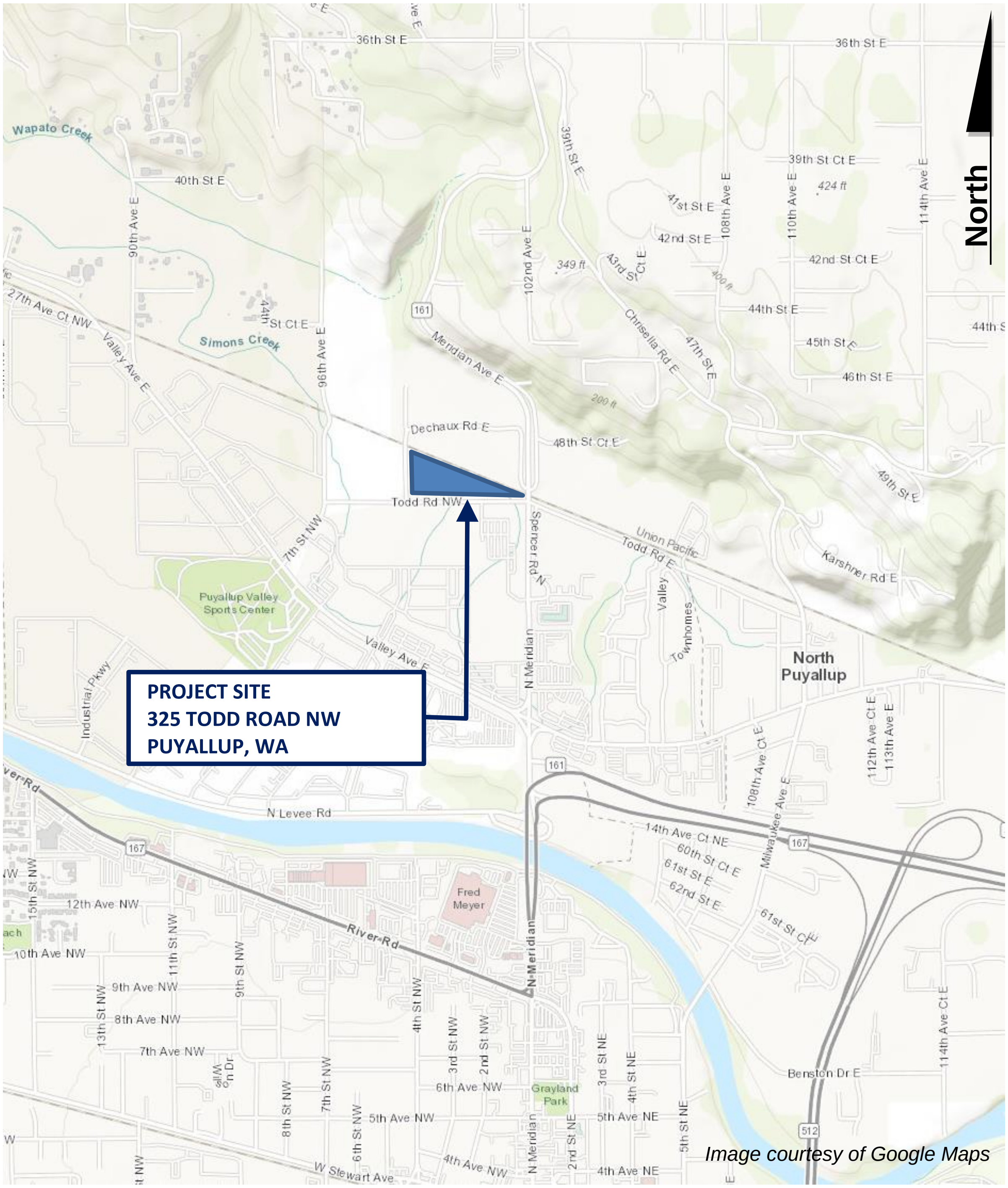


Image courtesy of Google Maps

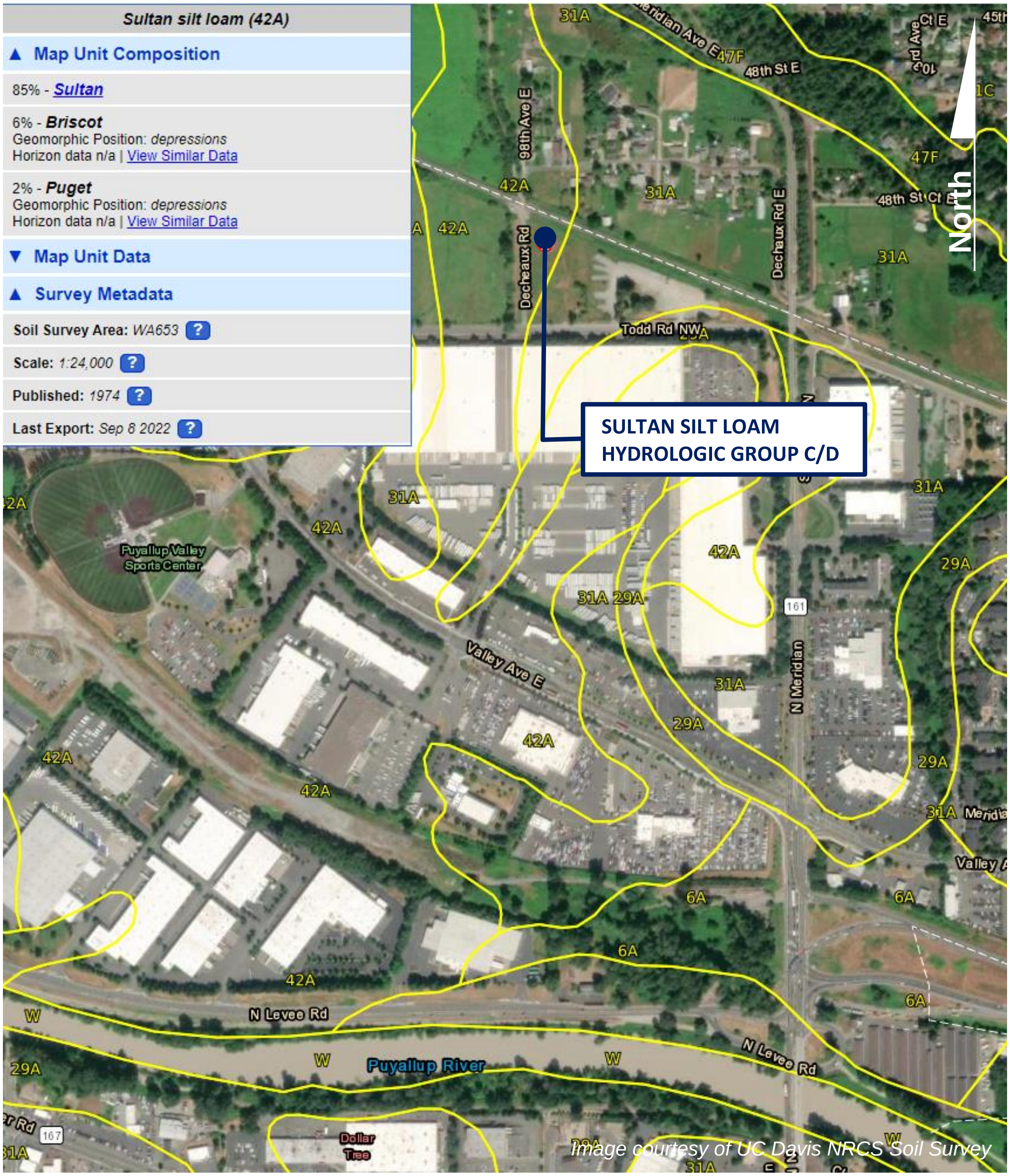
Vicinity Map

Fig. 1

Image courtesy of Google Maps

Aerial Photograph

Fig. 2



Sultan silt loam (42A)

▲ Map Unit Composition

85% - Sultan

6% - **Briscot**
Geomorphic Position: *depressions*
Horizon data n/a | View Similar Data

2% - **Puget**
Geomorphic Position: *depressions*
Horizon data n/a | View Similar Data

▼ Map Unit Data

▲ Survey Metadata

Soil Survey Area: *WA653* ?

Scale: *1:24,000* ?

Published: *1974* ?

Last Export: *Sep 8 2022* ?

SULTAN SILT LOAM
HYDROLOGIC GROUP C/D

Image courtesy of UC Davis NRCS Soil Survey

Soil Map

Fig. 3a

Puyallup fine sandy loam (31A)

▲ Map Unit Composition

85% - *Puyallup*
Geomorphic Position: *terraces*
flood plains

2% - ***Briscot***
Geomorphic Position: *depressions*
Horizon data n/a | View Similar Data

▼ Map Unit Data

▲ Survey Metadata

Soil Survey Area: *WA653* ?

Scale: *1:24,000* ?

Published: *1974* ?

Last Export: *Sep 8 2022* ?

PUYALLUP FINE SANDY LOAM
HYDROLOGIC GROUP A

Image courtesy of UC Davis NRCS Soil Survey

Soil Map

Fig. 3b

Pilchuck fine sand (29A)

▲ Map Unit Composition

85% - *Pilchuck*
Geomorphic Position: *flood plains*

10% - ***Aquic Xerofluvents***
Geomorphic Position: *flood plains*
Horizon data n/a | View Similar Data

▼ Map Unit Data

▲ Survey Metadata

Soil Survey Area: *WA653* ?

Scale: *1:24,000* ?

Published: *1974* ?

Last Export: *Sep 8 2022* ?

PILCHUCK FINE SAND
HYDROLOGIC GROUP A

Image courtesy of UC Davis NRCS Soil Survey

Soil Map

Fig. 3c

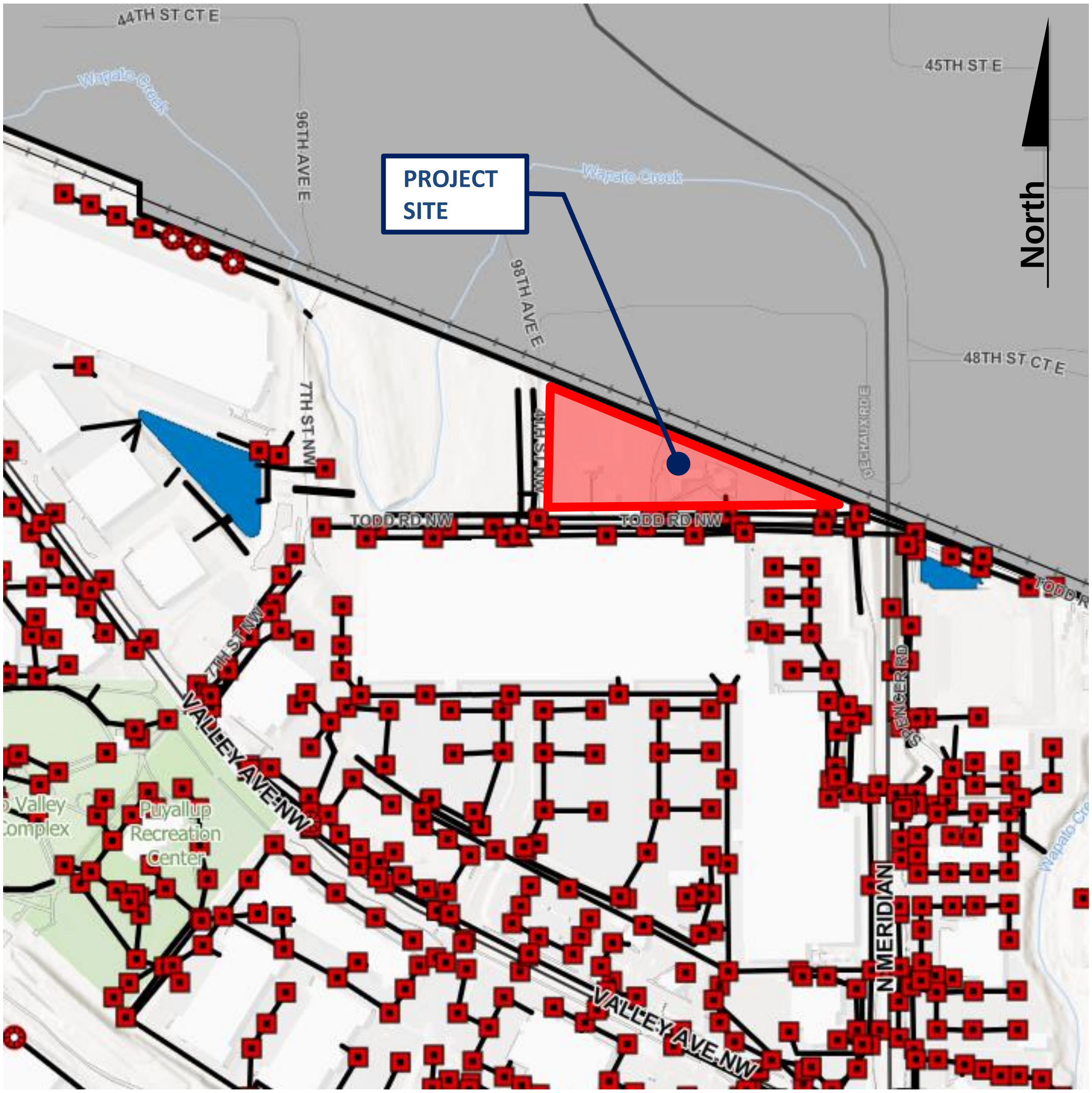


Image courtesy of City of Puyallup

Downstream Drainage Map

Figure 4

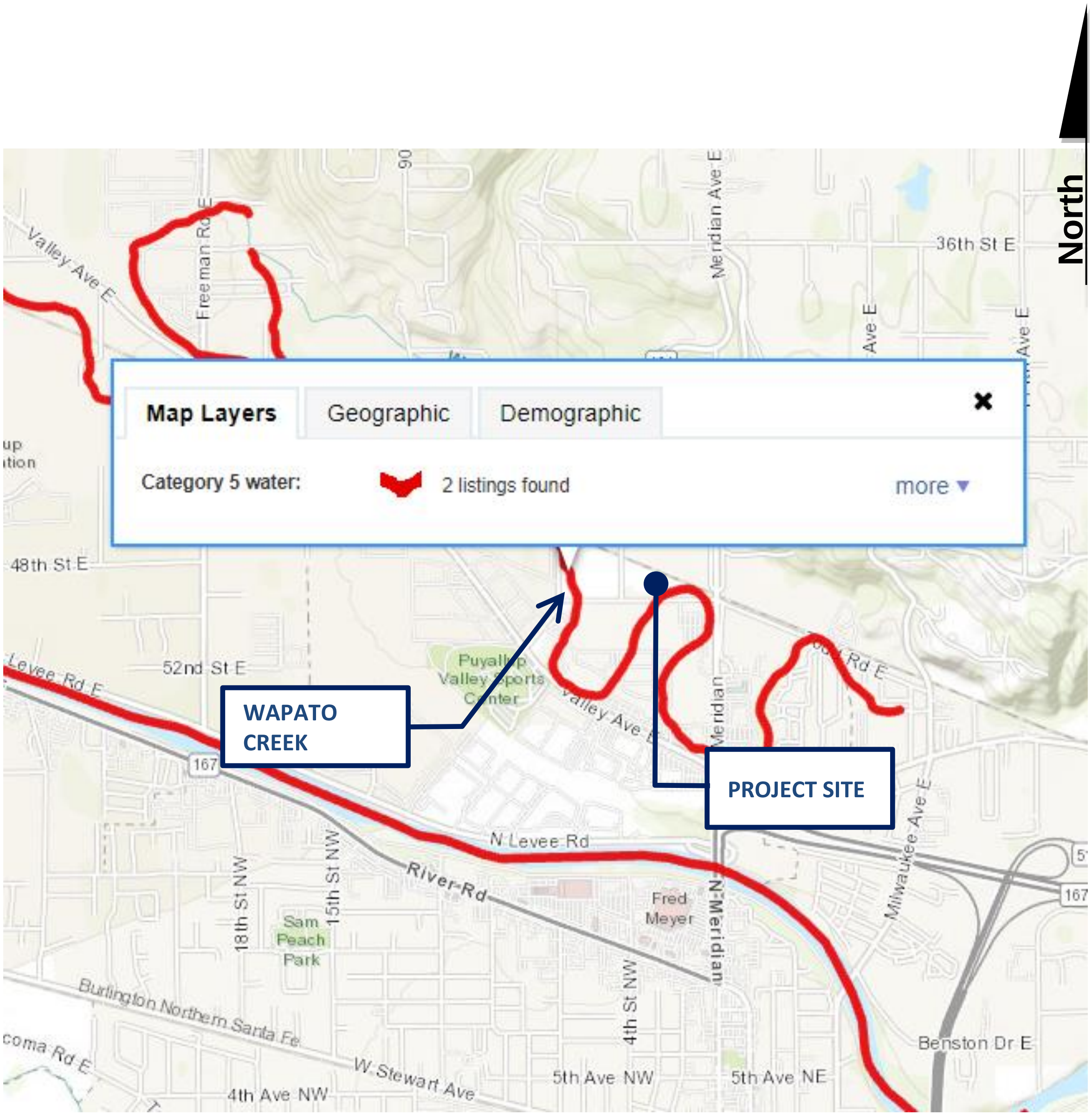
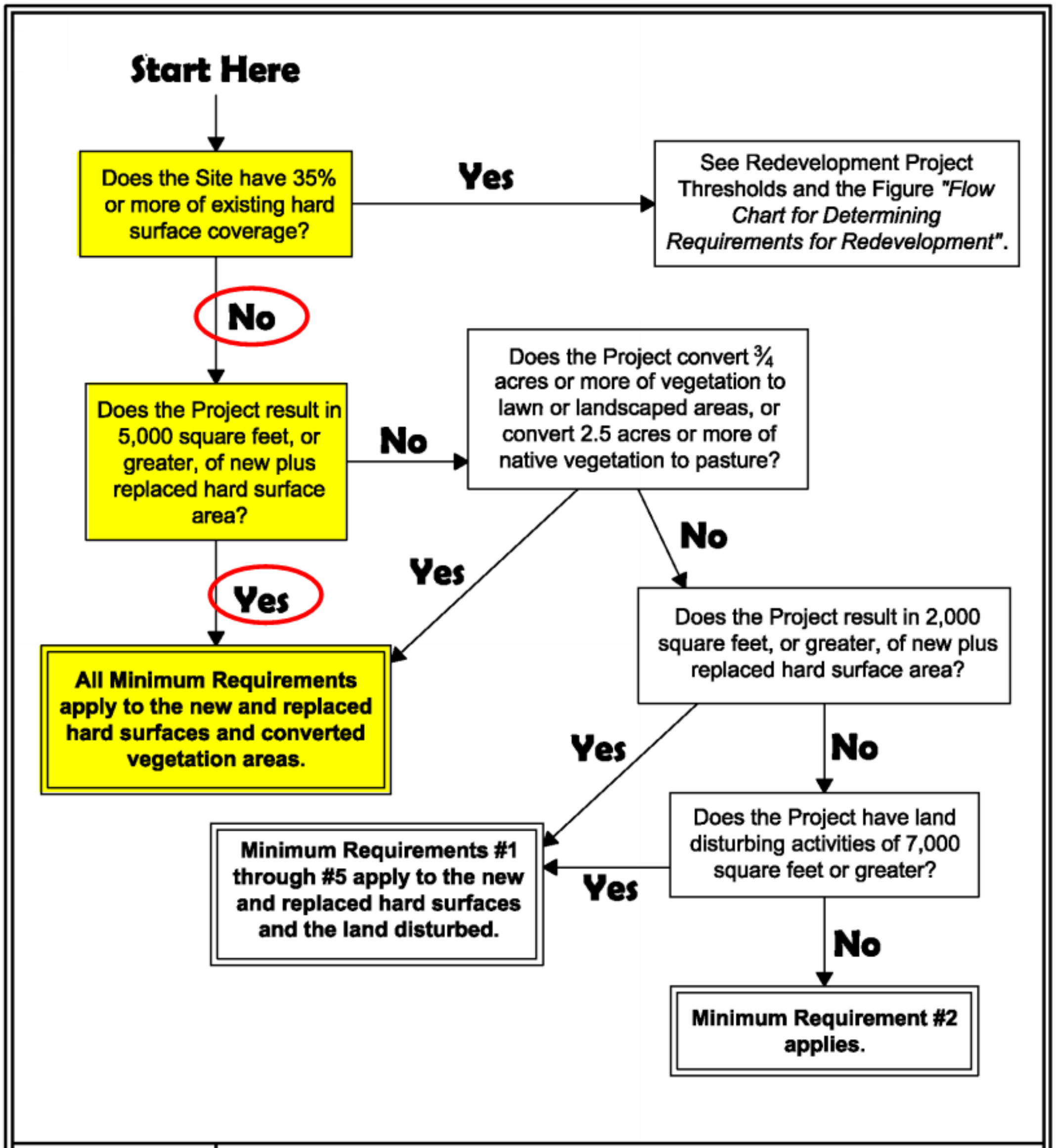


Image courtesy of DOE

Water Quality Assessment Map

Figure 5



DEPARTMENT OF
ECOLOGY
State of Washington

Flow Chart for Determining Requirements for New Development

Revised March 2019

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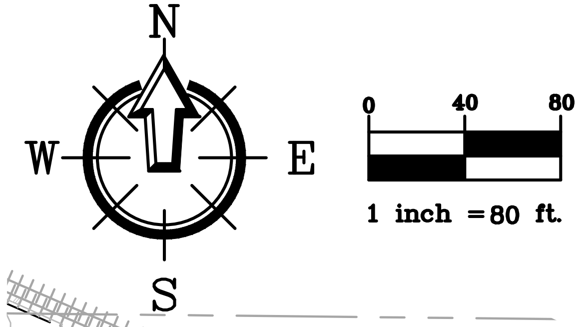
2019 DOE Minimum Requirements

Figure 6

Figure 7 - Post-development Basin Map



NOTE:
VEGETATION (NOT CONVERTED) IS PROPOSED LAWN/LANDSCAPING WHERE EXISTING GRAVEL SURFACING IS LOCATED. THIS PROPOSED PERVIOUS SURFACE IS NOT CONSIDERED CONVERTED VEGETATION AND WILL NOT BE MITIGATED TO A FORESTED CONDITION. BASED ON DEPARTMENT OF ECOLOGY RECOMMENDATION THESE SURFACES ARE MODELED AS ADDITIONAL AREA INFLOW. THEY ARE CONSIDERED IMPERVIOUS IN THE PRE-DEVELOPMENT STORMWATER MODEL. ALL OTHER SURFACES (NEW HARD SURFACE AND CONVERTED VEGETATION) ARE MITIGATED TO FORESTED CONDITION.

DRAINAGE LEGEND

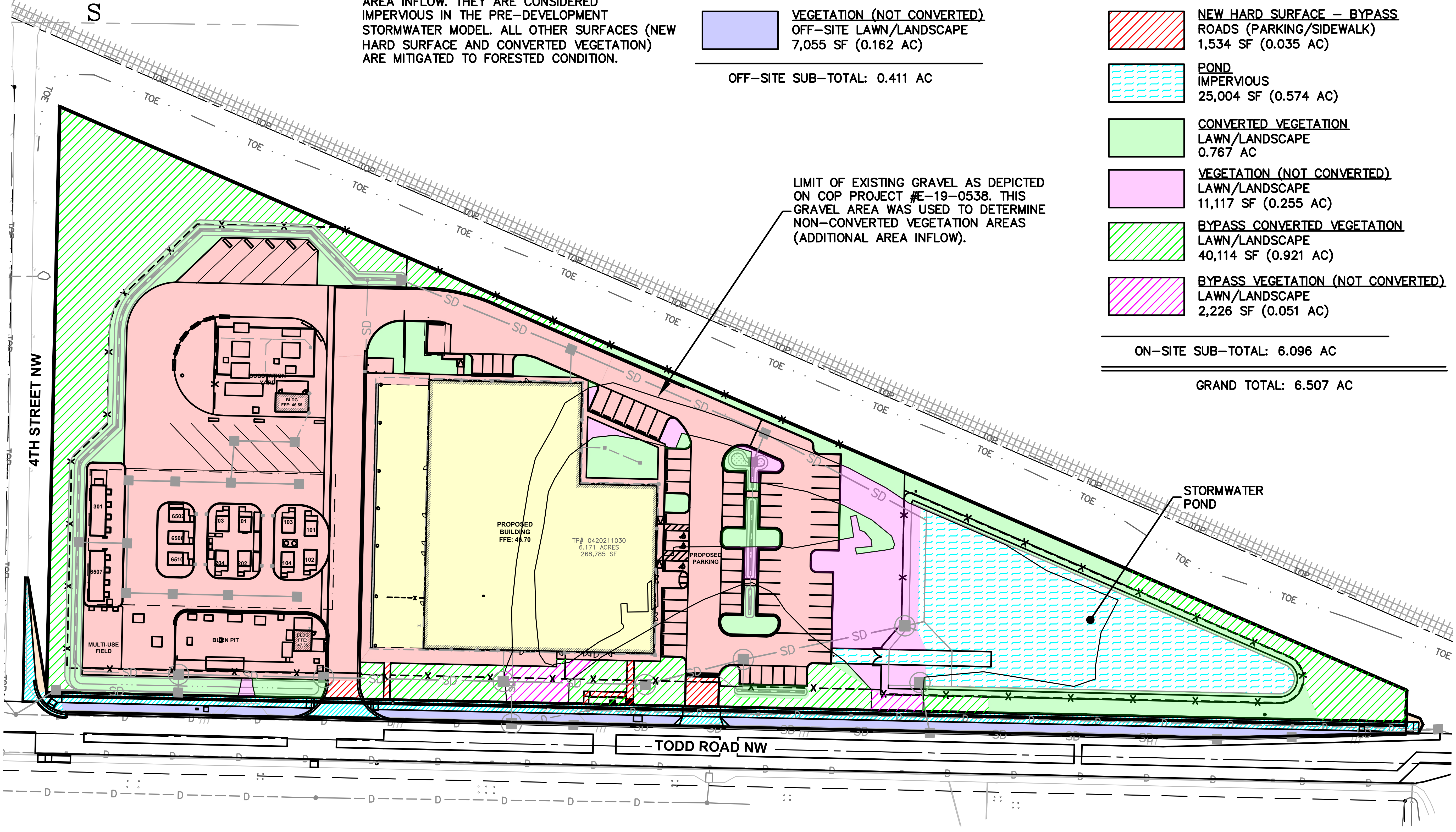
▨	NEW HARD SURFACE – BYPASS OFF-SITE ROADS (ROAD/SIDEWALK) 10,399 SF (0.239 AC)
🟧	CONVERTED VEGETATION OFF-SITE LAWN/LANDSCAPE 429 SF (0.010 AC)
🟪	VEGETATION (NOT CONVERTED) OFF-SITE LAWN/LANDSCAPE 7,055 SF (0.162 AC)

OFF-SITE SUB-TOTAL: 0.411 AC

🟥	NEW HARD SURFACE ROADS (PARKING/SIDEWALK) 109,172 SF (2.506 AC)
🟨	NEW HARD SURFACE ROOF TOPS 42,978 SF (0.987 AC)
▨	NEW HARD SURFACE – BYPASS ROADS (PARKING/SIDEWALK) 1,534 SF (0.035 AC)
▤	POND IMPERVIOUS 25,004 SF (0.574 AC)
🟩	CONVERTED VEGETATION LAWN/LANDSCAPE 0.767 AC
🟪	VEGETATION (NOT CONVERTED) LAWN/LANDSCAPE 11,117 SF (0.255 AC)
▨	BYPASS CONVERTED VEGETATION LAWN/LANDSCAPE 40,114 SF (0.921 AC)
▨	BYPASS VEGETATION (NOT CONVERTED) LAWN/LANDSCAPE 2,226 SF (0.051 AC)

ON-SITE SUB-TOTAL: 6.096 AC

GRAND TOTAL: 6.507 AC



DATE
Dec. 2023

SHEET NAME
Fig. 7

JOB #
22219

DRAWING #
22219SP19.DWG

SHEET CONTENTS
POST-DEVELOPMENT BASIN MAP

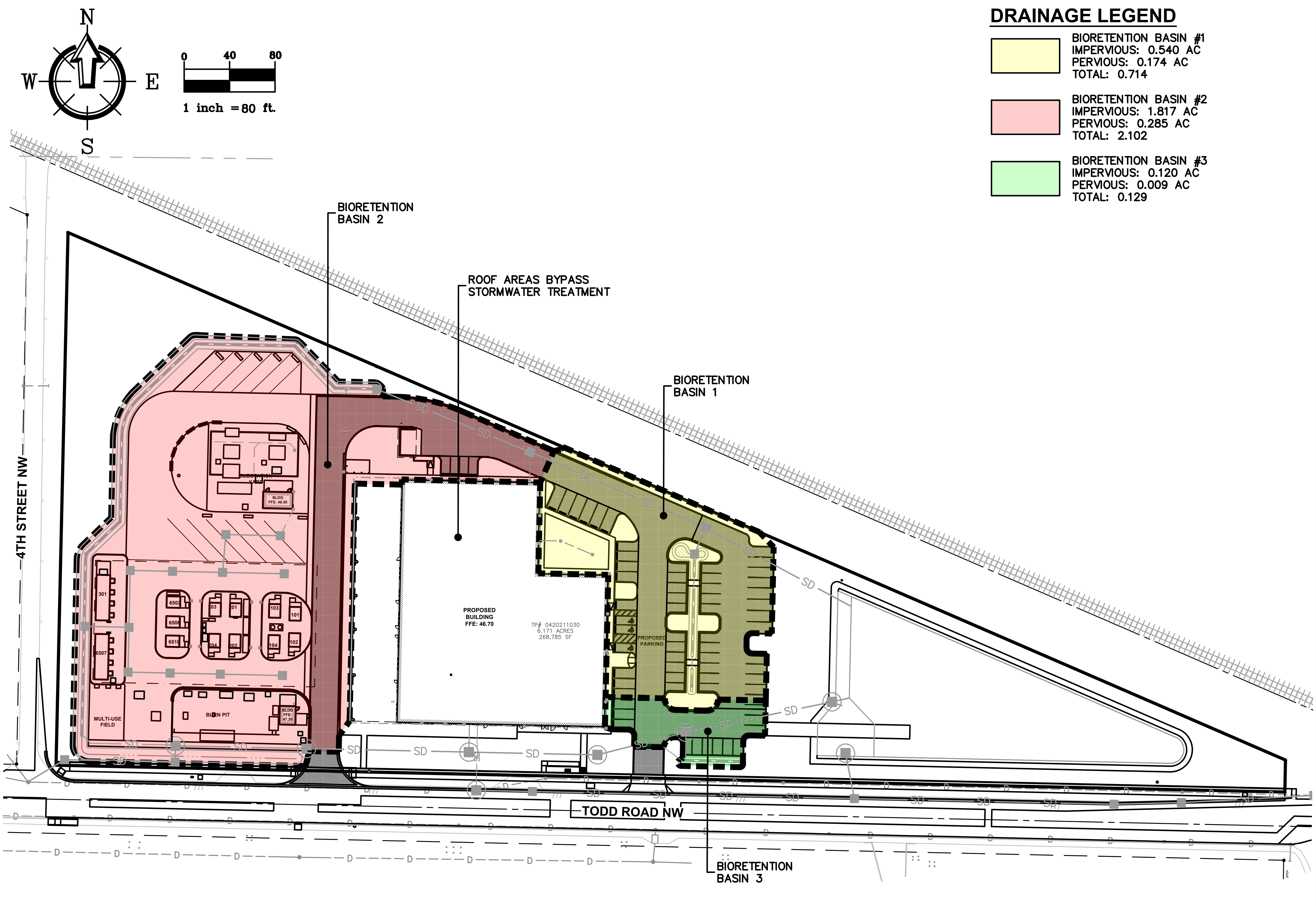
FREELAND
& ASSOCIATES

220 W. Champion Street, Suite 200
Bellingham, WA 98225
t: 360.650.1408
f: 360.650.1401

Figure 8 - Stormwater Treatment Basin Map

DRAINAGE LEGEND

🟨	BIORETENTION BASIN #1 IMPERVIOUS: 0.540 AC PERVIOUS: 0.174 AC TOTAL: 0.714
🟥	BIORETENTION BASIN #2 IMPERVIOUS: 1.817 AC PERVIOUS: 0.285 AC TOTAL: 2.102
🟩	BIORETENTION BASIN #3 IMPERVIOUS: 0.120 AC PERVIOUS: 0.009 AC TOTAL: 0.129



DATE
Dec. 2023

SHEET NAME
Fig. 8

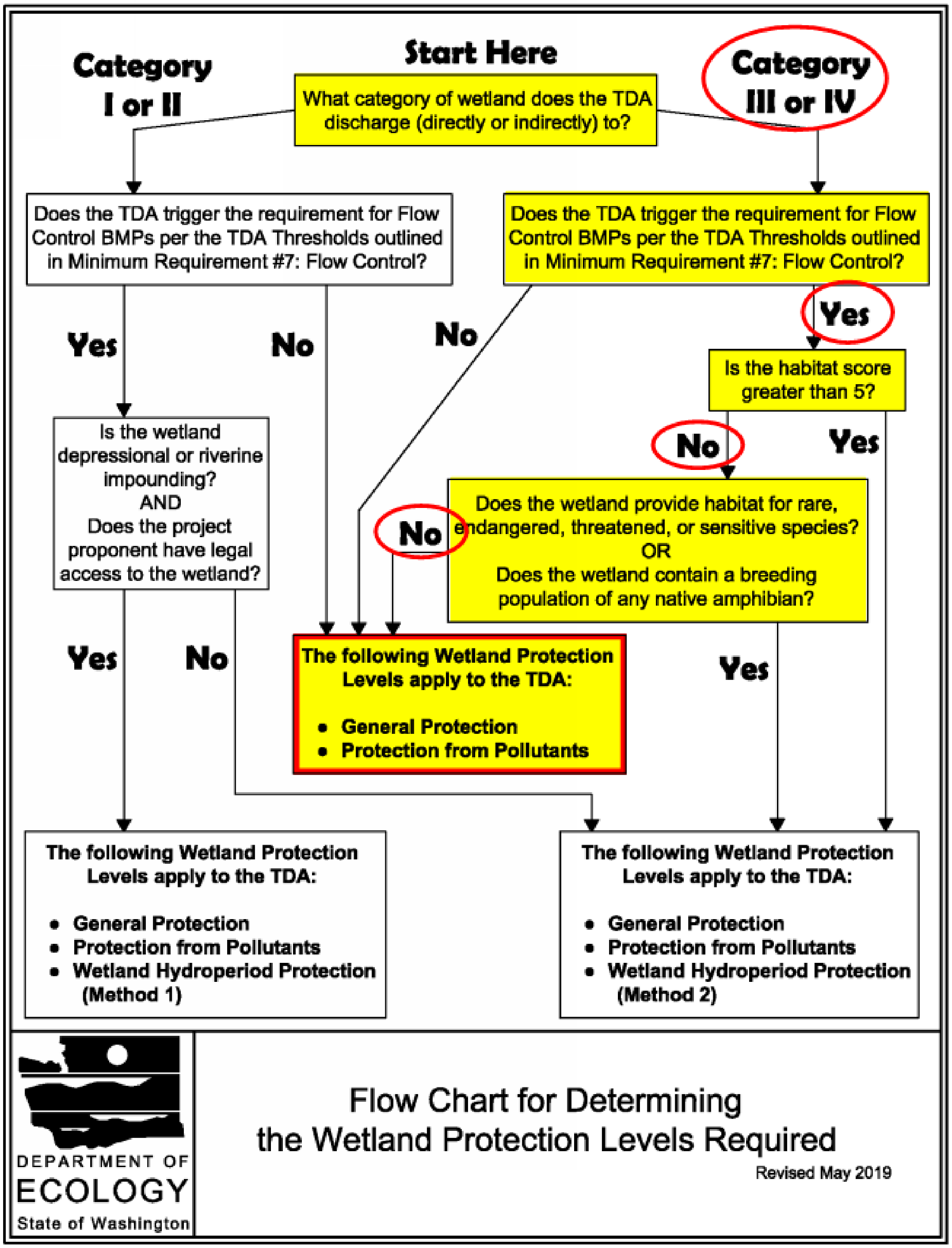
JOB #
22219

DRAWING #
22219SP19.DWG

SHEET CONTENTS
STORMWATER TREATMENT BASIN MAP

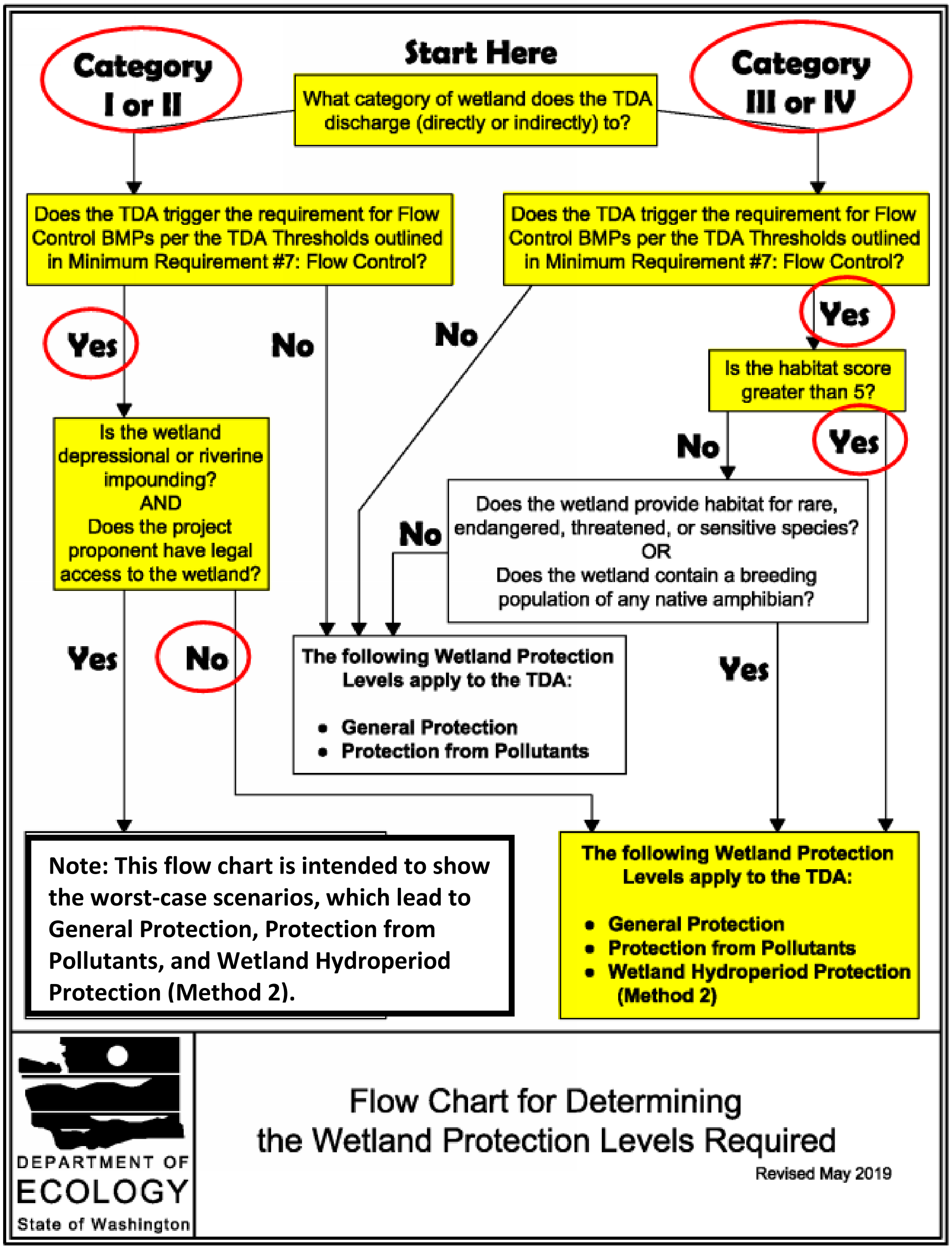
220 W. Champion Street, Suite 200
Bellingham, WA 98225
t: 360.650.1408
f: 360.650.1401

FREELAND
& ASSOCIATES



DOE Wetland Protection
On-Site Wetland

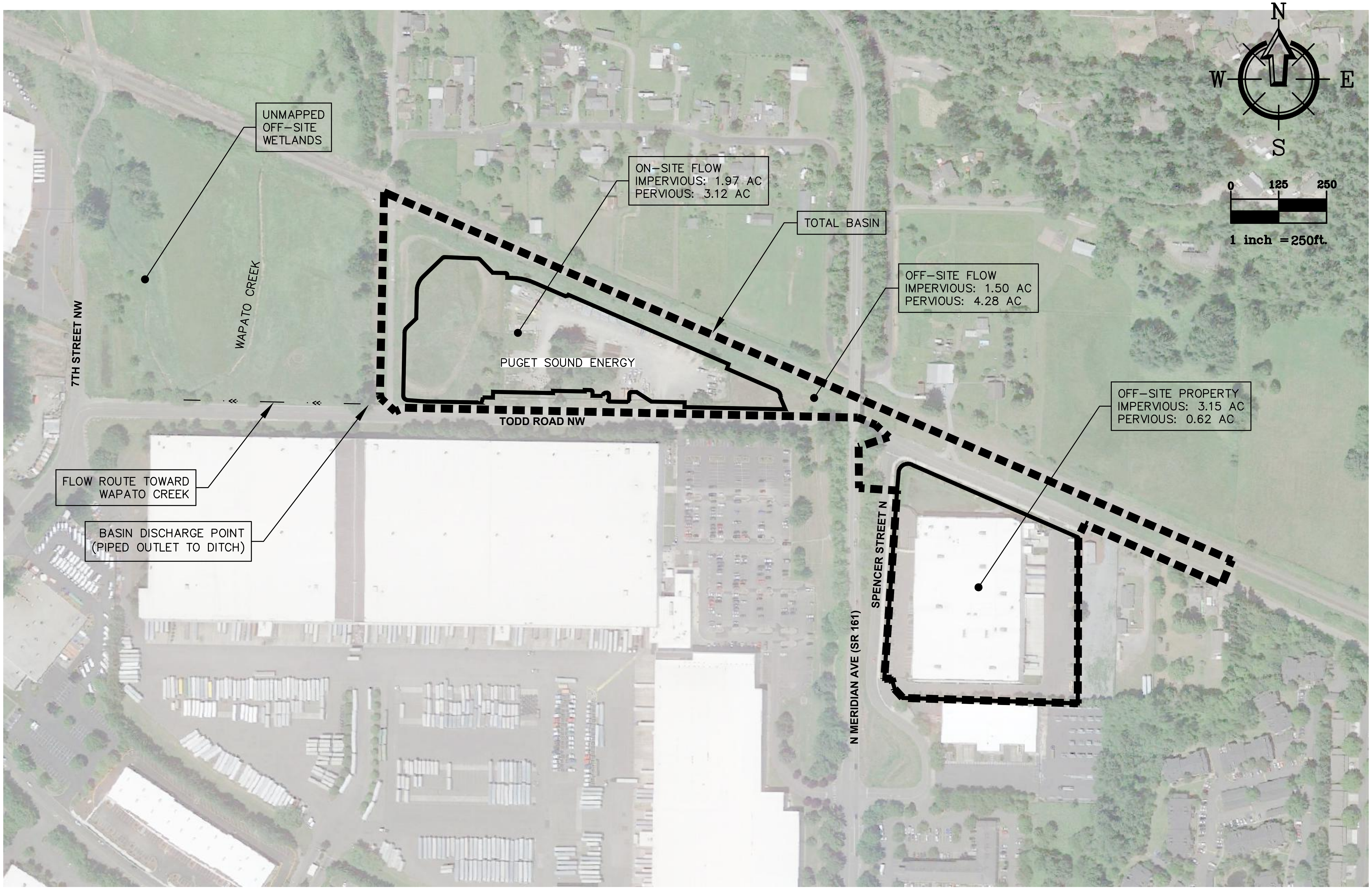
Figure 9



DOE Wetland Protection
Off-Site Wetland

Figure 10

Figure 11 – Pre-development Off-Site Wetland Basin



DATE

Dec. 2023

SHEET NAME

Fig. 11

JOB #

22219

DRAWING #

22219EXH1.DWG

SHEET CONTENTS

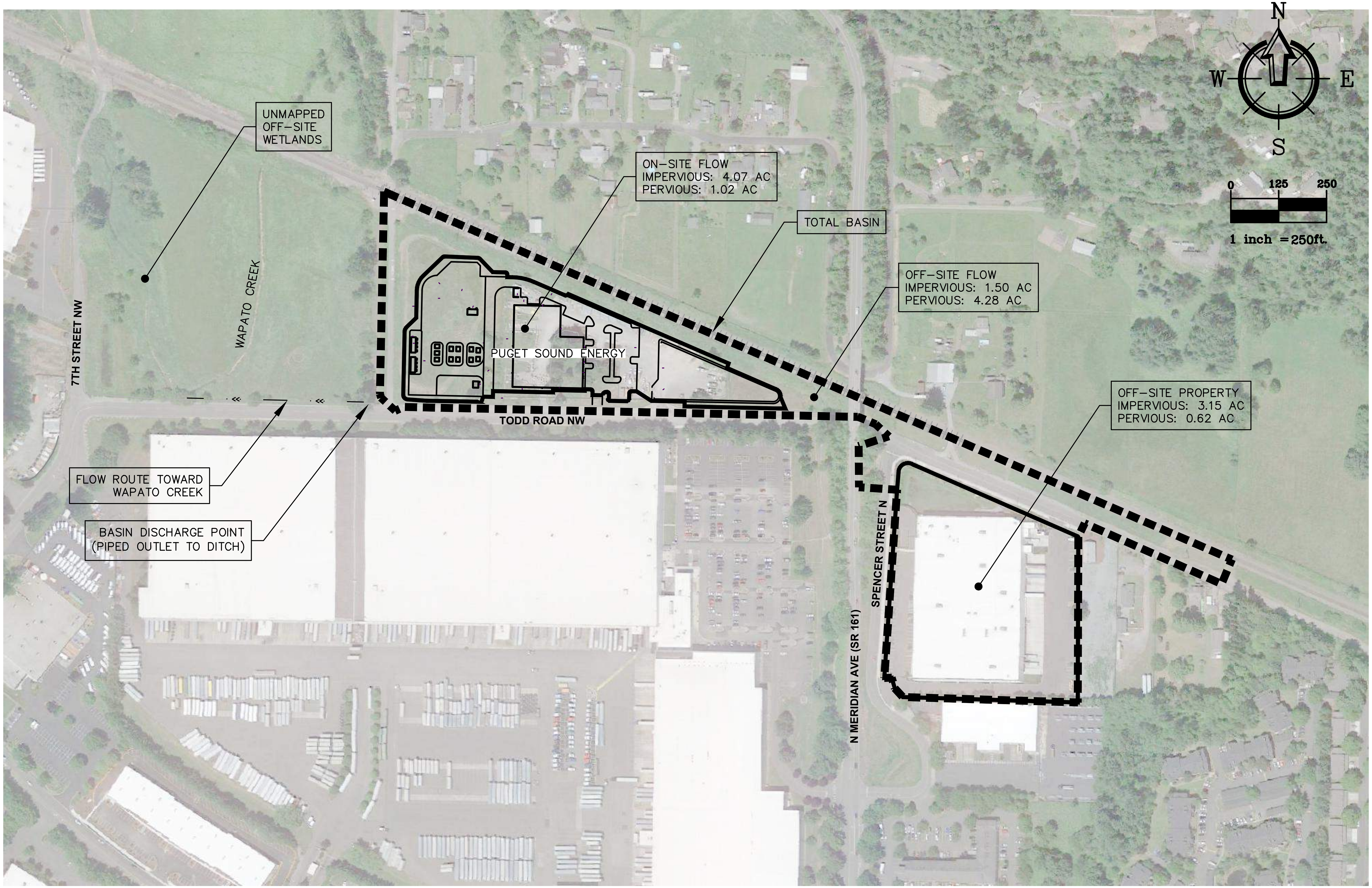
PRE-DEVELOPMENT OFF-SITE WETLAND BASIN

2500 Elm Street, Suite 1
Bellingham, WA 98225

t: 360.650.1408
f: 360.650.1401

FREELAND
& ASSOCIATES

Figure 12 – Post-development Off-Site Wetland Basin



DATE
Dec. 2023

SHEET NAME
Fig. 12

JOB #
22219

DRAWING #
22219EXH1.DWG

SHEET CONTENTS

POST-DEVELOPMENT
OFF-SITE WETLAND BASIN

2500 Elm Street, Suite 1
Bellingham, WA 98225
t: 360.650.1408
f: 360.650.1401

FREELAND
& ASSOCIATES

CALCULATIONS

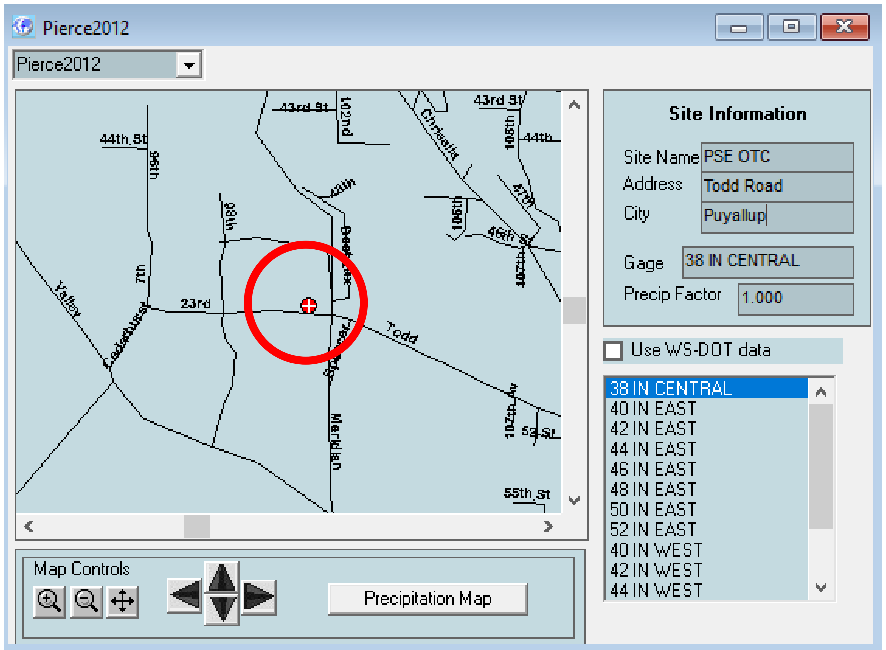
Stormwater Modeling Overview

In accordance with Puyallup Municipal Code 21.10.040 and the 2019 DOE Manual, Western Washington Hydrology Model v2012 (WWHM2012) software is used to model the anticipated stormwater flows and durations from the site. WWHM2012 software uses HSPF continuous simulation methodology to compare predevelopment discharge rates to post development discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow.

WWHM2012 has three categories for slopes: 0-5% flat, 5%-15% moderate, 15%+ steep. Slopes within the project site are generally flat and will be considered flat in the predevelopment and developed scenarios. Soils on the site belong to hydrologic groups 'A' and 'C/D', as mapped by the Natural Resources Conservation Service (NRCS), described previously in this report. For the purposes of stormwater modeling, all soil types will be considered 'C' due to the presence of shallow groundwater and low infiltration potential.

A 15-minute timestep will be used for this analysis. Precipitation data for the design uses the Puyallup 38-inch Central rain gage. Figure C1 below identifies the location of the project and WWHM2012 calculates the difference in rainfall with a precipitation scaling factor of 1.000.

Figure C1 – Rain Gage Scaling



Site Information

Site Name PSE OTC
Address Todd Road
City Puyallup
Gage 38 IN CENTRAL
Precip Factor 1.000

☐ Use WS-DOT data

- 38 IN CENTRAL
- 40 IN EAST
- 42 IN EAST
- 44 IN EAST
- 46 IN EAST
- 48 IN EAST
- 50 IN EAST
- 52 IN EAST
- 40 IN WEST
- 42 IN WEST
- 44 IN WEST

Considered new development, the project is required to provide flow control for the ***new and replaced*** hard surfaces and ***converted*** vegetation areas. Therefore, all ***new and replaced*** hard surfaces and ***converted*** vegetation areas will be considered forested in the predevelopment scenario.

Portions of the project site have already been developed with gravel surfacing and lawn areas. Therefore, there will be areas where new pervious surfaces are not considered a converted vegetation area. Based on correspondence with Department of Ecology, these areas with existing gravel that will be a pervious surface at completion of the project will be modeled as they exist in the predevelopment scenario (which is gravel). These are considered additional area inflow per the DOE Manual. A separate stormwater model will be prepared to ensure that the performance of the flow control BMP will not be compromised. Refer to the Appendix for stormwater modeling results demonstrating that the existing 100-year peak flow rate from the additional area is not greater than 50% of the 100-year developed peak flow rate (undetained) from the area requiring mitigation.

Roadwork including trenching, pavement replacement, grinding and overlaying will be necessary for completing utility extensions along City streets. Work associated with utility extensions is considered exempt from Minimum Requirements except for Minimum Requirement 2: Construction Stormwater Pollution Prevention Plan (SWPPP).

WWHM2012 software is used to determine the required size of the system that will meet the flow control standard in 2019 DOE Manual. Online stormwater treatment will be upstream of detention using bioretention cells for filtration. Stormwater treatment systems will be sized to treat at least 91% of the runoff volume using WWHM2012.

Existing Conditions (Predevelopment)

For modeling purposes, new and replaced impervious surfaces and converted vegetation areas are subject to flow control requirements and considered forested in the predevelopment scenario. Areas proposed to be new lawn/landscaping where existing gravel exists, will be modeled as they exist in the predevelopment scenario, which is gravel. Refer to Table C1 below for a summary of the predeveloped modeling conditions of the project and Figure 7 for a graphical depiction of the contributing basin.

Table C1
Predevelopment Modeling Characteristics

Type	Area (Acres)
On-Site Basin	
Forest	5.790
Parking (Existing Gravel)	0.306
Total Sub-Basin	**6.096**
Off-site Basin	
Forest	0.249
Parking (Existing Gravel)	0.162
Total Sub-Basin	**0.411**
Grand Total	**6.507**

Proposed Conditions (Post-developed)

Refer to Table C2 below for a summary of the post-developed modeling conditions for the project and Figure 7 for a graphical depiction of the contributing basin draining to the flow control facility.

Table C2
Post-development Modeling Characteristics

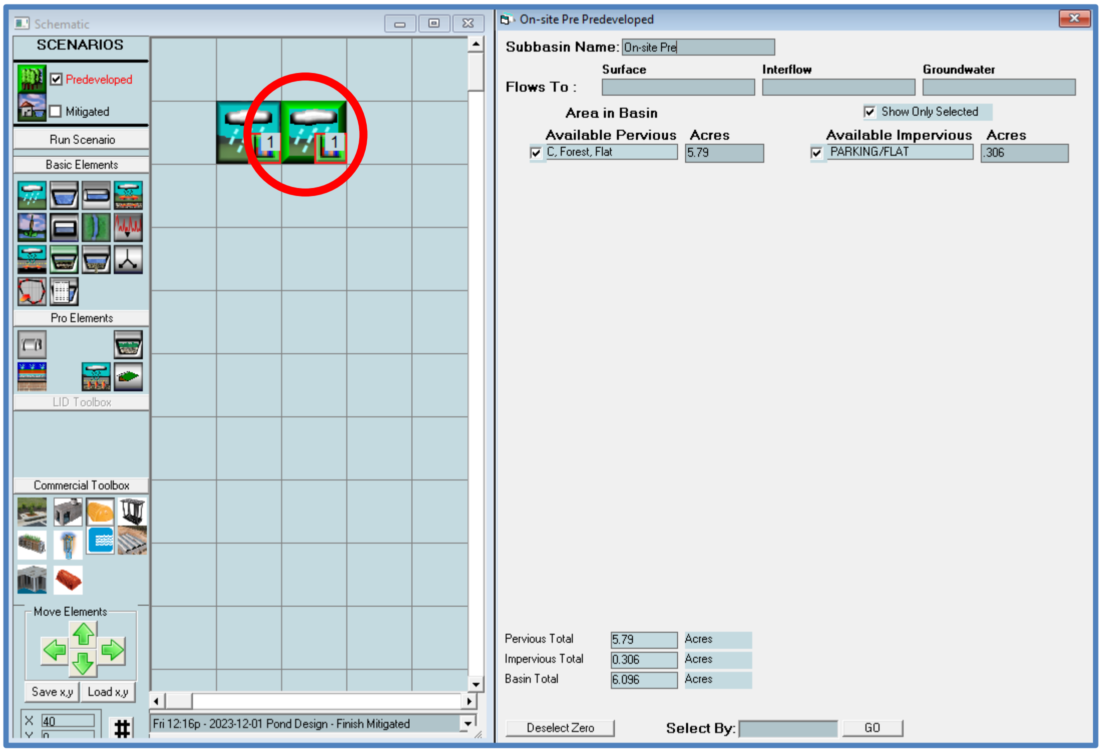
Type	Area (Acres)
On-Site Basin	
Roads (Parking/Sidewalk)	2.506
Roof Tops	0.987
Pond	0.574
Lawn* (Converted Vegetation)	0.767
Lawn* (Not Converted Vegetation)	0.255
Total Sub-Basin	**5.089**
On-Site Bypass Basin	
Driveways (Parking/Sidewalk)	0.035
Lawn* (Converted Vegetation)	0.921
Lawn* (Not Converted Vegetation)	0.051
Total Sub-Basin	**1.007**
Off-Site Bypass Basin	
Roads (Roads/Sidewalk)	0.239
Lawn* (Converted Vegetation)	0.010
Lawn* (Not Converted Vegetation)	0.162
Total Sub-Basin	**0.411**
Grand Total	**6.507**

*Note: Lawn is modeled as pasture per modeling credit associated with BMP T5.13.

Stormwater Modeling Input & Output - Flow Control Calculations

Screenshots of the software model are provided below. The left half of each screenshot shows the entire pre- or post-development stormwater model layout with a single component selected. The right half of each screenshot provides input information for the selected component of the model.

Figure C2 – Pre-development On-Site Basin



☑ Predeveloped
☐ Mitigated

X 40
Y 0

Fri 12:16p - 2023-12-01 Pond Design - Finish Mitigated

On-site Pre Predeveloped

Subbasin Name: On-site Pre

Flows To :

	Surface	Interflow	Groundwater
Flows To :			

Area in Basin

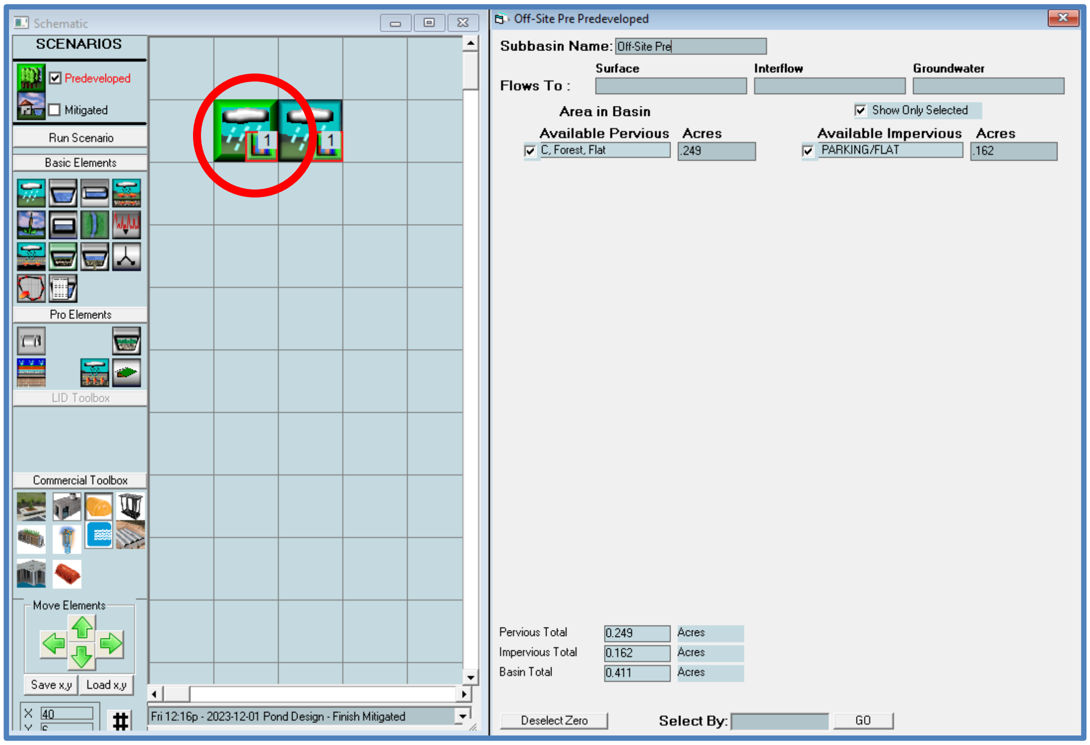
☑ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☑ C, Forest, Flat	5.79	☑ PARKING/FLAT	.306

Pervious Total	5.79	Acres
Impervious Total	0.306	Acres
Basin Total	6.096	Acres

Select By:

Figure C3 – Pre-development Off-Site Basin



Off-Site Pre Predeveloped

☑ Predeveloped
☐ Mitigated

Subbasin Name: Off-Site Pre

Flows To : Surface / Interflow / Groundwater

Area in Basin ☑ Show Only Selected

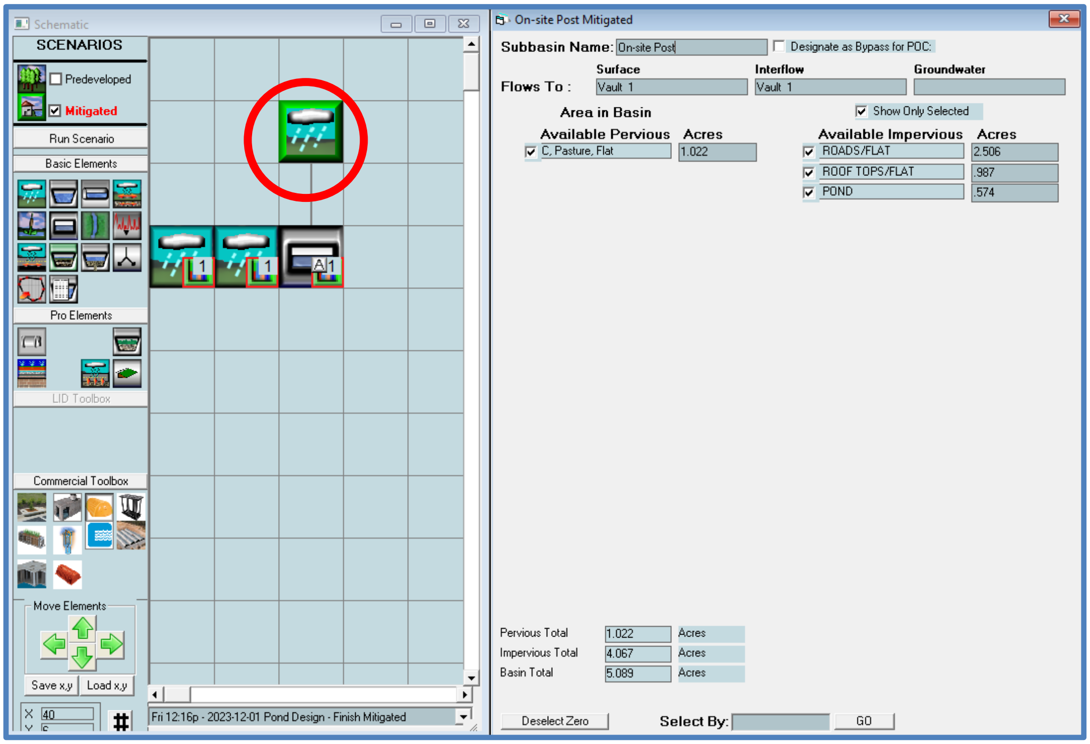
Available Pervious	Acres	Available Impervious	Acres
☑ C, Forest, Flat	.249	☑ PARKING/FLAT	.162

Pervious Total	0.249	Acres
Impervious Total	0.162	Acres
Basin Total	0.411	Acres

X 40

Fri 12:16p - 2023-12-01 Pond Design - Finish Mitigated

Figure C4 - Post-development On-Site Basin



On-site Post Mitigated

☐ Predeveloped
☑ Mitigated

Subbasin Name: On-site Post ☐ Designate as Bypass for POC:

Flows To : Surface: Vault 1 Interflow: Vault 1 Groundwater:

Area in Basin ☑ Show Only Selected

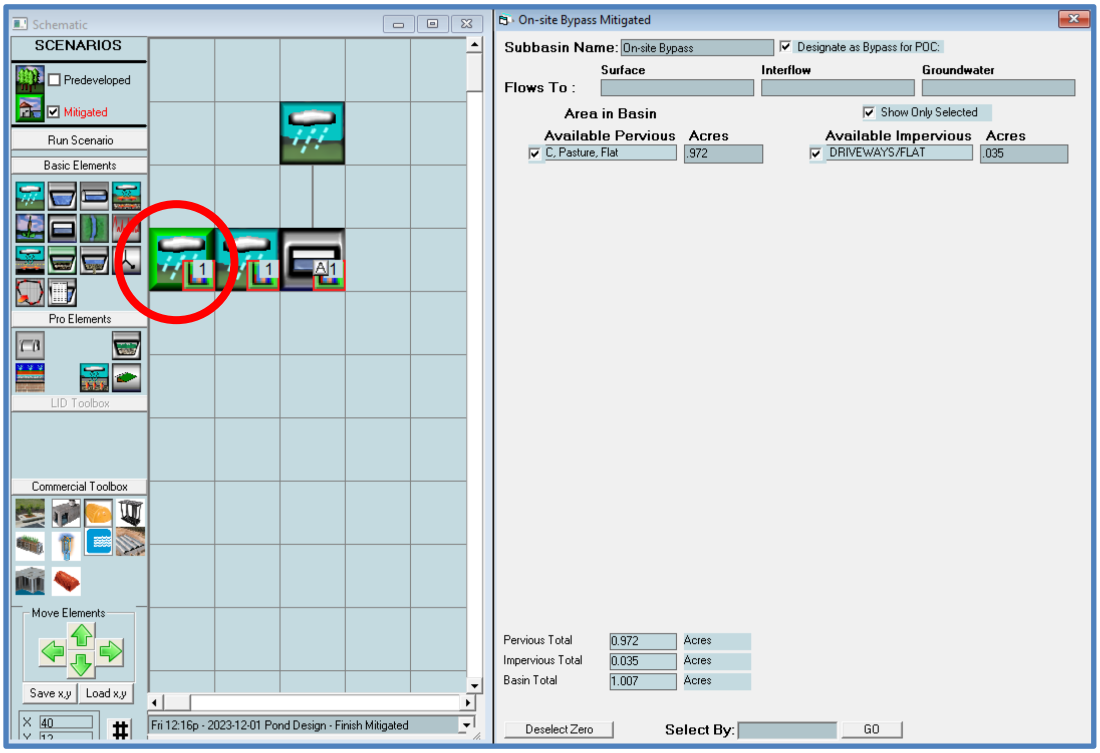
Available Pervious	Acres	Available Impervious	Acres
☑ C, Pasture, Flat	1.022	☑ ROADS/FLAT	2.506
		☑ ROOF TOPS/FLAT	.987
		☑ POND	.574

Pervious Total	1.022	Acres
Impervious Total	4.067	Acres
Basin Total	5.089	Acres

X 40

Fri 12:16p - 2023-12-01 Pond Design - Finish Mitigated

Figure C5 - Post-development On-Site Bypass Basin



☐ Predeveloped
☑ Mitigated

X 40

Fri 12:16p - 2023-12-01 Pond Design - Finish Mitigated

Subbasin Name: On-site Bypass
☑ Designate as Bypass for POC:

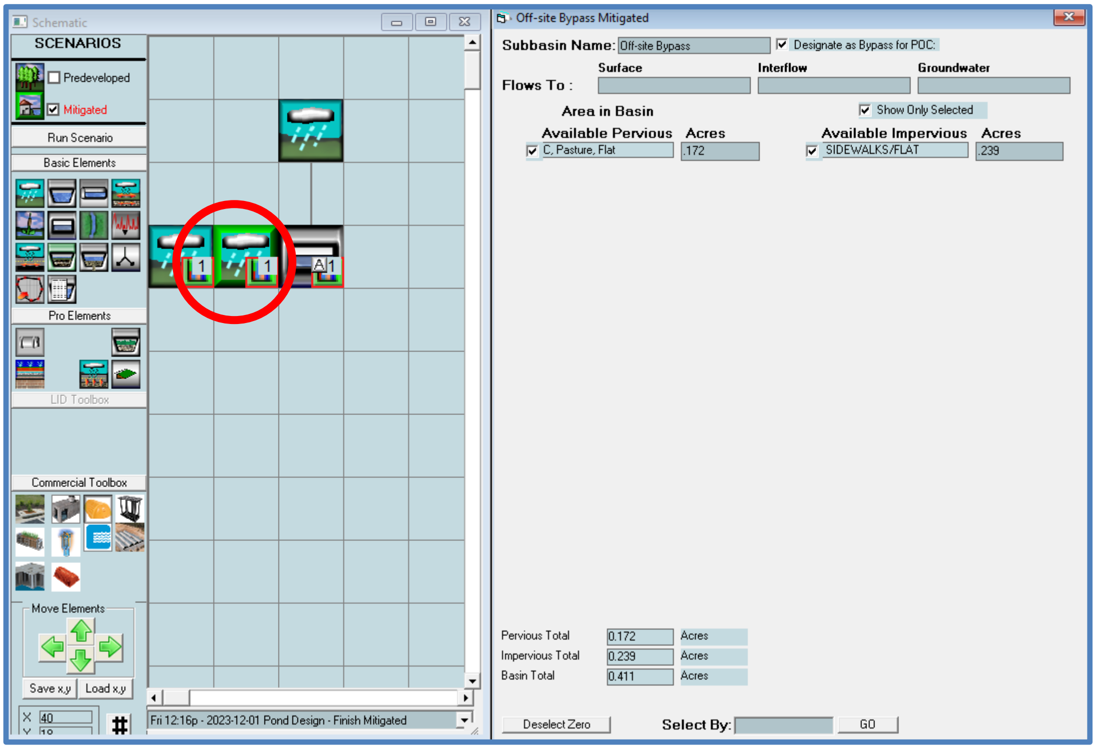
Flows To : Surface / Interflow / Groundwater

Area in Basin
☑ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☑ C, Pasture, Flat	.972	☑ DRIVEWAYS/FLAT	.035

Pervious Total	0.972	Acres
Impervious Total	0.035	Acres
Basin Total	1.007	Acres

Figure C6 - Post-development Off-Site Bypass Basin



☐ Predeveloped
☑ Mitigated

X 40

Fri 12:16p - 2023-12-01 Pond Design - Finish Mitigated

Subbasin Name: Off-site Bypass
☑ Designate as Bypass for POC:

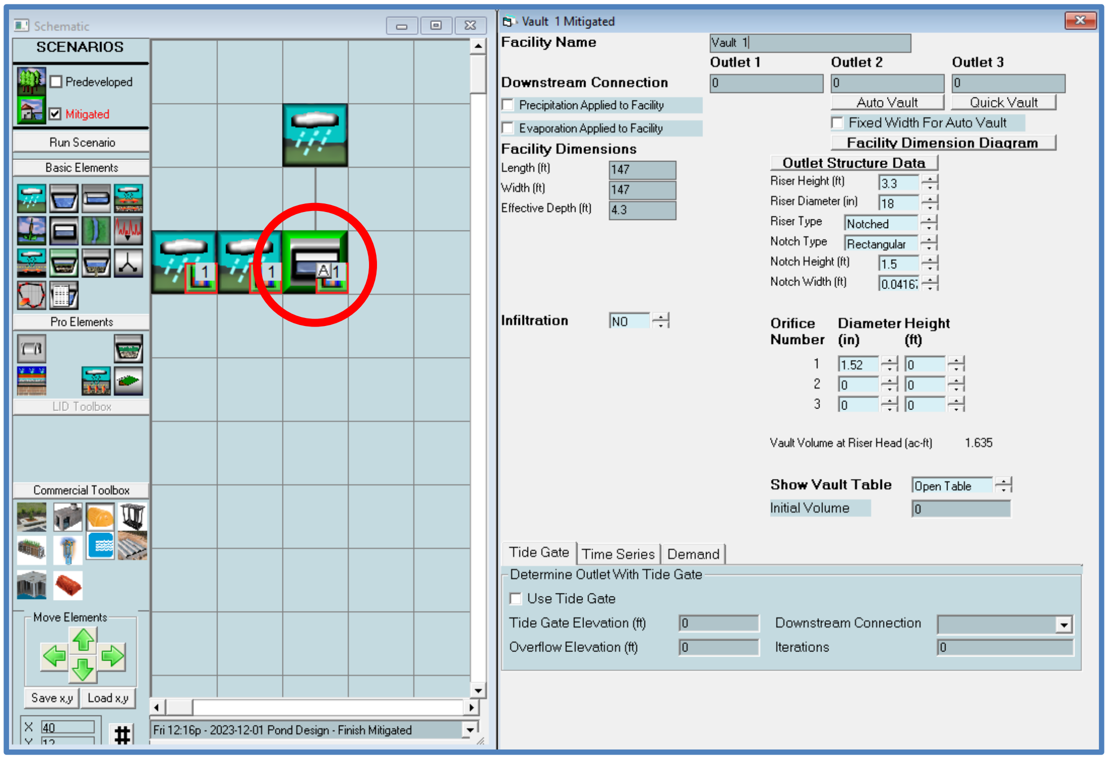
Flows To : Surface / Interflow / Groundwater

Area in Basin
☑ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☑ C, Pasture, Flat	.172	☑ SIDEWALKS/FLAT	.239

Pervious Total	0.172	Acres
Impervious Total	0.239	Acres
Basin Total	0.411	Acres

Figure C7 - Detention Design



Facility Name Vault 1

	Outlet 1	Outlet 2	Outlet 3
Downstream Connection	0	0	0

☐ Precipitation Applied to Facility
☐ Evaporation Applied to Facility
☐ Fixed Width For Auto Vault

Facility Dimensions
Length (ft) 147
Width (ft) 147
Effective Depth (ft) 4.3

Outlet Structure Data
Riser Height (ft) 3.3
Riser Diameter (in) 18
Riser Type Notched
Notch Type Rectangular
Notch Height (ft) 1.5
Notch Width (ft) 0.0416

Infiltration NO

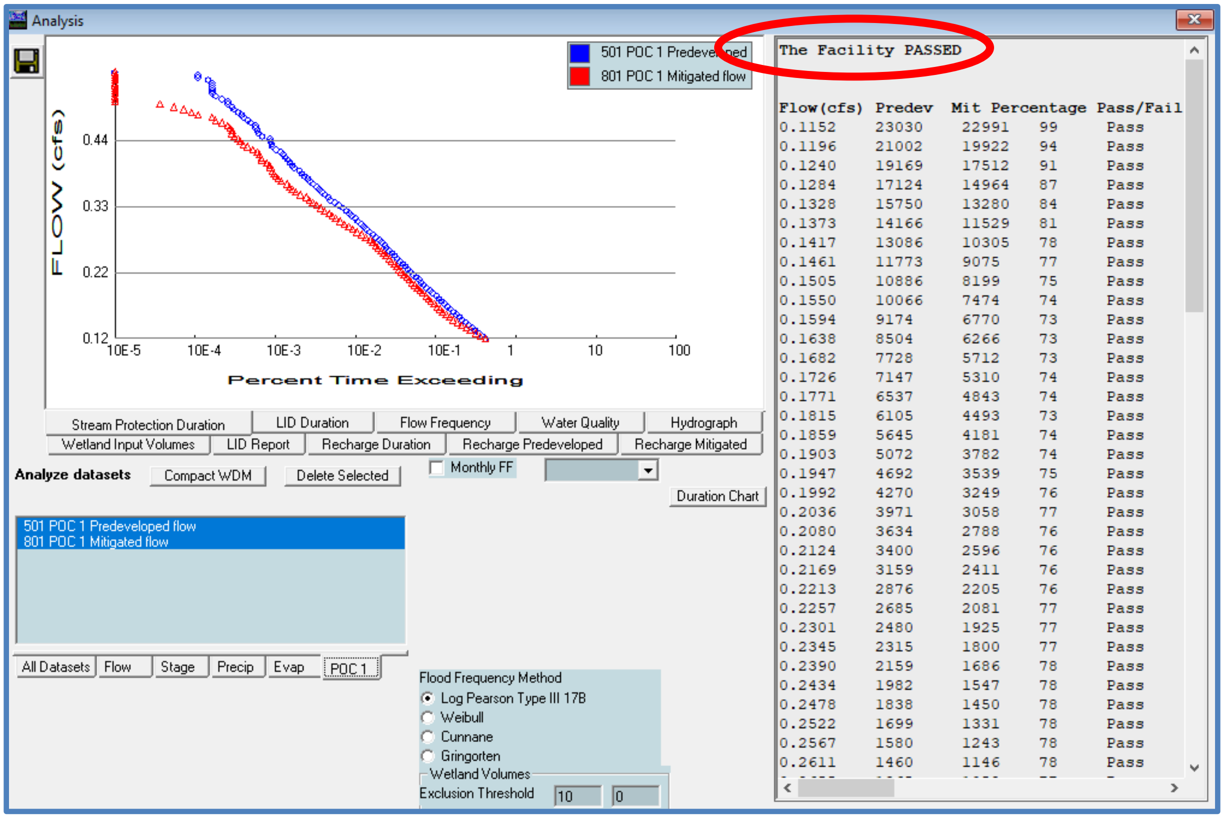
Orifice Number	Diameter (in)	Height (ft)
1	1.52	0
2	0	0
3	0	0

Vault Volume at Riser Head (ac-ft) 1.635

Initial Volume 0

Determine Outlet With Tide Gate
☐ Use Tide Gate
Tide Gate Elevation (ft) 0
Overflow Elevation (ft) 0
Downstream Connection
Iterations 0

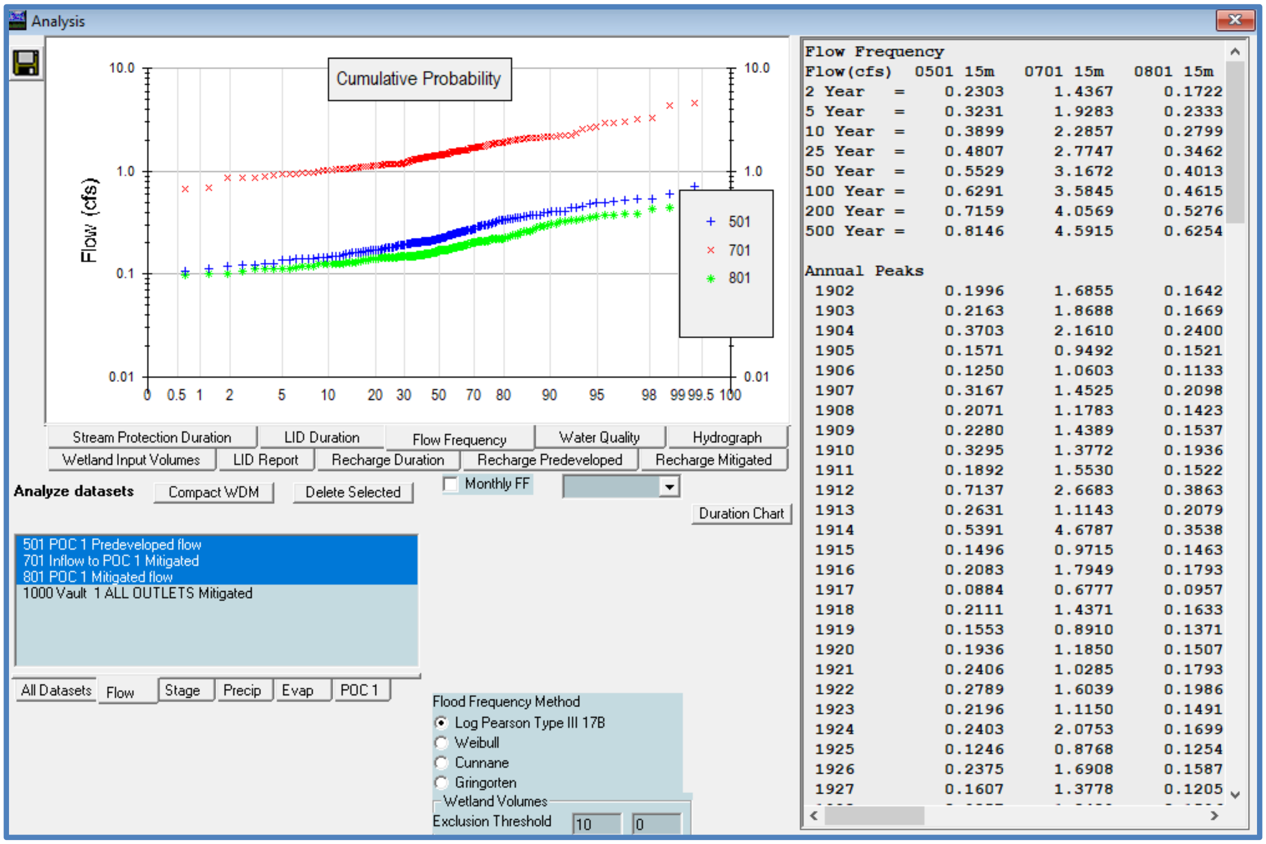
Figure C8 - Stream Protection Duration Analysis



```
The Facility PASSED


Flow(cfs) Predev  Mit Percentage Pass/Fail
0.1152    23030    22991    99       Pass
0.1196    21002    19922    94       Pass
0.1240    19169    17512    91       Pass
0.1284    17124    14964    87       Pass
0.1328    15750    13280    84       Pass
0.1373    14166    11529    81       Pass
0.1417    13086    10305    78       Pass
0.1461    11773    9075     77       Pass
0.1505    10886    8199     75       Pass
0.1550    10066    7474     74       Pass
0.1594    9174     6770     73       Pass
0.1638    8504     6266     73       Pass
0.1682    7728     5712     73       Pass
0.1726    7147     5310     74       Pass
0.1771    6537     4843     74       Pass
0.1815    6105     4493     73       Pass
0.1859    5645     4181     74       Pass
0.1903    5072     3782     74       Pass
0.1947    4692     3539     75       Pass
0.1992    4270     3249     76       Pass
0.2036    3971     3058     77       Pass
0.2080    3634     2788     76       Pass
0.2124    3400     2596     76       Pass
0.2169    3159     2411     76       Pass
0.2213    2876     2205     76       Pass
0.2257    2685     2081     77       Pass
0.2301    2480     1925     77       Pass
0.2345    2315     1800     77       Pass
0.2390    2159     1686     78       Pass
0.2434    1982     1547     78       Pass
0.2478    1838     1450     78       Pass
0.2522    1699     1331     78       Pass
0.2567    1580     1243     78       Pass
0.2611    1460     1146     78       Pass
```

Figure C9 - Flow Frequency Analysis



☐ Monthly FF

501 POC 1 Predeveloped flow
701 Inflow to POC 1 Mitigated
801 POC 1 Mitigated flow
1000 Vault 1 ALL OUTLETS Mitigated

Flood Frequency Method
● Log Pearson Type III 17B
○ Weibull
○ Cunnane
○ Gringorten

Wetland Volumes
Exclusion Threshold 10 0

```
Flow Frequency
Flow(cfs)  0501 15m   0701 15m   0801 15m
2 Year   =     0.2303     1.4367     0.1722
5 Year   =     0.3231     1.9283     0.2333
10 Year  =     0.3899     2.2857     0.2799
25 Year  =     0.4807     2.7747     0.3462
50 Year  =     0.5529     3.1672     0.4013
100 Year =     0.6291     3.5845     0.4615
200 Year =     0.7159     4.0569     0.5276
500 Year =     0.8146     4.5915     0.6254

Annual Peaks
 1902          0.1996     1.6855     0.1642
 1903          0.2163     1.8688     0.1669
 1904          0.3703     2.1610     0.2400
 1905          0.1571     0.9492     0.1521
 1906          0.1250     1.0603     0.1133
 1907          0.3167     1.4525     0.2098
 1908          0.2071     1.1783     0.1423
 1909          0.2280     1.4389     0.1537
 1910          0.3295     1.3772     0.1936
 1911          0.1892     1.5530     0.1522
 1912          0.7137     2.6683     0.3863
 1913          0.2631     1.1143     0.2079
 1914          0.5391     4.6787     0.3538
 1915          0.1496     0.9715     0.1463
 1916          0.2083     1.7949     0.1793
 1917          0.0884     0.6777     0.0957
 1918          0.2111     1.4371     0.1633
 1919          0.1553     0.8910     0.1371
 1920          0.1936     1.1850     0.1507
 1921          0.2406     1.0285     0.1793
 1922          0.2789     1.6039     0.1986
 1923          0.2196     1.1150     0.1491
 1924          0.2403     2.0753     0.1699
 1925          0.1246     0.8768     0.1254
 1926          0.2375     1.6908     0.1587
 1927          0.1607     1.3778     0.1205
```

Based on stormwater modeling, the detention system must be at least 147 feet long x 147 feet wide x 3.3 feet tall, or an equivalent volume of 71,310 cubic feet. The proposed stormwater detention pond design includes a designed storage volume of 79,400 cubic feet which exceeds the necessary volume. Therefore, the design meets the requirements.

The detention pond will be designed to ensure the outlet is above expected high groundwater. High groundwater is located at elevation 39, the pond outlet is at elevation 40.

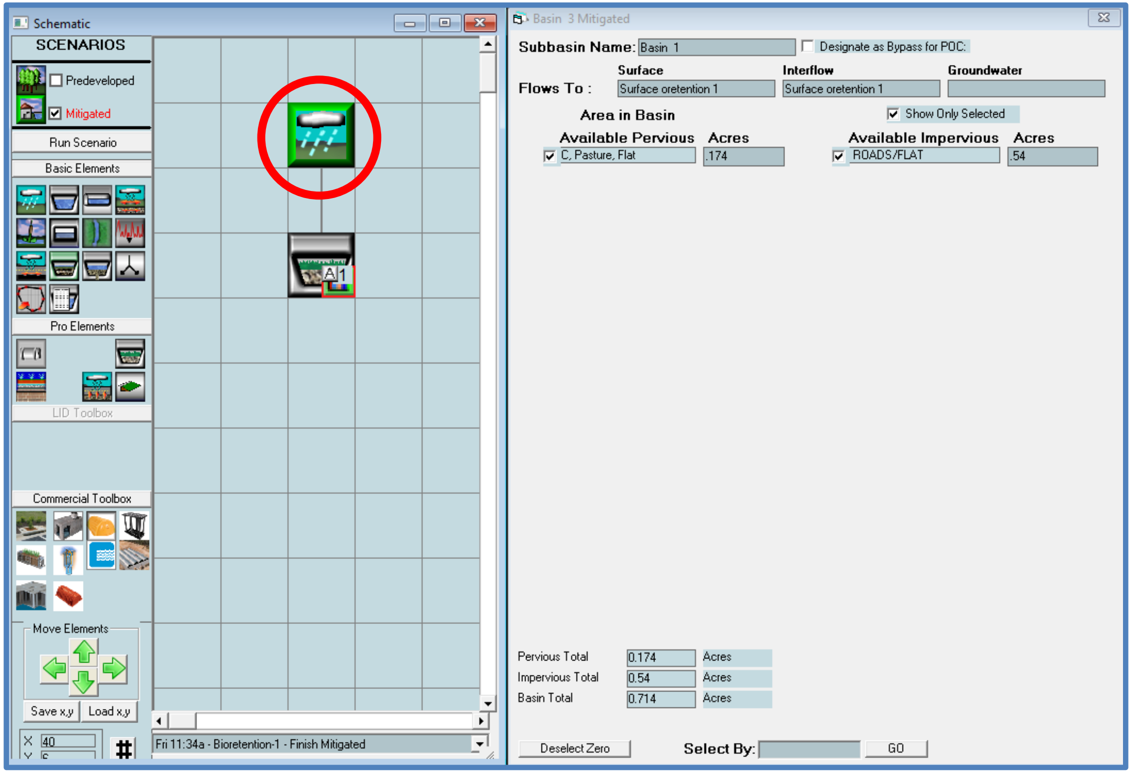
BMP T7.30 – Bioretention

Three bioretention cells are proposed to provide on-line treatment of stormwater runoff. Each cell has over 5,000 square feet of tributary area. The bioretention cell section consists of 18-inches of Bioretention Soil Mix over 18-inches of Mineral Aggregate Type 21. The Bioretention Soil Mix will be Ecology's default mix with an initial Ksat of 12 in/hr and a safety factor of 4. Based on geotechnical analysis, infiltration is infeasible, therefore no infiltration rate will be applied to the bioretention cell design. Refer to Figure 8 for a summary of the post-developed modeling conditions for each basin and a graphical depiction of the tributary area draining to each bioretention cell.

Stormwater Modeling Input & Output – Bioretention Treatment Calculations

Screenshots of the software model for the bioretention treatment calculations are provided below. The left half of each screenshot shows the entire pre- or post-development stormwater model layout with a single component selected. The right half of each screenshot provides input information for the selected component of the model.

Figure C10 – Bioretention Basin 1



Subbasin Name: Basin 1 ☐ Designate as Bypass for POC:

	Surface	Interflow	Groundwater
Flows To :	Surface oretention 1	Surface oretention 1	

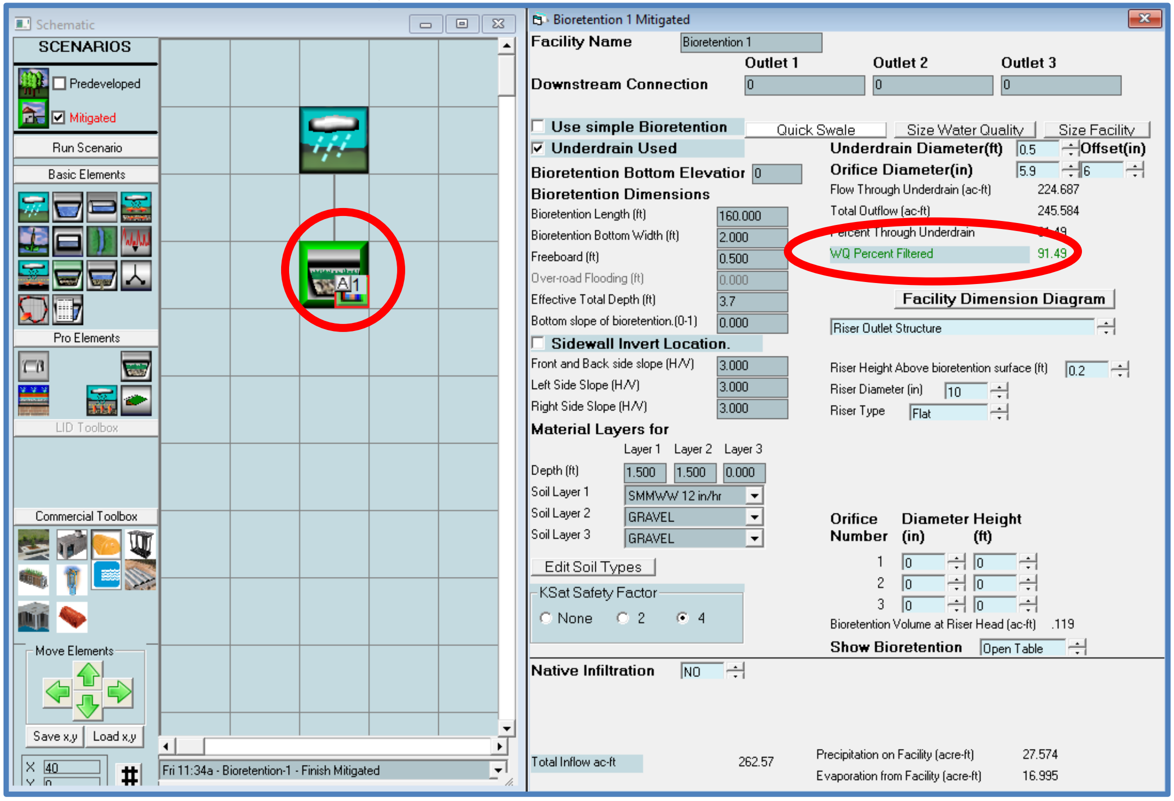
Area in Basin ☑ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☑ C, Pasture, Flat	.174	☑ ROADS/FLAT	.54

Pervious Total	0.174	Acres
Impervious Total	0.54	Acres
Basin Total	0.714	Acres

Select By:

Figure C11 – Bioretention 1 Analysis



Facility Name: Bioretention 1

	Outlet 1	Outlet 2	Outlet 3
Downstream Connection	0	0	0

☐ Use simple Bioretention

☑ Underdrain Used

Bioretention Bottom Elevatior 0

Bioretention Dimensions

Bioretention Length (ft)	160.000
Bioretention Bottom Width (ft)	2.000
Freeboard (ft)	0.500
Over-road Flooding (ft)	0.000
Effective Total Depth (ft)	3.7
Bottom slope of bioretention.(0-1)	0.000

☐ Sidewall Invert Location.

Front and Back side slope (H/V)	3.000
Left Side Slope (H/V)	3.000
Right Side Slope (H/V)	3.000

Material Layers for

	Layer 1	Layer 2	Layer 3
Depth (ft)	1.500	1.500	0.000

Soil Layer 1: SMMWW 12 in/hr
Soil Layer 2: GRAVEL
Soil Layer 3: GRAVEL

KSat Safety Factor: ○ None ○ 2 ● 4

Underdrain Diameter(ft) 0.5 Offset(in)
Orifice Diameter(in) 5.9 6

Flow Through Underdrain (ac-ft)	224.687
Total Outflow (ac-ft)	245.584
Percent Through Underdrain	91.49
WQ Percent Filtered	91.49

Riser Outlet Structure

Riser Height Above bioretention surface (ft) 0.2
Riser Diameter (in) 10
Riser Type Flat

Orifice Number	Diameter (in)	Height (ft)
1	0	0
2	0	0
3	0	0

Bioretention Volume at Riser Head (ac-ft) .119

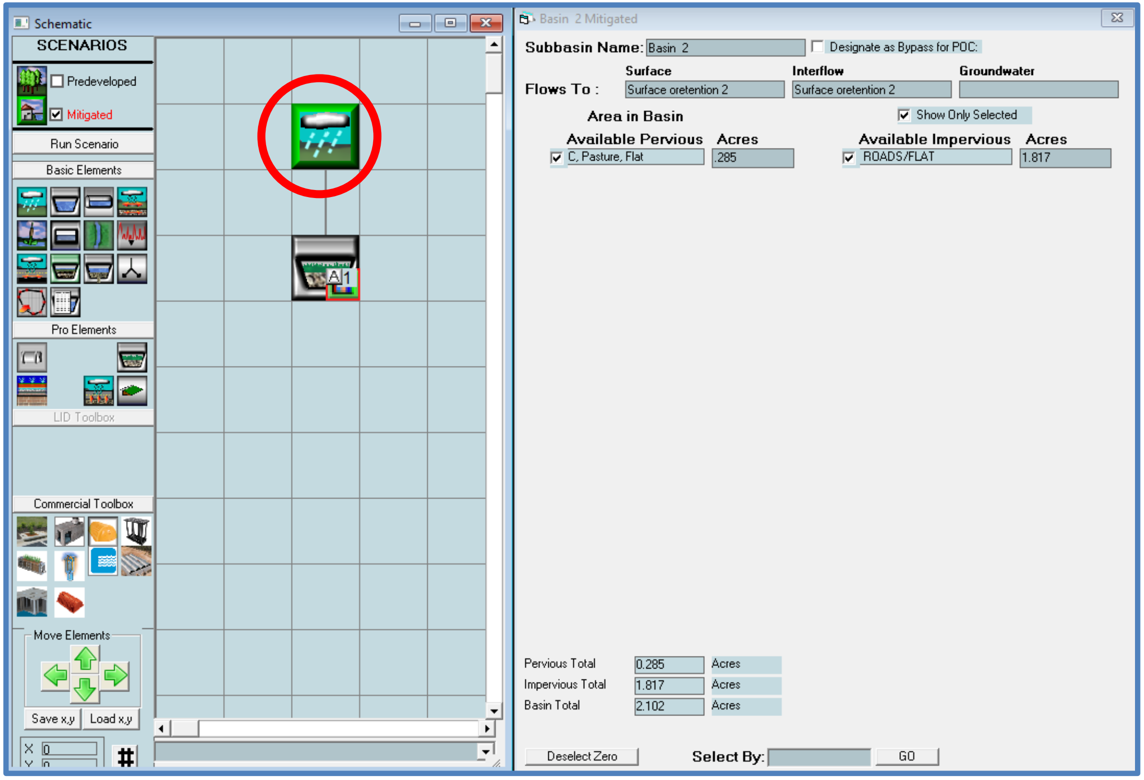
Show Bioretention: Open Table

Native Infiltration: NO

Total Inflow ac-ft 262.57

Precipitation on Facility (acre-ft) 27.574
Evaporation from Facility (acre-ft) 16.995

Figure C12 – Bioretention Basin 2



Subbasin Name: Basin 2 ☐ Designate as Bypass for POC:

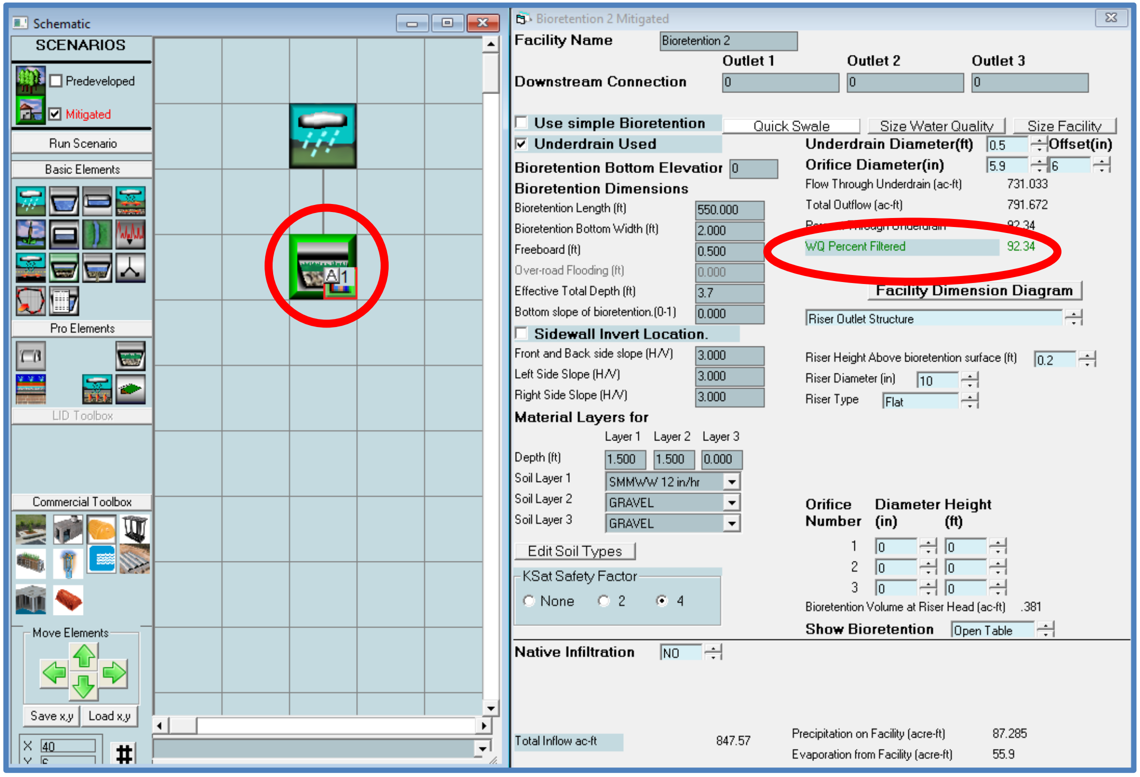
	Surface	Interflow	Groundwater
Flows To :	Surface oretention 2	Surface oretention 2	

Area in Basin ☑ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☑ C, Pasture, Flat	.285	☑ ROADS/FLAT	1.817

Pervious Total	0.285	Acres
Impervious Total	1.817	Acres
Basin Total	2.102	Acres

Figure C13 – Bioretention 2



Facility Name Bioretention 2

	Outlet 1	Outlet 2	Outlet 3
Downstream Connection	0	0	0

☐ **Use simple Bioretention**

☑ **Underdrain Used**

Bioretention Bottom Elevatior 0

Bioretention Dimensions

Bioretention Length (ft)	550.000
Bioretention Bottom Width (ft)	2.000
Freeboard (ft)	0.500
Over-road Flooding (ft)	0.000
Effective Total Depth (ft)	3.7
Bottom slope of bioretention.(0-1)	0.000

☐ **Sidewall Invert Location.**

Front and Back side slope (H/V)	3.000
Left Side Slope (H/V)	3.000
Right Side Slope (H/V)	3.000

Material Layers for

	Layer 1	Layer 2	Layer 3
Depth (ft)	1.500	1.500	0.000
Soil Layer 1	SMMWW 12 in/hr		
Soil Layer 2	GRAVEL		
Soil Layer 3	GRAVEL		

KSat Safety Factor: ○ None ○ 2 ● 4

Underdrain Diameter(ft) 0.5 **Offset(in)**

Orifice Diameter(in) 5.9 6

Flow Through Underdrain (ac-ft)	731.033
Total Outflow (ac-ft)	791.672
Percent Through Underdrain	92.34
WQ Percent Filtered	92.34

Riser Outlet Structure

Riser Height Above bioretention surface (ft)	0.2
Riser Diameter (in)	10
Riser Type	Flat

Orifice Number	Diameter (in)	Height (ft)
1	0	0
2	0	0
3	0	0

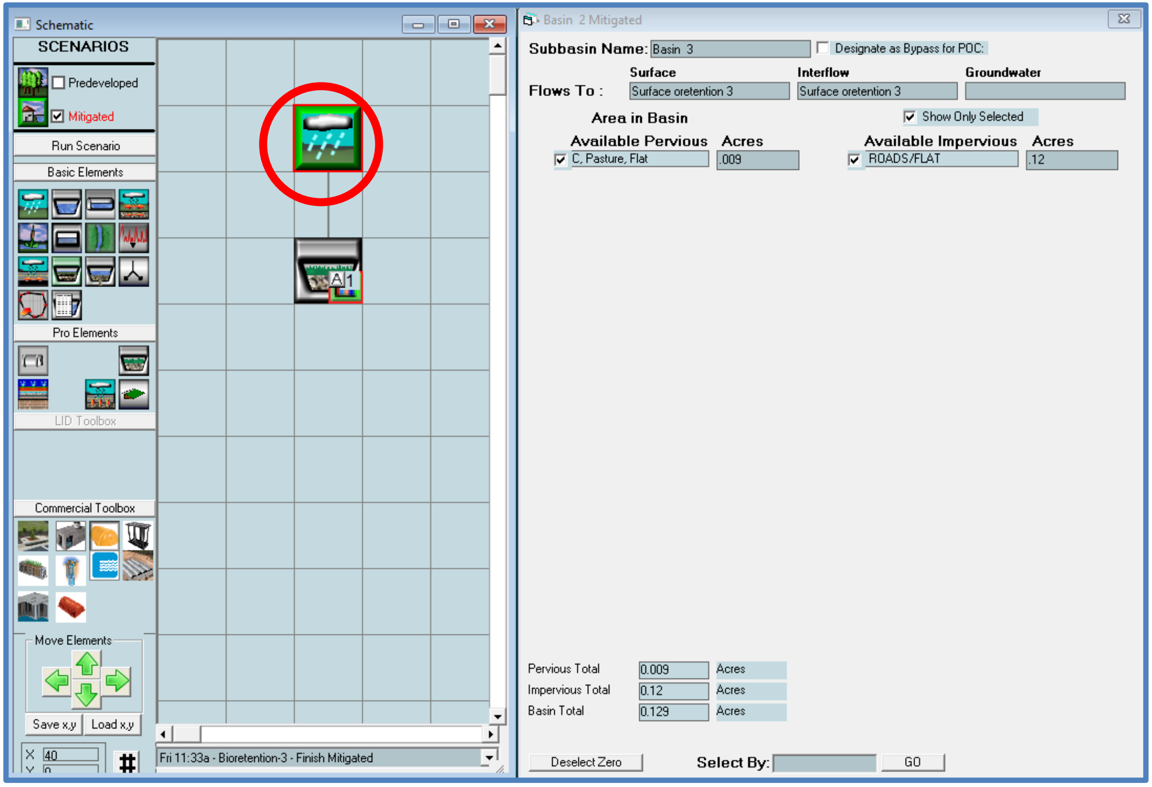
Bioretention Volume at Riser Head (ac-ft) .381

Show Bioretention Open Table

Native Infiltration NO

Total Inflow ac-ft	847.57	Precipitation on Facility (acre-ft)	87.285
		Evaporation from Facility (acre-ft)	55.9

Figure C14 – Bioretention Basin 3



Subbasin Name: Basin 3 ☐ Designate as Bypass for POC:

	Surface	Interflow	Groundwater
Flows To :	Surface oretention 3	Surface oretention 3	

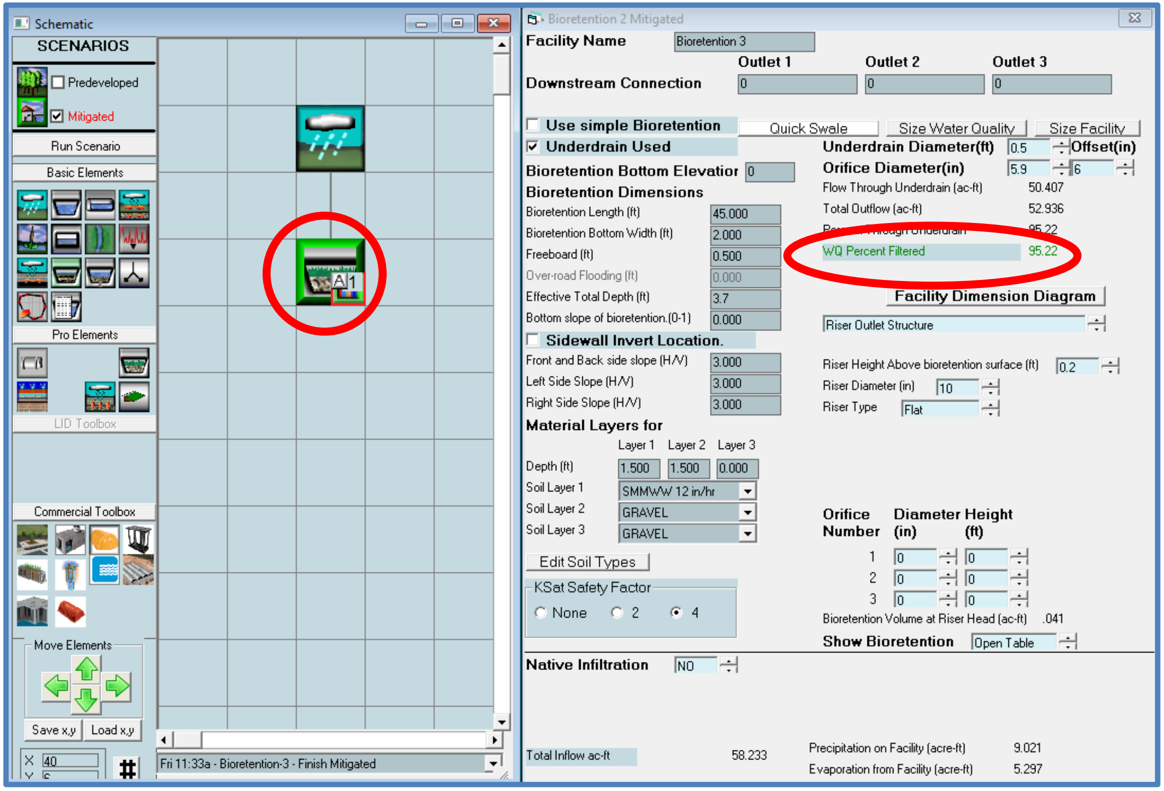
Area in Basin ☑ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☑ C, Pasture, Flat	.009	☑ ROADS/FLAT	.12

Pervious Total	0.009	Acres
Impervious Total	0.12	Acres
Basin Total	0.129	Acres

Deselect Zero **Select By:** GO

Figure C15 – Bioretention 3 Analysis



Facility Name Bioretention 3

	Outlet 1	Outlet 2	Outlet 3
Downstream Connection	0	0	0

☐ **Use simple Bioretention**

☑ **Underdrain Used**

Bioretention Bottom Elevatior 0

Bioretention Dimensions

Bioretention Length (ft)	45.000
Bioretention Bottom Width (ft)	2.000
Freeboard (ft)	0.500
Over-road Flooding (ft)	0.000
Effective Total Depth (ft)	3.7
Bottom slope of bioretention.(0-1)	0.000

☐ **Sidewall Invert Location.**

Front and Back side slope (H/V)	3.000
Left Side Slope (H/V)	3.000
Right Side Slope (H/V)	3.000

Material Layers for

	Layer 1	Layer 2	Layer 3
Depth (ft)	1.500	1.500	0.000
Soil Layer 1	SMMWW 12 in/hr		
Soil Layer 2	GRAVEL		
Soil Layer 3	GRAVEL		

KSat Safety Factor ○ None ○ 2 ● 4

Underdrain Diameter(ft) 0.5 **Offset(in)**

Orifice Diameter(in) 5.9 6

Flow Through Underdrain (ac-ft)	50.407
Total Outflow (ac-ft)	52.936
Percent Through Underdrain	95.22
WQ Percent Filtered	95.22

Riser Outlet Structure

Riser Height Above bioretention surface (ft) 0.2

Riser Diameter (in) 10

Riser Type Flat

Orifice Number	Diameter (in)	Height (ft)
1	0	0
2	0	0
3	0	0

Bioretention Volume at Riser Head (ac-ft) .041

Show Bioretention Open Table

Native Infiltration NO

Total Inflow ac-ft	58.233	Precipitation on Facility (acre-ft)	9.021
		Evaporation from Facility (acre-ft)	5.297

As shown in figures above, bioretention cells will provide on-line treatment with greater than 91% filtration per the 2019 DOE Manual. Therefore, the bioretention cells shown in the proposed civil plans are adequately sized to filter their contributing sub-basins. Groundwater is expected to remain below the bottom of bioretention cells, therefore, no impermeable lines are specified. See civil plans for complete treatment facility designs and details.

Emergency Overflow Conveyance Capacity

Stormwater runoff will discharge from the site’s flow control facility using 15-inch diameter pipe at a minimum slope of 0.5 percent. Mitigated and un-mitigated 15-minute 100-year stormwater flow rates from the stormwater management facility are shown in Figure C9 above.

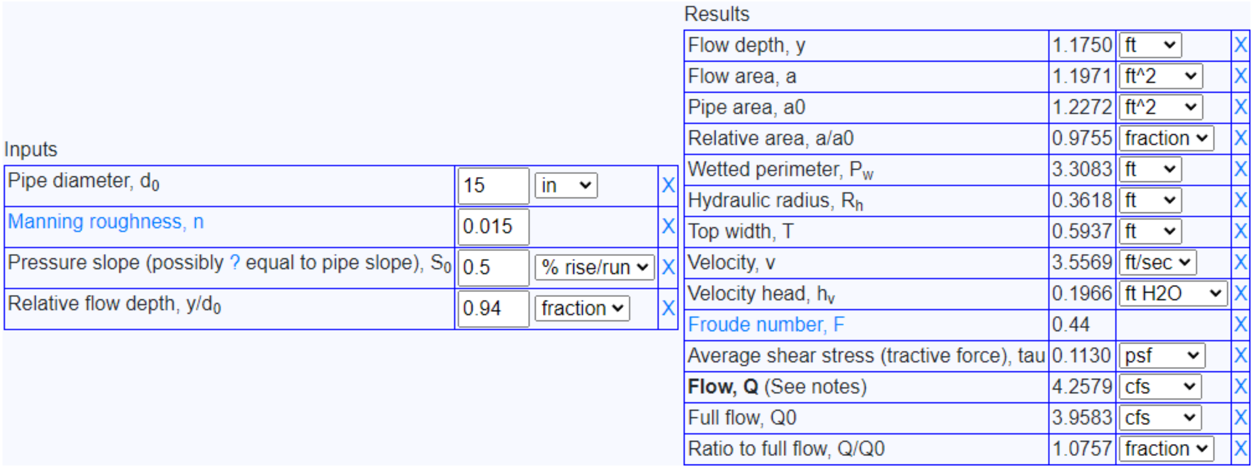
Given:

- Peak 100-year undetained flow rate from flow control facility: = 3.58 cfs
- Discharge Pipe Minimum Slope: 0.50%
- Pipe Diameter: 15 inches

Determine:

- Pipe Suitability

From Manning's Pipe Calculator:



Inputs

Pipe diameter, d_0	15	in	X
Manning roughness, n	0.015		X
Pressure slope (possibly ? equal to pipe slope), S_0	0.5	% rise/run	X
Relative flow depth, y/d_0	0.94	fraction	X

Results

Flow depth, y	1.1750	ft	X
Flow area, a	1.1971	ft^2	X
Pipe area, a0	1.2272	ft^2	X
Relative area, a/a0	0.9755	fraction	X
Wetted perimeter, P_w	3.3083	ft	X
Hydraulic radius, R_h	0.3618	ft	X
Top width, T	0.5937	ft	X
Velocity, v	3.5569	ft/sec	X
Velocity head, h_v	0.1966	ft H2O	X
Froude number, F	0.44		X
Average shear stress (tractive force), tau	0.1130	psf	X
Flow, Q (See notes)	4.2579	cfs	X
Full flow, Q0	3.9583	cfs	X
Ratio to full flow, Q/Q0	1.0757	fraction	X

http://www.hawsedc.com/engcalcs/Manning-Pipe-Flow.php

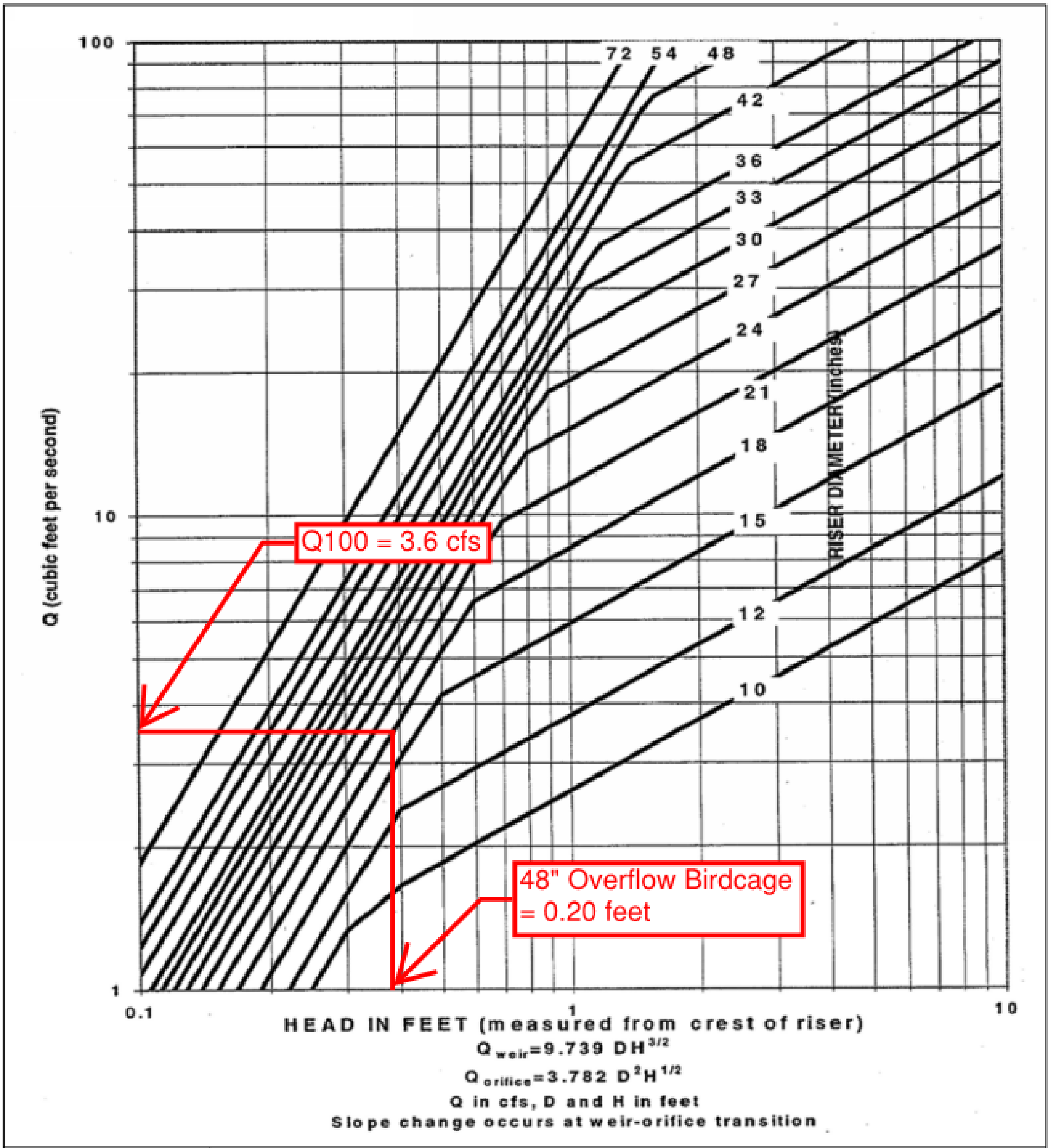
Q_{100} = 3.58 cfs

Q_{CAPACITY} = 4.25 cfs

Therefore, the proposed 15-inch pipe is sized to safely convey the anticipated 100-year unmitigated post-development runoff flow rates from the flow control facility.

The detention system will be equipped with a riser pipe with an open top in the control structure to receive flows when ponding is deeper than intended. In addition, a second emergency overflow consisting of an open-topped 48-inch diameter catch basin (in lieu of a spillway) will be provided. In the event of an overflow, water will spill over the 48-inch diameter riser. Head over the top of the overflow is determined using Figure V-12.8: Riser Inflow Curves from the 2019 DOE Manual. As shown in the figure below, 100-year undetained flow rates will result in 0.20 feet of head over the top of the emergency overflow.

Figure V-12.8: Riser Inflow Curves



DEPARTMENT OF
ECOLOGY
State of Washington

Riser Inflow Curves

Revised June 2016

Wetland Hydroperiod Analysis

A wetland hydroperiod analysis following Method 2 as outlined in Volume I, Section I-C.4 of the DOE Manual has been prepared for the off-site unmapped wetland. Method 2 compares the wetland's existing condition basin and proposed condition basin using WWHM's Wetland Input Volume analysis. A contributing basin for the off-site wetland was identified using aerial photography, City of Puyallup online mapping, and City Record Drawings. To be conservative, the contributing basin is limited to runoff discharging from the Todd Road NW storm conveyance system that outfalls to the roadside ditch. The analysis does not include Wapato Creek stream flow other basin areas that may contribute to Wapato Creek flow upstream of the project. Refer to Table C3 and C4 below for a summary of basin ground cover conditions and Figure 12 and 13 for a graphical depiction of the pre-development and post-development contributing basin.

Table C3
Existing Condition Modeling Characteristics

Sub-basin	Impervious (Acres)	Pervious (Acres)	Total Su-basin (Acres)
Off-Site Property	3.15	0.62	3.77
Off-Site Flow	1.50	4.28	5.78
On-Site Flow	1.97	3.12	5.09
Total Area	**6.62**	**8.02**	**14.64**

Table C3
Proposed Condition Modeling Characteristics

Sub-basin	Impervious (Acres)	Pervious (Acres)	Total Su-basin (Acres)
Off-Site Property	3.15	0.62	3.77
Off-Site Flow	1.50	4.28	5.78
On-Site Flow	4.07	1.02	5.09
Total Area	**6.62**	**8.02**	**14.64**

Figure C16 – Wetland Basin Existing Condition

Figure C17 – Wetland Basin Developed Condition

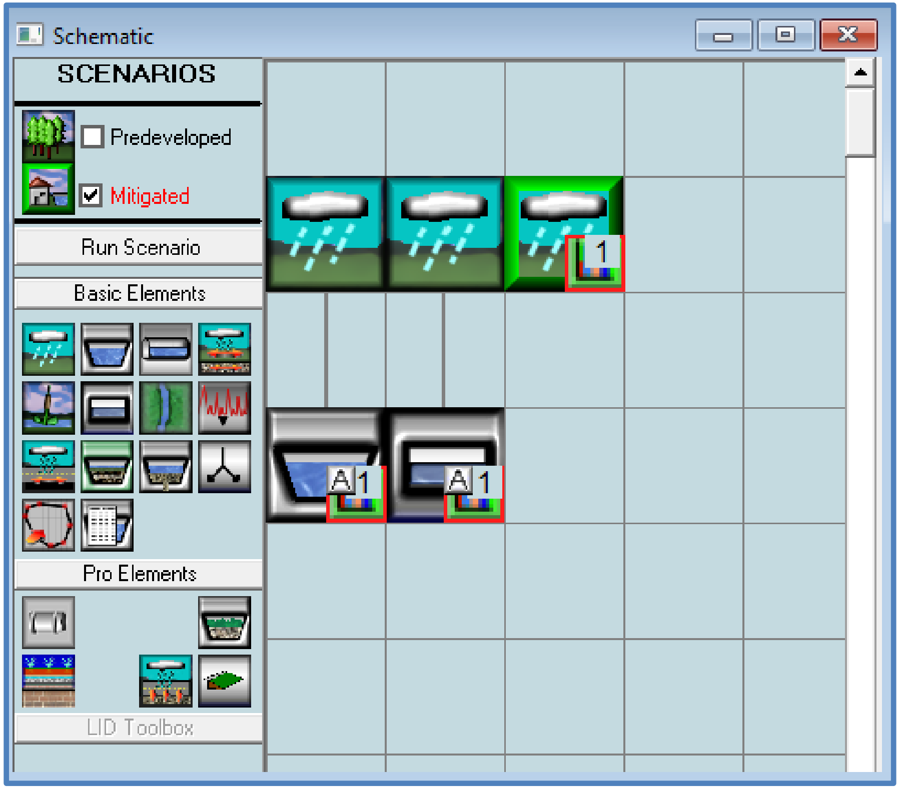
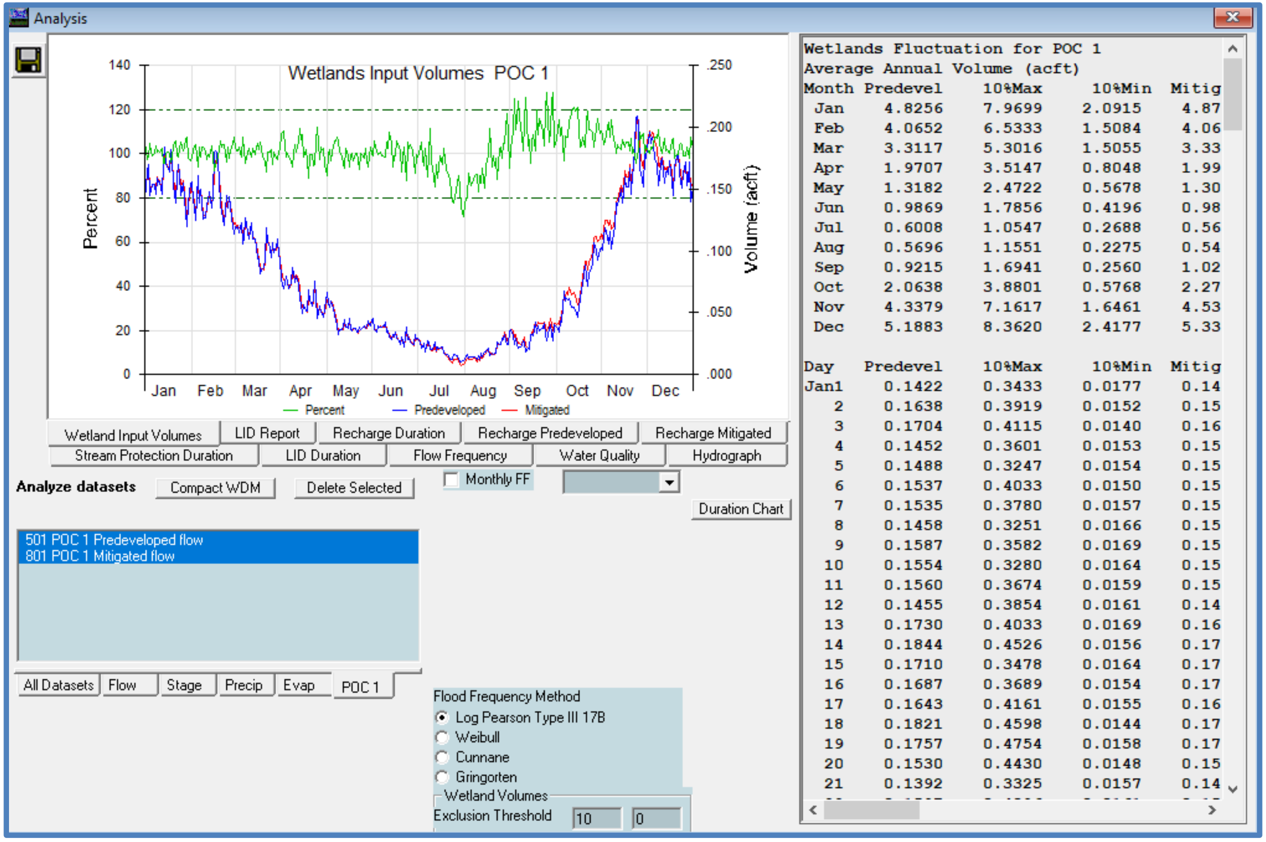


Figure C18 – Wetland Basin Input Volumes



☐ Monthly FF

501 POC 1 Predeveloped flow
801 POC 1 Mitigated flow

Flood Frequency Method
● Log Pearson Type III 17B
○ Weibull
○ Cunnane
○ Gringorten

Wetland Volumes
Exclusion Threshold 10 0

```
Wetlands Fluctuation for POC 1
Average Annual Volume (acft)
Month Predevel    10%Max     10%Min  Mitig
 Jan    4.8256    7.9699    2.0915   4.87
 Feb    4.0652    6.5333    1.5084   4.06
 Mar    3.3117    5.3016    1.5055   3.33
 Apr    1.9707    3.5147    0.8048   1.99
 May    1.3182    2.4722    0.5678   1.30
 Jun    0.9869    1.7856    0.4196   0.98
 Jul    0.6008    1.0547    0.2688   0.56
 Aug    0.5696    1.1551    0.2275   0.54
 Sep    0.9215    1.6941    0.2560   1.02
 Oct    2.0638    3.8801    0.5768   2.27
 Nov    4.3379    7.1617    1.6461   4.53
 Dec    5.1883    8.3620    2.4177   5.33

Day   Predevel    10%Max     10%Min  Mitig
Jan1    0.1422    0.3433    0.0177   0.14
   2    0.1638    0.3919    0.0152   0.15
   3    0.1704    0.4115    0.0140   0.16
   4    0.1452    0.3601    0.0153   0.15
   5    0.1488    0.3247    0.0154   0.15
   6    0.1537    0.4033    0.0150   0.15
   7    0.1535    0.3780    0.0157   0.15
   8    0.1458    0.3251    0.0166   0.15
   9    0.1587    0.3582    0.0169   0.15
  10    0.1554    0.3280    0.0164   0.15
  11    0.1560    0.3674    0.0159   0.15
  12    0.1455    0.3854    0.0161   0.14
  13    0.1730    0.4033    0.0169   0.16
  14    0.1844    0.4526    0.0156   0.17
  15    0.1710    0.3478    0.0164   0.17
  16    0.1687    0.3689    0.0154   0.17
  17    0.1643    0.4161    0.0155   0.16
  18    0.1821    0.4598    0.0144   0.17
  19    0.1757    0.4754    0.0158   0.17
  20    0.1530    0.4430    0.0148   0.15
  21    0.1392    0.3325    0.0157   0.14
```

Full results of the stormwater model for the hydroperiod analysis are provided in the Appendix of this report. All monthly volumes pass with limited days from July to October that fail. Refer to the Wetland Report in the Appendix for more information regarding how the hydroperiod is not anticipated to negatively impact the off-site wetland area.

APPENDIX

Geotechnical Evaluation

MEMORANDUM

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

To: **Alex Garcia Mendoza**
Trammell Crow Company
From: **Ted Schepper, P.E.**
Subject: **Response to City Comments**
Date: **12-4-23**
Project No.: **T-8829**
Project Name: **PSE Operation Training Center**
Puyallup, Washington
Ref: **Terra Associates Geotechnical Report, PSE Operational Training Center, revised dated 8-28-23**

Alex,

As requested by the project civil engineer, Freeland and Associates, we have reviewed two comments from the City of Puyallup regarding the stormwater drainage design. The first relates to the bioretention swale located above and adjacent to a fill embankment at the northwest perimeter of the site. The city requested confirmation from us that the infiltrated stormwater would not impact the stability of the fill embankment. In their second comment the city requested an expanded narrative regarding infiltration rates used in design of the permeable pavement. The following summarizes our responses:

Review of the section through the bioretention swale shows the fill embankment will be slightly less than five feet high and sloped at a gradient of 3:1 (horizontal: vertical). The swale design includes an underdrain that will collect stormwater treated by infiltration though the bioretention soil mix and convey the treated stormwater to discharge into the developments stormwater detention pond located in the eastern portion of the site. Provided the embankment fill is compacted structurally as recommended in the referenced report and the underdrain is installed, stormwater collected by and infiltrated below the swale would have no adverse impact on the stability of the fill embankment.

As discussed in our referenced report, soil conditions at the site are alluvial sediments. These soils were deposited by the Puyallup River following retreat of the glaciers and are unconsolidated deposits. Infiltration rates discussed in the referenced report for design of low impact development (LID) features such as permeable pavement and bioretention cells are based on our experience and as allowed by Ecology's Stormwater Management Manual for Western Washington (Manual), results of grain size analysis. We would note that the rates recommended represent saturated permeability values (K_{sat}) of less than .3 inches per hour which in the Manual, is a threshold below which permeable pavement and bioretention for managing stormwater runoff is considered infeasible.

If you have any questions or require additional information, please call.

Theodore J. Schepper
Theodore J. Schepper
26742
12-4-23

Cc: Miles McEathron, P.E., Freeland and Associates, Inc.

GEOTECHNICAL REPORT

PSE Operational Training Center
325 Todd Road Northwest
Puyallup, Washington

Project No. T-8829

Terra Associates, Inc.

Prepared for:

Trammell Crow Company
Seattle, Washington

April 6, 2023
Revised August 28, 2023

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

April 6, 2023
Revised August 28, 2023
Project No. T-8829

Mr. Alex Garcia Mendoza
Trammell Crow Company
600 University Street, Suite 2912
Seattle, Washington 98101

Subject: Geotechnical Report
PSE Operational Training Center
325 Todd Road Northwest
Puyallup, Washington

Dear Mr. Mendoza:

As requested, we have conducted a geotechnical engineering study for the subject project. The attached report presents our findings and recommendations for the geotechnical aspects of project design.

Our field exploration indicates the site is generally underlain by native alluvial sediments composed of alternating and interbedded layers of soft to stiff stilt to clayey silt, and very loose to medium dense sand to silty sand. Below a depth of approximately 15 feet beneath existing surface grades, the relative density of the sand deposits becomes medium dense to very dense as indicated by some of the test borings and the deeper CPT data. Groundwater is shallow residing between five and ten feet below the current site grades at the time our field work was completed.

In our opinion, the native soils on the site will be suitable for support of the proposed development provided the recommendations presented in this report are incorporated into project design and construction.

We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

Michael J. Xenos, E.I.T.
Staff Engineer

Theodore J. Schepper, P.E.
Senior Principal Engineer

26742

8-28-23

12220 113th Avenue NE, Ste. 130, Kirkland, Washington 98034
Phone (425) 821-7777

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325 Todd Road Northwest
Puyallup, Washington

1.0 PROJECT DESCRIPTION

The project consists of developing the approximately six-acre one parcel property with a PSE Operational Training Center (OTC) along with associated infrastructure improvements. Review of the site plan prepared by Zervas Architects, dated July 21, 2023, shows the OTC building centrally located on the property with a floor area of approximately 33,800 square feet. The area west of the building is designated for outdoor training and includes two smaller buildings, covered areas, burn pit, substation yard and other training features. Design elevations in this western outdoor training area will require raising site grades by placing five to six feet of fill material. Design elevations in the central building and paved eastern site areas are near existing with cuts and fills required to achieve design grades of less than two feet.

The main central building will be a timber framed structure with the western smaller training building steel framed. Both buildings will have their floors constructed at grade. We anticipate structural loading will be relatively light with columns carrying 50 to 75 kips and continuous bearing walls carrying 2 to 4 kips per lineal foot. Loading on the floor slab is not expected to exceed 200 pounds per square foot (psf).

Stormwater will be collected and conveyed to a below grade stormwater detention facility located in the eastern portion of the site. The vault floor will be constructed at approximately elevation 29 feet. When considering the thickness of the vault foundation, this design elevation will require an excavation approaching 20 feet below existing site grades.

The recommendations in the following sections of this report are based on our understanding of the design features outlined above. We should review design drawings as they become available to verify that our recommendations have been properly interpreted and to supplement them, if required.

2.0 SCOPE OF WORK

Our scope of work was completed in accordance with our authorized proposal, dated October 6, 2022. On November 16 and 17, 2022, we observed soil and groundwater conditions at the site by drilling 13 test borings advanced with a hollow-stem auger to depths ranging from approximately 10 to 30 feet below existing site grades. On November 18, 2022, two cone penetration tests (CPTs) were advanced at the site by In Situ Engineering, under subcontract with our office to maximum depths of approximately 60 to 70 feet below existing surface grades. In addition, seismic shear wave testing was completed at one of the CPT locations. Using this data, we performed analyses to develop geotechnical engineering recommendations for project design and construction. Specifically, this report addresses the following:

- Soil and groundwater conditions.
- Geologic hazards per the City of Puyallup Municipal Code (KCC).
- Site preparation and grading.
- Building preload/surcharge program.
- Excavations.
- Foundations.
- Floor slabs at grade.
- Lateral earth pressures for wall design.
- Stormwater facilities.
- Subsurface drainage.
- Utilities.
- Pavements.

It should be noted that recommendations outlined in this report regarding drainage are associated with soil strength, design earth pressures, erosion, and stability. Design and performance issues with respect to moisture as it relates to the structure environment is beyond Terra Associates' purview. A building envelope specialist or contactor should be consulted to address these issues, as needed.

3.0 SITE CONDITIONS

3.1 Surface

The site is located north and east of the intersection of Todd Road Northwest and 4th Street Northwest in Puyallup, Washington. The site is bounded by a railroad along the northeast. The site location is shown on the attached Vicinity Map, Figure 1.

The eastern parcel is currently partially developed and used as a storage yard. The western parcel is not developed and is largely an open grass-covered field. Site topography is relatively flat with no obvious signs of sloping.

3.2 Subsurface

The soil conditions observed at the exploration locations generally consisted of native alluvial sediments composed of alternating and interbedded layers of soft to stiff stilt to clayey silt, and very loose to medium dense sand to silty sand. Trace, small organic fragments were observed in several samples obtained from the test borings.

Below a depth of approximately 15 feet beneath existing surface grades, the relative density of the sand deposits becomes medium dense to very dense as indicated by some of the test borings and the deeper CPT data. The CPT data also indicate that the alluvial sediments become predominately fine-grained below a depth of approximately 45 feet beneath existing surface grades, composed of soft to stiff silt to clayey silt deposits. CPT-2 indicates the presence of medium dense to very dense sand deposits underlying the predominant silt deposits at a depth of approximately 67 feet below existing surface grades.

The exceptions to this general condition were observed at Test Borings B-7, B-8, B-9, B-12, and B-13. In Test Boring B-7, we observed numerous organic peat inclusions at a depth of approximately 10 feet. The sample obtained at approximately 20 feet in Test Boring B-9 consisted of a partially decomposed tree trunk. We observed up to approximately four feet of fill material in Test Borings B-8, B-12, and B-13 composed of loose to medium dense gravel with silt and sand to silty gravel with sand.

The *Geologic Map of the Tacoma 1:100,000-Scale Quadrangle, Washington*, by J.E. Schuster, A.A Cabibbo, J.F. Schilter, and I.J. Hubert (2015) maps the site as Alluvium (Qa). This map unit is consistent with the native soils observed in our field explorations.

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) classifies the onsite soils as Pilchuck fine sand, Puyallup fine sandy loam, and Sultan silt loam materials. A soil horizon, consisting of these materials, is typically deposited by alluvial processes in the form of flood plains and is derived from alluvium deposited by the Puyallup River which is consistent with our exploratory findings and knowledge of the area's geologic setting.

The preceding discussion is intended to be a brief review of the soil conditions observed at the site. More detailed descriptions are presented on the Test Boring Logs and CPT Logs attached in Appendix A. The approximate locations of the Test Boring and CPTs are shown in attached Figure 2.

3.3 Groundwater

The site is underlain by a regional groundwater table residing in the alluvial sediments. Based on observations during drilling and measurements obtained from installed groundwater monitoring wells, groundwater was located at a depth of approximately 4.5 feet below existing grades in the western portion of the site to approximately 10 feet below existing grades in the eastern portion of the site at the time of our November exploration. Given the time of year our field work was completed, and our experience with groundwater conditions in the area, the groundwater levels observed during drilling likely represent near seasonal low levels.

To evaluate the seasonal weather influence, Test Borings B-11 and B-13 were converted to groundwater monitoring wells. The monitoring wells were instrumented with automatic level loggers. Based on data collected from December 2022 through March 29, 2023, this seasons high groundwater was recorded at a depth of 7.2 feet at Test Boring B-11 and 8 feet at Test Boring B-13. The fluctuation of the groundwater levels over the course of the study is shown in hydrographs presented in Appendix B of this report.

When referenced to existing surface elevations, the groundwater table is at approximately elevation 39 feet at Test Boring B-13 and 38.8 feet at Test Boring B-11. This indicates a slight approximately .1 percent groundwater flow gradient to the west. Projecting this gradient to western area of the site indicates the groundwater table would be around elevation 38.4 feet or about two to three feet below grade in this lower elevated portion of the site.

3.4 Geologically Hazardous Areas

Section 21.06.1210(1) of the City of Puyallup Municipal Code (PMC) defines geologic hazards as "…areas susceptible to erosion, landsliding, earthquake, volcanic activity or other potentially hazardous geological processes. Areas susceptible to these types of hazards are hereby designated as geologically hazardous areas and subject to the provisions of this chapter." We have evaluated the site for these hazards in the following sections below.

3.4.1 Erosion Hazard Areas

Section 21.06.1210(3)(a) of the PMC defines erosion hazard areas as "…areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service or identified by a special study as having a "moderate to severe," "severe," or "very severe" erosion potential."

The soils observed on the site are classified as Pilchuck fine sand, Puyallup fine sandy loam, and Sultan silt loam by the United States Department of Agriculture Natural Resources Conservation Service (NRCS). Over the site with existing gradients, these soils will have a slight susceptibility to erosion when exposed. Therefore, the site does not present an erosion hazard per the PMC. Regardless, the site soils would be susceptible to some erosion when exposed during construction. In our opinion, proper implementation, and maintenance of Best Management Practices (BMPs) for erosion prevention and sediment control would adequately mitigate the erosion potential in the planned development area. Erosion protection measures as required by the City of Puyallup will need to be in place prior to and during grading activities at the site.

3.4.2 Landslide Hazard Areas

> Section 21.06.1210(3)(b) of the PMC defines landslide hazard areas as "…areas subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include any areas susceptible to landslide because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors, and include, at a minimum, the following:
>
> (i) Areas of historic failures, such as:
>
> (A) Those areas delineated by the United States Department of Agriculture Natural Resources Conservation Service as having a significant limitation for building site development;
>
> (B) Those coastal areas mapped as class u (unstable), uos (unstable old slides), and urs (unstable recent slides) in the Department of Ecology Washington coastal atlas; or

(C) Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the United States Geological Survey or Washington Department of Natural Resources.

(ii) Areas with all three of the following characteristics:

(A) Slopes steeper than 15 percent;

(B) Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

(C) Springs or groundwater seepage.

(iii) Areas that have shown movement during the holocene epoch (from 10,000 years ago to the present) or which are underlain or covered by mass wastage debris of this epoch;

(iv) Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;

(v) Slopes having gradients steeper than eighty percent subject to rockfall during seismic shaking;

(vi) Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action, including stream channel migration zones;

(vii) Areas that show evidence of, or are at risk from snow avalanches;

(viii) Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding; and

(ix) Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of bedrock. A slope is delineated by establishing its toe and top and measured by averaging the inclination over at least 10 feet of vertical relief."

As stated above, the site's topography is relatively flat with no obvious signs of sloping. There are no landslide hazard areas on or near the site.

3.4.3 Volcanic Hazard Areas

Section 21.06.1210(3)(d) of the PMC defines volcanic hazard areas as "…areas subject to pyroclastic flows, lava flows, debris avalanche, inundation by debris flows, lahars, mudflows, or related flooding resulting from volcanic activity. Volcanic hazard areas shall be classified as Case I or Case II lahars per the definitions in PMC 21.06.210. Pyroclastic-flow hazard zones and inundation zones for Case I and II lahars are identified in the report Sedimentology, Behavior, and Hazards of Debris Flows at Mount Rainier, Washington, U.S. Geological Survey Professional Paper 1547, 1995. All volcanic hazard areas regulated under this code are located within lahar time travel zone 3."

The site is located within the Mount Rainier lahar hazard zone as shown on the USGS Mt. Rainier Lahar Hazard Map, dated November 9, 2016. Given the distance from Mt. Rainier and the general absence of pervasive lahar deposits observed in the CPTs and test borings, it is our opinion that the site meets the definition of a Case I volcanic hazard area per the PMC.

3.4.4 Seismic Hazard Areas

Section 21.06.1210(3)(c) of the PMC defines seismic hazard areas as "… areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement or subsidence, soil liquefaction, or tsunamis. Settlement and soil liquefaction conditions occur in areas underlain by cohesionless, loose, or soft-saturated soils of low density, typically in association with a shallow ground water table."

Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in water pressure induced by vibrations. Liquefaction mainly affects geologically recent deposits of fine-grained sands underlying the groundwater table. Soils of this nature derive their strength from intergranular friction. The generated water pressure or pore pressure essentially separates the soil grains and eliminates this intergranular friction; thus, eliminating the soil's strength.

The site is mapped as having a high susceptibility to soil liquefaction on the Washington Department of Natural Resources *Natural Hazards Single-Topic Map*.

Based on the soil and groundwater conditions observed at the site, we expected that the site soils would have the potential to liquefy. Therefore, we completed an analysis of soil liquefaction potential incorporating field soil strength values and soil types determined from the CPT's. An assumed depth to groundwater of five feet was used in the analysis based on depths to groundwater measured in the monitoring wells prior to the wet season. The analysis is based on a Magnitude 7 earthquake inducing ground motions having a peak ground acceleration (PGA) value of 0.5g. This acceleration represents an earthquake with a 2 percent probability of exceedance in 50 years.

The results of our analysis indicate soil liquefaction could occur during the design earthquake event, resulting in total settlements approaching approximately three-and-one-half to five inches, with one-half of that settlement likely being differential in nature. Results of the analysis are attached in Appendix C.

In our opinion, the potential settlement is borderline regarding structural impairment and should be reviewed by the project structural engineer. If the owner is not willing to accept the risk of building damage, requiring repair, should liquefaction-induced settlements occur, or if the structural engineer cannot design the structure to meet all governing life safety codes, including the life safety provisions of the current International Building Code, foundations should be supported on ground improved using vibrated stone columns designed to mitigate soil liquefaction settlements.

3.5 Seismic Site Class

As discussed, soil conditions at the site will be subject to the soil liquefaction phenomenon. Because of this condition, per the current International Building Code (IBC), subsurface conditions would be assigned Site Class “F”, which would require performing a site-specific seismic analysis to determine seismic forces for structural design. However, the IBC allows for using code derived seismic values for the soil conditions indicated if the buildings fundamental period is equal to or less than .5 seconds. We expect that this building will fall into this category. In this case, based on soil conditions encountered, Site Class “E” can be used to determine seismic design forces.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 General

Based on our study, development of the site as proposed is feasible from a geotechnical engineering standpoint. The primary geotechnical concern at the site is the presence of soil strata susceptible to consolidation under the planned building loads. The compressible soils consist of layers of very soft to stiff silt, in addition to collections and inclusions of organic peat, that vary in thickness across the site. These soils are compressible and, if not mitigated, will likely cause unacceptable levels of differential building settlement under expected static building loads.

Given the depth to the compressible silt layers, in our opinion, the potential post-construction building settlements can be mitigated by implementing a surcharge program. This would entail raising site grades to finish floor elevation and then placing an additional depth of surcharge fill for a period of time to induce settlements prior to application of building loads. Building construction can begin after completion of the surcharge program.

The building can be supported on conventional spread footings bearing on a minimum of two feet of structural fill. Depending upon final building grades, the existing granular fill observed at Test Borings B-8 and B-12, located in the eastern developed storage yard area, could serve as this structural fill layer provided it is re-compacted to achieve structural fill compaction requirements. The building floor and exterior pavements can be similarly supported.

If building schedules do not allow for a surcharge program to take place, or if the owner is unwilling to or cannot accept the risk of seismically induced building settlement, the building can be supported on ground improved by installing vibrated stone columns. If completed over the entire building footprint, this would preclude the need for a fill surcharge program. If stone columns are only used to improve ground conditions below building footings, surcharging to mitigate potential floor slab settlement is recommended.

The majority of the native and existing fill soils observed at the site contain a significant amount of fines and will be difficult to compact as structural fill when too wet. The ability to use native soil soils from site excavations as structural fill will depend upon its moisture content and the prevailing weather conditions at the time of construction.

If grading activities will take place during winter, the owner should be prepared to import clean granular material for use as structural fill and backfill. Alternatively, stabilizing the moisture in the native and existing fill soils with cement or lime can be considered.

Detailed recommendations regarding these issues and other geotechnical design considerations are provided in the following sections. These recommendations should be incorporated into the final design drawings and construction specifications.

4.2 Site Preparation and Grading

To prepare the site for construction, all vegetation and organic surface soils should be stripped and removed from the site. We expect surface stripping depths of about three to six inches will be required to remove the organic surficial soils. Organic soils will not be suitable for use as structural fill but may be used for limited depths in nonstructural areas or for landscaping purposes.

Demolition of existing structures should include removal of existing foundations and other buried utilities. Abandoned utility pipes that fall outside of new building areas can be left in place provided they are sealed to prevent intrusion of groundwater seepage and soil.

Prior to fill placement or construction of building foundations or site pavements, we recommend all exposed subgrade surfaces be observed by a representative of Terra Associates, Inc. to verify soil conditions are as expected and suitable for support. The contractor should be prepared to proofroll subgrade areas with heavy construction equipment to assist in evaluating the suitability of the bearing subgrade. If excessively yielding areas are observed and cannot be stabilized in place by compaction, the affected soils should be excavated and removed to firm bearing and grade restored with new structural fill. If the depth of excavation to remove unstable soils is excessive, use of a geotextile reinforcing/separation fabric, such as Mirafi 600X or equivalent, can be considered in conjunction with structural fill. Our experience has shown that, in general, a minimum of 18 to 24 inches of a clean, granular structural fill over the geotextile fabric should establish a stable bearing surface.

All building footings should obtain support on a minimum of two feet of granular structural fill, extending at least one foot laterally from the edge of footing. As discussed earlier, the existing granular fill observed at Test Borings B-8 and B-12 located in the eastern developed storage yard area, could serve as this structural fill layer provided it is re-compacted to achieve structural fill compaction requirements.

The majority of the native and existing fill soils observed at the site contain a sufficient percentage of fines (silt and clay size particles), which will make them difficult to re-compact as structural fill if they are too wet or too dry. Accordingly, the ability to use the soils from site excavations as structural fill will depend upon their moisture content and the prevailing weather conditions when site grading activities take place. Soils that are too wet to properly compact can be dried by aeration during dry weather conditions. Alternatively, treatment with cement or lime can be considered. If additives are used, additional Best Management Practices (BMPs) will need to be implemented to mitigate potential impacts to construction stormwater runoff.

If grading activities are planned during the wet winter months, or if they are initiated during the summer and extend into fall and winter, the contractor should be prepared to import wet weather structural fill. For this purpose, we recommend importing a granular soil that meets the following grading requirements:

U.S. Sieve Size	Percent Passing
6 inches	100
No. 4	75 maximum
No. 200	5 maximum*

*Based on the 3/4-inch fraction.

Prior to use, Terra Associates, Inc. should examine and test all materials imported to the site for use as structural fill.

Structural fill should be placed in uniform loose layers not exceeding 12 inches and compacted to a minimum of 95 percent of the soil's maximum dry density, as determined by American Society for Testing and Materials (ASTM) Test Designation D-1557 (Modified Proctor). The moisture content of the soil at the time of compaction should be within two percent of its optimum, as determined by this ASTM standard. In nonstructural areas, the degree of compaction can be reduced to 90 percent.

4.3 Surcharge Program

We recommend surcharging the building area to limit building foundation and floor slab settlements to tolerable levels. For this procedure, we recommend placing structural fill in the building areas to the design floor elevation and then placing an additional four-foot depth of surcharge fill. The surcharge fill should extend a minimum of two feet beyond the building perimeter footing edge. This surcharge fill does not need to meet any special requirements other than having a minimum in-place unit weight of 120 pounds per cubic foot (pcf). However, it may be advisable to use a good quality fill to raise grades in other portions of the site, such as parking and driveway areas, if necessary.

In the western pavement areas where five to six feet of fill is required to establish design grades, the recommended full surcharge depth is not required. Here we recommend placing fill to the design final pavement elevation and allowing settlement under this fill loading to occur prior to pavement or utility construction.

Total settlement under the surcharge fill is estimated in the range of four to six inches. These settlements are expected to occur in about four to six weeks following full application of the building fill.

To verify the amount of settlement and the time rate of movement, the surcharge program should be monitored by installing settlement markers. The settlement markers should be installed on the existing grade prior to placing any building or preload fills. Once installed, elevations of both the fill height and marker should be taken twice weekly until the full height of the surcharge is in place. Once fully surcharged, readings should continue weekly until the anticipated settlements have occurred. A typical settlement marker detail is provided as Figure 3.

It is critical that the grading contractor recognize the importance of the settlement marker installations. All efforts must be made to protect the markers from damage during fill placement. It is difficult, if not impossible, to evaluate the progress of the surcharge program if the markers are damaged or destroyed by construction equipment. As a result, it may be necessary to install new markers and extend the surcharging time period in order to ensure that settlements have ceased and building construction can begin.

Potential long-term settlements due to secondary compression of the peat layers, which cannot be fully mitigated by surcharging, will also occur. The magnitude of this settlement will be greater in the early years diminishing with time. The approximate total settlement due to secondary compression is estimated to be 1.5 to 2 inches in 20 years. Approximately 50 percent of the total secondary settlement may be differential in nature due to the varying thickness of the peat layers. For floor slab design purposes, we estimate these differential settlements will occur over a distance of 100 feet.

4.4 Excavations

All excavations at the site associated with confined spaces, such as utility trenches, must be completed in accordance with local, state, and federal requirements. Based on regulations outlined in the Washington Industrial Safety and Health Act (WISHA), the fill soils would be classified as Type C soil.

Accordingly, temporary excavations in Type C soils should have their slopes laid back at an inclination of 1.5:1 (Horizontal:Vertical) or flatter, from the toe to the crest of the slope. All exposed temporary slope faces that will remain open for more than two days should be covered with a durable reinforced plastic membrane during construction to prevent slope raveling and rutting during periods of precipitation. If there is insufficient room to slope, the temporary excavation sides shoring will be required. Properly designed and installed shoring trench boxes can be used to support utility trench excavations where required.

Based on our study, groundwater should be anticipated within excavations extending below depths of about three to seven feet below existing site grades during the wet winter months. Excavations extending below these depths will likely encounter groundwater with volumes and flow rates sufficient to require some level of dewatering. Shallow excavations that do not extend more than two feet below the groundwater table can likely be dewatered by conventional sump-pumping procedures along with a system of collection trenches. Deeper excavation as is expected for construction of the stormwater detention facility will require dewatering by well points or isolated deep-pump wells. The dewatering system should be designed and installed by an experienced dewatering contractor.

This information is provided solely for the benefit of the owner and other design consultants and should not be construed to imply that Terra Associates, Inc. assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

4.5 Foundations

In our opinion, following the successful implementation of the surcharge program, the buildings can be supported on conventional spread footing foundations bearing on structural fill as recommended in the Site Grading and Preparation section of this report. However, if the owner is not willing to accept the risk for building damage due to the potential for liquefaction induced settlements during an earthquake or it is determined that the estimated liquefaction settlements would preclude design of the structure the building shell to meet all governing life safety codes, including the life safety provisions of the current International Building Code, the building foundations should be supported on ground improved using vibrated stone columns designed to mitigate soil liquefaction settlements.

Spread Footings

In our opinion, following the completion of a successful surcharge program as outlined in Section 4.3, the building may be supported on conventional spread footing foundations. As noted, all foundations must be supported on a minimum of two feet of structural fill that extends laterally beyond the edge of the footing a minimum distance of one foot. Structural fill used for support of footings should consist of a granular import material meeting the grading recommendations for a wet weather structural fill.

Foundations exposed to the weather should bear at a minimum depth of one and one-half feet below adjacent exterior grades for frost protection. Interior foundations should be supported at a minimum depth of one foot below the finished floor elevation.

We recommend designing foundations for a net allowable bearing capacity of 2,500 psf. For short-term loads, such as wind and seismic, a one-third increase in this allowable capacity can be used. With the expected building loads and this bearing stress applied, in general, total, and differential settlements should not exceed one inch and one-half inch, respectively. The differential settlement is expected to occur between perimeter wall and interior column locations.

For designing foundations to resist lateral loads, a base friction coefficient of 0.35 can be used. Passive earth pressures acting on the sides of the footings should be considered. We recommend calculating this lateral resistance using an equivalent fluid weight of 300 pounds per cubic foot (pcf). We do not recommend including the upper 12 inches of soil in this computation because it can be affected by weather or disturbed by future grading activity. This value assumes the foundation will be backfilled with structural fill, as described in Section 4.2 of this report. The values recommended include a safety factor of 1.5.

Ground Improvement

As noted earlier if the owner is unwilling to accept the risk of building damage due to liquefaction settlement, the building can be supported on ground improved using vibrated stone columns specifically designed to mitigate liquefaction settlement to tolerable levels. This method creates highly densified columns of graded aggregate that would extend through the upper loose and soft to medium stiff soils into the underlying medium dense to dense sand deposits. Due to the methods used to construct the columns, some improvement of the adjacent soils is also realized.

Moreover, these methods can provide liquefaction mitigation by providing drainage paths and reduced pore pressures during ground shaking, and by constructing stiff, non-liquefiable inclusions in the soils. Once constructed, conventional spread footing foundations can be designed to bear immediately above the stone columns.

These ground improvement techniques are typically completed on a design/build approach with both design and construction completed by a geotechnical specialty contractor. We can assist in contacting and selecting the specialty contractor, if desired.

4.6 Slab on Grade Floors

Suitable support for slab on grade floors will be provided by subgrade prepared as recommended in Section 4.2 of this report following implementation of the surcharge program. Immediately below the floor slab, we recommend placing a four-inch-thick capillary break layer composed of clean, coarse sand or fine gravel that has less than three percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slab.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer and then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction, and aid in uniform curing of the concrete slab. It should be noted that if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will be ineffective in assisting uniform curing of the slab and can actually serve as a water supply for moisture transmission through the slab that affects floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet winter months and the layer cannot be effectively drained. We recommend floor designers and contractors refer to the updated American Concrete Institute (ACI) Manual of Concrete Practice for further information regarding vapor barrier installation below slab-on-grade floors.

With the floor subgrade prepared as recommended, a subgrade modulus (k_s) value of 100 pounds per square inch per inch of deflection (pci) can be used in design of the building floor slabs subject to heavy lift truck traffic.

4.7 Lateral Earth Pressures for Wall Design

The magnitude of earth pressure development on retaining walls partly depend upon the quality of wall backfill. Where fill is placed behind retaining walls, we recommend placing and compacting it as structural fill. The fill should be compacted to a minimum of 90 percent of its maximum dry unit weight as determined by ASTM Test Designation D-1557 (Modified Proctor). To guard against the build-up of hydrostatic pressure, wall drainage must also be installed. We recommend that wall drainage consist of a minimum 12-inch-thick layer of washed gravel placed adjacent to the wall. Alternatively, a composite drainage panel such as Mirafi G100N or equal can be used. A four-inch diameter perforated pipe should be placed on a bed of gravel along the base of the wall footing and directed to a suitable outlet. A typical wall drainage detail is attached as Figure 4.

With granular backfill placed and compacted as recommended and drainage properly installed, we recommend designing restrained (not free to deflect) retaining walls for an at-rest earth pressure equivalent to a fluid weighing 50 pcf. A value of 35 pcf may be used for the case where the wall is unrestrained. These values do not include other surcharge loading such as from fill backslopes or adjacent footings that may act on the wall. If such conditions exist, then the imposed loading must be included in wall design. Values of friction at the base of wall foundations and passive earth pressure that are used in design to resist lateral loads are provided in Section 4.5 of this report.

4.8 Stormwater Detention Vault

With the eastern detention vault foundation bearing at a depth of 15 to 20 feet below existing site grades, soils that will likely be exposed will consist of medium dense fine to medium sand. These sands will be suitable for support of the detention vault and no over excavation and replacement with crushed rock would be required for bearing purposes. For constructability however, it would be advisable to construct a working mat to avoid excessive disturbance of the native sand subgrade. For this purpose, we recommend over-excavating the by 6-inches and restoring grade with clean 1 ¼-inch to 2-inch crushed rock. Additionally, any organic peat or organic inclusions exposed should be removed to expose competent native soils. Vault foundations supported in this manner can be designed for an allowable bearing capacity of 2,500 psf. For short-term loads, such as seismic, a one-third increase in this allowable capacity can be used.

Vault walls should be designed as below-grade retaining walls following the parameters outline in Section 4.7 of this report. Any portion of the wall for which drainage cannot be provided should be designed for an earth pressure equivalent to a fluid weighing 85 pcf. Where applicable, a uniform horizontal traffic value of 75 psf should be included in the design of vault walls.

The detention vault will be subject to uplift pressures if drainage is not provided for the detention vault walls. For design, uplift forces should be based on a groundwater elevation equal to elevation 40 feet. The weight of the structure and the weight of the soil above its foundation will provide resistance to uplift. A soil unit weight of 125 pcf can be used in designing the structure to resist uplift forces.

4.9 Drainage

Infiltration Feasibility

In general, based on the shallow seasonal water table and the fine-grained nature of the soils observed across the site, it is our opinion that infiltration should not be relied on to manage development stormwater runoff on a whole scale basis. Conventional stormwater detention with controlled release should be used to manage a majority of the stormwater runoff.

It may be feasible to use low impact development (LID) features such as shallow bioretention cells or permeable pavements for managing a minor component of the runoff. Bioretention cells could be considered along the northern margin of the site where shallow soil conditions generally consist of silty sand and sand with silt with a few silt seams. Designing these elements with an infiltration component equivalent to .2 inches per hour would be feasible in our opinion. Permeable concrete pavement could also be considered across the site with design based on an infiltration rate of .05 inches per hour.

Surface

Final exterior grades should promote free and positive drainage away from the building areas. We recommend providing a gradient of at least three percent for a minimum distance of ten feet from the building perimeter, except in paved locations. In paved locations, a minimum gradient of two percent should be provided, unless provisions are included for collection and disposal of surface water adjacent to the structures.

Subsurface

Foundation drains should be installed where floor slab wetness or interior moisture due to water vapor is not desired. Where foundation drainage is installed, we recommend it consist of four-inch diameter perforated PVC pipe that is enveloped in washed ½- to ¾-inch gravel-sized drainage aggregate. The aggregate should extend six inches above and to the sides of the pipe. The foundation drains and roof downspouts should be tightlined separately to an approved point of controlled discharge.

4.10 Utilities

Utility pipes should be bedded and backfilled in accordance with American Public Works Association (APWA), or City of Puyallup specifications. As a minimum, trench backfill should be placed and compacted as structural fill, as described in Section 4.2 of this report. As noted, the existing fill and native soils are moisture sensitive and close moisture control will be required to facilitate proper compaction. If utility construction takes place during the wet winter months, it will likely be necessary to import suitable wet weather fill for utility trench backfilling.

The utility contractor should also be prepared for encountering unstable loose native soils below the pipe invert elevations. If not removed from below the pipe and replaced with crushed rock or additional bedding material, pipe deflections may occur as a result of the soil yielding and compressing in response to loading imposed during trench backfilling. The need to over-excavate and stabilize the pipe foundation before backfilling should be evaluated by observation and testing during construction.

4.11 Pavements

Pavement subgrades should be prepared as described in Section 4.2 of this report. Regardless of the degree of relative compaction achieved, the subgrade must be firm and relatively unyielding before paving. The subgrade should be proof rolled with heavy rubber-tired construction equipment such as a loaded 10-yard dump truck to verify this condition.

The pavement design section is dependent upon the supporting capability of the subgrade soils and the traffic conditions to which it will be subjected. New pavements for the project will consist of drive aisles accessing parking spaces and storage areas. Accordingly, we expect traffic will consist of cars and light trucks, along with heavy traffic in the form of tractor-trailer rigs. For design considerations, we have assumed traffic in parking and in car/light truck access pavement areas can be represented by an 18-kip Equivalent Single Axle Loading (ESAL) of 50,000 over a 20-year design life. For heavy traffic pavement areas, we have assumed an ESAL of 300,000 would be representative of the expected loading. These ESALs represent loading approximately equivalent to 3 and 18, loaded (80,000-pound GVW) tractor-trailer rigs traversing the pavement daily in each area, respectively. If higher truck traffic volumes are expected, we should be notified and asked to review and revise the following pavement recommendations, as needed.

With a stable subgrade prepared as recommended, we recommend the following options for pavement sections:

Light traffic and parking:

- Two inches of hot mix asphalt (HMA) over four inches of crushed rock base (CRB).
- Full depth HMA – four inches.

Heavy traffic:

- Three inches of HMA over eight inches of CRB.
- Full depth HMA – six inches.

For exterior Portland cement concrete (PCC) pavement, we recommend the following:

- Six inches of PCC over two inches of CRB.
    - 28-day compressive strength – 4,000 psi.
    - Control joints spaced at a maximum of 15 feet.

Soil cement stabilization or constructing a soil cement base for support of the pavement section can also be considered as an alternative to the above conventional pavement sections. Assuming a properly constructed soil cement base having a minimum thickness of 12 inches and a minimum seven-day compressive strength of 100 pounds per square inch (psi), a minimum HMA pavement thickness of three inches would be required for the heavy traffic areas. The design of the soil cement base should be completed using samples of the subgrade exposed at the time of construction.

The paving materials used should conform to the Washington State Department of Transportation (WSDOT) specifications for half-inch class HMA, PCC, and CRB.

Long-term pavement performance will depend upon surface drainage. A poorly drained pavement section will be subject to premature failure resulting from surface water infiltrating the subgrade soils and reducing their supporting capability. For optimum performance, we recommend surface drainage gradients of at least two percent. Some degree of longitudinal and transverse cracking of the pavement surface should be expected over time. Regular maintenance should be planned to seal cracks as they occur. In addition, because of long-term secondary compression of the peat material, some subsidence of the pavement surface resulting in depressed bird bath areas should be expected. Above normal maintenance of the pavement requiring repair of failed pavement in these areas should be planned for.

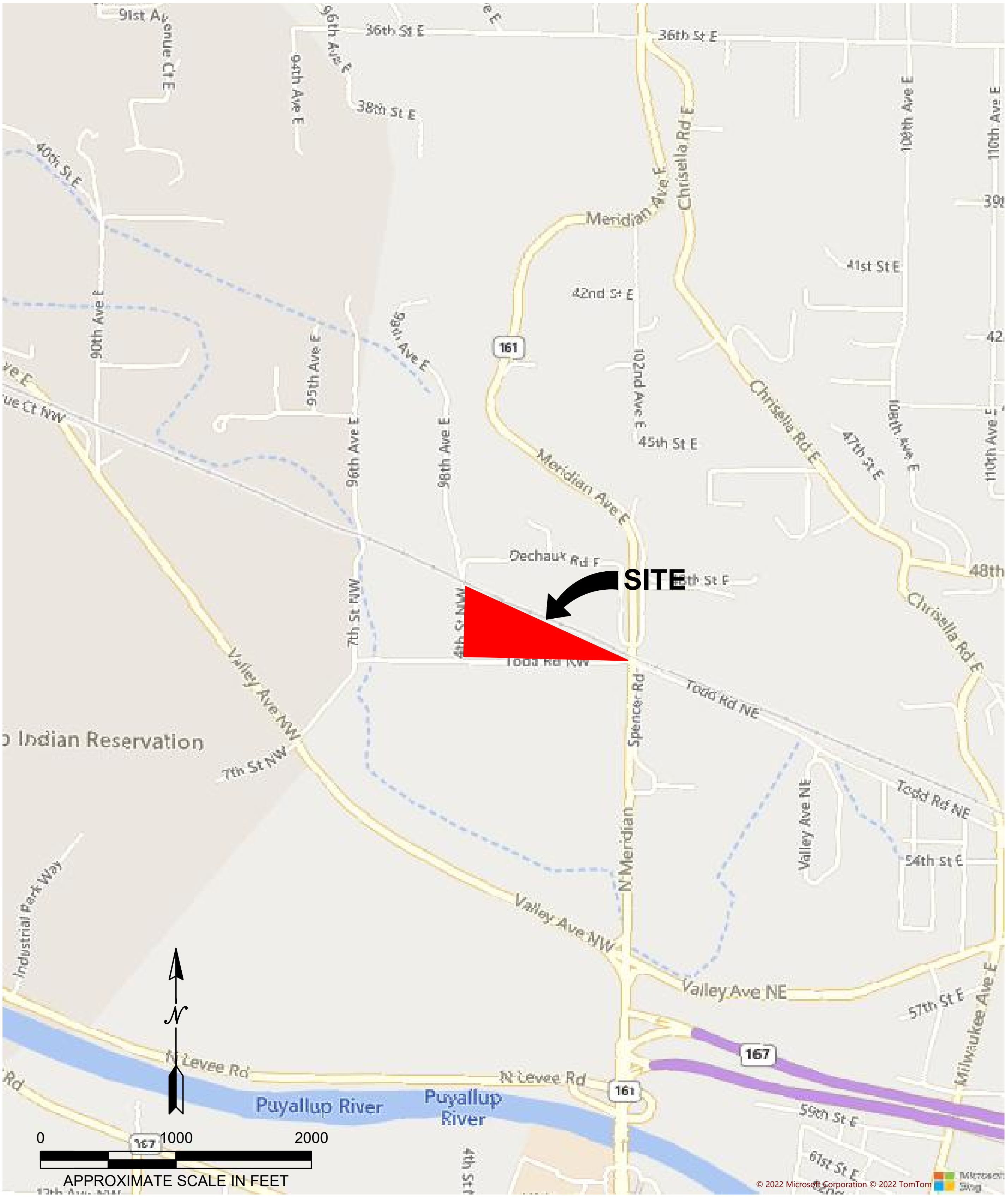
5.0 ADDITIONAL SERVICES

Terra Associates, Inc. should review the final design drawings and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and implemented in project design. We should also provide geotechnical services during construction to observe compliance with our design concepts, specifications, and recommendations. This will allow for design changes if subsurface conditions differ from those anticipated prior to the start of construction.

6.0 LIMITATIONS

We prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. This report is the copyrighted property of Terra Associates, Inc. and is intended for specific application to the PSE Operational Training Center project in Puyallup, Washington. This report is for the exclusive use of Trammell Crow Company and their authorized representatives.

The analyses and recommendations presented in this report are preliminary in nature and are based on data obtained from the test borings and CPTs completed on the site. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, Terra Associates, Inc. should be requested to reevaluate the recommendations in this report prior to proceeding with construction.



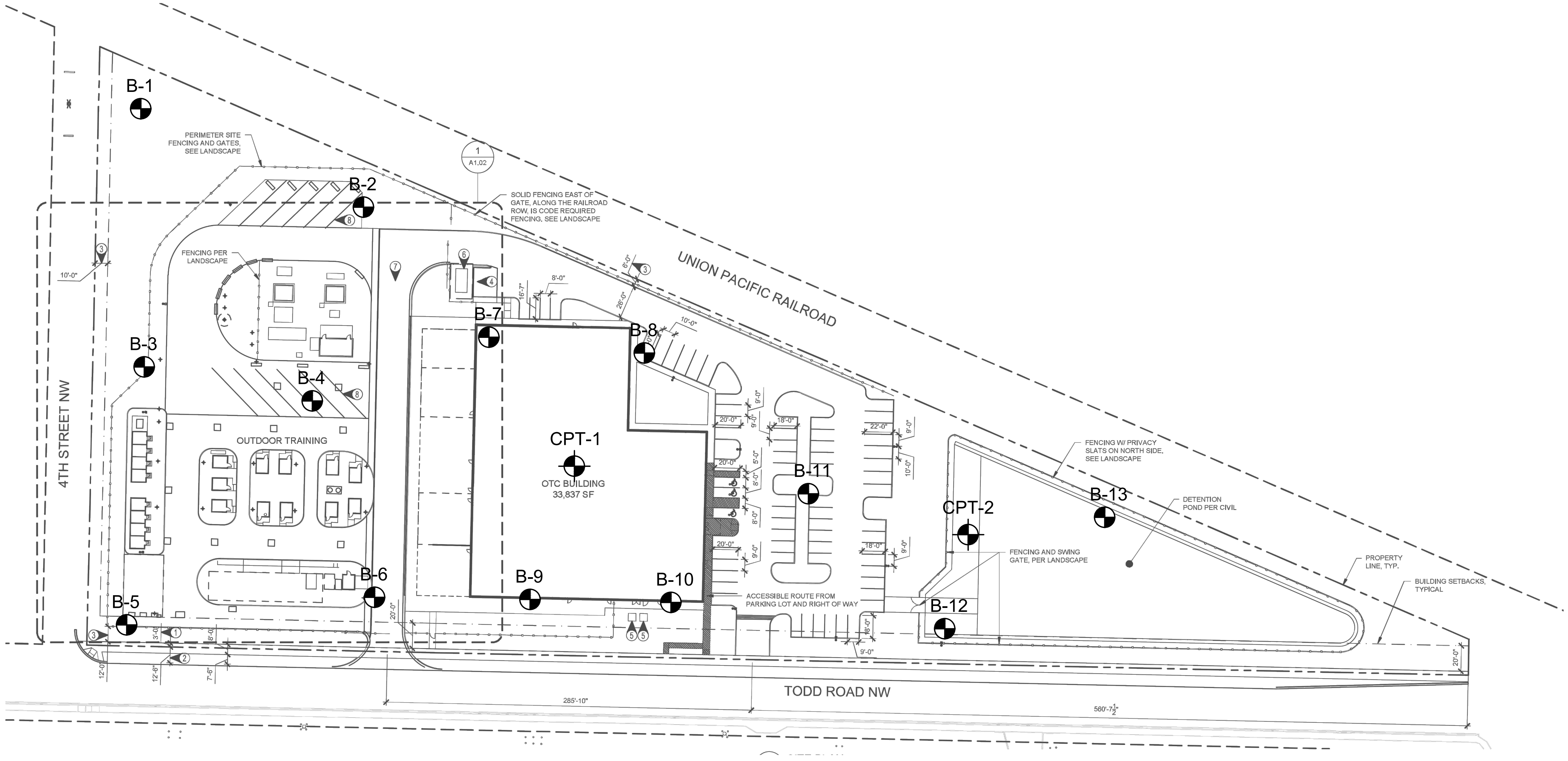
REFERENCE: https://www.bing.com/maps ACCESSED 2023

Terra Associates, Inc.

Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

VICINITY MAP
PSE OPERATION TRAINING CENTER
PUYALLUP, WASHINGTON

Proj.No. T-8829	Date: AUG 2023	Figure 1



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE: SITE PLAN PROVIDED BY CLIENT.

LEGEND:

- ◐ APPROXIMATE BORING LOCATION
- ⊕ APPROXIMATE CONE PENETRATION TEST

0 100 200
APPROXIMATE SCALE IN FEET

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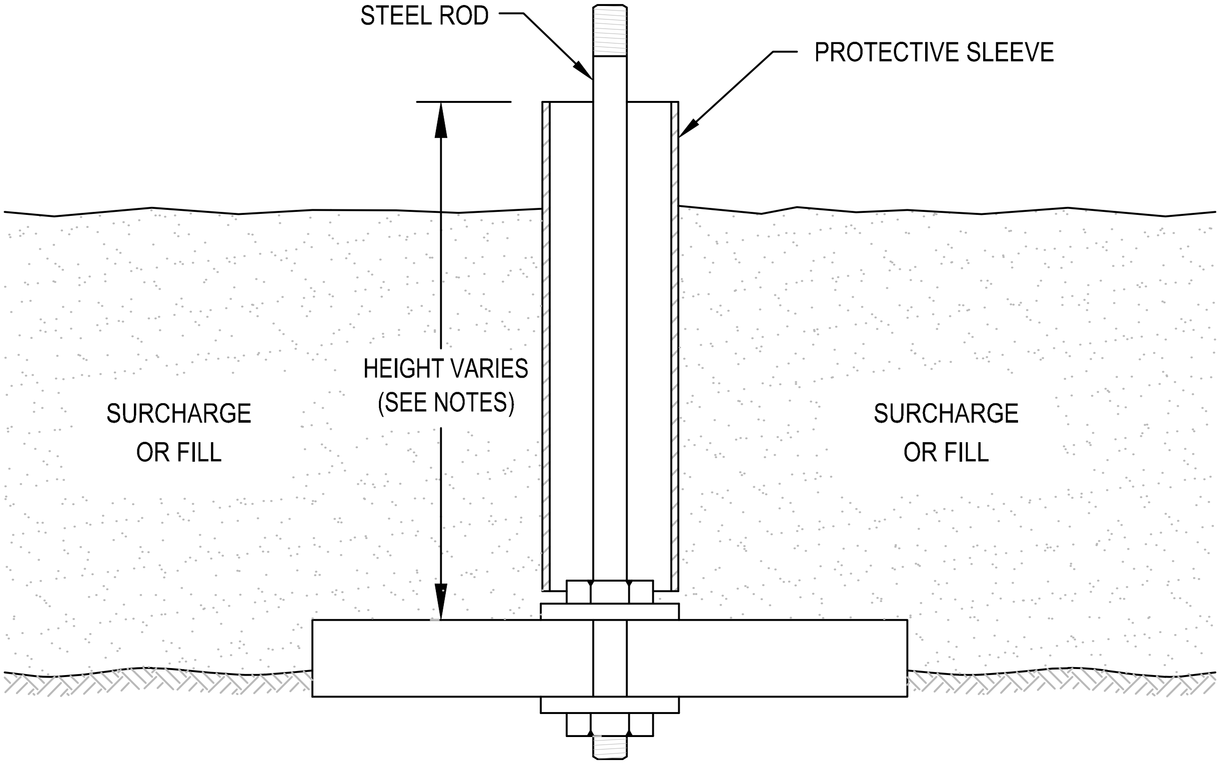
Geology and
Environmental Earth Sciences

EXPLORATION LOCATION PLAN
PSE OPERATION TRAINING CENTER
PUYALLUP, WASHINGTON

Proj.No. T-8829
Date: AUG 2023
Figure 2



NOT TO SCALE

NOTES:

1. BASE CONSISTS OF 3/4" THICK, 2'x2' PLYWOOD WITH CENTER DRILLED 5/8" DIAMETER HOLE.
2. BEDDING MATERIAL, IF REQUIRED, SHOULD CONSIST OF CLEAN COARSE SAND.
3. MARKER ROD IS 1/2" DIAMETER STEEL ROD THREADED AT BOTH ENDS.
4. MARKER ROD IS ATTACHED TO BASE BY NUT AND WASHER ON EACH SIDE OF BASE.
5. PROTECTIVE SLEEVE SURROUNDING MARKER ROD SHOULD CONSIST OF 2" DIAMETER PLASTIC TUBING. SLEEVE IS NOT ATTACHED TO ROD OR BASE.
6. ADDITIONAL SECTIONS OF STEEL ROD CAN BE CONNECTED WITH THREADED COUPLINGS.
7. ADDITIONAL SECTIONS OF PLASTIC PROTECTIVE SLEEVE CAN BE CONNECTED WITH PRESS-FIT PLASTIC COUPLINGS.
8. STEEL MARKER ROD SHOULD EXTEND AT LEAST 6" ABOVE TOP OF PLASTIC PROTECTIVE SLEEVE.
9. PLASTIC PROTECTIVE SLEEVE SHOULD EXTEND AT LEAST 1" ABOVE TOP OF FILL SURFACE.

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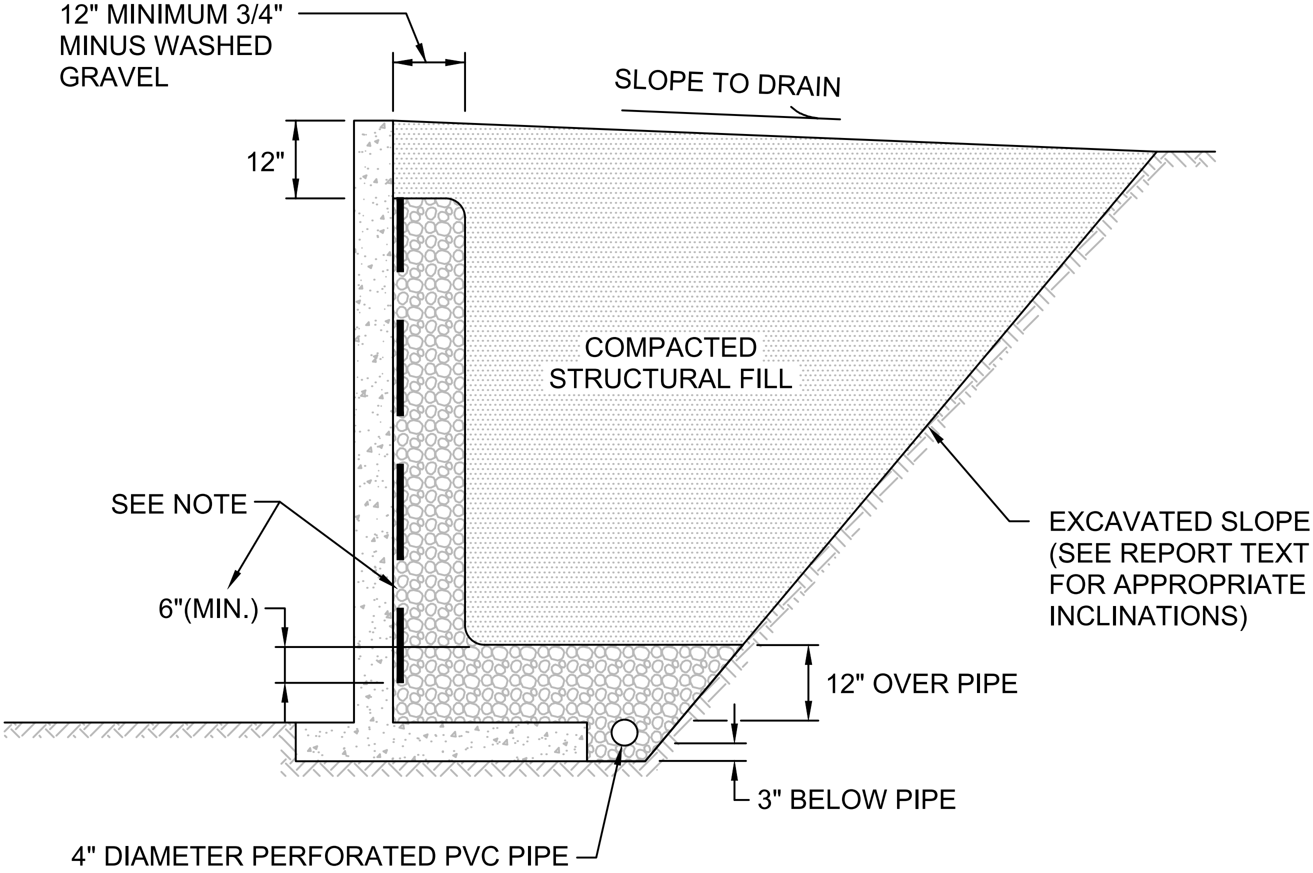
SETTLEMENT MARKER DETAIL
PSE OPERATION TRAINING CENTER
PUYALLUP, WASHINGTON

Proj.No. T-8829	Date: AUG 2023	Figure 3



NOT TO SCALE

NOTE:

MIRADRAIN G100N PREFABRICATED DRAINAGE PANELS OR SIMILAR PRODUCT CAN BE SUBSTITUTED FOR THE 12-INCH WIDE GRAVEL DRAIN BEHIND WALL. DRAINAGE PANELS SHOULD EXTEND A MINIMUM OF SIX INCHES INTO 12-INCH THICK DRAINAGE GRAVEL LAYER OVER PERFORATED DRAIN PIPE.

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TYPICAL WALL DRAINAGE DETAIL
PSE OPERATION TRAINING CENTER
PUYALLUP, WASHINGTON

Proj.No. T-8829	Date: AUG 2023	Figure 4

APPENDIX A
FIELD EXPLORATION AND LABORATORY TESTING

PSE Operational Training Center
Puyallup, Washington

On November 16, 2022, and November 17, 2022, we observed soil conditions at 13 test borings drilled to depths of approximately 10 to 30 feet below existing surface grades. On November 18, 2022, In-Situ Engineering, under subcontract with Terra Associates, Inc., performed 2 cone penetration tests (CPTs). Test boring and CPT locations were determined in the field by measuring from existing site features. The approximate locations of the test borings and CPTs are shown on the attached Exploration Location Plan, Figure 2. Test Boring Logs are attached as Figures A-2 through A-14.

A geotechnical engineer from our office conducted the field exploration. Our representative classified the soil conditions encountered, maintained a log of each test boring, obtained representative soil samples, and recorded water levels observed during drilling. During drilling, soil samples were obtained in general accordance with ASTM Test Designation D-1586. Using this procedure, a 2-inch (outside diameter) split barrel sampler is driven into the ground 18 inches using a 140-pound hammer free falling from a height of 30 inches. The number of blows required to drive the sampler 12 inches after an initial 6-inch set is referred to as the Standard Penetration Resistance value or N value. This is an index related to the consistency of cohesive soils and relative density of cohesionless materials. N values obtained for each sampling interval are recorded on the Test Boring Logs, Figures A-2 through A-14. All soil samples were visually classified in accordance with the Unified Soil Classification System (USCS) described on Figure A-1.

Representative soil samples obtained from the test borings were placed in sealed plastic bags and taken to our laboratory for further examination and testing. The moisture content of each sample was measured and is reported on the Test Boring Logs. Grain size analyses were performed on select soil samples. The results are shown on Figures A-15 and A-16.

InSitu Engineering, under subcontract with Terra Associates, Inc., conducted two electric CPTs at locations selected by Terra Associates, Inc. which are shown in Figure 2. The CPTs were advanced to depths of 60 to 70 feet below the surface. The CPT was instrumented, and an approximately 1.5-inch diameter cone was pushed into the ground at a constant rate. During advancement, continuous measurements are made of the resistance to penetration of the cone and the friction of the outer surface of the sleeve. The cone is also equipped with a porous filter and a pressure transducer for measuring groundwater or pore water pressure generated. Measurements of tip and sleeve frictional resistance, pore pressure, and interpreted soil conditions are summarized in graphical form on the attached CPT Logs.

MAJOR DIVISIONS				LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS	More than 50% material larger than No. 200 sieve size	**GRAVELS** More than 50% of coarse fraction is larger than No. 4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
				GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.
			Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
				GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
		SANDS More than 50% of coarse fraction is smaller than No. 4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, sands with gravel, little or no fines.
				SP	Poorly-graded sands, sands with gravel, little or no fines.
			Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines.
				SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS	More than 50% material smaller than No. 200 sieve size	**SILTS AND CLAYS** Liquid Limit is less than 50%		ML	Inorganic silts, rock flour, clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity. (Lean clay)
				OL	Organic silts and organic clays of low plasticity.
		SILTS AND CLAYS Liquid Limit is greater than 50%		MH	Inorganic silts, elastic.
				CH	Inorganic clays of high plasticity. (Fat clay)
				OH	Organic clays of high plasticity.
HIGHLY ORGANIC SOILS				PT	Peat.

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

Density	Standard Penetration Resistance in Blows/Foot
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

COHESIVE

Consistancy	Standard Penetration Resistance in Blows/Foot
Very Soft	0-2
Soft	2-4
Medium Stiff	4-8
Stiff	8-16
Very Stiff	16-32
Hard	>32

I	2" OUTSIDE DIAMETER SPILT SPOON SAMPLER
Ⅱ	2.4" INSIDE DIAMETER RING SAMPLER OR SHELBY TUBE SAMPLER
▼	WATER LEVEL (Date)
Tr	TORVANE READINGS, tsf
Pp	PENETROMETER READING, tsf
DD	DRY DENSITY, pounds per cubic foot
LL	LIQUID LIMIT, percent
PI	PLASTIC INDEX
N	STANDARD PENETRATION, blows per foot

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UNIFIED SOIL CLASSIFICATION SYSTEM
PSE OPERATION TRAINING CENTER
PUYALLUP, WASHINGTON

Proj.No. T-8829 | Date: AUG 2023 | Figure A-1

LOG OF BORING NO. B-1

Figure No. A-2

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Blackish-gray silty SAND, fine to coarse sand, moist to wet, trace rootlets, occasional silt seam. (SM)	Loose		
				5	20.4
▼					
5				5	29.1
				4	29.0
		Blackish-gray SAND with silt, fine to coarse sand, wet, trace small organic fragments. (SP-SM)			
10				7	27.5
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			
15					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-2

Figure No. A-3

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Blackish-gray SAND, fine to medium sand, moist, trace rootlets, occasional sandy silt seam. (SP)	Loose	9	10.1
5		Gray sandy SILT, fine sand, wet, occasional clayey silt layer, occasional rootlet. (ML)		6	31.6
		Gray clayey SILT, wet, trace rootlets, interbedded sand seams. (ML)	Soft	2	52.3
10			Stiff	9	31.1
		Blackish-gray SAND, fine to coarse sand, wet, interbedded silt seams. (SP)	Loose		27.5
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			
15					

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LOG OF BORING NO. B-3

Figure No. A-4

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50		Moisture Content (%)
0		Gray SILT, moist, mottled, occasional rootlet, occasional sand seam. (ML)	Medium Stiff	●	5	35.4
5		Gray clayey SILT, wet, occasional rootlet. (ML)	Soft	●	2	36.7
		Blackish-gray SAND with silt, fine to coarse sand, wet, occasional small organic fragment, occasional clayey silt seam. (SP-SM)		●	5	27.3
10			Loose	●	6	29.0
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.				
15						

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-4

Figure No. A-5

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0					
		Gray SILT, moist, generally mottled, localized oxidized laminations, occasional rootlet, occasional charcoal inclusion. (ML)	Soft	3	38.7
▼					
5		Blackish-gray to gray clayey SILT, wet, mottled, occasional rootlet, occasional sand with silt layer. (ML)		2	37.7
		Interbedded sand seams observed	Medium Stiff	8	31.9
		Blackish-gray SAND, fine to coarse sand, wet, trace gravel, occasional silt seam. (SP)	Loose		23.7
10				7	24.8
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			
15					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-5

Figure No. A-6

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Alternating layers of brownish-gray silty SAND and sandy SILT, fine to medium sand, moist, mottled, trace rootlets. (SM/ML)			
			Very Loose	3	27.7
▼		Gray clayey SILT, wet, mottled, trace sand, occasional rootlet. (ML)			
5			Soft	2	40.6
			Medium Stiff	6	36.8
					25.2
		Blackish-gray SAND with silt, fine to medium sand, wet, occasional silt seam. (SP-SM)	Loose		
10		Blackish-gray SAND, fine to coarse sand, wet, occasional silt layer. (SP)	Very Loose	3	26.1
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			
15					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-6

Figure No. A-7

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 6 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Brownish-gray silty SAND, fine sand, moist, occasional rootlet, occasional clayey silt layer. (SM)	Loose	6	19.2
5		Alternating layers of silty SAND and sandy SILT, fine sand, moist to wet, mottled, occasional sand seam. (SM/ML)	Very Loose	3	28.8
▼		Gray SILT, moist to wet, mottled, interbedded sandy silt layers, occasional sand seam. (ML)	Soft	4	33.7
10		Gray clayey SILT, moist to wet, oxidized laminations. (ML)		3	39.7
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 6 feet.			
15					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-7

Figure No. A-8

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 6 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Brownish-gray silty SAND, fine sand, moist to wet, slightly mottled, trace sandy silt seams, occasional rootlet. (SM)	Very Loose	3	18.9
5			Loose	5	38.0
		Brownish-gray SAND with silt, fine to medium sand, wet, trace silt layers. (SP-SM)		8	29.0
10		Gray clayey SILT, moist, trace small organic fragments, interbedded sand layers. (ML) *Numerous organic PEAT inclusions observed in upper 6 inches of sample*	Soft	3	42.2
		Blackish-gray SAND with silt, fine to medium sand, wet, occasional silt layer. (SP-SM)	Loose	9	29.3
15			Medium Dense	17	29.1
20		Gray SILT, moist, occasional small organic fragment, interbedded and inundated sand layers. (ML)	Very Stiff	19	27.9
		Test Boring terminated at approximately 20 feet, Groundwater seepage observed at approximately 6 feet.			
25					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-8

Figure No. A-9

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 10 ft **Approx. Elev:** NA

Depth (ft)	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0	FILL: Gray silty GRAVEL with sand, fine to coarse sand, fine to coarse gravel, wet, trace rootlets. (GM)	Loose	5	5.6
5	Brownish-gray clayey SILT, moist, mottled, trace sand seams, occasional rootlet. (ML)	Medium Stiff	5	30.4 16.8
	Brownish-gray SAND with silt, fine to medium sand, moist, occasional silt layer. (SP-SM)	Loose	5	36.0
	Gray sandy SILT, fine to medium sand, moist, mottled, trace sand seams. (ML)	Loose		
▼10	Blackish-gray SAND with silt, fine to coarse sand, wet, occasional silt layer. (SP-SM)	Medium Dense	11	26.4
	Gray SILT, moist to wet, trace sand seams, trace fine gravel. (ML)	Medium Stiff	5	44.4
15	Blackish-gray SAND with silt, fine to medium sand, wet, occasional fine gravel. (SP-SM)	Medium Dense	13	28.6
20	Dark gray SAND with silt, fine to medium sand, wet, occasional fine gravel, interbedded silt layers. (SP-SM)	Medium Dense	20	27.8
25	Blackish-gray SAND with silt, fine to medium sand, wet, interbedded silt layers. (SP-SM)	Medium Dense	24	27.6
30		Dense	31	24.2
	Test Boring terminated at approximately 30 feet. Groundwater seepage observed at approximately 10 feet.			
35				

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-9

Figure No. A-10

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 7.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0					
		Brownish-gray silty SAND, fine sand, moist, occasional gravel, occasional rootlet, interbedded sand seams, interbedded silt seams. (SM)	Loose	6	16.3
5				5	17.8
		Gray sandy SILT, fine sand, moist to wet, mottled, interbedded and inundated sand seams. (ML)		7	33.5
10		Gray clayey SILT, moist to wet, occasional localized mottling, occasional localized oxidized lamination. (ML)	Medium Stiff	6	42.8
		Gray SILT, wet, occasional small organic fragment. (ML)		4	40.4
15		Blackish-gray SAND with silt, fine to medium sand, wet, interbedded silt layers. (SP-SM)	Loose	9	30.7
20		Light brown organic PEAT, wet, fibrous, trace sand. (PT) (Partially decomposed tree trunk)	Very Loose	3	211.4
25		Gray sandy SILT, fine to medium sand, wet, interbedded silty sand layers. (ML)	Medium Dense	26	33.2
30		Gray SILT with sand, fine to medium sand, wet, interbedded silty sand layers. (ML)	Stiff	13	32.2
		Test Boring terminated at approximately 30 feet. Groundwater seepage observed at approximately 7.5 feet.			
35					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-10

Figure No. A-11

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 10 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Grayish-brown sandy SILT, fine sand, moist, localized mottling, localized oxidized laminations, trace small organic fragments, interbedded fine sand layers. (ML)	Loose		
				7	12.9
5				5	23.3
		Brownish-gray SAND, fine to medium sand, moist, occasional silt seam. (SP)		6	11.3
▼10		Gray SILT, moist to wet, oxidized laminations, trace small organic fragments, interbedded and inundated sand layers. (ML)	Medium Stiff	4	36.8
			Stiff	10	35.2
15		Gray SAND with silt, fine to medium sand, wet, interbedded silt layers. (SP-SM)	Medium Dense	14	28.4
		Gray sandy SILT, fine sand, moist to wet, occasional silt seam, occasional wood waste inclusion. (ML)			
20				13	32.6
		Test Boring terminated at approximately 20 feet. Groundwater seepage observed at approximately 10 feet.			
25					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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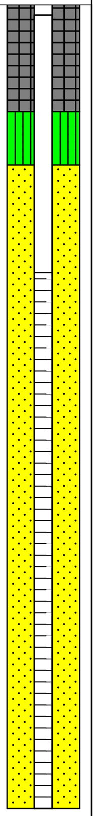
LOG OF BORING NO. B-11

Figure No. A-12

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 10 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)	Observ. Well
0		Brownish-gray SILT with sand, fine sand, moist, mottled, trace rootlets. (ML)	Medium Stiff	4	36.6	
5		Brownish-gray silty SAND, fine sand, moist to wet, interbedded silt with sand layers. (SM)	Loose	4	24.3	
		Gray SAND with silt, fine to medium sand, moist to wet, interbedded and mottled silty sand and silt layers. (SP-SM)		5	28.2	
▼10				4	30.7	
		Gray SILT, moist to wet, interbedded and inundated sand with silt layers. (ML)	Stiff	8	46.2	
15		Gray SAND with silt, fine to medium sand, wet, occasional silt layer. (SP-SM)	Medium Dense	11	31.2	
20		Test Boring terminated at approximately 15 feet. Groundwater seepage observed at approximately 10 feet. Boring converted to groundwater monitoring well with monument no. BNV 571.				

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-12

Figure No. A-13

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 9 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		FILL: Gray GRAVEL with silt and sand, fine to coarse sand, fine to coarse gravel, moist, scattered rootlets. (GP-GM)	Loose	8	9.1
5		Gray SILT, moist, mottled, trace sand seams. (ML)	Stiff	11	32.5
		Brown SAND, fine to coarse sand, moist, (SP)	Medium Dense		9.6
		Gray SAND with silt, fine to coarse sand, moist to wet, trace gravel, occasional silt seam. (SP-SM)		10	16.3
10		Blackish-gray SAND, fine to coarse sand, wet, trace fine gravel, trace silt. (SP)		11	24.7
				12	18.7
15			Loose	9	19.8
		Test Boring terminated at approximately 15 feet. Groundwater seepage observed at approximately 9 feet.			
20					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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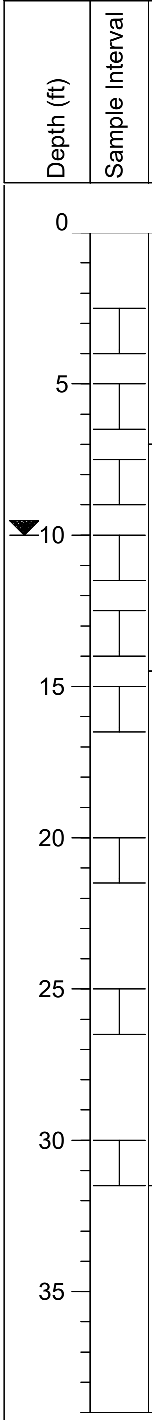
LOG OF BORING NO. B-13

Figure No. A-14

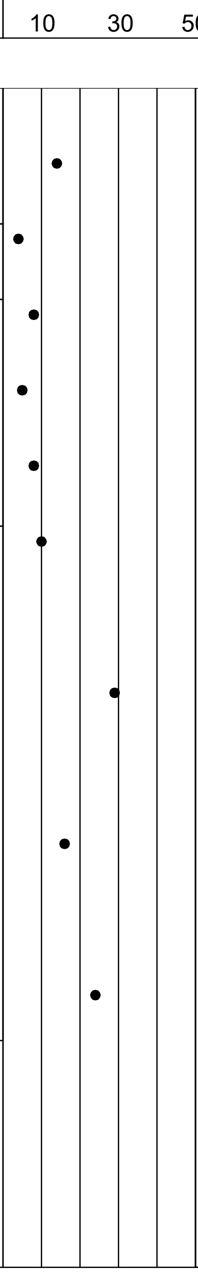
Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

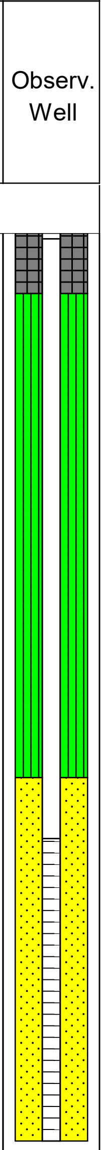
Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 10 ft **Approx. Elev:** NA



Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot	Moisture Content (%)
FILL: Gray GRAVEL with silt and sand, fine to coarse sand, fine to coarse gravel, moist. (GP-GM)	Medium Dense	14	9.9
Brownish-gray sandy SILT, fine sand, moist, mottled, occasional gravel, occasional rootlet. (ML)	Loose	4	22.3
Gray SILT, moist to wet, oxidized laminations, trace sand, occasional small organic fragment, interbedded sand with silt and silty sand layers. (ML)	Medium Stiff	8 5 8	20.1 36.5 26.5
Blackish-gray SAND with silt, fine to medium sand, wet, occasional fine gravel, interbedded silty sand and silt layers. (SP-SM)	Medium Dense	10 29 16 24	31.2 25.0 26.6 24.9





Test Boring terminated at approximately 30 feet.

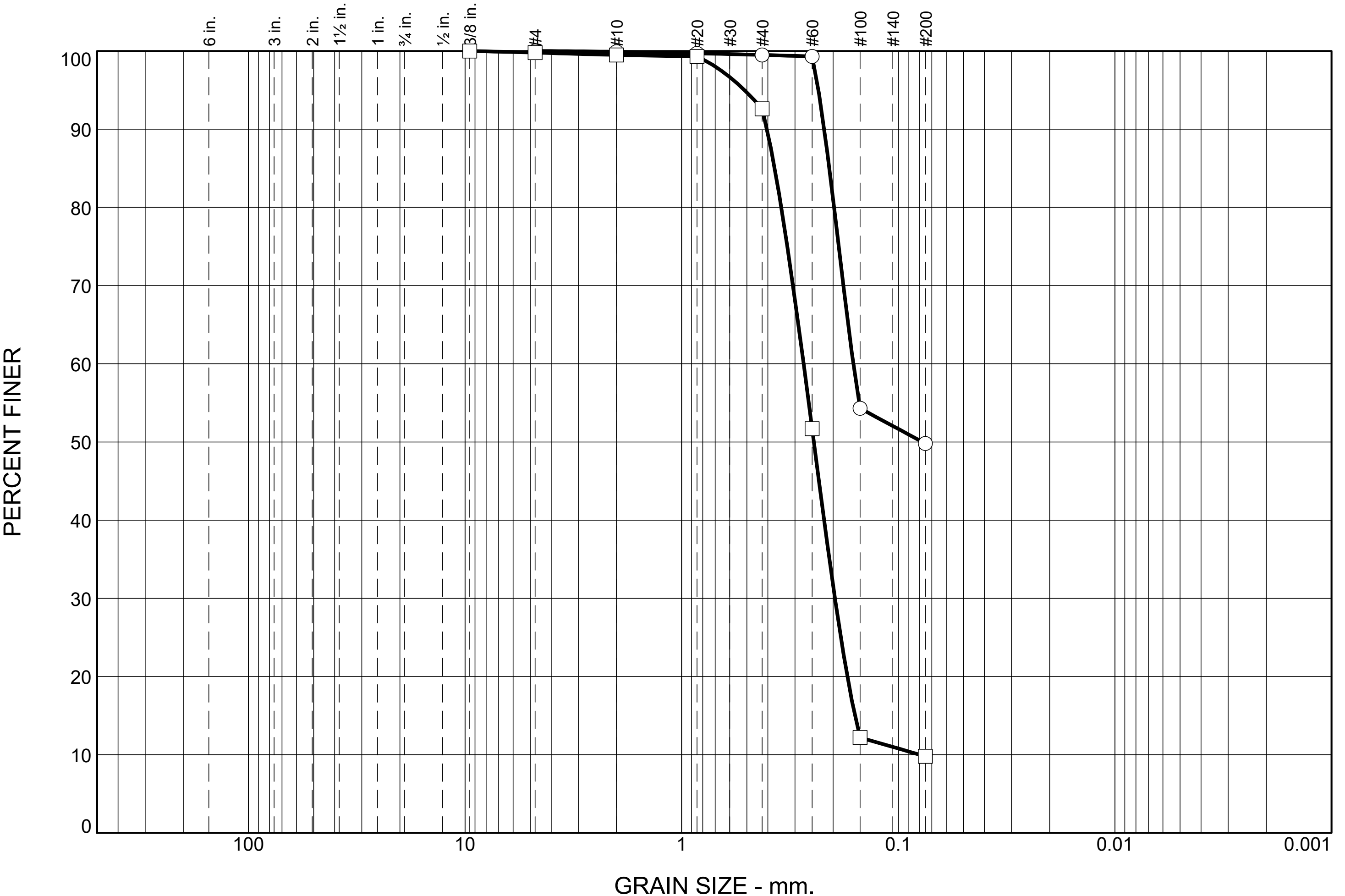
Groundwater seepage observed at approximately 10 feet.

Boring converted to groundwater monitoring well with monument no. BNV 572.

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

Terra Associates, Inc.
Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.4	49.7	49.8	
□	0.0	0.0	0.2	0.3	6.9	82.8	9.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2081	0.1612	0.0773					
□			0.3720	0.2736	0.2455	0.1961	0.1585	0.0795	1.77	3.44

Material Description	USCS	AASHTO
○ Silty SAND	SM	
□ SAND with silt	SP-SM	

Project No. T-8829 **Client:** Trammel Crow Company

Project: PSE Operational Training Facility

○ **Location:** Test Boring B-7 **Depth:** 2.5 ft **Sample Number:** 1

□ **Location:** Test Boring B-8 **Depth:** 15 ft **Sample Number:** 7

Terra Associates, Inc.

Kirkland, WA

Remarks:

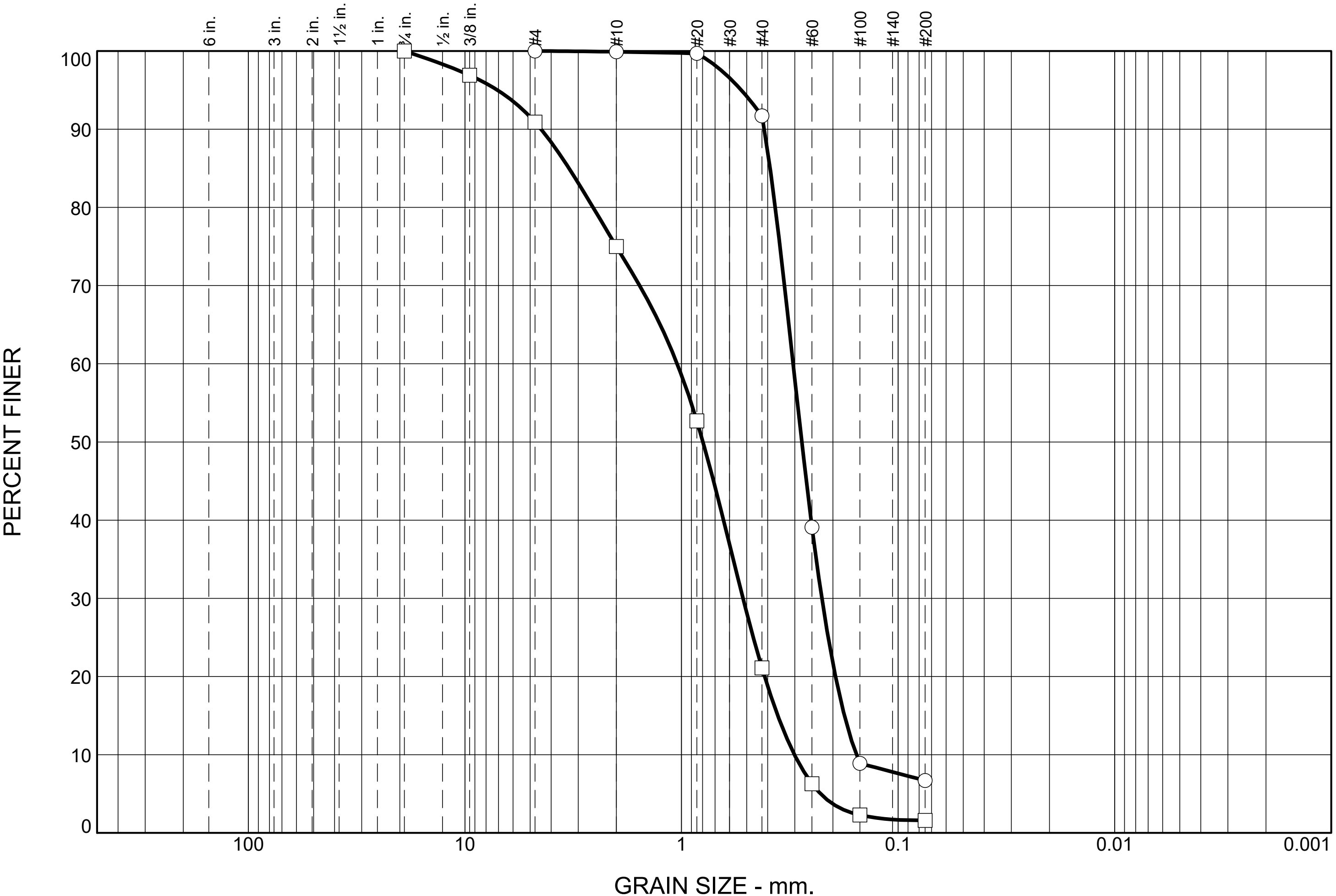
○ Tested on November 29, 2022

□ Tested on November 29, 2022

Figure A-15

Tested By: KJ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	8.2	85.0	6.7	
□	0.0	0.0	9.1	15.9	53.9	19.5	1.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3897	0.3051	0.2784	0.2251	0.1769	0.1556	1.07	1.96
□			3.3088	1.0474	0.7961	0.5200	0.3592	0.3008	0.86	3.48

Material Description	USCS	AASHTO
○ SAND with silt	SP-SM	
□ SAND	SP	

Project No. T-8829 **Client:** Trammel Crow Company

Project: PSE Operational Training Facility

○ **Location:** Test Boring B-8 **Depth:** 25 ft **Sample Number:** 9

□ **Location:** Test Boring B-12 **Depth:** 15 ft **Sample Number:** 7

Terra Associates, Inc.

Kirkland, WA

Remarks:

○ Tested on November 29, 2022

□ Tested on November 29, 2022

Figure A-16

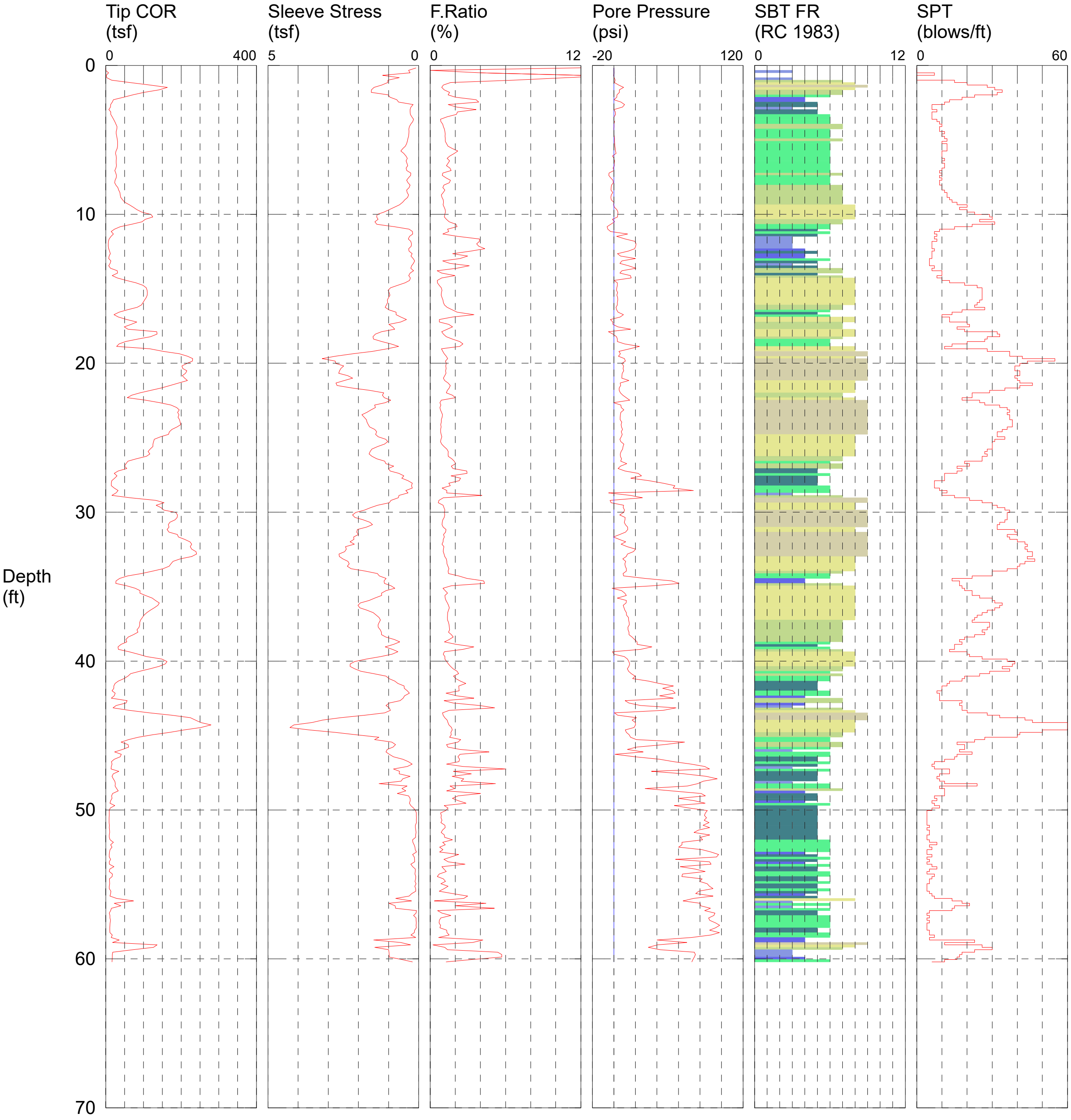
Tested By: KJ

CPT LOGS

CPT-01

CPT CONTRUCTOR: In Situ Engineering
CUSTOMER: Terra Associates
LOCATION: Puyallup
JOB NUMBER: T-8829
COMMENT: PSE Operational Training Center
COMMENT:

OPERATOR: Okbay
CONE ID: DDG1351
TEST DATE: 11/18/2022 11:40:03 AM
PREDRILL: 0 ft
BACK FILL: 20% Grout + Bentonite Chips
SURFACE PATCH: None



TOTAL DEPTH: 60.203 ft

DEPTH INTERVAL: 0.050 m

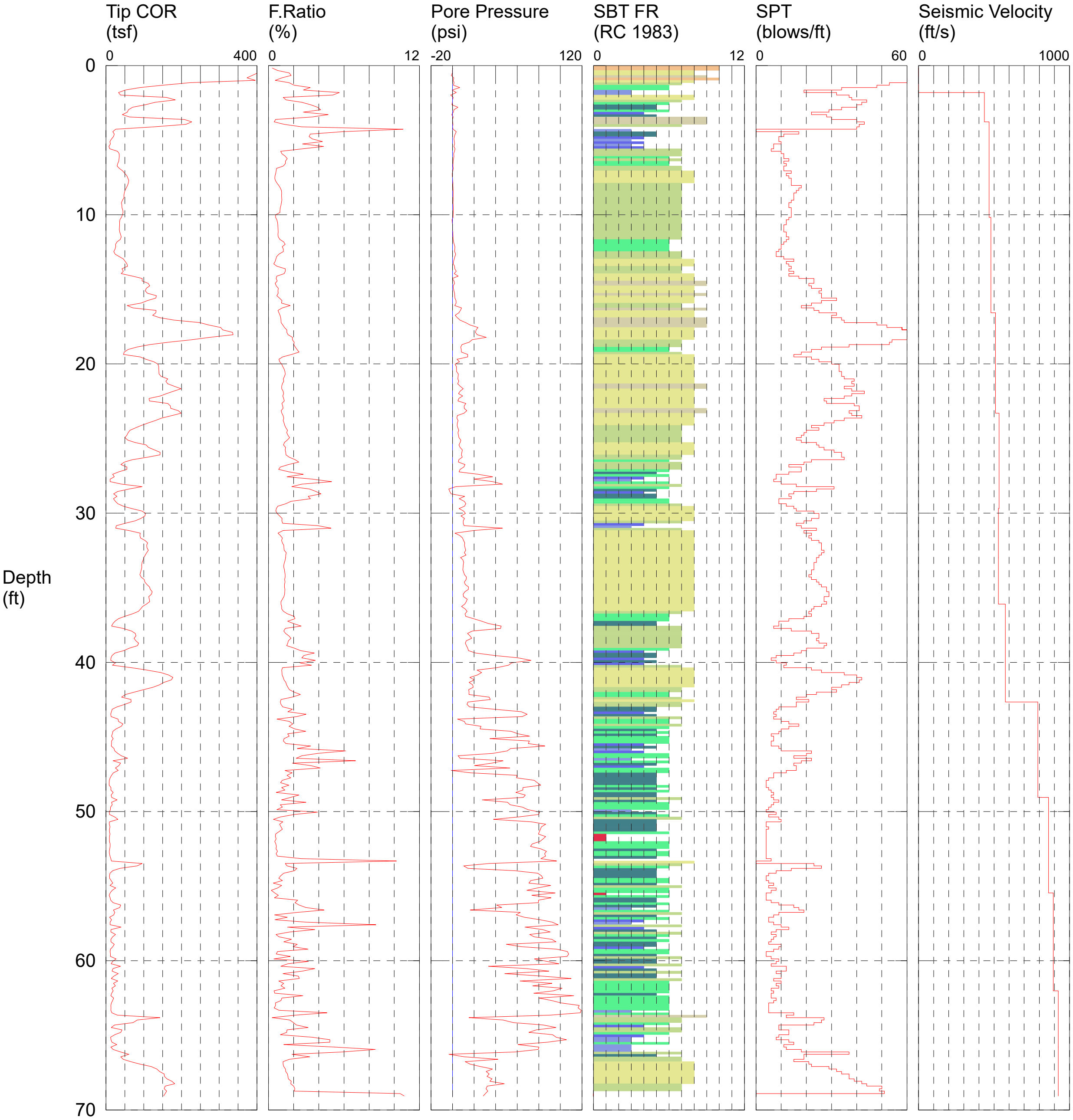
🟥 1 sensitive fine grained
🟥 2 organic material
🟦 3 clay
🟦 4 silty clay to clay
🟦 5 clayey silt to silty clay
🟩 6 sandy silt to clayey silt
🟩 7 silty sand to sandy silt
🟨 8 sand to silty sand
🟫 9 sand
🟧 10 gravelly sand to sand
⬜ 11 very stiff fine grained (*)
⬛ 12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

CPT-02

CPT CONTRUCTOR: In Situ Engineering
CUSTOMER: Terra Associates
LOCATION: Puyallup
JOB NUMBER: T-8829
COMMENT: PSE Operational Training Center
COMMENT:

OPERATOR: Okbay
CONE ID: DDG1351
TEST DATE: 11/18/2022 1:29:19 PM
PREDRILL: 0 ft
BACK FILL: 20% Grout + Bentonite Chips
SURFACE PATCH: None



TOTAL DEPTH: 69.062 ft

DEPTH INTERVAL: 0.050 m

🟥 1 sensitive fine grained
🟥 2 organic material
🟦 3 clay
🟦 4 silty clay to clay
🟩 5 clayey silt to silty clay
🟩 6 sandy silt to clayey silt
🟩 7 silty sand to sandy silt
🟨 8 sand to silty sand
🟫 9 sand
🟧 10 gravelly sand to sand
⬜ 11 very stiff fine grained (*)
⬛ 12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

HOLE NUMBER: CPT-02

OPERATOR: Okbay

CUSTOMER:

LOCATION: Puyallup

JOB NUMBER: T-8829

CPT CONTRUCTOR: In Situ Engineering

CONE ID: DDG1351

TEST DATE: 11/18/2022 1:29:19 PM

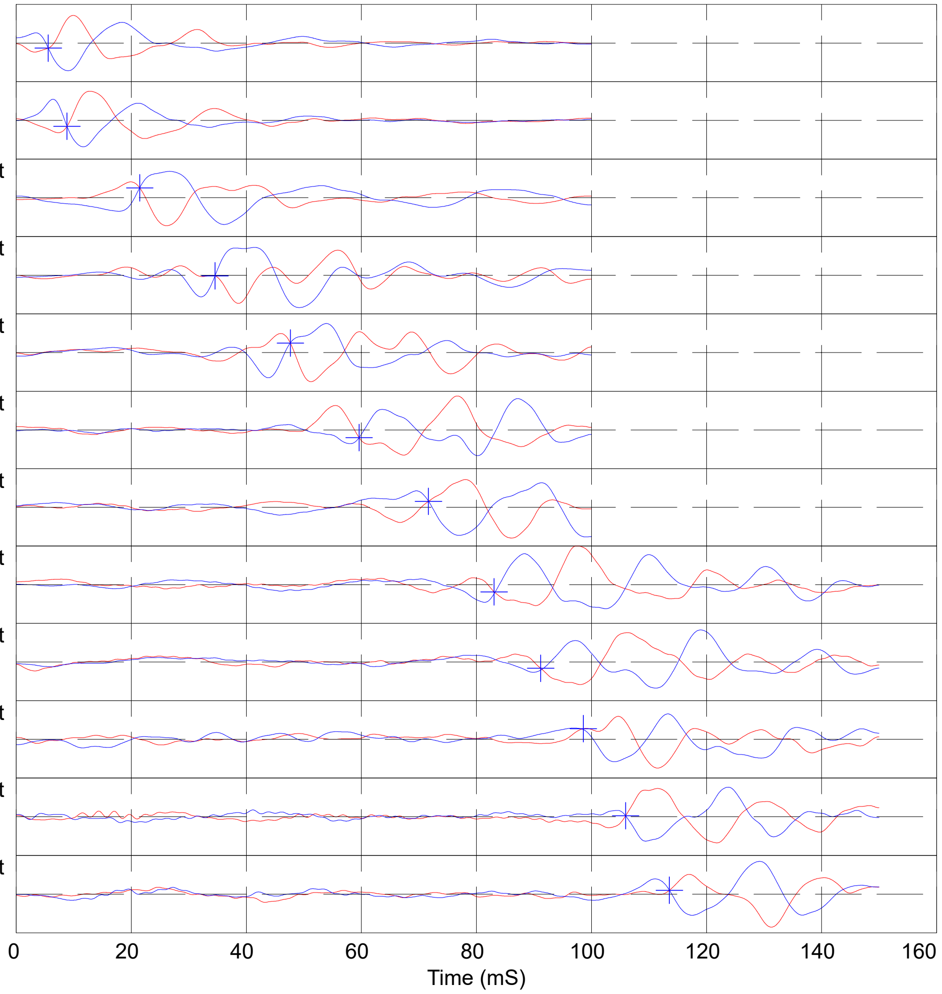
COMMENT: PSE Operational Training Center

PREDRILL 0 ft

BACK FILL: 20% Grout + Bentonite Chips

SURFACE PATCH: None

HOLE NUMBER: CPT-02



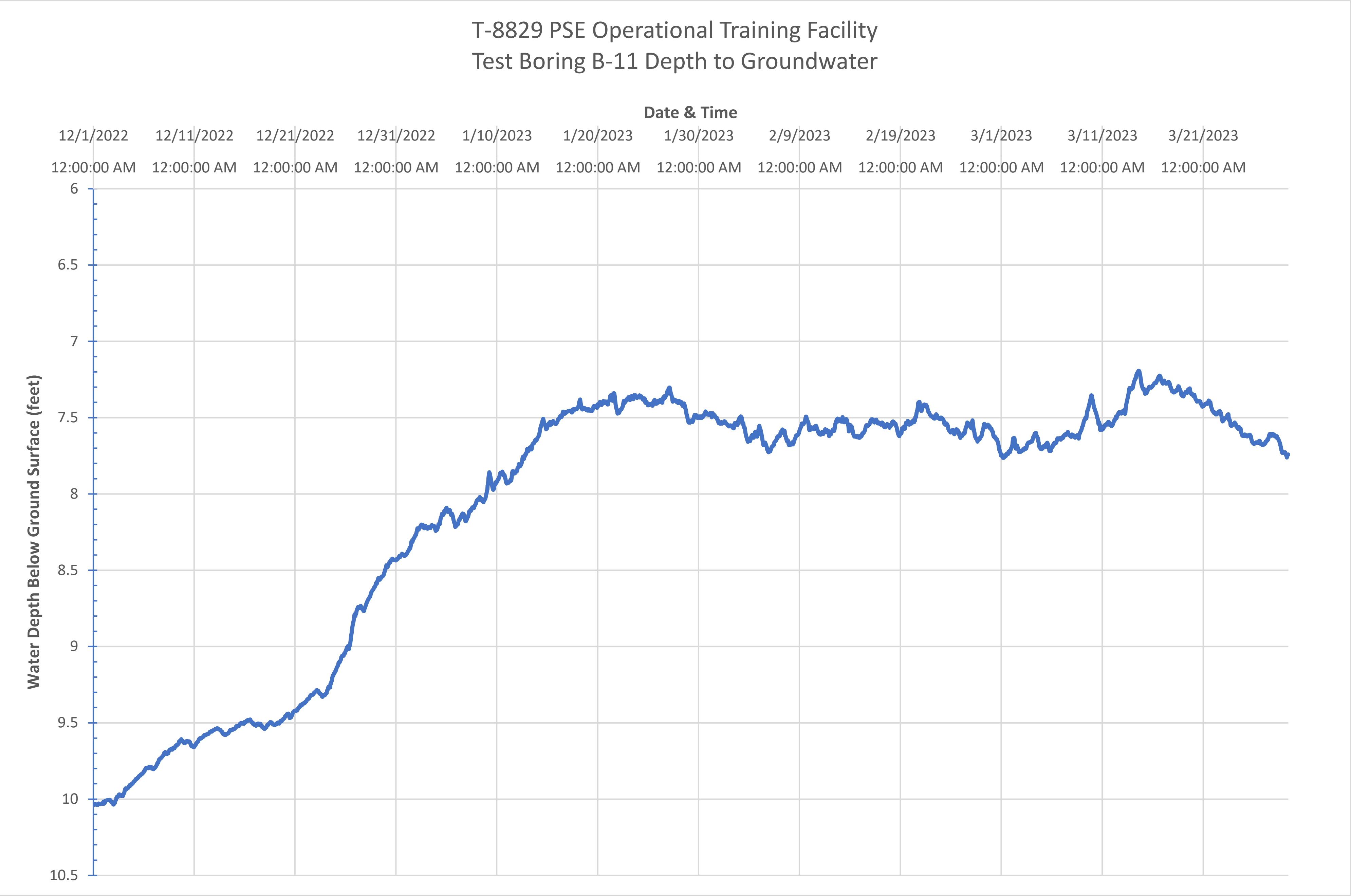
Depth 1.80ft	Ref*	Arrival 5.59mS	Velocity*
Depth 3.77ft	Ref 1.80ft	Arrival 8.83mS	Velocity 435.22ft/S
Depth 10.17ft	Ref 3.77ft	Arrival 21.48mS	Velocity 466.81ft/S
Depth 16.57ft	Ref 10.17ft	Arrival 34.57mS	Velocity 479.25ft/S
Depth 23.29ft	Ref 16.57ft	Arrival 47.65mS	Velocity 509.47ft/S
Depth 29.69ft	Ref 23.29ft	Arrival 59.61mS	Velocity 532.62ft/S
Depth 36.09ft	Ref 29.69ft	Arrival 71.68mS	Velocity 528.37ft/S
Depth 42.65ft	Ref 36.09ft	Arrival 83.08mS	Velocity 574.02ft/S
Depth 49.05ft	Ref 42.65ft	Arrival 91.17mS	Velocity 789.96ft/S
Depth 55.45ft	Ref 49.05ft	Arrival 98.59mS	Velocity 860.96ft/S
Depth 62.01ft	Ref 55.45ft	Arrival 105.93mS	Velocity 892.67ft/S
Depth 69.06ft	Ref 62.01ft	Arrival 113.55mS	Velocity 925.35ft/S

Hammer to Rod String Distance (ft): 2.62
* = Not Determined

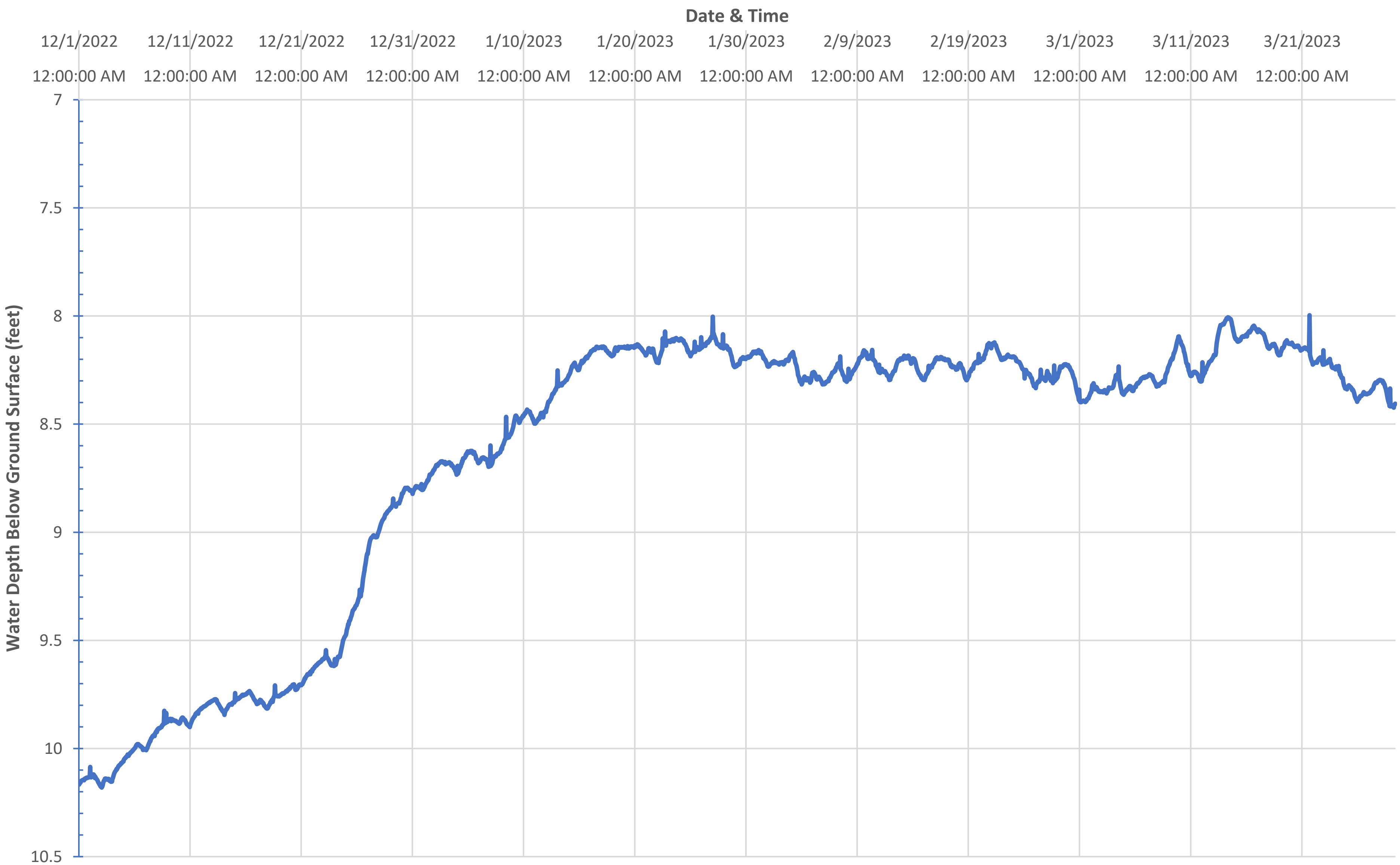
COMMENT: PSE Operational Training Center

APPENDIX B

GROUNDWATER MONITORING HYDROGRAPHS


T-8829 PSE Operational Training Facility
Test Boring B-11 Depth to Groundwater
Date & Time
12/1/2022 12:00:00 AM
12/11/2022 12:00:00 AM
12/21/2022 12:00:00 AM
12/31/2022 12:00:00 AM
1/10/2023 12:00:00 AM
1/20/2023 12:00:00 AM
1/30/2023 12:00:00 AM
2/9/2023 12:00:00 AM
2/19/2023 12:00:00 AM
3/1/2023 12:00:00 AM
3/11/2023 12:00:00 AM
3/21/2023 12:00:00 AM
Water Depth Below Ground Surface (feet)
6
6.5
7
7.5
8
8.5
9
9.5
10
10.5

T-8829 PSE Operational Training Facility
Test Boring B-13 Depth to Groundwater



APPENDIX C

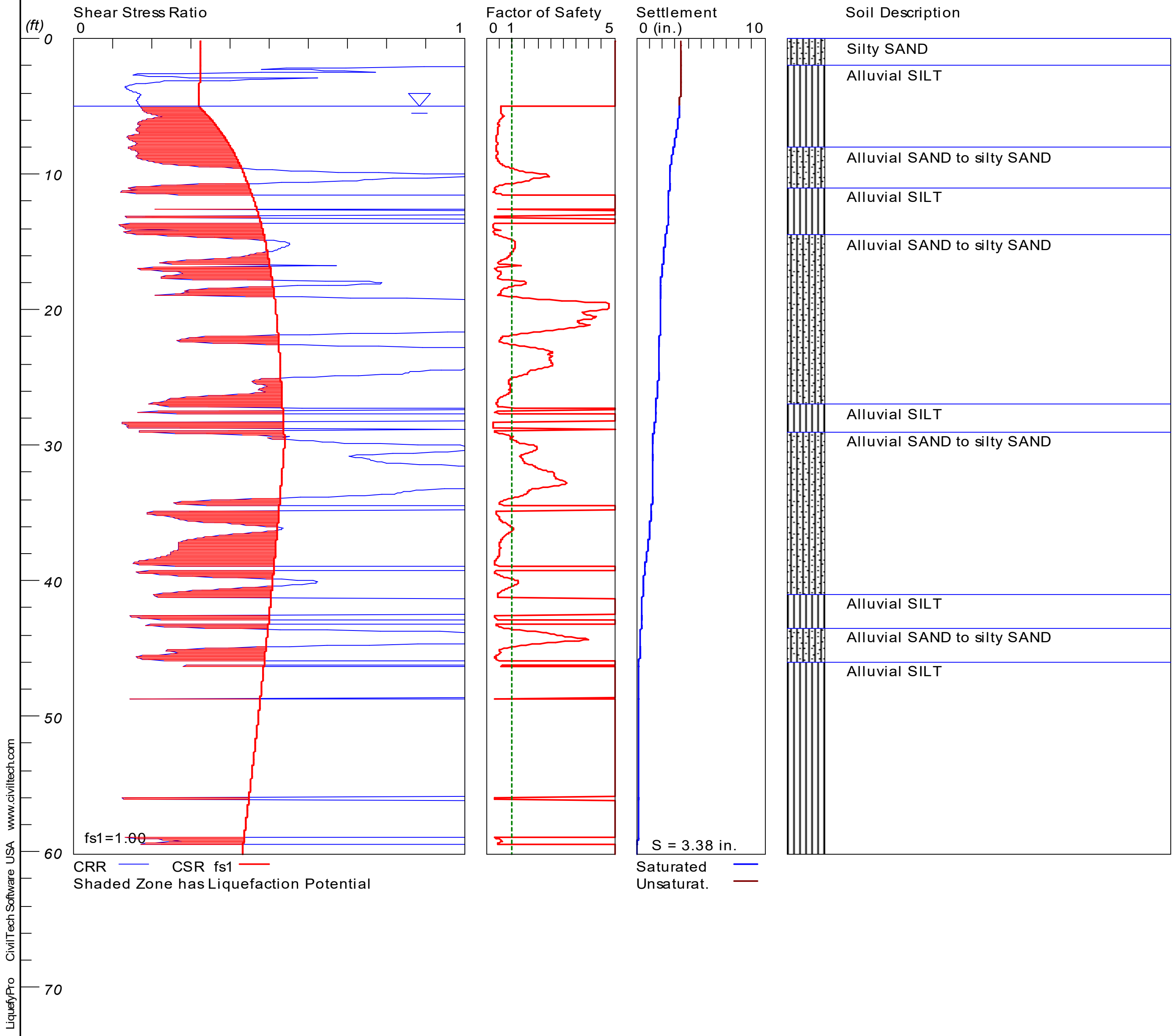
LIQUEFACTION ANALYSIS RESULTS

LIQUEFACTION ANALYSIS

T-8829 PSE Operational Training Facility

Hole No.=CPT-01 Water Depth=5 ft

Magnitude=7
Acceleration=0.5g

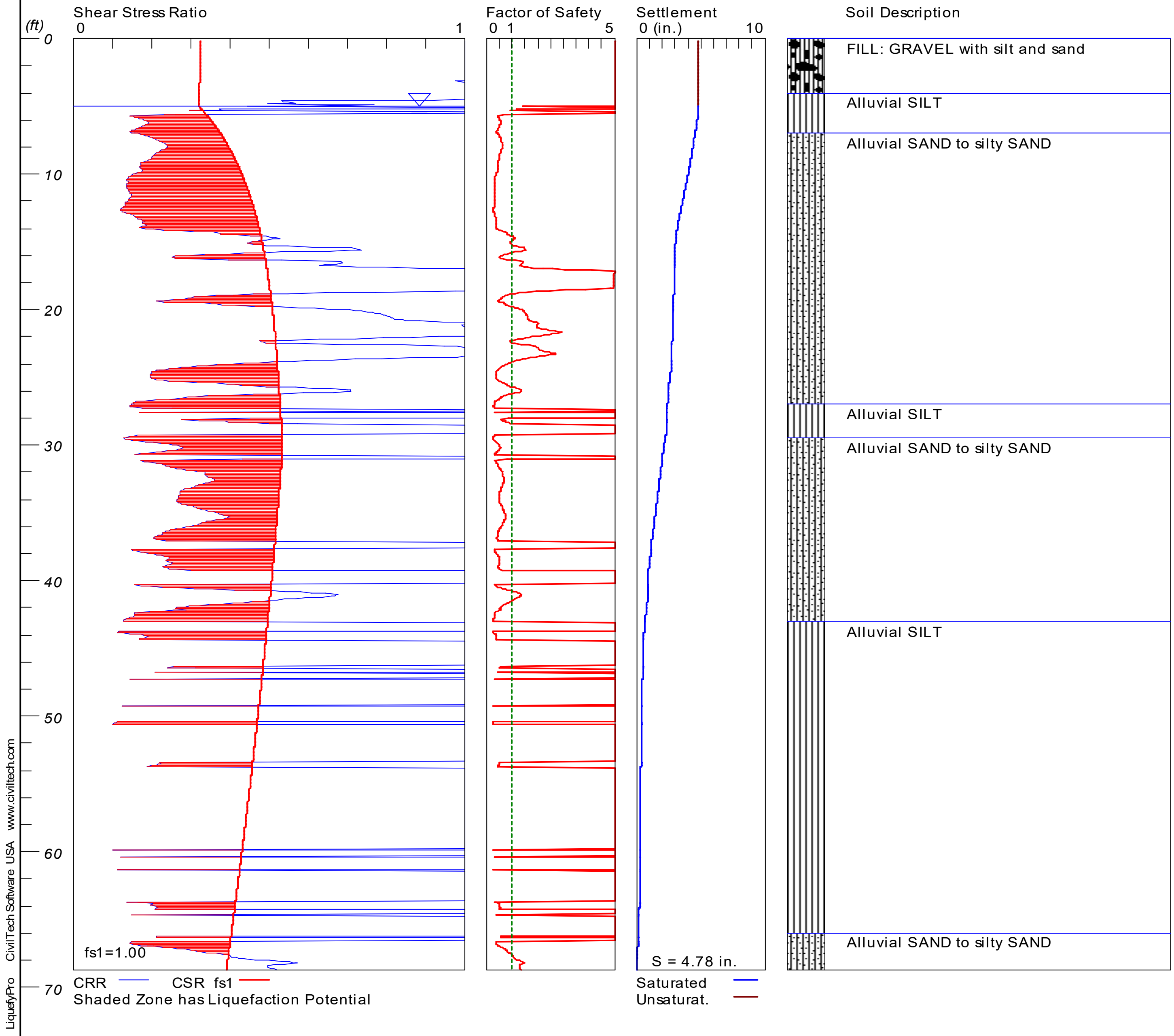


LIQUEFACTION ANALYSIS

T-8829 PSE Operational Training Facility

Hole No.=CPT-02   Water Depth=5 ft

Magnitude=7
Acceleration=0.5g



TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

June 12, 2023
Revised August 1, 2023
Project No. T-8829

Mr. Alex Garcia Mendoza
Trammell Crow Company
600 University Street, Suite 2912
Seattle, Washington 98101

Subject: Critical Aquifer Recharge Areas Evaluation
PSE Operational Training Center
221 and 325 Todd Road Northwest
Puyallup, Washington

Reference: Geotechnical Report, PSE Operational Training Center, Project No. T-8829,
prepared by Terra Associates, Inc., dated April 6, 2023

Dear Mr. Garcia Mendoza:

As requested, we performed an aquifer recharge and wellhead protection area review of the subject site. The purpose of our study was to determine if the site is located within the boundaries of aquifer recharge areas or wellhead protection areas as defined in Chapter 21.06.1110 (Designation, mapping and rating) of the Puyallup Municipal Code (PMC) and to conduct a hydrogeologic assessment of the site in accordance with the requirements of PMC 21.06.1150 (Critical area report requirements for critical aquifer recharge areas).

The site is located within the boundaries of an aquifer recharge area and wellhead protection areas per the defining criteria given in PMC 21.06.1110.3(a) and 21.06.1110.3(b), respectively. The site location is rated as a high susceptibility aquifer recharge area per the criteria given in PMC 21.06.1110.4(a). Review of the Washington State Department of Health (WSDOH) Source Water Assessment Program (SWAP) interactive GIS mapping tool (https://fortress.wa.gov/doh/swap/index.html) shows the all but the southwestern portion of the site overlain by the 6-month, 1-year, 5-year, and 10-year time-of-travel (TOT) zones of two wells operated by a Group A water system identified as Mountainview-Edgewood Water Company (MEWC). Smaller portions of the site are within the 5-year and 10-year TOT zones of a City of Puyallup (COP) well, and the 10-year TOT zone of a Group A water system well operated by DeChaux Mutual Water (DMW). The position of the site relative to the time-of-travel plots of these systems is shown on Figure 1. The SWAP map shows the site within the boundary of the Puyallup-White Watershed.

SITE DESCRIPTION

The site is a vacant, triangular-shaped, 6.17-acre parcel located northeast of and adjacent to the intersection of Todd Road NW and 4th Street NW in Puyallup, Washington. A northwest-trending Union Pacific Railroad right-of-way (ROW) borders the northern site margin. The site location is near the northern margin of the Puyallup River alluvial plain, approximately 3,200 feet north of the river channel. The approximate site location is shown on Figure 2.

Site topography is relatively flat with a topographic relief of about 8 feet between the western and southeastern site margins. Topographic information obtained from the Pierce County Public GIS (PCPGIS) interactive mapping tool website (https://matterhornwab.co.pierce.wa.us/publicgis/) shows site elevations ranging between Elev. 40 at the western site margin and about Elev. 48 near the southeastern site corner. Maximum surface gradients at the site are about 3 percent.

Historical aerial photographs of the site obtained from the PCPGIS website show residential farm buildings occupying the southwestern and central portions of the site until about 2018. An equipment and materials storage yard occupies the central portion of the site in aerial photographs from 2020 and 2021. Site vegetation consists primarily of grasses with scattered mature coniferous and deciduous trees. A significant portion of the former storage yard area is surfaced with gravel.

OTHER CRITICAL AREAS REVIEW

The PCPGIS website shows several environmentally-significant surface features located within 1,300 feet of the site. The type of surface feature and general direction and distance from the site are given below: The approximate location of each surface feature relative to the site is shown on Figure 3.

Type of Feature	Feature ID	Distance (feet)[1]	Direction	Hydrogeologic Position Relative to Site
Wetland[2]	WL1	43	West	Downgradient
	WL2	830	West-Northwest	Downgradient
Regulated Floodplain	RFP1	820	Northeast	Upgradient
	RFP2	510	North-Northwest	Crossgradient
	RFP3	350	Northwest	Downgradient
	RFP4	325	West	Downgradient
	RFP5	75	West	Downgradient
	RFP6	540	West	Downgradient
	RFP7	950	Northwest	Downgradient
	RFP8	1,275	West	Downgradient
	RFP9	880	South	Crossgradient
	RFP0	1,010	South	Crossgradient
	RFP11	820	South-Southeast	Crossgradient
	RFP12	1,120	Southeast	Upgradient
Floodway	FW1	620	West	Downgradient
	FW2	820	South-Southeast	Crossgradient
	FW3	1,120	Southeast	Upgradient
Stream	STRM1	360	Northwest	Downgradient
	STRM2	1,150	Southeast	Upgradient

1 – Distance from site perimeter to closest edge of feature.

2 – Delineated wetland area per Puyallup GIS

We evaluated site conditions for the presence of geologically hazardous areas as part of our geotechnical engineering study of the site. The results of our evaluation are discussed in Section 3.4 of the referenced geotechnical report.

PROJECT DESCRIPTION

A schematic site plan by Zervas, dated July 21, 2023, shows the project consisting of a centrally-located, 33,837 square-foot building with outdoor training features located west of the building. The outdoor training features include several smaller buildings, covered areas, a burn pit, substation yard and other training features.

Stormwater runoff will be conveyed to a detention pond located in the eastern portion of the site. Pond elevations are currently not available. The proposed development plan is shown on Figure 4.

SUBSURFACE CONDITIONS

Soils

We explored subsurface conditions at the site by drilling 13 test borings to depths of 10 to 30 feet with a track-mounted drill rig using hollow-stem auger drilling methods, and by advancing two cone penetration tests (CPTs) to maximum depths of 60 and 70 feet. The boring logs and CPT plots are presented in Appendix A. The approximate boring and CPT locations are shown on Figure 4.

The soils observed in the test borings are alluvial deposits comprised predominantly of interbedded silt to clayey silt, silty fine sand, and sand. The CPT data indicates that the alluvial deposits below a depth of 45 feet consist primarily of silt to clayey silt; however, medium dense to very dense sand deposits are indicated below a depth of about 67 feet in CPT-2. We observed up to approximately four feet of fill consisting of loose to medium dense gravel with silt and sand to silty gravel with sand in Test Borings B-8, B-12, and B-13.

The *Geologic Map of the Tacoma 1:100,000-Scale Quadrangle, Washington*, by J.E. Schuster, A.A Cabibbo, J.F. Schilter, and I.J. Hubert (2015) shows surficial geology at the site mapped as Holocene alluvium (Qa). The soils observed in the subsurface explorations are consistent with this geologic map unit. The referenced geologic map is attached as Figure 5.

Groundwater

Wet soils indicative of groundwater saturation were encountered below depths ranging from about 4.5 feet in Borings B-1 through B-5 to about 10 feet in Borings B-8, B-10, B-11, and B-13 during drilling. Groundwater levels at the site will fluctuate on a seasonal basis with highest levels occurring during the normally wet winter and spring months. This seasonal increase of groundwater levels was observed by monitoring of wells installed in Borings B-11 and B-13, which showed water levels generally fluctuating between depths of about 7.2 and 7.8 feet in B-11 and between depths of about 8 and 8.4 feet in B-13 between mid-January 2023 and mid-April 2023.

Based on area topography, our observations of surface drainage patterns in the site vicinity, and the northwesterly direction of flow in the Puyallup River approximately 3,200 feet south of the site, we expect that the direction of shallow groundwater flow beneath the site is generally to the west-northwest.

Hydrogeology

Based on our study, two primary groundwater regimes are present in the site vicinity. These include the relatively shallow Puyallup Valley water table aquifer and the deeper Vashon advance outwash aquifer (Qva aquifer). The Qva aquifer includes the Redondo-Milton Channel (RMC) aquifer, which according to the MEWC 2022 Water Quality Report, is the aquifer that MEWC Wells 1R and 8 draw from.

WATER WELL REVIEW

We reviewed available well log records obtained from the Washington State Department of Ecology (DOE) Well Report Viewer website (https://fortress.wa.gov/ecy/wellconstruction/map/WCLSWebMap/default.aspx) for existing water wells located in the site vicinity. Our research of the DOE database found driller's logs or related documents associated with 25 wells potentially located within a 1,300 foot radius from the site. Further review determined that four of the wells are located outside of the search radius and sixteen of the wells had been decommissioned or were used for irrigation or dewatering purposes. Five water wells used for domestic or municipal purposes are potentially located within the 1,300-foot search radius.

The approximate locations of the five wells relative to the subject site are shown on Figure 6. Documented well details and driller's logs are attached as Appendix B. Brief summaries of the five wells identified in the DOE database search are given below:

1. Burton Wulf Well (SE ¼ of SE ¼ of Section 16, Township 20N, Range 4E):

The DOE database incorrectly lists the well owner as Burton Walf. Located approximately 970 feet north and crossgradient from the subject site. The street address of the well is not given. The well is finished in sand and gravel deposits, interpreted to be the RMC aquifer, that underlies about 238 feet of soil described as clay and silt. The static water level in the well is reported to be at a depth of 4 feet.

3. Frank DeChaux Well (DOE Well ID AEF399) (SE ¼ of SE ¼ of Section 16, Township 20N, Range 4E):

This is a Group A well operated by DeChaux Mutual Water. The well is located approximately 1,055 feet north and crossgradient from the subject site. The street address of the well is not given. The well was drilled to a depth of 103 feet and screened in coarse sand and gravel deposits, interpreted to be the RMC aquifer, between depths of 83 and 93 feet. The sand and gravel aquifer is overlain by about 83 feet of soil described as clay or hardpan. The static water level in the well is reported to be at the ground surface.

4. Guy Abbey Well (NE ¼ of NE ¼ of NE ¼ of Section 21, Township 20N, Range 4E):

Located approximately 485 feet north and crossgradient from the subject site. The street address of the well is not given. The well was driven to a depth of 12 feet in the relatively-shallow Puyallup Valley water table aquifer. The soils are described as "soil and sand." The static water level in the well is reported to be at a depth of 10 feet.

The driller's log indicates that the well was constructed in 1944. The purpose of the well is not given. We were unable to determine if the well is still in use. Due to its shallow depth, it is unlikely that the well is used for domestic purposes if still operational. Based on this, we have excluded this well from further discussion.

19. Mountainview-Edgewood Water Company Well 1R (DOE Well ID AEC906) (SW ¼ of SW ¼ of Section 15, Township 20N, Range 4E):

Group A well located approximately 1,300 feet northeast and crossgradient from the subject site. The well address is 4623 Meridian E. The well was drilled to a depth of 100 feet and screened in soils described as sand, gravel, and cobbles between depths of 66.5 and 86.5 feet. The overlying soils are described as gravel, cobbles, and sand. The aquifer is underlain by soils described as till at a depth of 90 feet. The static water level in the well is reported to be at a depth of 18 feet. As indicated in the MEWC 2022 Water Quality Report, the well draws water from the RMC aquifer.

21. Mountainview-Edgewood Water Company Well (SW ¼ of SW ¼ of Section 15, Township 20N, Range 4E):

Located approximately 1,300 feet northeast and crossgradient from the subject site. The well identification number is not given. The street address of the well is not given. The well is cased to a depth of 92 feet with casing perforations made gravel and sand between 70 and 82 feet. Soils overlying the perforated depths consist predominantly of sand and gravel with soil described as clay between 5 and 22 feet. The static water level in the well is reported to be at a depth of 2.8 feet. As indicated in the MEWC 2022 Water Quality Report, the well draws water from the RMC aquifer.

We were unable to locate driller's logs for the 884-foot deep City of Puyallup Rec Center Well No. 17 (DOE Well ID AAB894) or the 98-foot deep Mountainview-Edgewood Water Company Well No. 8 (DOE Well ID ACV818) shown as Group A wells on the WSDOH SWAP map.

WELL WATER QUALITY REVIEW

We researched available water quality data for wells located within 1,300 feet of the site using the Washington State Department of Health, Office of Drinking Water (ODW) interactive web site (https://fortress.wa.gov/doh/eh/portal/odw/si/FindWaterSystem.aspx). Water quality data exists for three of the five wells. The results of water quality monitoring of each well are summarized below:

Mountainview-Edgewood Water Company Well 1R, Source 10 (DOE Well ID AEC906)

There are no recorded exceedances in samples collected from this well. Total coliform has been present in samples collected from the distribution system.

Mountainview-Edgewood Water Company Well 8, Source 8 (DOE Well ID AEC906)

There are no recorded exceedances in samples collected from this well. Total coliform has been present in samples collected from the distribution system.

DeChaux Mutual Water (DOE Well ID AEF399)

There are no recorded exceedances in samples collected from this well. Total coliform has been present in samples collected from the distribution system.

DISCUSSION

The four domestic water wells located within 1,300 feet of the site are completed in the RMC aquifer below depths ranging between 66.5 and 241 feet. The recorded static water levels in these wells are between the ground surface and a depth of 18 feet, indicating the RMC aquifer has a vertical flow gradient at the well locations. Additionally, the RMC aquifer at three of the four well locations is overlain by soils described as clay and silt or hardpan. Considering these hydrogeologic conditions, it is our opinion that the planned site development would not result in significant adverse impacts to the water quality or recharge of the RMC aquifer.

The relatively-shallow groundwater conditions at the site are consistent with the Puyallup Valley water table aquifer. Based on our review, there are no wells within 1,300 feet of the site that draw from the Puyallup Valley water table aquifer for domestic purposes. However, the shallow water table aquifer does contribute to support of the downgradient surface water features and other critical areas identified on Figure 3.

Potential impacts of the planned site development to the shallow water table aquifer include localized shallow construction dewatering, if necessary, and a decrease of permeable surface area at the site, which may impact shallow aquifer recharge currently occurring at the site by way of infiltration. However, we expect that the proposed stormwater pond would discharge into the existing storm sewer system that runs to the west along Todd Road NW and discharges to the wetland adjacent to Wapato Creek on the west side of 4th Street NW. In our opinion, the on-site stormwater quality treatment and discharge to the existing storm sewer system would adequately mitigate any potential adverse impacts to current on-site groundwater recharge and support of downgradient surface water features and wetland areas. In our opinion, any construction dewatering would have no impact on downgradient surface water features and wetland areas if the dewatering system is discharged to the existing storm sewer system. We expect that City of Puyallup notification and submittal of a temporary construction dewatering (TCD) plan for City of Puyallup review and approval would be required prior to construction.

In our opinion, the potential for adverse impacts to on-site and downgradient surface water features resulting from erosion and sedimentation during construction would be adequately mitigated with proper implementation and maintenance of BMPs for erosion prevention and sedimentation control outlined in the project construction stormwater pollution prevention plan (SWPPP).

In our opinion, potential hazards associated with the use of equipment fuels and lubricants at the site during construction would be adequately mitigated with proper implementation and maintenance of BMPs for spill prevention and recovery of hazardous materials during construction outlined in the project SWPPP.

Potential post-development impacts to groundwater at the site would be in the form of trace petroleum hydrocarbons and trace metals from roadway and parking area runoff, and typical landscape products in the form of fertilizers, pesticides, and other landscaping chemicals. It is not expected that any deleterious substances and hazardous materials used by site maintenance and landscape subcontractors would be stored on site or used in significant amounts.

In our opinion, specific recommendations for storage or handling of typical volumes of these materials for landscape and maintenance purposes, in typical residential volumes, is not warranted. Additionally, trace petroleum products and many common pesticides are readily degradable in the natural environment when dilute, and metals and pesticides are typically filtered by sorption in the upper portion of the soil column.

Potential impacts to site groundwater from a spill or leak from the permanent diesel-fueled backup generator can be adequately mitigated by implementing source control best management practices (BMPs) for fueling at dedicated stations (and above-ground and underground fuel storage facilities) as outlined in Volume IV, Chapter 6 of the 2019 *Stormwater Management Manual for Western Washington*. Applicable operational BMPs would include the following:

- Prepare an emergency spill response and cleanup plan (spill plan) per S426 BMPs for Spills of Oil and Hazardous Substances.
- Train employees on the proper use of fuel dispensers and on the spill plan.
- Have a designated trained person(s) available either on site or on call at all times to implement the spill plan promptly and properly and immediately cleanup all spills.
- The person conducting the fuel transfer must be present at the fueling pump during fuel transfer, particularly at unattended or self-serve stations.
- Keep suitable cleanup materials, such as dry adsorbent materials, on site to allow prompt cleanup of a spill.
- Do not use dispersants to clean up spills or sheens unless properly removed for disposal following application. Dispersants are not allowed to enter storm drains, surface waters, treatment systems, or sanitary sewers.
- Post signs in accordance with the requirements in the Uniform Fire Code (UFC) or International Fire Code (IFC). For example, post “No Topping Off” signs (topping off gas tanks causes spillage and vents gas fumes to the air).

Applicable Structural Source Control BMPs for new fueling stations would include the following:

- Slope the concrete containment pad around the fuel tank toward drains; either trench drains, catch basins and/or a dead-end sump. The slope of the drains shall not be less than 1 percent (Section 7901.8 of the UFC, Section 5703.6.8 of the IFC).
- Drains from containment pads must have a normally closed shutoff valve. The valve may be opened to convey contaminated stormwater to oil removal treatment such as an API or CP oil/water separator (see V-13 Oil and Water Separator BMPs), catch basin insert, or equivalent treatment, and then to a basic treatment BMP (as described in III-1.2 Choosing Your Runoff Treatment BMPs) or to a sanitary sewer, if approved by the sewer authority. Discharges from treatment systems to storm sewer or surface water or to the ground must not display ongoing or recurring visible sheen and must not contain a significant amount of oil and grease.
- The spill control capacity must be sized in compliance with Section 7901.8 of the UFC. The spill control capacity may be acquired by either an underground system including a sump, or an above ground containment area consisting of a containment pad with berms.

- The fueling island may be designed as a spill containment pad with a sill or berm raised to a minimum of four inches (per Section 7901.8 of the UFC) to prevent the runoff of spilled liquids and to prevent run-on of stormwater from the surrounding area. All stormwater collected on the containment pad must discharge to treatment with a normally closed valve downstream of the treatment.
- The fueling pad must be paved with Portland cement concrete, or equivalent. Asphalt pavement is not considered an equivalent material.

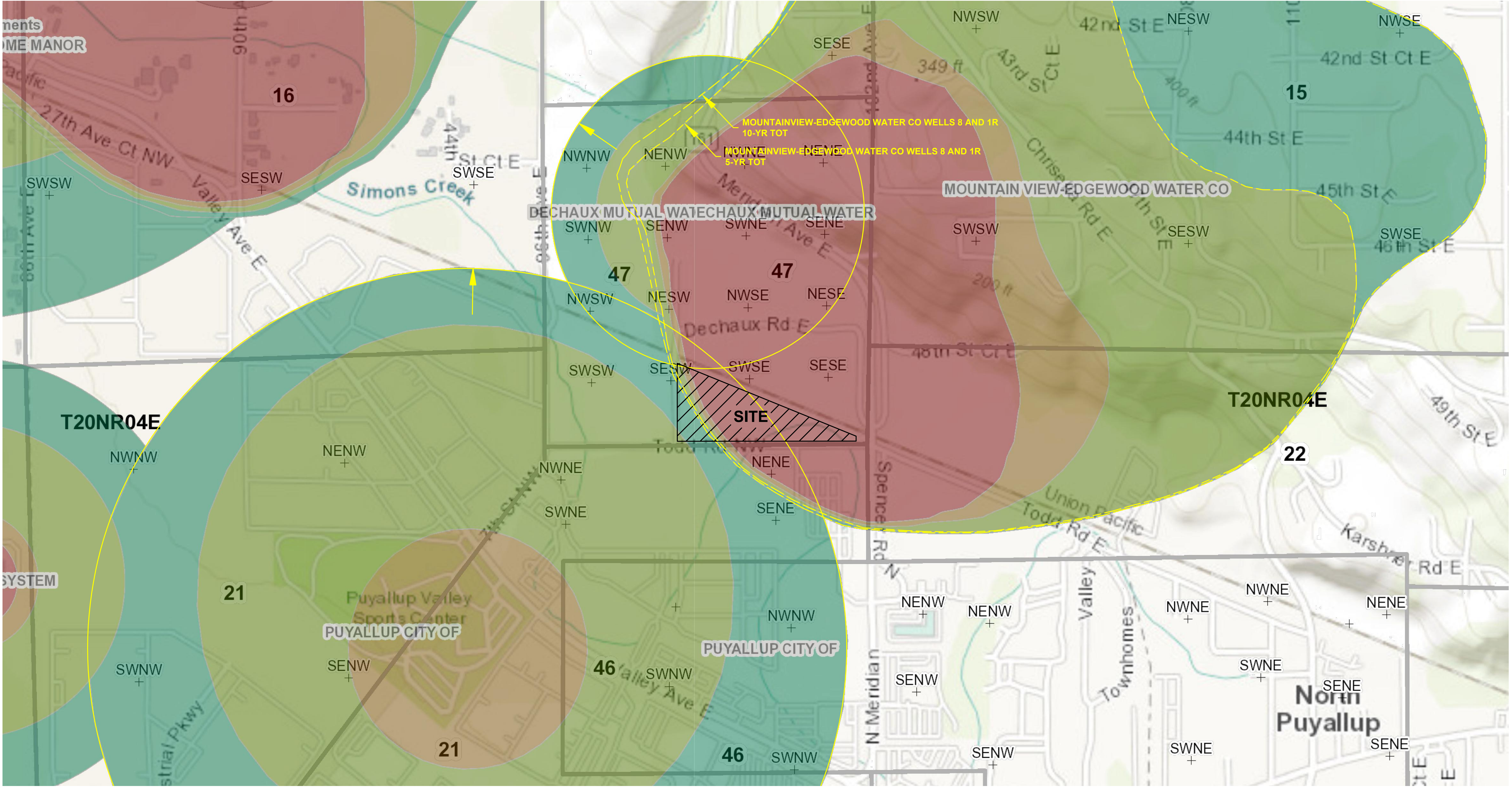
Based on our review, and provided appropriate BMPs are implemented as discussed above, it is our opinion that the use of a permanent diesel-fueled emergency generator at the site would not result in any significant adverse impacts to water quality of the shallow water table aquifer.

We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.
John C Sadler
John C. Sadler, L.E.G., L.H.G.
Project Manager/Senior Engineering Geologist

State of Washington
Engineering Geologist
1218
Licensed Geologist
JOHN C. SADLER
8-1-23

Encl:
- Figure 1 – Wellhead Protection Zones Map
- Figure 2 – Vicinity Map
- Figure 3 – Other Critical Areas Map
- Figure 4 – Proposed Development Plan
- Figure 5 – Exploration Location Plan
- Figure 6 – Surficial Geologic Map
- Figure 7 – WSDOE Well Location Map
- Appendix A – Boring Logs and CPT Plots
- Appendix B – DOE Well Details and Driller's Logs



REFERENCE: WSDOH SWAP (MAY 2023)

0 600 1,200

APPROXIMATE SCALE IN FEET

LEGEND:

- 🟢 GROUP A SYSTEM 10-YR TIME-OF-TRAVEL ZONE
- 🟡 GROUP A SYSTEM 5-YR TIME-OF-TRAVEL ZONE
- 🟠 GROUP A SYSTEM 1-YR TIME-OF-TRAVEL ZONE
- 🔴 GROUP A SYSTEM 6-MO TIME-OF-TRAVEL ZONE

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WELLHEAD PROTECTION ZONES MAP
PSE OPERATIONAL TRAINING CENTER
PUYALLUP, WASHINGTON

Proj. No.T-8829	Date AUG 2023	Figure 1

REFERENCE: WSDOT GEOPORTAL

NOT TO SCALE

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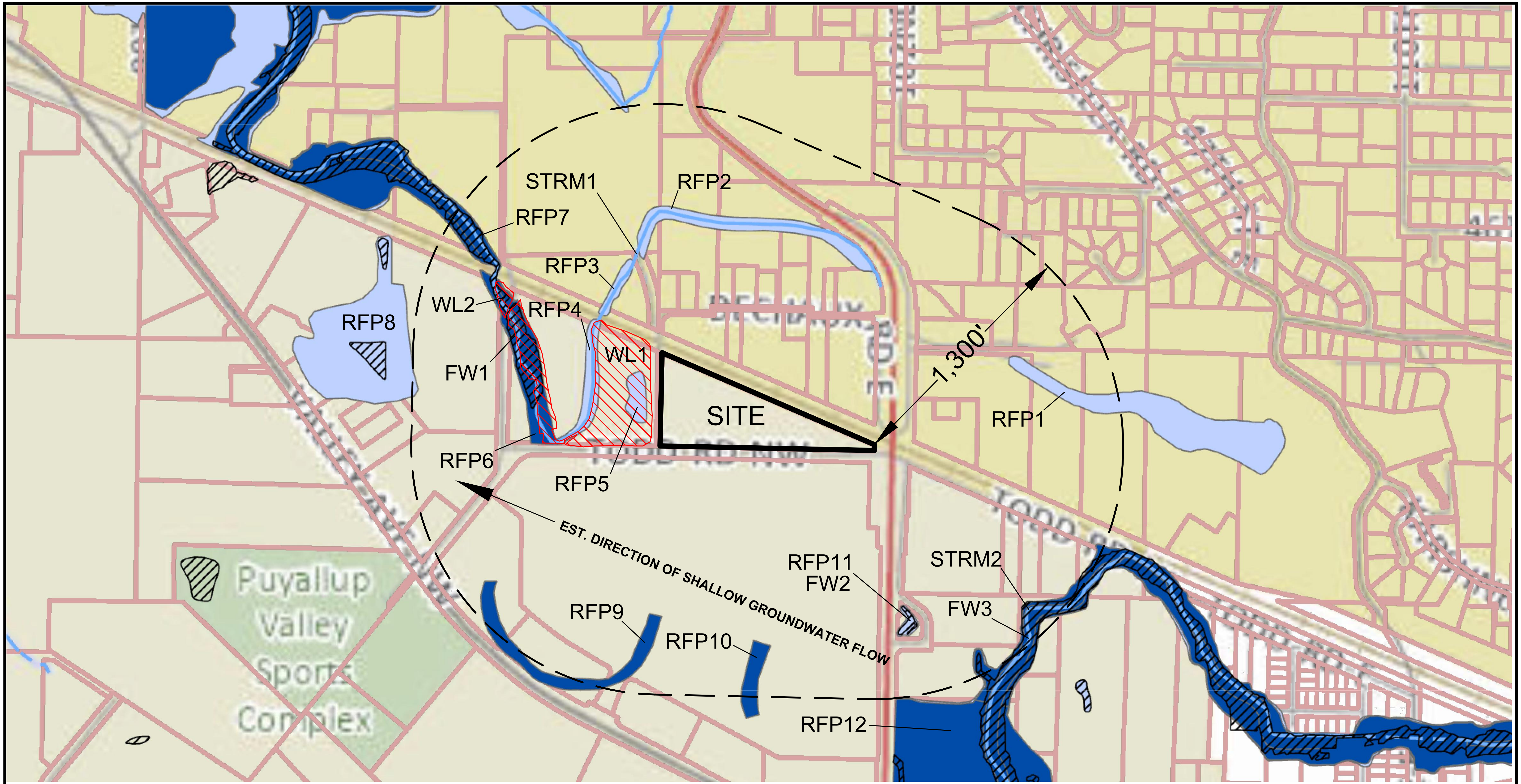
VICINITY MAP
PSE OPERATIONAL TRAINING CENTER
PUYALLUP, WASHINGTON

Proj. No. T-8829	Date AUG 2023	Figure 2



REFERENCES: PIERCE COUNTY PUBLIC GIS
CITY OF PUYALLUP GIS

0 500 1,000
APPROXIMATE SCALE IN FEET

N

LEGEND:

▨	**WL**	WETLAND (CITY OF PUYALLUP)
◩	**RFP**	REGULATED FLOODPLAIN
▨	**FW**	FLOODWAY
━	**STRM**	STREAM

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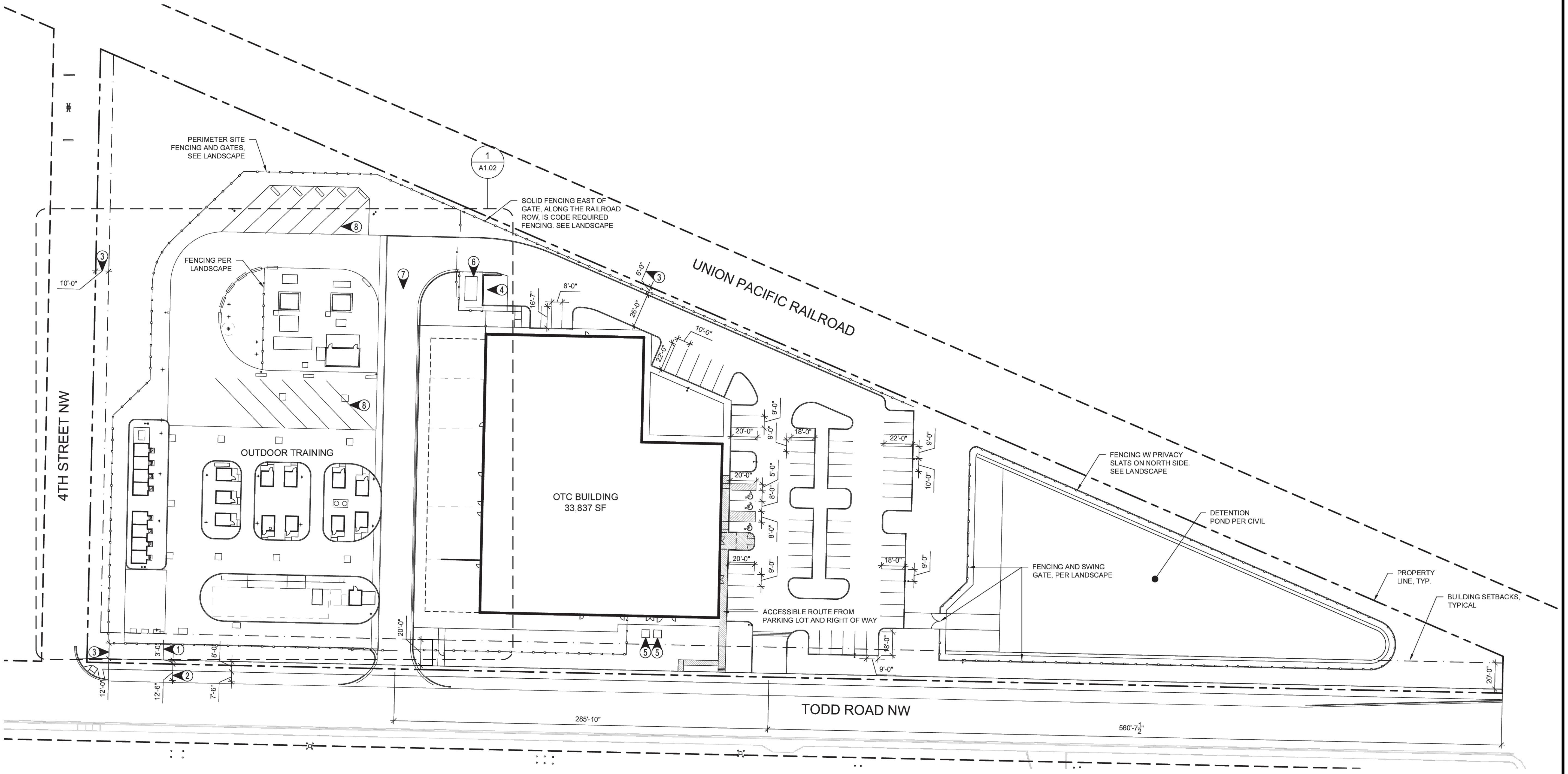
OTHER CRITICAL AREAS MAP
PSE OPERATIONAL TRAINING CENTER
PUYALLUP, WASHINGTON

Proj. No.T-8829 | Date AUG 2023 | Figure 3



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE:

ZERVAS (7-21-2023)

0 80 160

APPROXIMATE SCALE IN FEET

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PROPOSED DEVELOPMENT PLAN
PSE OPERATIONAL TRAINING CENTER
PUYALLUP, WASHINGTON

Proj. No.T-8829	Date AUG 2023	Figure 4

NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE:

PIERCE COUNTY PUBLIC GIS

LEGEND:

◑ APPROXIMATE BORING LOCATION

⊕ APPROXIMATE CPT LOCATION

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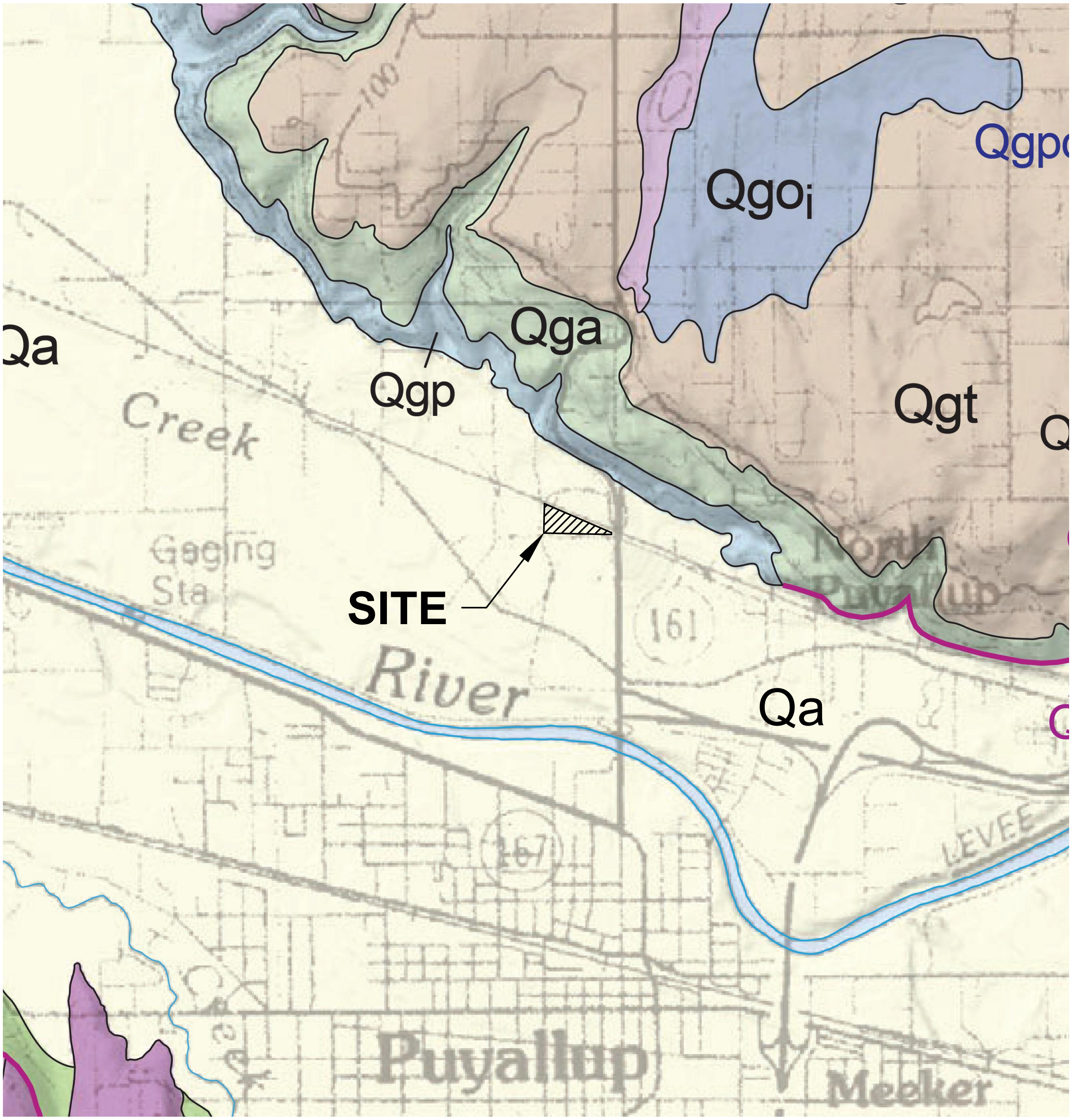
EXPLORATION LOCATION PLAN
PSE OPERATIONAL TRAINING CENTER
PUYALLUP, WASHINGTON

Proj. No.T-8829	Date AUG 2023	Figure 5



LEGEND:

Qa - ALLUVIUM (HOLOCENE)

Qgo$_i$ - VASHON RECESSIONAL OUTWASH - ICE-CONTACT DEPOSITS

Qgt - VASHON TILL

Qga - VASHON ADVANCE OUTWASH

Qgp - PRE-FRASER CONTINENTAL GLACIAL DRIFT

N

NOT TO SCALE

REFERENCE: GEOLOGIC MAP OF THE TACOMA 1:100,000 SCALE QUADRANGLE, WASHINGTON, 2015

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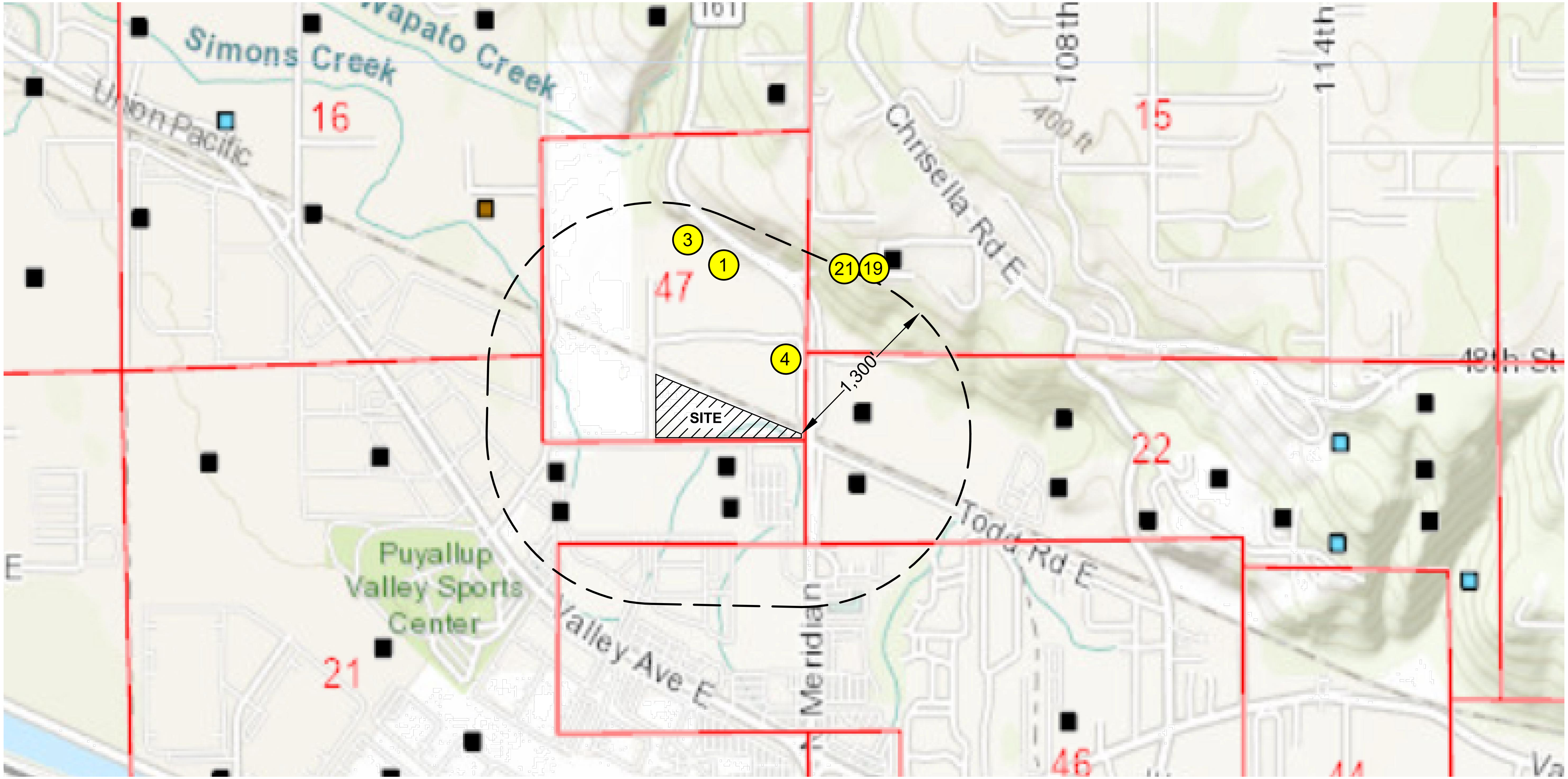
SURFICIAL GEOLOGIC MAP
PSE OPERATIONAL TRAINING CENTER
PUYALLUP, WASHINGTON

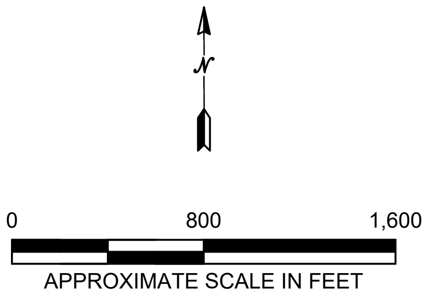
Proj. No.T-8829	Date AUG 2023	Figure 6



LEGEND:

①	WULF WELL
③	DECHAUX WELL
④	ABBEY WELL
(19)	MOUNTAINVIEW-EDGEWOOD WELL
(21)	MOUNTAINVIEW-EDGEWOOD WELL

REFERENCE: WSDOE WATER RESOURCES PROGRAM - WELL LOCATOR WEBSITE



APPROXIMATE SCALE IN FEET

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WSDOE WELL LOCATION MAP
PSE OPERATIONAL TRAINING CENTER
PUYALLUP, WASHINGTON

Proj. No.T-8829	Date AUG 2023	Figure 7

APPENDIX A

BORING LOGS AND CPT PLOTS

LOG OF BORING NO. B-1

Figure No. A-2

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Blackish-gray silty SAND, fine to coarse sand, moist to wet, trace rootlets, occasional silt seam. (SM)	Loose		
				5	20.4
▼					
5				5	29.1
				4	29.0
		Blackish-gray SAND with silt, fine to coarse sand, wet, trace small organic fragments. (SP-SM)			
10				7	27.5
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			
15					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-2

Figure No. A-3

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Blackish-gray SAND, fine to medium sand, moist, trace rootlets, occasional sandy silt seam. (SP)	Loose	9	10.1
▼ 5		Gray sandy SILT, fine sand, wet, occasional clayey silt layer, occasional rootlet. (ML)		6	31.6
		Gray clayey SILT, wet, trace rootlets, interbedded sand seams. (ML)	Soft	2	52.3
10			Stiff	9	31.1
		Blackish-gray SAND, fine to coarse sand, wet, interbedded silt seams. (SP)	Loose		27.5
15		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			

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LOG OF BORING NO. B-3

Figure No. A-4

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Gray SILT, moist, mottled, occasional rootlet, occasional sand seam. (ML)	Medium Stiff	5	35.4
5		Gray clayey SILT, wet, occasional rootlet. (ML)	Soft	2	36.7
		Blackish-gray SAND with silt, fine to coarse sand, wet, occasional small organic fragment, occasional clayey silt seam. (SP-SM)	Loose	5	27.3
10				6	29.0
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			
15					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-4

Figure No. A-5

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Gray SILT, moist, generally mottled, localized oxidized laminations, occasional rootlet, occasional charcoal inclusion. (ML)	Soft		
				3	38.7
▼					
5		Blackish-gray to gray clayey SILT, wet, mottled, occasional rootlet, occasional sand with silt layer. (ML)		2	37.7
		Interbedded sand seams observed	Medium Stiff	8	31.9 23.7
		Blackish-gray SAND, fine to coarse sand, wet, trace gravel, occasional silt seam. (SP)	Loose		
10				7	24.8
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			
15					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-5

Figure No. A-6

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 4.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Alternating layers of brownish-gray silty SAND and sandy SILT, fine to medium sand, moist, mottled, trace rootlets. (SM/ML)	Very Loose	3	27.7
5		Gray clayey SILT, wet, mottled, trace sand, occasional rootlet. (ML)	Soft	2	40.6
			Medium Stiff	6	36.8
					25.2
		Blackish-gray SAND with silt, fine to medium sand, wet, occasional silt seam. (SP-SM)	Loose		
10		Blackish-gray SAND, fine to coarse sand, wet, occasional silt layer. (SP)	Very Loose	3	26.1
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 4.5 feet.			
15					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-6

Figure No. A-7

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 17, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 6 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50		Moisture Content (%)
0		Brownish-gray silty SAND, fine sand, moist, occasional rootlet, occasional clayey silt layer. (SM)	Loose	●	6	19.2
5		Alternating layers of silty SAND and sandy SILT, fine sand, moist to wet, mottled, occasional sand seam. (SM/ML)	Very Loose	●	3	28.8
▼						
		Gray SILT, moist to wet, mottled, interbedded sandy silt layers, occasional sand seam. (ML)	Soft	●	4	33.7
10		Gray clayey SILT, moist to wet, oxidized laminations. (ML)		●	3	39.7
		Test Boring terminated at approximately 10 feet. Groundwater seepage observed at approximately 6 feet.				
15						

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-7

Figure No. A-8

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 6 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Brownish-gray silty SAND, fine sand, moist to wet, slightly mottled, trace sandy silt seams, occasional rootlet. (SM)			
			Very Loose	3	18.9
5			Loose	5	38.0
		Brownish-gray SAND with silt, fine to medium sand, wet, trace silt layers. (SP-SM)		8	29.0
10		Gray clayey SILT, moist, trace small organic fragments, interbedded sand layers. (ML) *Numerous organic PEAT inclusions observed in upper 6 inches of sample*	Soft	3	42.2
		Blackish-gray SAND with silt, fine to medium sand, wet, occasional silt layer. (SP-SM)	Loose	9	29.3
15			Medium Dense	17	29.1
20		Gray SILT, moist, occasional small organic fragment, interbedded and inundated sand layers. (ML)	Very Stiff	19	27.9
		Test Boring terminated at approximately 20 feet, Groundwater seepage observed at approximately 6 feet.			
25					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-8

Figure No. A-9

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 10 ft **Approx. Elev:** NA

Depth (ft)	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0	FILL: Gray silty GRAVEL with sand, fine to coarse sand, fine to coarse gravel, wet, trace rootlets. (GM)	Loose	5	5.6
5	Brownish-gray clayey SILT, moist, mottled, trace sand seams, occasional rootlet. (ML)	Medium Stiff	5	30.4 16.8
	Brownish-gray SAND with silt, fine to medium sand, moist, occasional silt layer. (SP-SM)	Loose	5	36.0
	Gray sandy SILT, fine to medium sand, moist, mottled, trace sand seams. (ML)			
▼10	Blackish-gray SAND with silt, fine to coarse sand, wet, occasional silt layer. (SP-SM)	Medium Dense	11	26.4
	Gray SILT, moist to wet, trace sand seams, trace fine gravel. (ML)	Medium Stiff	5	44.4
15	Blackish-gray SAND with silt, fine to medium sand, wet, occasional fine gravel. (SP-SM)	Medium Dense	13	28.6
20	Dark gray SAND with silt, fine to medium sand, wet, occasional fine gravel, interbedded silt layers. (SP-SM)		20	27.8
25	Blackish-gray SAND with silt, fine to medium sand, wet, interbedded silt layers. (SP-SM)		24	27.6
30		Dense	31	24.2
35	Test Boring terminated at approximately 30 feet. Groundwater seepage observed at approximately 10 feet.			

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-9

Figure No. A-10

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 7.5 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0					
		Brownish-gray silty SAND, fine sand, moist, occasional gravel, occasional rootlet, interbedded sand seams, interbedded silt seams. (SM)	Loose	6	16.3
5				5	17.8
▼		Gray sandy SILT, fine sand, moist to wet, mottled, interbedded and inundated sand seams. (ML)		7	33.5
10		Gray clayey SILT, moist to wet, occasional localized mottling, occasional localized oxidized lamination. (ML)	Medium Stiff	6	42.8
		Gray SILT, wet, occasional small organic fragment. (ML)		4	40.4
15		Blackish-gray SAND with silt, fine to medium sand, wet, interbedded silt layers. (SP-SM)	Loose	9	30.7
20		Light brown organic PEAT, wet, fibrous, trace sand. (PT) (Partially decomposed tree trunk)	Very Loose	3	211.4
25		Gray sandy SILT, fine to medium sand, wet, interbedded silty sand layers. (ML)	Medium Dense	26	33.2
30		Gray SILT with sand, fine to medium sand, wet, interbedded silty sand layers. (ML)	Stiff	13	32.2
35		Test Boring terminated at approximately 30 feet. Groundwater seepage observed at approximately 7.5 feet.			

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-10

Figure No. A-11

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 10 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		Grayish-brown sandy SILT, fine sand, moist, localized mottling, localized oxidized laminations, trace small organic fragments, interbedded fine sand layers. (ML)	Loose	7	12.9
5				5	23.3
		Brownish-gray SAND, fine to medium sand, moist, occasional silt seam. (SP)		6	11.3
▼10		Gray SILT, moist to wet, oxidized laminations, trace small organic fragments, interbedded and inundated sand layers. (ML)	Medium Stiff	4	36.8
			Stiff	10	35.2
15		Gray SAND with silt, fine to medium sand, wet, interbedded silt layers. (SP-SM)	Medium Dense	14	28.4
		Gray sandy SILT, fine sand, moist to wet, occasional silt seam, occasional wood waste inclusion. (ML)			
20				13	32.6
		Test Boring terminated at approximately 20 feet. Groundwater seepage observed at approximately 10 feet.			
25					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-11

Figure No. A-12

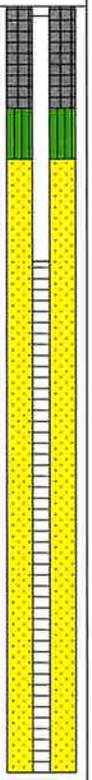
Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 10 ft **Approx. Elev:** NA

Depth (ft)	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot	Moisture Content (%)
0	Brownish-gray SILT with sand, fine sand, moist, mottled, trace rootlets. (ML)	Medium Stiff	4	36.6
5	Brownish-gray silty SAND, fine sand, moist to wet, interbedded silt with sand layers. (SM)	Loose	4	24.3
	Gray SAND with silt, fine to medium sand, moist to wet, interbedded and mottled silty sand and silt layers. (SP-SM)		5	28.2
10			4	30.7
	Gray SILT, moist to wet, interbedded and inundated sand with silt layers. (ML)	Stiff	8	46.2
15	Gray SAND with silt, fine to medium sand, wet, occasional silt layer. (SP-SM)	Medium Dense	11	31.2
	Test Boring terminated at approximately 15 feet. Groundwater seepage observed at approximately 10 feet. Boring converted to groundwater monitoring well with monument no. BNV 571.			
20				

Observ. Well



NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-12

Figure No. A-13

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 9 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)
0		FILL: Gray GRAVEL with silt and sand, fine to coarse sand, fine to coarse gravel, moist, scattered rootlets. (GP-GM)	Loose	8	9.1
5		Gray SILT, moist, mottled, trace sand seams. (ML)	Stiff	11	32.5
		Brown SAND, fine to coarse sand, moist, (SP)	Medium Dense		9.6
		Gray SAND with silt, fine to coarse sand, moist to wet, trace gravel, occasional silt seam. (SP-SM)		10	16.3
▼					
10		Blackish-gray SAND, fine to coarse sand, wet, trace fine gravel, trace silt. (SP)		11	24.7
				12	18.7
15			Loose	9	19.8
		Test Boring terminated at approximately 15 feet. Groundwater seepage observed at approximately 9 feet.			
20					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

Terra Associates, Inc.
Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

LOG OF BORING NO. B-13

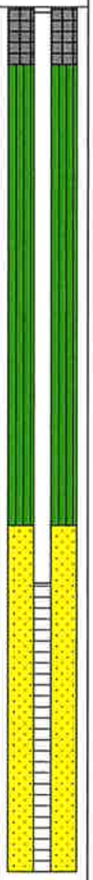
Figure No. A-14

Project: PSE Operational Training Facility **Project No:** T-8829 **Date Drilled:** November 16, 2022

Client: Trammel Crow Company **Driller:** BoreTec **Logged By:** MJX

Location: Puyallup, Washington **Depth to Groundwater:** 10 ft **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows / foot 10 30 50	Moisture Content (%)	Observ. Well
0		FILL: Gray GRAVEL with silt and sand, fine to coarse sand, fine to coarse gravel, moist. (GP-GM)	Medium Dense	14	9.9	
5		Brownish-gray sandy SILT, fine sand, moist, mottled, occasional gravel, occasional rootlet. (ML)	Loose	4	22.3	
▼10		Gray SILT, moist to wet, oxidized laminations, trace sand, occasional small organic fragment, interbedded sand with silt and silty sand layers. (ML)	Medium Stiff	8 5 8	20.1 36.5 26.5	
15 20 25 30		Blackish-gray SAND with silt, fine to medium sand, wet, occasional fine gravel, interbedded silty sand and silt layers. (SP-SM)	Medium Dense	10 29 16 24	31.2 25.0 26.6 24.9	
35		Test Boring terminated at approximately 30 feet. Groundwater seepage observed at approximately 10 feet. Boring converted to groundwater monitoring well with monument no. BNV 572.				



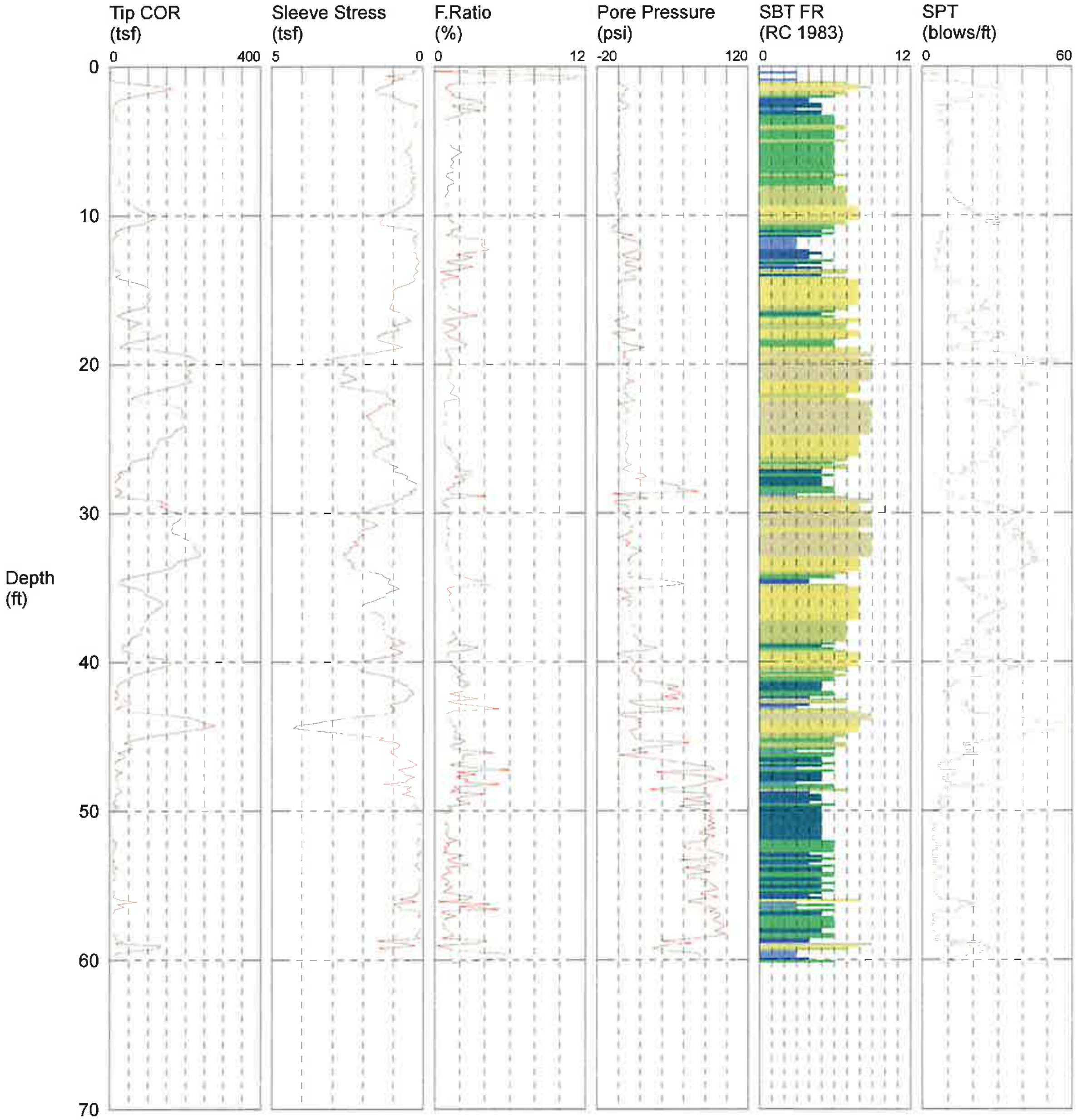
NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

Terra Associates, Inc.
Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

CPT-01

CPT CONTRUCTOR: In Situ Engineering
CUSTOMER: Terra Associates
LOCATION: Puyallup
JOB NUMBER: T-8829
COMMENT: PSE Operational Training Center
COMMENT:

OPERATOR: Okbay
CONE ID: DDG1351
TEST DATE: 11/18/2022 11:40:03 AM
PREDRILL: 0 ft
BACK FILL: 20% Grout + Bentonite Chips
SURFACE PATCH: None



TOTAL DEPTH: 60.203 ft

DEPTH INTERVAL: 0.050 m

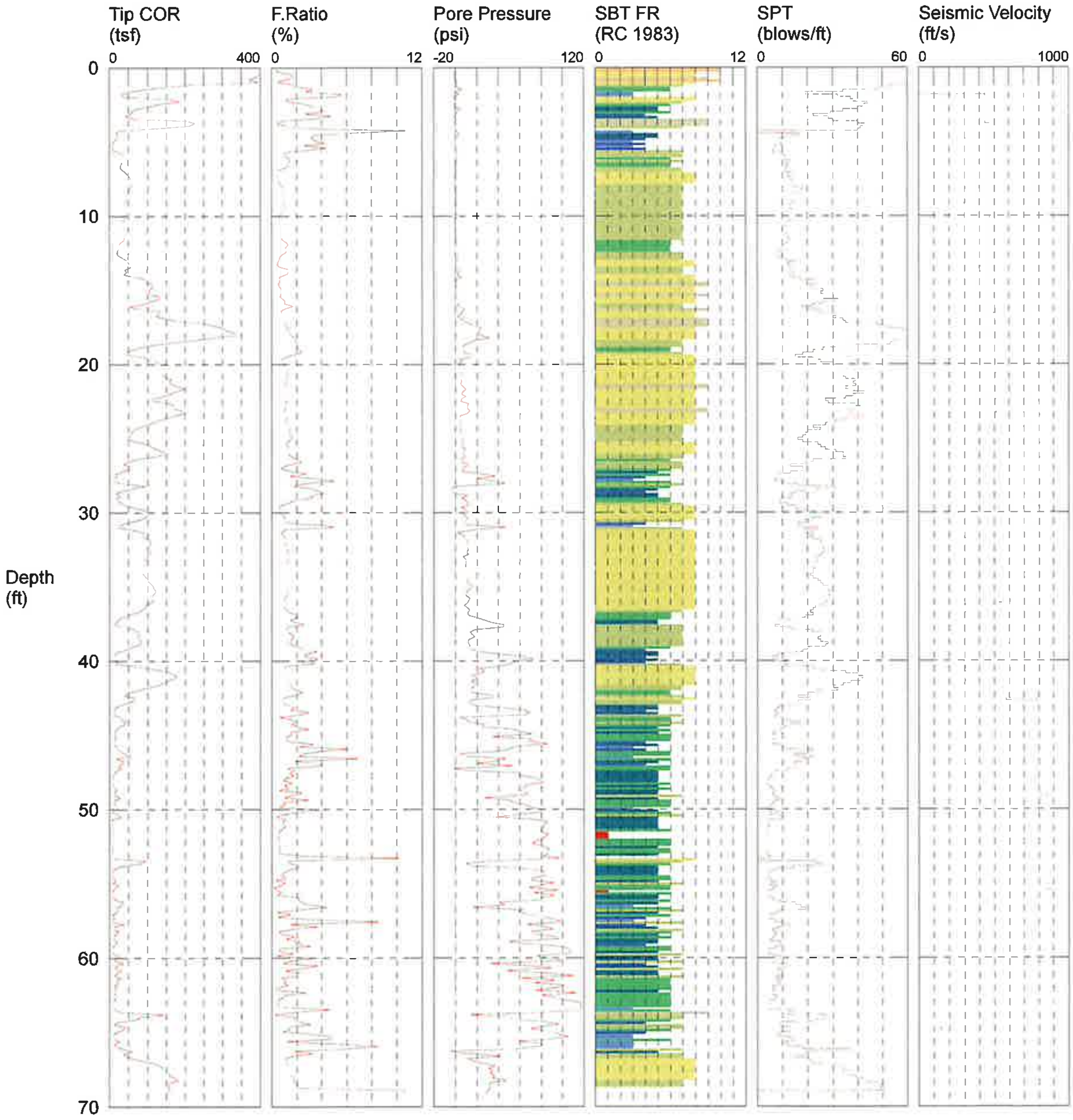
- 🟥 1 sensitive fine grained
- 🟥 2 organic material
- 🟦 3 clay
- 🟦 4 silty clay to clay
- 🟦 5 clayey silt to silty clay
- 🟩 6 sandy silt to clayey silt
- 🟩 7 silty sand to sandy silt
- 🟨 8 sand to silty sand
- 🟨 9 sand
- 🟧 10 gravelly sand to sand
- ⬜ 11 very stiff fine grained (*)
- ⬛ 12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

CPT-02

CPT CONTRUCTOR: In Situ Engineering
CUSTOMER: Terra Associates
LOCATION: Puyallup
JOB NUMBER: T-8829
COMMENT: PSE Operational Training Center
COMMENT:

OPERATOR: Okbay
CONE ID: DDG1351
TEST DATE: 11/18/2022 1:29:19 PM
PREDRILL: 0 ft
BACK FILL: 20% Grout + Bentonite Chips
SURFACE PATCH: None



TOTAL DEPTH: 69.062 ft

DEPTH INTERVAL: 0.050 m

🟥 1 sensitive fine grained
🟥 2 organic material
🟦 3 clay
🟦 4 silty clay to clay
🟦 5 clayey silt to silty clay
🟩 6 sandy silt to clayey silt
🟩 7 silty sand to sandy silt
🟨 8 sand to silty sand
🟨 9 sand
🟧 10 gravelly sand to sand
⬛ 11 very stiff fine grained (*)
⬛ 12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

APPENDIX B

DOE WELL DETAILS AND DRILLER'S LOGS

DEPARTMENT OF
ECOLOGY
State of Washington

Well Construction & Licensing

Well Report Search Results

Edit Search Criteria

New Search

Search Criteria Used:

- Left Coordinate: 1191492
- Right Coordinate: 1195874
- Top Coordinate: 689450
- Bottom Coordinate: 693757
- Well Type: Water

Download all 25 images
Download all 25 data records
Print this page
Need Help

Displaying well reports 1 → 25 of 25

Sort results by:

Well Owner Name

Results Per Page:

100

#		Well Details	Location Details
1.	View PDF	Well Owner: **BURTON ~~WALF~~** Driller's log says WOLF Well Tag ID: Notice of Intent Number: Group Number: Not Applicable Well Report ID: 44836 Well Diameter: 6 in. Well Depth: 245 ft.	Tax Parcel Number: Well Address: County: PIERCE Public Land Survey: SE-SE / S-16 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: 10-03-1979 Well Report Received Date: 11-06-1979
2.	View PDF	Well Owner: **CHARLES & PHYLLIS SMITH** Well Tag ID: ACK068 Mis located Notice of Intent Number: W072034 Group Number: Not Applicable Well Report ID: 55825 Well Diameter: 6 in. OUTSIDE SEARCH RADIUS Well Depth: 114 ft.	Tax Parcel Number: Well Address: 3802 84TH AVE CT E County: PIERCE Public Land Survey: NE-SE / ~~S-16~~ sec 17 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: 08-15-1996 Well Report Received Date:
3.	View PDF	Well Owner: **FRANK DECHAUX** Well Tag ID: AEF399 Notice of Intent Number: Group Number: Not Applicable Well Report ID: 46923 Well Diameter: 8 in. Well Depth: 100 ft.	Tax Parcel Number: 0420164088 Well Address: County: PIERCE Public Land Survey: SE-SE / S-16 / T-20-N / R-4 - E Well Type: Water / Subtype: Unknown Well Completion Date: 08-08-1978 Well Report Received Date: 08-25-1978

4.	View PDF	Well Owner: **GUY ABBEY** Well Tag ID: Notice of Intent Number: Group Number: Not Applicable Well Report ID: 47603 Well Diameter: 1 in. Well Depth: 12 ft.	Tax Parcel Number: Well Address: County: PIERCE Public Land Survey: NE-NE / S-21 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: Well Report Received Date:
5.	View PDF	Well Owner: **JEANETTE HUBBARD** Well Tag ID: BAC440 MIS LOCATED Notice of Intent Number: W210491 Group Number: Not Applicable Well Report ID: 667934 OUTSIDE SEARCH RADIUS. Well Diameter: 6 in. Well Depth: 131 ft.	Tax Parcel Number: 0420175002 Well Address: 3906 84TH AVE CT E County: PIERCE → SEC 17 Public Land Survey: NW-NE / ~~S-21~~ / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: 07-14-2010 Well Report Received Date: 08-18-2010
6.	View PDF	Well Owner: **JR. WUNELL CONSTRUCTION** Well Tag ID: IRRIGATION WELL Notice of Intent Number: Group Number: Not Applicable Well Report ID: 49259 Well Diameter: 6 in. Well Depth: 52 ft.	Tax Parcel Number: Well Address: VALLEY AVE, County: PIERCE Public Land Survey: SW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: 08-31-1993 Well Report Received Date: 04-06-1994
7.	View PDF	Well Owner: **KASSEL CONSTRUCTION / CITY PUYALLUP** WELL DECOMMIS LOG Well Tag ID: Notice of Intent Number: 042758 Group Number: Not Applicable Well Report ID: 49325 Well Diameter: 2 in. Well Depth: 0 ft.	Tax Parcel Number: Well Address: 902 VALLEY AVE County: PIERCE Public Land Survey: SW-NE / S-21 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: 10-15-1998 Well Report Received Date: 12-24-1998
8.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT976 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657838 Well Diameter: 1.5 in. DEWATERING WELL Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017
9.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT977 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657839 Well Diameter: 1.5 in. Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017
10.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT978 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657840 Well Diameter: 1.5 in. Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017

11.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT979 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657841 Well Diameter: 1.5 in. Well Depth: 20 ft. DEWATERING WELL	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017
12.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT980 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657842 Well Diameter: 1.5 in. Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017
13.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT981 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657843 Well Diameter: 1.5 in. Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017
14.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT982 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657844 Well Diameter: 1.5 in. Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017
15.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT983 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657845 Well Diameter: 1.5 in. Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017
16.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT984 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657846 Well Diameter: 1.5 in. Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017
17.	View PDF	Well Owner: **Lattitude Development** Well Tag ID: BKT985 Notice of Intent Number: DE02055 Group Number: Not Applicable Well Report ID: 1657847 Well Diameter: 1.5 in. Well Depth: 20 ft.	Tax Parcel Number: Well Address: 102 Todd Rd NE County: PIERCE Public Land Survey: NW-NW / S-22 / T-20-N / R-04-E Well Type: Water / Subtype: Dewatering Well Completion Date: 07-25-2017 Well Report Received Date: 08-29-2017

18.	View PDF	Well Owner: **LENA GWERDER** Well Tag ID: Notice of Intent Number: Group Number: Not Applicable Well Report ID: 49765 Well Diameter: 6 in. Well Depth: 164 ft. OUTSIDE RADIUS	Tax Parcel Number: Well Address: County: PIERCE Public Land Survey: NE-SE / S-16 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: 09-24-1984 Well Report Received Date: 10-30-1984
19.	View PDF	Well Owner: **Mountain View Edgewood Water Co** Well Tag ID: ACE906 Notice of Intent Number: Group Number: Not Applicable Well Report ID: 1915508 Well Diameter: 0 in. Well Depth: 0 ft.	Tax Parcel Number: 0420153014 Well Address: 4623 Meridan E County: PIERCE Public Land Survey: SW-SW / S-15 / T-20-N / R-4-E Well Type: Water / Subtype: Unknown Well Completion Date: Well Report Received Date:
~~20.~~	View PDF	Well Owner: **MOUNTAIN VIEW-EDGEWOOD WATER CO.** Well Tag ID: AEC906 Notice of Intent Number: W106915 Group Number: Not Applicable Well Report ID: 56386 Well Diameter: 16 in. Well Depth: 96 ft. CONTINU-ATION of ABV LOG.	Tax Parcel Number: Well Address: County: PIERCE Public Land Survey: SW-SW / S-15 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: 02-17-1999 Well Report Received Date: 03-04-1999
21.	View PDF	Well Owner: **MT VIEW EDGEWOOD WATER CO** Well Tag ID: Notice of Intent Number: Group Number: Not Applicable Well Report ID: 1557289 Well Diameter: 12 in. Well Depth: 94 ft. SAME LOC. AS ABV. 1953	Tax Parcel Number: Well Address: County: PIERCE Public Land Survey: SW-SW / S-15 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: Well Report Received Date:
22.	View PDF	Well Owner: **ROUND UP COMPANY** Well Tag ID: Notice of Intent Number: 019671 Group Number: Not Applicable Well Report ID: 52462 Well Diameter: 8 in. Well Depth: 30 ft. DEWATERING WELL	Tax Parcel Number: Well Address: 2200 N MERIDIAN County: PIERCE Public Land Survey: NE-NE / S-21 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: 05-03-1995 Well Report Received Date: 05-15-1995
23.	View PDF	Well Owner: **ROUNDUP CO., STEVE SALISBURY** Well Tag ID: Notice of Intent Number: Group Number: Not Applicable Well Report ID: 276939 Well Diameter: 10 in. Well Depth: 40 ft. DEWATERING WELL	Tax Parcel Number: Well Address: County: PIERCE Public Land Survey: NE-NE / S-21 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: Well Report Received Date:

24. Ø	View PDF	Well Owner: **ROUNDUP CO., STEVE SALISBURY** Well Tag ID: DEWATERING WELL Notice of Intent Number: Group Number: Not Applicable Well Report ID: 276940 Well Diameter: 10 in. Well Depth: 40 ft.	Tax Parcel Number: Well Address: County: PIERCE Public Land Survey: NE-NE / S-21 / T-20-N / R-04-E Well Type: Water / Subtype: Unknown Well Completion Date: Well Report Received Date:
25.	View PDF	Well Owner: **TED YAGUCHI** Well Tag ID: MISLOCATED Notice of Intent Number: 065586 Group Number: Not Applicable Well Report ID: 53176 Well Diameter: 6 in. Well Depth: 50 ft.	Tax Parcel Number: Well Address: 4303 90TH AVE E County: PIERCE Public Land Survey: NE-~~SE~~ / S-16 / T-20-N / R-04-E NE of SW Well Type: Water / Subtype: Unknown Well Completion Date: 02-25-1991 Well Report Received Date:

Total Result Pages: 1

File Original and First Copy with
Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

1

Application No. ....

Permit No. ....

(1) OWNER: Name Burton Wolf Address 29th St NW Puyallup

(2) LOCATION OF WELL: County Pierce — SE ¼ SE ¼ Sec. 16 T. 20 N., R. 4E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 243 ft. Depth of completed well 245 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: .... " Diam. from .... ft. to .... ft.
Threaded ☐ .... " Diam. from .... ft. to .... ft.
Welded ☒ 6 " Diam. from 41 ft. to 245 ft.

Perforations: Yes ☐ No ☒
Type of perforator used ....
SIZE of perforations .... in. by .... in.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type S.S., 0.12 Model No. ....
Diam. 6 Slot size 0.12 from 41 ft. to 245 ft.
Diam. .... Slot size .... from .... ft. to .... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ....
Gravel placed from .... ft. to .... ft.

Surface seal: Yes ☒ No ☐ To what depth? 18th ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? .... Depth of strata ....
Method of sealing strata off gravity

(7) PUMP: Manufacturer's Name none
Type: .... H.P. ....

(8) WATER LEVELS: Land-surface elevation above mean sea level 10+ ft.
Static level 4 ft. below top of well Date 10-2-96
Artesian pressure .... lbs. per square inch Date ....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ....
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 50 gal./min. with 18 ft. drawdown after 3 hrs.
Artesian flow .... g.p.m. Date ....
Temperature of water .... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
CLAY, SANDY, BR	0	83
CLAY, GRAY, WOOD chips	83	130
S.A	130	200
CLAY, BLUE	200	230
SILT, GRAVEL	230	238
GRAVEL & SAND water Baring	238	243

RECEIVED
NOV 6 1979
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

Work started 9-27, 1979 Completed 10-3, 1979

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME PARK & ROBSON AMERICAN DRILLI (Person, firm, or corporation) (Type or print)

Address 5514-4th St E Tacoma

[Signed] Larry J Vaught (Well Driller)

License No. OPFC Date Nov 3, 1979

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

MISLOCATED MISLOCATED ②

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W072034.
UNIQUE WELL I.D. # AGK 068
Water Right Permit No. ____

(1) OWNER: Name Charles & Phyllis smith Address 3802 84th ave ct. E. Edgewood

(2) LOCATION OF WELL: County peirce NE 1/4 SE 1/4 Sec ~~16~~ SEC 17 T. 20 N., R 4E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) 3802 - 84th ave cnt E

(3) PROPOSED USE: ☒ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (If more than one) ____

Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☒ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 114 feet. Depth of completed well 114 ft.

(6) CONSTRUCTION DETAILS:

Casing Installed: 6" Diam. from +1 ft. to 109 ft.
Welded ☐ ____" Diam. from ____ ft. to ____ ft.
Liner installed ☐ ____" Diam. from ____ ft. to ____ ft.
Threaded ☐

Perforations: Yes ☐ No ☒
Type of perforator used ____
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type ____ Model No. ____
Diam. 5 Slot size 20 from 114 ft. to 109 ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☑ Size of gravel ____
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☑ No ☐ To what depth? 20 ft.
Material used in seal chip
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

(7) PUMP: Manufacturer's Name ____
Type: ____ H.P. ____

(8) WATER LEVELS: Land-surface elevation above mean sea level ____ ft.
Static level 8 ft. below top of well Date 8-15-96
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? ____
Yield: 7 gal./min. with 40 ft. drawdown after 1 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ____
Bailer test 10 gal./min. with 47 ft. drawdown after 2 hrs.
Airtest ____ gal./min. with stem set at ____ ft. for ____ hrs.
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Brown Sandy SILT	0	20
Grey Sandy SILT	20	38
Med Sand	38	41
Sand & wood	41	54
Sand	54	57
Grey SILT	57	108
Sand	108	114

Work Started 8-13, 1996 Completed 8-15, 1996

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Drilling Inc (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 10621 Todd Rd E Puyallup 9837
(Signed) ____ (WELL DRILLER) License No. 597

Contractor's Registration No. HOLTDI*136OG Date 9-19, 1996

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-6006.

ECY 050-1-20 (9/93) * * f

Dechaux Mutual - Group A

③

File Original and First Copy with
Department of Ecology
Second Copy -- Owner's Copy
Third Copy   Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

AEF399

Application No. E

Permit No.

(1) OWNER: Name Frank Dechaux   Address 419 Dechaux Rd, NW Puyallup, Wa. 98371

(2) LOCATION OF WELL: County Pierce   SE ¼ SE ¼ Sec 16 T. 20 N., R 4E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 1
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 103 ft. Depth of completed well 100 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from 0 ft. to 100 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson Well
Type Stainless steel Model No.
Diam. 8 Slot size 80 from 93 ft. to 83 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Jacuzzi Bros.
Type: 5S4B HP 5

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 0 ft. below top of well Date 8-8-78
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 100 gal./min. with 5 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date 8-17-78
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Top soil	0	1
Clay & sand	1	3
Seapage	3	5
Sand & clay	5	16
Hardpan	16	23
Clay, sand & gravel	23	38
Gray clay	38	40
Water, reddish clay & gravel	40	83
Water, corse sand & gravel	83	93
Gray clay clay & gravel	93	103

RECEIVED
AUG 25 1978
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

Work started 8-7 19 78. Completed 8-8 19 78

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richardson Well Drilling Co.
(Person, firm, or corporation) (Type or print)

Address P.O. Box 44408 Tacoma, Wa. 98444

[Signed]
(Well Driller)

License No. 223-02-5500 Date 8-17, 19 78

(USE ADDITIONAL SHEETS IF NECESSARY)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report

3

Pierce County Assessor-Treasurer's Office

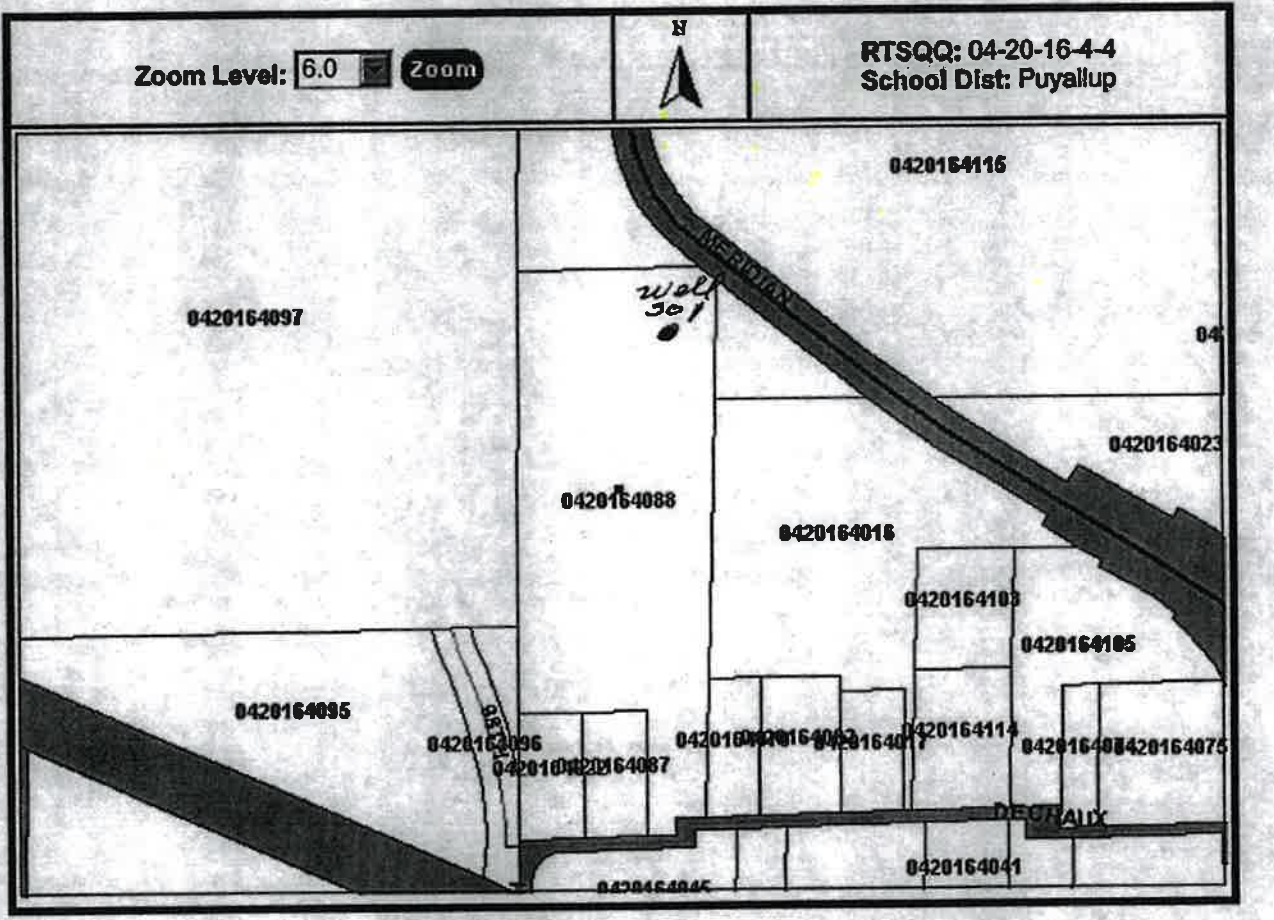
AEF399

Warning: Tax Payer Name Information Is Unavailable.

Please Click One Of The Following For Details

Tax & Assessment | Land Characteristics | Building Characteristics | Parcel Map | Recorded Data | Back to Search

Zoom Level: 6.0 Zoom



RTSQQ: 04-20-16-4-4
School Dist: Puyallup

For additional mapping options, visit Map Your Way

Pierce County Assessor-Treasurer
2401 South 35th St Room 142
Tacoma, Washington 98409
(253)798-6111 or Fax (253)798-3142

I acknowledge and agree to the prohibitions listed in RCW 42.17.260(9) against releasing and/or using lists of individuals for commercial purposes.

3

46923

Unique Well ID Number AEP399
X Y Z 1 2 3

Tacoma-Pierce County
Health Department

WELL TAGGING FORM

All shaded areas **must** be completed.

Date of Field Visit 3-19-99 By Matt + Scott

ADDITIONAL WELL IDENTIFIERS

Department of Health System ID Number 183507 Source # SO 1

USGS Site Identification

Other

RECORD VERIFICATION

☒ Well Report available (*please attach*)
☐ Well Report not available
☐ Verification inconclusive

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

Name DECHAUX MUTUAL WATER

Street Address 9811 DECHAUX RD. E

City PUYALLUP State WA. 98371

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address

City County PIERCE

T. 20 N. R. 04 E W.M. Sec. 16 SE ¼ of the SE ¼

Latitude 47 ° 12 ' 59.1 "

Longitude 122 ° 17 ' 48.4 "

☐ GPS (raw data)
☒ GPS (corrected)
☐ Topographic Map
☐ Survey
☐ Computer Generated
☐ Other

Elevation at land surface ______ feet/meters (circle one)

☐ Digital Altimeter
☐ Topographic Map
☐ Other

AEF399

Additional information, if available:

☐ Location marked on topographic map *(please attach)*

☐ Location marked on air photo *(please attach)*

Water right # Priority Date

Circle One: Application Permit Certificate Claim Exempt

WELL CHARACTERISTICS

Physical Description of Well (size of casing, type of well, housing, etc.): 8" cased well, uncovered, in the open field.

Location of Well Identification Tag: on the 8" casing

Was supplemental tag needed for ease of identifying well?

☑ NO ☐ YES

If yes, where was tag placed?

Scale 1:24,000 (1"=2,000')

Indicate the location of the well within the Section by drawing a dot at that point.

D	X	B	A
E	F	G	H
M	L	K	J
N	P	Q	● R

SECTION 16

TOWNSHIP 20

RANGE 04E

COMMENTS:

4

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Decla. #165
Cert. #115-D

Date 1944, 19

Record by Guy E. Abbey

Source G. W. Decla. Claim

Location: State of WASHINGTON

County Pierce

Area

Map

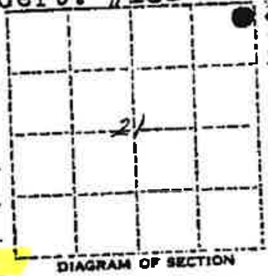


DIAGRAM OF SECTION

NE¼ NE¼ NE¼ sec. 21 T. 20 N., R. 4 E.

Drilling Co.

Address

Method of Drilling Driven Date 19

Owner Guy E. Abbey

Address Rt. 4, Box 8, Puyallup, Wash.

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Well log:		
	Soil & sand		
	Dim.: 12' deep; 1¼" diam.		
	SWL: 10 feet		
	DD: 10'		
	Yield: 140 g.p.m.		
	Casing: No data		
	Perfs.: No data		
	Size & Type of Pump: Demming Centrifugal		
	" " " " Motor: 5 h.p.		

Turn up

Sheet of sheets

MISLOCATED ⑤

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Construction/Decommission *("x" in circle)*

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ____

392457

PROPOSED USE: ☑ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other ____

TYPE OF WORK: Owner's number of well (if more than one) ____

☑ New well ☐ Reconditioned *Method*: ☐ Dug ☐ Bored ☐ Driven

☐ Deepened ☑ Cable ☐ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 131 ft

Depth of completed well 131 ft

CONSTRUCTION DETAILS

Casing Installed:

☑ Welded 6 " Diam. from + 1 5 ft. to 126 ft

☐ Liner installed ____ " Diam from ____ ft. to ____ ft.

☐ Threaded ____ " Diam from ____ ft to ____ ft

Perforations: ☐ Yes ☑ No

Type of perforator used ____

SIZE of perfs ____ in by ____ in. and no of perfs ____ from ____ ft to ____ ft

Screens: ☑ Yes ☐ No ☑ K-Pac Location 125'

Manufacturer's Name Alloy Machine Works

Type V-wire cont wrap - S S. Model No. 304SS

Diam. 6" tele Slot size 12 from 131 ft. to 126 ft

Diam ____ Slot size ____ from ____ ft. to ____ ft

Gravel/Filter packed: ☐ Yes ☑ No ☐ Size of gravel/sand ____

Materials placed from ____ ft to ____ ft

Surface Seal: ☑ Yes ☐ No To what depth? 18 ft

Material used in seal 3/8" bentonite chips

Did any strata contain unusable water? ☐ Yes ☑ No

Type of water? ____ Depth of strata ____

Method of sealing strata off ____

PUMP: Manufacturer's Name Flint & Walling

Type 10GPM SS H P 3/4

WATER LEVELS: Land-surface elevation above mean sea level ____ ft.

Static level 8'5" ft below top of well Date 07/16/10

Artesian pressure ____ lbs per square inch Date ____

Artesian water is controlled by ____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☑ Yes ☐ No If yes, by whom? Bison

Yield 15 gal./min with 3'9" ft drawdown after 2.0 hrs.

Yield ____ gal /min with ____ ft drawdown after ____ hrs.

Yield ____ gal /min. with ____ ft. drawdown after ____ hrs

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ____

Bailer test 20 gal /min. with 4'6" ft drawdown after 1 0 hrs

Airtest ____ gal./min with stem set at ____ ft. for ____ hrs.

Artesian flow ____ g.p m. Date ____

Temperature of water ____ Was a chemical analysis made? ☑ Yes ☐ No

CURRENT

Notice of Intent No. W210491

Unique Ecology Well ID Tag No. BAC-440

Water Right Permit No. ____

Property Owner Name Jeanette Hubbard

Well Street Address 3906 84th Ave. Ct E

City Edgewood County Pierce

Location nw 1/4-1/4 ne 1/4 Sec ~~21~~ Twn 20 R 04 EWM ☑ or WWM ☐ circle one

SEC 17

Lat/Long (s, t, r Still **REQUIRED**) Lat Deg ____ Lat Min/Sec ____ Long Deg ____ Long Min/Sec ____

Tax Parcel No. 0420175002

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
brown silt	0	8
brown silty fine sand w/wood	8	13
grey fine silty sand	13	23
pea gravel w/course sand	23	25
brown silt w/trace peat	25	28
brown compacted silt bound sand/gravel w/wood	28	47
purple/grey clay w/sand lenses	47	49
grey clay	49	58
purple sandy silt	58	65
grey/brown silty fine sand	65	74
grey silty sand w/wood - trace H20	74	82
grey fine sand - silty	82	87
brown silty sand	87	103
brown silty sand w/wood - H20	103	107
grey silty sand	107	121
clean sand - H20	121	129
sand/gravel - H20	129	131
grey silt	131	

RECEIVED
AUG 18 2010
WA State Department of Ecology (SWRO)

Start Date 07/12/2010 Completed Date 07/14/2010

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☑ Driller ☐ Engineer ☐ Trainee Name (Print) Driller - Darrell Feavel

Driller/Engineer/Trainee Signature ____

Driller or trainee License No 2398

If TRAINEE,
Driller's Licensed No. ____
Driller's Signature ____

Drilling Company Bison Well Drilling & Septic, LLC

Address PO Box 5142

City, State, Zip Spanaway, WA 98387

Contractor's Registration No BISONWD945R9 Date 08/06/2010

Ecology is an Equal Opportunity Employer

ECY 050-1-20 (Rev 3/05)

The Department of Ecology does NOT warranty the Data and/or Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original with Department of Ecology
First Copy with Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

IRRIGATION WELL

6

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 219724
UNIQUE WELL I.D. # ____
Water Right Permit No. ____

(1) **OWNER:** Name JR Qunell Construction Address 9709 104th St E

(2) **LOCATION OF WELL:** County Pierce — SW 1/4 NW 1/4 Sec 22 T. 20 N., R. 4 E. W.M.

(2a) **STREET ADDRESS OF WELL** (or nearest address) Vally Ave Valley Townhouses

(3) **PROPOSED USE:** ☐ Domestic ☒ Irrigation ☐ DeWater Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

IRRIGATION

(4) **TYPE OF WORK:** Owner's number of well (If more than one) 1

Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☒ Bored ☐ Driven ☐ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 6" inches.
Drilled 113 feet. Depth of completed well 52 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 6" " Diam. from +2 ft. to 45 ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.
Liner installed ☐ ____ " Diam. from ____ ft. to ____ ft.
Threaded ☐

Perforations: Yes ☐ No ☒
Type of perforator used ____
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type 304 Model No. ____
Diam. 5" Slot size 25 from 46 ft. to 51 ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel ____
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Bentonite +
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

(7) **PUMP:** Manufacturer's Name ____
Type: ____ H.P. ____

(8) **WATER LEVELS:** Land-surface elevation above mean sea level ____ ft.
Static level Approx 5' ft. below top of well Date ____
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: Approx 35 gal./min. with From 41 drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ____
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Airtest ____ gal./min. with stem set at ____ ft. for ____ hrs.
Artesian flow ____ g.p.m. Date By owner
Temperature of water ____ Was a chemical analysis made? Yes ☒ No ☐

(10) **WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION**

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Fine silty sand - silt layers occasional gravel	0	40
Cleaner fine sand some gravel	40	55
Fine sandy silt	50	100
Fine silty sand some water	100	113

'94 APR -6 A10:21

Work Started 7th month, 1993 Completed 8-31, 19 93

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Testing Inc (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 10621 Todd Rd E
(Signed) Rusty Holt (WELL DRILLER) License No. 1094
Contractor's Registration No. HOLTTI*087QJ Date 3-30, 19 94

(USE ADDITIONAL SHEETS IF NECESSARY)

ECL 050-1-20 (2/93)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Decommission

(7)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. A 42758
UNIQUE WELL I.D. # —NA—
Water Right Permit No. — NA —

(1) **OWNER:** Name Kassel Construction / city Puyallup Address

(2) **LOCATION OF WELL:** County Pierce SW 1/4 NE 1/4 Sec 21 T. 20 N., R 4E W.M.

(2a) **STREET ADDRESS OF WELL** (or nearest address) 902 Valley AVE

(3) **PROPOSED USE:** ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (If more than one)

Abandoned ☐ New well ☐ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 2" inches.
Drilled ________ feet. Depth of completed well ________ ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: ____" Diam. from ____ ft. to ____ ft.
Welded ☐ ____" Diam. from ____ ft. to ____ ft.
Liner installed ☐ ____" Diam. from ____ ft. to ____ ft.
Threaded ☐

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type ____ Model No. ____
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☐ No ☐ To what depth? ____ ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ____ Depth of strata ____
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: ____ H.P. ____

(8) **WATER LEVELS:** ~~Land-surface elevation above mean sea level~~ was slightly ft.
Static level Flowing. ft. below top of well Date
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Airtest ____ gal./min. with stem set at ____ ft. for ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☐

(10) **WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION**

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
this old diverenor jetted		
well was decommissioned		
by tremie placement		
of 9½# Groutwell DF.		
GROUT TAKE WAS		
2½ times calculated.		
it had to be topped off		
4' on 2nd DAY. IT WAS		
then cut-off under ground.		

RECEIVED
DEC 24 1998
DEPARTMENT OF ECOLOGY
WELL DRILLING UNIT

Work Started 10-13-98 19. Completed 10-15-98, 19

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Geoboring & Development, Inc (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 9415 SR162 Puyallup WA
(Signed) ________ (WELL DRILLER) License No. 1253
Contractor's Registration No. GEOBODIN707 Date 12/4/98, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-6006.

ECY 050-1-20 (9/93)

DEWATERING Well

8-17

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

DEPARTMENT OF ECOLOGY State of Washington

Construction/Decommission *("x" in circle)*

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number ____________

CURRENT

Notice of Intent No. DE02055

Unique Ecology Well ID Tag No. BKT976-BKT985

Water Right Permit No. ____________

Property Owner Name Lattitude Development

Well Street Address 102 Todd Rd NE

City Puyallup County: Pierce

Location NW1/4-1/4 NW1/4 Sec 22 Twn 20N R 04E EWM ☒ Or WWM ☐

(s, t, r Still REQUIRED)

Lat/Long Lat Deg ____ Lat Min/Sec ____

Long Deg ____ Long Min/Sec ____

Tax Parcel No. (Required) Road ROW

PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☒ DeWater ☐ Irrigation ☐ Test Well ☐ Other ____

TYPE OF WORK: Owner's number of well (if more than one) 10 wells

☒ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven

☐ Deepened ☐ Cable ☐ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 1.5 inches, drilled 20 ft.

Depth of completed well 20 ft.

CONSTRUCTION DETAILS

Casing Installed: ☐ Welded ____" Diam. from ____ ft. to ____ ft.

☐ Liner installed ____" Diam. from ____ ft. to ____ ft.

☐ Threaded ____" Diam. From ____ ft. to ____ ft.

Perforations: ☐ Yes ☒ No

Type of perforator used ____________

SIZE of perfs ____ in. by ____ in. and no. of perfs ____ from ____ ft. to ____ ft.

Screens: ☒ Yes ☐ No ☐ K-Pac Location ____________

Manufacturer's Name Western

Type PVC Point Model No. ____________

Diam. 2 in Slot size 20 from 18 ft. to 20 ft.

Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel/Filter packed: ☒ Yes ☐ No Size of gravel/sand 10/20

Materials placed from 3 ft. to ____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 3 ft.

Material used in seal Bentonite Chips

Did any strata contain unusable water? ☐ Yes ☐ No

Type of water? ____________ Depth of strata ____________

Method of sealing strata off ____________

PUMP: Manufacturer's Name ____________

Type: ____________ H.P. ____________

WATER LEVELS: Land-surface elevation above mean sea level ____ ft.

Static level 4 ft. below top of well Date 7/25/2017

Artesian pressure ____ lbs. per square inch Date ____________

Artesian water is controlled by ____________ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom? ____________

Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ____________

Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.

Airtest ____ gal./min. with stem set at ____ ft. for ____ hrs.

Artesian flow ____ g.p.m. Date ____________

Temperature of water ____ Was a chemical analysis made? ☐ Yes ☐ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
1.5 inch PVC		
Brown soil	0	3 ft
Gray silt	3	12 ft
Black sand	12	20 ft
3 ft surface seal w/ bentonite chips		
10 /20 colorado sand pack		
2 in x 2 ft PVC Screen		
20 slot screen		

RECEIVED
AUG 29 2017
WA State Department of Ecology (SWRO)

Start Date 07/25/2017 Completed Date 07/25/2017

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) Randy Harris

Driller/Engineer/Trainee Signature

Driller or trainee License No. 1374

IF TRAINEE: Driller's License No:

Driller's Signature: Randy Harris

Drilling Company Harris Water Well Drilling LLC

Address 3980 E North Island Dr

City, State, Zip Shelton , WA , 98584

Contractor's Registration No. Harriww873J9 Date 07/25/2017

ECY 050-1-20 (Rev 02/10) *If you need this document in an alternate format, please call the Water Resources Program at 360-407-6872. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.*

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Outside Radius

(18)

File Original and First Copy with
Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No.

Permit No.

(1) **OWNER:** Name Lena Gwerder Address 2623 Cederhurst Rd NW Puyallup Wa 98

(2) **LOCATION OF WELL:** County Fierce NE ¼ SE ¼ Sec. 16 T. 20 N., R. 4E W.M.

Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one)

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 164 ft. Depth of completed well 164 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 6" Diam. from 0 ft. to 159 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type Model No.
Diam. 6 Slot size 30,000 from 159 ft. to 164 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level
Static level 6" ft. below top of well Date 9-25-84
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 30 gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) **WELL LOG:**

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
silty brown top soil	0	12'
brown clay	12'	26'
brown silty clay & sand	26'	84'
pete logs & sand	84'	87'
sand & water 12 gpm	87'	90'
gray clay	90'	103'
gray clay sand seams	103'	140'
gray clay logs	140'	146'
course sand water 30gpm	146'	164'

RECEIVED
OCT 30 1984
DEPARTMENT OF ECOLOGY
S.W. REGIONAL OFFICE

Work started 9-17 1984. Completed 9-24 1984

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Stoican Drilling Inc (Person, firm, or corporation) (Type or print)

Address Rt 1 Box 175 Eatonville Wa 98328

[Signed] Thomas L Kitzenberg (Well Driller)

License No. 0240 Date 10/26, 1984

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

19

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

ENTE

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W106915
AEC906
Water Right Permit No. 20-4E-15N

(1) **OWNER:** Name MOUNTAIN VIEW-EDGEWOOD WATER CO Address PO BOX 1868 EDGEWOOD WA 98372

(2) **LOCATION OF WELL:** County PIERCE SW ¼ SW ¼ Sec 15 T. 20 N., R. 4E W.M.

(2a) **STREET ADDDRESS OF WELL** (or nearest address)

(3) **PROPOSED USE:** ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☐ Municipal ☒ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one) 1R

Abandoned ☐ New well ☐ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☒ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 16" inches.
Drilled 100 feet. Depth of completed well 96.5 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 16 " Diam. from +2 ft. to 66.5 ft.
Welded ☒ " Diam. from ft. to ft.
Liner installed ☐ " Diam. from ft. to ft.
Threaded ☐

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name JOHNSON
Type Model No.
Diam. 14" Slot size 100 from 66.5 ft. to 86.5 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 35 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level 70 ft.
Static level 18 ft. below top of well Date 2/12/99
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom?
Yield: 1500 gal./min. with 5 ft. drawdown after 6 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
5	20.5				
10	20.2				
30	19.8				

Date of test 2/12/98

Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water 51 Was a chemical analysis made? Yes ☒ No ☐

(10) **WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION**

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
MULTI-COLORED GRAVEL, COBBLES AND SAND, WATER-BEARING BELOW 15'	0	
LARGER COBBLES @ 50'		
GREATER NUMBER OF COBBLES @ 76'		
SLIGHT CLAYEY SAND MATRIX @ 82'		
INCREASING SAND @ 88'		90
GREY & BROWN TILL	90	100

RECEIVED
MAR 4 1999
DEPT OF ECOLOGY

Work started 1/20, 1999 Completed 2/17, 1999

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME CHARON DRILLING, INC. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 12719 E. 224 ST - GRAHAM, WA 98338
(Signed) Dave Charon (WELL DRILLER) License No. 1190
Contractor's Registration No. CHARODI133NF Date 3-1-99, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

Unique Well ID Number A C E 9 0 6
X Y Z 1 2 3

Tacoma-Pierce County
Health Department

WELL TAGGING FORM

All shaded areas **must** be completed.

19

Date of Field Visit ____________ By Matt + Kerry

ADDITIONAL WELL IDENTIFIERS

Department of Health System ID Number 56820 Source # SO 10

USGS Site Identification ____________

Other

RECORD VERIFICATION

☐ Well Report available (*please attach*)
☐ Well Report not available
☑ Verification inconclusive

WELL OWNERSHIP, IF DIFFERENT FROM WELL REPORT

Name MOUNTAIN VIEW-EDGEWOOD WATER CO.

Street Address 11610 32nd ST E

City EDGEWOOD State WA 98372-2099

LOCATION OF WELL, IF DIFFERENT FROM WELL REPORT

Well Address 4623 MERIDAN E

City EDGEWOOD County PIERCE

T. 20 N. R. 04 E W.M. Sec. 15 SW ¼ of the . SW ¼

Latitude 47 ° 12 ' 53.9 "

Longitude -122 ° 17 ' 31.09 "

☐ GPS (raw data)
☑ GPS (corrected)
☐ Topographic Map
☐ Survey
☐ Computer Generated
☐ Other ____________

Elevation at land surface ________ feet/meters (circle one)

☐ Digital Altimeter
☐ Topographic Map
☐ Other

(19)

ACE906

Additional information, if available:

☐ Location marked on topographic map *(please attach)*

☐ Location marked on air photo *(please attach)*

Water right #

Priority Date

Circle One: Application Permit Certificate Claim Exempt

WELL CHARACTERISTICS

Physical Description of Well (size of casing, type of well, housing, etc.):

Location of Well Identification Tag:

Was supplemental tag needed for ease of identifying well?

☐ NO ☐ YES

If yes, where was tag placed?

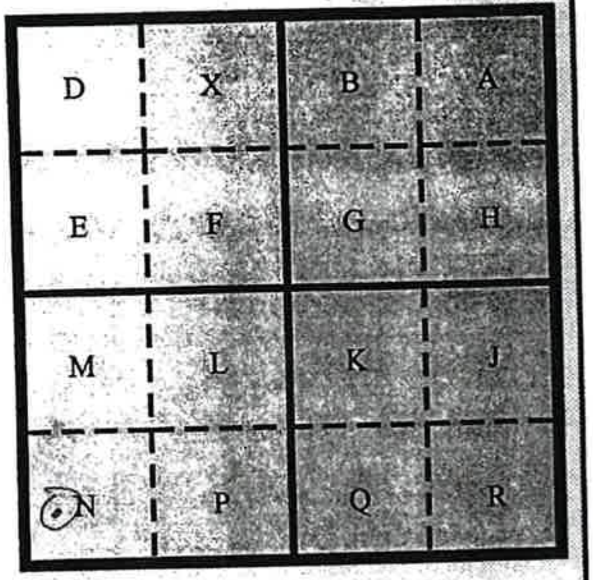
Scale 1:24,000 (1"=2,000')

Indicate the location of the well within the Section by drawing a dot at that point.

SECTION 15

TOWNSHIP 20

RANGE 04E



D	X	B	A
E	F	G	H
M	L	K	J
[✓ N]	P	Q	R

COMMENTS:

19

Pierce County Assessor-Treasurer's Office

Jan-08-2001, 08:44 AM

Parcel: R0420153014

Name: MT VIEW EDGEWOOD WATER CO

ACE906

Site Address: 4623 MERIDIAN E

Mailing Address: 11610 32ND ST E , EDGEWOOD WA 98372

Use Code: 9100 IDENTIFIES THOSE PARCELS OF LAND THAT ARE UNDEVELOPED.REF MANUAL

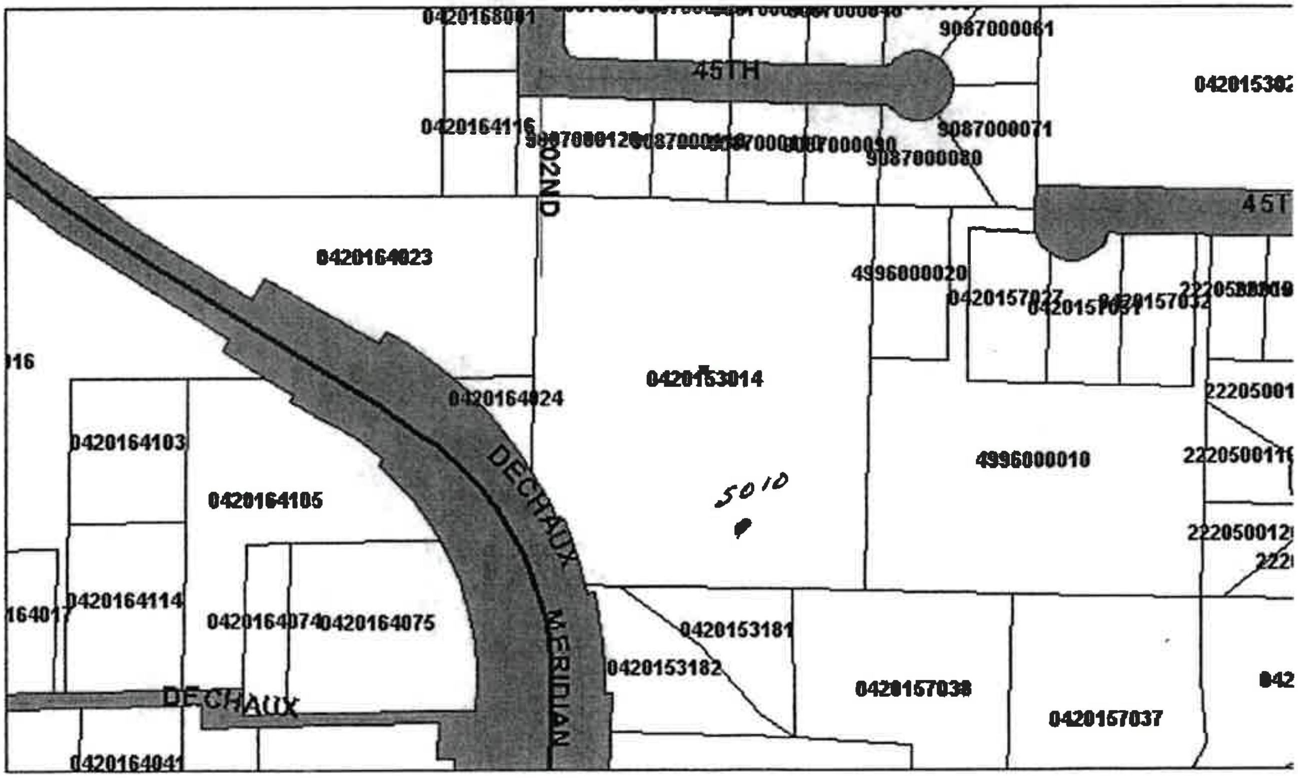
Mh Code:

Click One | Tax & Assessment | Land Characteristics | Building Characteristics | Parcel Map | Recorded Data | Back to S

Zoom Level: 5.0 Zoom

---North---

RTSQ: 04-20-15-3-3 **School Dist:** Puyallup



Pierce County Assessor-Treasurer
2401 South 35th St Room 142
Tacoma, Washington 98409
(253)798-6111 or Fax (253)798-3142

2.1

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Appli. #3303
Cert. #1749-A

Date June 22, 1953

Record by Fred B. Roberts

Source Driller's Record

Location: State of WASHINGTON

County Pierce

Area

Map

SW ¼ SW ¼ sec. 15 T. 20 N., R. 4 E.

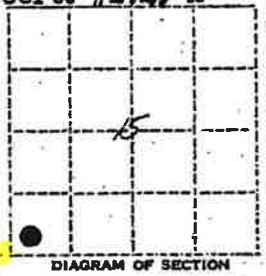


DIAGRAM OF SECTION

Drilling Co. Robinson & Roberts, Groundwater Geologists

Address Tacoma, Washington

Method of Drilling Date 19

Owner Mt. View-Edgewood Water Co.

Address 4408 N. Meridian St.; Puyallup, Washington

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Sand & gravel, some clay	22	22
	Clay, yellow, soft some sand & gravel	5	27
	Gravel up to 8" & sand, gray	29	56
	Gravel, sand & clay	3	59
	Gravel & sand, gray	11	70
	Gravel, coarse & sand, gray	12	82
	Hardpan, gray	11	93
Pump	Test:		
	Dim: 94' x 12"		
	SWL: 2.8'		
	Dd: 6'		
	Yield: 580 g.p.m.		
	Casing: 12" diameter Standard drive casing, +2 to 92'		
	Perf: 120 - Mills Knife, ½" x2½", 70' to 82'		

Turn up

Sheet of sheets

DEWATERING WELL

D 22

File Original and First Copy with
Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 19671

Water Right Permit No.

(1) OWNER: Name ~~ROUND UP COMPANY~~ Address ~~3800 SE 22ND AVE PORTLAND, OR~~

(2) LOCATION OF WELL: County PIERCE NE ¼ NE ¼ Sec 21 T. 20 N., R. 4 E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) 2200 N MERIDIAN

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☑ DeWater Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 1-2

Abandoned ☐ New well ☑ Deepened ☐ Reconditioned ☐

Method: Dug ☐ Cable ☐ Rotary ☑ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.

Drilled 30 feet. Depth of completed well 30 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from +1 ft. to 30 ft.

Welded ☐ " Diam. from ft. to ft.

Liner installed ☐ " Diam. from ft. to ft.

Threaded ☐

Perforations: Yes ☑ No ☐

Type of perforator used Machine Slot

SIZE of perforations .030 in. by 7 in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

Screens: Yes ☐ No ☐

Manufacturer's Name

Type Model No.

Diam. Slot size from ft. to ft.

Diam. Slot size from ft. to ft.

Gravel packed: Yes ☑ No ☐ Size of gravel Gran Pea gravel

Gravel placed from 30 ft. to 7 ft.

Surface seal: Yes ☑ No ☐ To what depth? Native Clay 7 ft ft.

Material used in seal Native Clay

Did any strata contain unusable water? Yes ☐ No ☐

Type of water? Depth of strata

Method of sealing strata off

(7) PUMP: Manufacturer's Name

Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.

Static level 8 ft. below top of well Date 5/3/95

Artesian pressure lbs. per square inch Date

Artesian water is controlled by (Cap, valve, etc.))

(9) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? Yes ☐ No ☑ If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test

Bailer test gal./min. with ft. drawdown after hrs.

Airtest gal./min. with stem set at ft. for hrs.

Artesian flow g.p.m. Date

Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

'95 MAY 11 A8:44

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Course Black Sand 2"-gravel	0	25
Grey Clay Dry	25	30

RECEIVED
'95 MAY 15 A9:50
S.W. REGIONAL

Temp Dewatering well.
Inside excavation.

Work started 5/3, 19. Completed 5/3, 1995

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME SLEAD'S CONSTRUCTION, INC. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 2703 96TH ST E TACOMA, WA

(Signed) License No. 2066
(WELL DRILLER)

Contractor's Registration No. SLEADC*325KQ Date 5/8/95, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

ECY 050-1-20 (10/87) -1329- 3

(23)

File Original and First Copy with
Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

Dewatering

~~WATER~~ WELL REPORT

STATE OF WASHINGTON

Start Card No. D 07889
UNIQUE WELL I.D. # ______
Water Right Permit No. ______

(1) **OWNER:** Name Roundup Co. Steve Salisbury Address PO Box 42121 Portland OR. 97242

(2) **LOCATION OF WELL:** County Pierce NE 1/4 NE 1/4 Sec 21 T. 20N N., R 4E W.M.

(2a) **STREET ADDRESS OF WELL** (or nearest address) 2200 North Meridian Puyallup Wa 98371

(3) **PROPOSED USE:** ☐ Domestic ☐ Irrigation ☑ DeWater Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (If more than one) 1-6

Abandoned ☐ New well ☑ Deepened ☐ Reconditioned ☐

Method: Dug ☐ Cable ☐ Rotary ☑ Bored ☐ Driven ☐ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 10 inches.
Drilled 40 feet. Depth of completed well 40 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 10" Diam. from +1 ft. to 40 ft.
Welded ☐ ______" Diam. from ______ ft. to ______ ft.
Liner installed ☐ ______" Diam. from ______ ft. to ______ ft.
Threaded ☐

Perforations: Yes ☑ No ☐
Type of perforator used mach. Slot
SIZE of perforations .030 in. by 2 in.
______ perforations from 40 ft. to 20 ft.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.

Screens: Yes ☑ No ☐
Manufacturer's Name ______
Type ______ Model No. ______
Diam. ______ Slot size ______ from ______ ft. to ______ ft.
Diam. ______ Slot size ______ from ______ ft. to ______ ft.

Gravel packed: Yes ☑ No ☐ Size of gravel 3/8 Gravel
Gravel placed from ______ ft. to ______ ft.

Surface seal: Yes ☑ No ☐ To what depth? 3 ft.
Material used in seal Bentonite chips
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ______ Depth of strata ______
Method of sealing strata off ______

(7) **PUMP:** Manufacturer's Name ______
Type: ______ H.P. ______

(8) **WATER LEVELS:** Land-surface elevation above mean sea level ______ ft.
Static level 16 ft. below top of well Date 7-18
Artesian pressure ______ lbs. per square inch Date ______
Artesian water is controlled by ______ (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom? ______
Yield: ______ gal./min. with ______ ft. drawdown after ______ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ______
Bailer test ______ gal./min. with ______ ft. drawdown after ______ hrs.
Airtest ______ gal./min. with stem set at ______ ft. for ______ hrs.
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? Yes ☐ No ☐

(10) **WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION**

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Brown SILTY sand	0'	10'
Black sand Med to		
Course	10'	30'
Grey Clayey silty (wet)	30	35'
*Black Silty sand w/		
gravel	35'	40'

RECEIVED
AUG 03 1994
DEPT. OF ECOLOGY

Work Started 7-18-94, 19. Completed 7-26, 1994

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Slead Construction Inc (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT) 531-2409
Address 2703 E 96th St Tacoma 98445
(Signed) ______ (WELL DRILLER) License No. 1852
Contractor's Registration No. Sleadc*325KO Date 8-1, 1994

(USE ADDITIONAL SHEETS IF NECESSARY)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

DEWATERING WELL

(24)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. D07889
UNIQUE WELL I.D. #
Water Right Permit No.

(1) **OWNER:** Name ROUNDUP CO. STEVE SALISBURY Address P.O. BOX 42121 PORTLAND OR 97242

(2) **LOCATION OF WELL:** County PIERCE NE 1/4 NE 1/4 Sec 21 T. 20N N., R 4E W.M.

(2a) **STREET ADDRESS OF WELL** (or nearest address) 2200 NORTH MERIDIAN PUYALLUP, WA 98371

(3) **PROPOSED USE:** ☐ Domestic ☐ Irrigation XX DeWater Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (If more than one) 10 thru 19
Abandoned ☐ New well ☐ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 10 inches.
Drilled 40 feet. Depth of completed well 40 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 10 " Diam. from 0 ft. to 40 ft.
Welded ☐ " Diam. from ft. to ft.
Liner installed ☐ " Diam. from ft. to ft.
Threaded ☐

Perforations: Yes ☒ XX No ☐
Type of perforator used MACHINE SLOTTED
SIZE of perforations .030 in. by in.
.030 perforations from 10 ft. to 40 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☒ X No ☐ Size of gravel 3/8 minus
Gravel placed from 10 ft. to 40 ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level ft.
Static level ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) **WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION**

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
BROWN SILTY SAND	0	10
BLACK SAND MED TO COURSE	10	30'
gray clay silty wet	30	35
BLACK SILTY SAND W/ GRAVEL	35	40

RECEIVED
'94 OCT -4 P2:42
S.W. REGIONAL

Work Started 8/10/94 19. Completed 9/15/94 19

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME SLEAD'S CONSTRUCTION, INC (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 2703 EAST 96TH STREET TACOMA, WA 98445
(Signed) Phil Riezinstein (WELL DRILLER) License No. 2066
Contractor's Registration No. SLEADC*325KO Date 9/20/94, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

ECL 050-1-20 (2/93)

OUT of SEARCH RADIUS

25

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 065586
Water Right Permit No.

(1) OWNER: Name YASUCHI TED Address PO BOX 1088 PUYALLUP, WA 98371-

(2) LOCATION OF WELL: County PIERCE - NE 1/4 SE 1/4 Sec 16 T 20 N., R 4E WM
(2a) STREET ADDRESS OF WELL (or nearest address) 4303 90TH AVE E

(3) PROPOSED USE: DOMESTIC

(4) TYPE OF WORK: Owner's Number of well (If more than one)
NEW WELL Method: AIR ROTARY

(5) DIMENSIONS: Diameter of well 6 inches
Drilled 50 ft. Depth of completed well 50 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Dia. from 0 ft. to 44.2 ft.
WELDED " Dia. from ft. to ft.
" Dia. from ft. to ft.

Perforations: NO
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: YES
Manufacturer's Name JOHNSON WELL
Type Model No.
Diam. 6 slot size 30 from 44.2 ft. to 50 ft.
Diam. slot size from ft. to ft.

Gravel packed: NO Size of gravel
Gravel placed from ft. to ft.

Surface seal: YES To what depth? 18 ft.
Material used in seal BENTONITE CLAY
Did any strata contain unusable water? NO
Type of water? Depth of strata ft.
Method of sealing strata off

(7) PUMP: Manufacturer's Name RED JACKET
Type SUBSMERSIBLE H.P. 1/2

(8) WATER LEVELS: Land-surface elevation above mean sea level ... ft.
Static level 7 ft. below top of well Date 02/25/91
Artesian Pressure lbs. per square inch Date / /
Artesian water controlled by

(9) WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? NO If yes, by whom?
Yield: gal./min with ft. drawdown after hrs.

Recovery data
Time Water Level Time Water Level Time Water Level

Date of test / /
Bailer test 20 gal/min. 8 ft. drawdown after 1 hrs.
Air test gal/min. w/ stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? NO

(10) WELL LOG → MISLOCATED NE of SW

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change in formation.

MATERIAL	FROM	TO
GRAVEL AND TOPSOIL	0	1
TOPSOIL	1	3
SAND	3	7
SEEPAGE SAND CLAY	7	16
PACKED SAND WOOD	16	19
COMPACTED SAND AND SOME GRAVEL	19	36
SANDY CLAY	36	47
WATER SAND & GRAVEL	47	50
	50	

Work started 02/22/91 Completed 02/25/91

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME RICHARDSON WELL DRILLING
(Person, firm, or corporation) (Type or print)

ADDRESS PO BOX 44427 TAC WA 98444

[SIGNED] License No. 0284

Contractor's
Registration No. RICHAW*3210B Date 03/14/91

Wetland Report

WETLAND, STREAM, AND FISH AND WILDLIFE HABITAT ASSESSMENT

PSE TODD ROAD

REVISED FEBRUARY 2024

AUGUST 2023

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

WETLAND, STREAM, AND FISH AND WILDLIFE HABITAT ASSESSMENT

PSE TODD ROAD

REVISED FEBRUARY 2, 2024

AUGUST 24, 2023

PROJECT LOCATION
325 TODD ROAD NORTHWEST
PUYALLUP, WASHINGTON 98371

PREPARED FOR

TRAMMEL CROW
600 UNIVERSITY STREET, SUITE 2912
SEATTLE, WASHINGTON 98101

PREPARED BY

SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
(253) 514-8952

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

Executive Summary

Soundview Consultants LLC (SVC) has been assisting Trammel Crow (Applicant) with a wetland, stream, and fish and wildlife habitat assessment for the proposed commercial development on a 6.17-acre property located at 325 Todd Road Northwest in the City of Puyallup, Washington. The property consists of one parcel located in the Southwest ¼ of Section 21, Township 20 North, Range 4 East, W.M. (Pierce County Tax Parcel Numbers 0420211030).

SVC investigated the subject property for the presence of potentially regulated wetlands, waterbodies, and fish and wildlife habitat in the fall of 2016, the fall and winter of 2018, the fall of 2022, winter of 2023 and winter of 2024. The original delineation was completed in 2016 with additional data collected in 2018. Following the change in Applicant, additional site visits were conducted in 2022, 2023, and 2024 to complete a tree assessment, check hydrology, verify the wetland boundary and data plots, and reflag the wetland and data plot locations. Following the City's third-party review by Confluence Environmental Company ("Confluence") which is documented in a Technical Memorandum dated November 1, 2023 (Confluence, 2023), SVC completed an additional site visit in winter 2023 to check hydrology and soils. Additionally, following the City's third-party review by Confluence Environmental Company ("Confluence") which is documented in a Technical Memorandum dated January 22, 2024 (Confluence, 2024), SVC completed an additional site visit in February of 2024 to investigate data plot locations established in 2016 and verify original findings and wet season hydrology.

The site investigations identified one potentially-regulated wetland (Wetland A) on the western boundary of the subject property and extending north and south within the right-of-way (ROW) of 4th Street Northwest. Two potential offsite wetlands were observed offsite to the west, west of 4th Street (Wetland 1 and Wetland 2). Wetland 1 is approximately 100 feet offsite to the west and Wetland 2 is located approximately 330 feet offsite to the west. Wetland A is considered a Category IV depressional wetland that is likely exempt from regulation by the City per Puyallup Municipal Code (PMC) 21.06.910(4) due to its low rating and small size (less than 10,000 square feet). Wetland 1 would be subject to an 80-foot buffer which would be functionally interrupted by 4th Street; Wetland 2 would be subject to a 100-foot buffer. No other potentially-regulated wetlands or fish and wildlife habitat were identified within 300 feet of the subject property.

The table below summarizes the critical areas and identifies the potential regulatory status by local, state, and federal agencies.

Waterbody Name	Size Onsite	Category[1]/ Type	Regulated Under PMC Chapter 21.06	Regulated Under RCW 90.48	Regulated Under Clean Water Act
Wetland A	~114 SF	IV	Not Likely	Likely	Likely
Wetland 1	N/A	III	Likely	Likely	Likely
Wetland 2	N/A	II	Likely	Likely	Likely

1. Current WSDOE and PMC 21.06.910 wetland definitions.

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Appendices

Chapter 1. Introduction

Soundview Consultants LLC (SVC) has been assisting Trammel Crow (Applicant) with a wetland, stream, and fish and wildlife habitat assessment for the proposed commercial development on a 6.17-acre site located at 325 Todd Road Northwest in the City of Puyallup, Washington. The subject property consists of one parcel located in the Southwest ¼ of Section 21, Township 20 North, Range 4 East, W.M. (Pierce County Tax Parcel Numbers 0420211030).

The purpose of the wetland, stream, and fish and wildlife habitat assessment is to identify the presence of potentially regulated wetlands, waterbodies, or other fish and wildlife habitat areas that may be found on or near the subject property.

This report provides conclusions, recommendations, and preliminary specifications regarding:

- Site description and area of assessment;
- Background research and identification of potentially-regulated critical areas within the vicinity of the proposed project;
- Identification and assessment of potentially-regulated wetlands and other aquatic features;
- Identification and assessment of potentially-regulated fish and wildlife habitat;
- Existing site map detailing identified critical areas and standard buffers and setbacks; and
- Supplemental information necessary for local regulatory review.

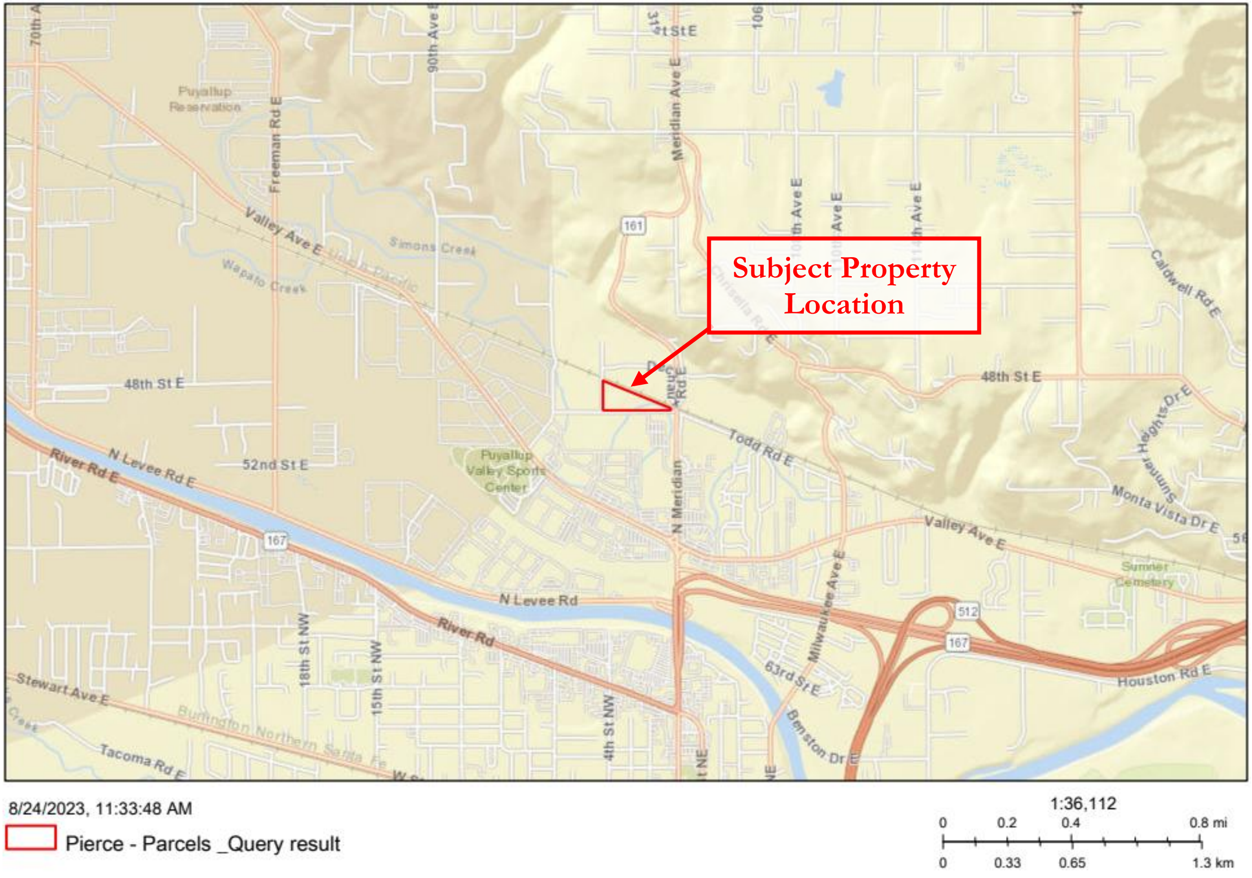
Chapter 2. Project Plan

2.1 Project Location

The subject property consists of a 6.17-acre site located at 325 Todd Road Northwest in the City of Puyallup, Washington (Figure 1). The subject property consists of one parcel located in the Southwest ¼ of Section 21, Township 20 North, Range 4 East, W.M. (Pierce County Tax Parcel Numbers 0420211030).

To access the subject site from Interstate-5 North from the Tacoma area, take exit 137 for WA-99 North toward Fife/Middleton and merge onto 54th Avenue East. Continue onto Valley Avenue East for 3.1 miles. Take a left onto 7th Street Northwest and after 0.1 mile, turn right onto 23rd Avenue Northwest. Proceed for 0.3 mile and the subject property will be on the left.

Figure 1. Vicinity Map



Chapter 3. Methods

SVC investigated and assessed any potentially-regulated wetlands, streams, and other fish and wildlife habitat conservation areas on or within 300 feet of the subject property in the fall of 2016, the fall and winter of 2018, and the fall of 2022. The original delineation was completed in 2016 with additional data collected in 2018. Following the change in Applicant, additional site visits were conducted in 2022 and 2023 to complete a tree assessment, check hydrology, verify the wetland boundary and data plots, and reflag the wetland and data plot locations. Following the City's third-party review by Confluence Environmental Company ("Confluence") which is documented in a Technical Memorandum dated November 1, 2023 (Confluence, 2023), SVC completed an additional site visit in winter 2023 to check hydrology and soils. Following Confluence's review of the winter 2023 hydrology data, which is documented in a Technical Memorandum dated January 22, 2024 (Confluence, 2024), SVC completed an additional site visit in February of 2024 to verify and update the original data collected in 2016, as it exceeded the 5-year delineation time frame.

All determinations were made using observable vegetation, hydrology, and soils in conjunction with data from the U.S. Geological Survey (USGS) topographic maps, National Resource Conservation Service (NRCS) soil survey, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) and Information for Planning and Consultation (IPaC) database, Washington State Department of Natural Resources (DNR) water typing system, Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS), WDFW and Northwest Indian Fisheries Commission (NWIFC) Statewide Washington Integrated Fish Distribution (SWIFD) mapping tools, City of Puyallup and Pierce County Geographic Information Systems (GIS) data, and various orthophotographic resources. Appendix A contains further details for the methods and tools used to prepare this report.

Wetland boundaries were determined using the routine approach described in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and modified according to the guidelines established in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE, 2010) and *Field Indicators of Hydric Soils in the United States* (NRCS, 2018). Prior precipitation conditions and seasonal timing of site investigations were considered in evaluations for wetland hydrology indicators. Qualified wetland scientists marked boundaries of onsite wetlands with orange surveyor's flagging labeled alpha-numerically and tied to 3-foot lath or vegetation along the wetland boundary. Pink surveyor's flagging was labeled alpha-numerically and tied to 3-foot lath or vegetation at formal sampling locations to mark the points where detailed data was collected (DP-1 to DP-19). Data plots DP-1 through DP-13 were collected during the initial 2016 delineation, and DP-14 through DP-19 were collected during a supplemental site visit in 2018. Due to the age of the delineation, the wetland boundary was verified in fall of 2022, with an additional hydrology check in early winter 2023, followed by reflagging of the wetland boundary. Additional tests pits were excavated at regular intervals inside and outside of the wetland boundaries to further confirm each delineation. An additional hydrology check was completed in February of 2024 to confirm that data, most notably hydrology, is consistent with previous findings. Site conditions remained relatively consistent since the original 2016 delineation. It is not feasible to complete a recheck of the exact location of each of the nineteen data plots as the digging results in disturbed soil and hydrological conditions, therefore, hydrology and soil conditions were confirmed throughout the site during each of the visits. No additional new data forms were collected during the 2023 delineation, but prior data was confirmed by digging adjacent to the previously collected data plots. Additionally, as the field had gone fallow since the original delineation, the February 2024 site investigation collected new data regarding vegetation, as well as hydrology for data plots originally assessed in 2016 (DP-1 through DP-10 and DP-13).

Wetlands were classified using the Cowardin (Cowardin, 1979) classification system. Following classification and assessment, wetlands were rated and categorized using the *Washington State Wetlands Rating System for Western Washington—Washington Department of Ecology, 2014, Publication No. 04-06-029*, per Puyallup Municipal Code (PMC) 21.06.910.

The fish and wildlife habitat assessment was conducted during the same site visits by qualified fish and wildlife biologists. The experienced biologists made visual and auditory observations using stationary and walking survey methods for both aquatic and upland habitats noting any special habitat features and direct and indirect signs of fish and wildlife activity (e.g. nesting, foraging, and migration/movement). Special attention was given to assessing the presence of fish and wildlife habitat conservation areas outlined under PMC 21.06.1010

Chapter 4. Existing Conditions

4.1 Landscape Setting

The subject property is located in an urban-commercial and rural-residential setting within the City of Puyallup (Figure 2). The site is currently developed with a gravel lot throughout the eastern portion of the site that has been utilized for equipment storage and parking, and the western portion of the site consists of undeveloped field. A single-family residence and associated infrastructure was demolished between 2018 and 2019. Topography on the subject property is generally flat, sloping gently down from east to the west with elevations ranging from approximately 48 feet above mean sea level (amsl) to 40 feet amsl. A topographic map is provided in Appendix B1. The subject property is located within Water Resource Inventory Area (WRIA) 10 – Puyallup-White.

Figure 2. Aerial View of the Subject Property

4.2 Soils

The NRCS Soil Survey of Pierce County, Washington identifies three soil series on the site: Sultan silt loam (42A), Puyallup Fine Sandy Loam (31A), and Pilchuck Fine Sand (29A). A soil map is provided in Appendix B2 (Zulauf, 1979).

Sultan silt loam (42A)

Sultan silt loam (42A) soil series are moderately well drained soils formed in recent alluvium on floodplains at the sea level to 120 feet, under deciduous and coniferous trees. This soil is on the bottom lands along the Puyallup and White Rivers at elevations ranging from near sea level to 100 feet. Slopes are less than 2 percent, and the surface is smooth. In a typical profile, the surface layer is a dark grayish brown (10YR 3/2) silt loam about 14 inches thick. The underlying material to a depth of 34 inches is a mottled, brown silt loam and dark yellowish brown (10YR 5/4) very fine sandy loam. To a depth of more than 60 inches, it is a mottled, dark gray fine sandy loam, gray silty clay loam, very dark grayish brown fine sand, and dark yellowish brown silt loam. The Sultan soil series is listed as non-hydric, however, as much as 8% of areas mapped as Sultan silt loam may contain hydric inclusions of Briscot and Puget soils (NRCS, N.d.).

Puyallup fine sandy loam (31A)

Puyallup fine sandy loam (31A) soil series has 0 to 3 percent slopes and are well drained soils formed in recent alluvium on the natural levees along the Puyallup River. Puyallup soils are usually found on floodplains and low-lying areas. In a typical profile, the surface layer is a very dark brown ashy fine sandy loam about 13 inches thick. The underlying material to a depth of 50 inches is a very dark grayish brown loamy fine sand and fine sand. Between depths of 50 and more than 68 inches, it is dark grayish brown fine sandy loam and fine sand. The Puyallup soil series is considered non-hydric, however, as much as 2 percent of areas mapped as Puyallup fine sandy loam may contain hydric inclusions of Briscot, undrained soil series (NRCS, N.d.).

Pilchuck fine sand (29A)

According to the survey, Pilchuck fine sand is excessively drained soil formed in major river valleys in mixed alluvium under hardwoods and conifers. In a typical profile, the surface layer is very dark brown fine sand about 7 inches thick. The underlying material to a depth of 36 inches is very dark brown fine sand, and very dark brown very gravelly sand to a depth of 60 inches or more. Pilchuck fine sand is considered non-hydric, however, as much as 10 percent of areas mapped as Pilchuck fine sand may contain hydric inclusions of Aquic xerofluvents soil series (NRCS, N.d.).

4.3 Critical Area Inventories

The DNR Stream Typing map (Appendix B3), WDFW PHS map (Appendix B4), and WDFW and NWIFC SWIFD map (Appendix B5) erroneously identify a potential Type F stream, labelled as Wapato Creek, across the eastern portion of the subject property, extending offsite to the south. The WDFW PHS map also identifies an offsite wetland associated with the stream southeast of the subject property. The City of Puyallup Stream and Wetland Inventory (Appendix B6), Pierce County Stream and Wetland Inventory (Appendix B7), and USFWS NWI map (Appendix B8) accurately identify Wapato Creek offsite, approximately 360 feet to the west of the subject property at its closest point. The City also maps an offsite wetland associated with Wapato Creek approximately 70 feet to the west of the subject property. No other wetlands or other waterbodies are documented on or within 300 feet of the subject property were identified during the background investigation.

WDFW and NWIFC SWIFD map identifies documented coho and steelhead and a gradient accessible reach for chinook and pink salmon within the erroneously mapped Wapato Creek onsite. The WDFW PHS map also identified steelhead and coho presence within the erroneously mapped stream onsite. Additionally, waterfowl concentrations were erroneously mapped adjacent to the southeast corner of the subject property, which currently consists of parking lots and warehouses. WDFW PHS does identify western pond turtle (*Actinemys marmorata*) within the township, but not necessarily on or near the site. According to the USFWS IPaC mapping database, marbled murrelet (*Brachyramphus marmoratus*), streaked horned lark (*Eremophila alpestris strigata*), yellow-billed cuckoo (*Coccyzus americanus*), bull trout (*Salvelinus confluentus*) and Taylor's checkerspot butterfly (*Euphydryas editha*) have the potential to occur within 300 feet of the subject property. No other potential priority habitats or species are documented within 300 feet of the subject property.

4.4 Precipitation

Precipitation data was acquired from the National Oceanic and Atmospheric Administration (NOAA) weather station at Seattle-Tacoma International Airport in order to obtain percent of normal precipitation for the Puyallup area during and preceding the investigations. A summary of data collected is provided in Table 1.

Table 1. Precipitation Summary[1]

Date	Day of	Day Before	1 Week Prior	2 Weeks Prior	30 Days Prior (Observed/Normal)	Year to Date (Observed/Normal)[2]	Percent of Normal[3]
9/20/2016	0.00	0.08	0.30	0.79	1.03/1.25	24.75/22.70	82/109
10/5/2016	0.17	0.13	0.22	0.25	1.05/1.70	25.00/23.82	62/105
2/14/2018	0.24	0.14	0.29	1.17	6.35/4.56	28.15/22.79	139/124
11/29/2022	1.05	1.07	2.60	2.60	5.20/6.45	6.78/10.01	81/68
1/5/2023	Trace	0.02	0.75	4.49	6.73[4]/5.73	14.92[5]/16.90	117/88
1/19/2023	0.00	0.18	1.63	2.69	7.84/5.86	18.27/19.58	134/93
12/8/2023	0.00	0.40	5.78	5.92	7.47/6.47	14.45/11.74	115/123
2/1/2024	0.09	0.12	2.02	3.98	6.40[6]/5.74	23.55[6]/21.87	111/108

Notes:

1. Precipitation levels provided in inches. Data obtained from NOAA (http://w2.weather.gov/climate/xmacis.php?wfo=sew) for SeaTac International Airport.
2. Year-to-date precipitation is for the calendar year from January 1 to onsite dates for the 2016 investigations, and the water year from October 1 to the onsite dates for 2018, 2022, 2023, and 2024.
3. Percent of normal is shown for the last 30 days and water year to date.
4. Missing precipitation data from December 21, 2022, therefore precipitation level may be under-represented.
5. Missing precipitation data from November 25 and December 21, 2022, therefore precipitation level may be under-represented.
6. Missing precipitation data from January 4 and January 16, 2024, therefore precipitation level may be under-represented.

During the 2016 site visits, precipitation was approximately 82 and 62 percent of normal 30 days prior to the site inspections, and 109 and 105 percent of normal for the calendar year. This data suggests conditions may have been somewhat drier than normal for the past 30 days during the October 2016 site visit. However, given that October is the end of the dry season, the observed conditions are relatively normal.

During February 2018 site visit precipitation levels were approximately 139 percent of normal for the 30 days prior, and 124 percent of statistical normal for the 2017/2018 water year. This precipitation data suggests that above normal precipitation during the prior 30 days during the wet season may have caused some areas not normally wet to become saturated or inundated during the time of the recent site investigations compared to the drier conditions of the earlier site visits.

The precipitation during the November 2022 site visit was within the statistical normal for the prior 30 days (81 percent of normal) and was below the statistical normal for the water year (68 percent of normal). This suggests that hydrologic conditions were drier than normal during the November site. The precipitation during the January 5, 2023, site visit was within the statistical normal for the prior 30 days (117 percent of normal) and the water year (88 percent of normal). The precipitation during the January 19, 2023, site visit was above the statistical normal for the prior 30 days (134 percent of normal) and within the statistical normal for the water year (93 percent of normal). The precipitation during the December 8, 2023, site visit was within the statistical normal for the prior 30 days (115 percent of normal) and the water year (123 percent of normal). However, nearly 6 inches of rainfall was recorded in the week leading up to the site visit, which likely resulted in short term exaggerations of hydrology onsite. Such conditions were considered in making professional wetland boundary determinations.

During February 2024 site visit precipitation levels were approximately 111 percent of normal for the 30 days prior, and 108 percent of statistical normal for the 2023/2024 water year. However, approximately 2.02 inches of precipitation was recorded in the week leading up to the February 2024 site investigation. This precipitation data suggests that precipitation during the February 2024 site investigation was relatively normal for the winter wet season. Such conditions were considered in making professional wetland boundary determinations.

Chapter 5. Results

The site investigations identified one wetland (Wetland A) subject property. No other wetlands, waterbodies, or priority habitats or species were identified on or within 300 feet of the subject property. A map depicting existing conditions is included in Appendix C.

5.1 Upland Characterization

The subject property is partially developed with gravel lot in the eastern portion of the site, and undeveloped field in the western portion of the site. Vegetation in the agricultural field on the east side of the property are dominated by various grass and forb species typical to fields, including colonial bentgrass (*Agrostis capillaris*) and meadow foxtail (*Alopecurus pratensis*).

5.2 Wetlands

One wetland (Wetland A) was identified on the subject property. The identified onsite wetland contained indicators of hydric soils, wetland hydrology, and a predominance of hydrophytic vegetation according to current wetland delineation methodology. Wetland data forms are provided in Appendix D, wetland rating forms are provided in Appendix E, and wetland rating maps are provided in Appendix F. Table 2 summarizes the wetlands identified during the site investigations.

Table 2. Wetland Summary

Wetland	Predominant Wetland Classification / Rating			Wetland Size Onsite (SF)
	Cowardin[1]	HGM	City of Puyallup[2]	
A	PEMBC	Depressional	IV	114

1. Cowardin et al. (1979); Federal Geographic Data Committee (2013); class based on vegetation: PEM = Palustrine Emergent. Modifiers for Water Regime: B = Seasonally Saturated, C = Seasonally Flooded.
2. Current WSDOE rating system per PMC 21.06.910

Wetland A

Wetland A is 114 square feet (0.003 acres) in size onsite and is located on the western edge of parcel -1002, extending offsite along 4th Street Northwest (Decheaux Road). The wetland is 1,498 square feet (0.034 acres) in total size. Hydrology for Wetland A is provided by surface sheet flow, direct precipitation, and a seasonally-high groundwater table. Wetland A appears to outlet to a non-wetland, roadside ditch along 4th Street Northwest to the west of the site under the road through a culvert. Wetland vegetation is dominated by soft rush (*Juncus effusus*), curly dock (*Rumex crispus*), creeping buttercup (*Ranunculus repens*), common velvetgrass (*Holcus lanatus*), and colonial bentgrass (*Agrostis capillaris*). Hydric soil indicator F3 (Depleted Matrix) was observed. The wetland was delineated based on the point of saturation and a transition to a hydrophytic plant community. The onsite buffer is degraded by actively managed agricultural fields. Wetland A is a Palustrine Emergent, Seasonally Saturated, Seasonally Flooded (PEMBC) wetland. Table 3 provides a summary of Wetland A.

Table 3. Wetland A Summary.

<table>
<tr><th colspan="3">WETLAND A</th></tr>
<tr><td rowspan="7"></td><td>Local Jurisdiction</td><td>City of Puyallup</td></tr>
<tr><td>City of Puyallup Rating</td><td>IV</td></tr>
<tr><td>Wetland Size (Onsite)</td><td>114 SF</td></tr>
<tr><td>Cowardin Classification</td><td>PEMBC</td></tr>
<tr><td>HGM Classification</td><td>Depressional</td></tr>
<tr><td>Wetland Data Sheet(s)</td><td>DP-15</td></tr>
<tr><td>Upland Data Sheet(s)</td><td>DP-14, DP-16, and DP-17</td></tr>
<tr><th colspan="3">Wetland Functions Summary</th></tr>
<tr><td>Water Quality
(Scores 6 out of 9 points)</td><td colspan="2">• Low site potential to trap sediments and pollutants and remove nitrogen due to an intermittently flowing outlet, less than 10% cover of persistent, ungrazed vegetation and less than 50% of the wetland seasonally ponds.
• Moderate landscape potential to receive sediment and pollutants due to the wetland receiving stormwater discharges and due to surrounding land uses that produce pollutants.
• High societal value for water quality functions due to the wetland discharging directly into degraded waters and 303(d) listed waterway within the sub-basin.</td></tr>
<tr><td>Hydrologic
(Scores 5 out of 9 points)</td><td colspan="2">• Low site potential to reduce flooding and erosion due to an intermittently flowing outlet, the moderate storage depth during wet periods and the small size of the wetland relative to the contributing basin.
• Moderate landscape potential to provide flood protection due to the adjacent land uses that produce run-off and the wetland receiving stormwater discharges. .
• Moderate societal value for hydrologic functions due to surface flooding within a downgradient sub-basin</td></tr>
<tr><td>Habitat
(Scores 3 out of 9 points)</td><td colspan="2">• Low site potential to provide diverse and complex habitat as the wetland consists entirely of one plant community, two hydroperiods, moderate species richness, no habitat interspersion, and one special habitat feature.
• Low landscape potential to support habitat use due to the lack of accessible and undisturbed habitat and the high intensity land uses surrounding the property.
• Low societal value for habitat functions due to the lack of nearby WDFW Priority Habitats</td></tr>
</table>

Potential Wetland 1

Wetland 1 is located approximately 100 feet offsite to the west of the subject property. Hydrology for Wetland 1 is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table. Surface runoff from Wetland 1 is conveyed into a ditch at the southern end of the wetland unit. Wetland vegetation is dominated by non-native invasive reed canarygrass (*Phalaris arundinacea*). Wetland 1 is a Palustrine Emergent, Seasonally Saturated wetland. Hydric soils and wetland hydrology are assumed. Wetland 1 is considered a Category III depressional wetland with a low habitat score of 4 subject to a 80 foot buffer interrupted by 4TH street. As the buffer is interrupted, this wetland is not further discussed in this document.

Potential Wetland 2

Wetland 2 is located approximately 330 feet offsite to the west of the subject property. Hydrology for Wetland 2 is provided by surface sheet flow from adjacent uplands, direct precipitation, overbank flooding from Wapato Creek and a seasonally high groundwater table. Wetland vegetation is dominated by non-native invasive reed canarygrass. Wetland 2 is a Palustrine Emergent Seasonally Flooded, Permanently Flooded (PEMCH) wetland. Hydric soils are assumed. Wetland 2 is considered a Category II riverine wetland with a habitat score of 5 points. As Wetland 2 is greater than 300 feet offsite, it is not further discussed in this document.

5.3 Wildlife Habitat Areas

Per PMC 21.06.1010, fish and wildlife habitat conservation areas are those areas identified as being of critical importance to the maintenance of fish, wildlife, or plant species. This includes streams and their associated riparian habitat areas, non-riparian habitat areas that support or have a primary association with state or federally listed species, state priority habitats and areas associated with a state priority species, and habitats and species of local importance, including habitat corridors, habitat blocks, and open spaces. No streams were identified on or within 300 feet of the subject property, therefore the site does not provide suitable fish habitat onsite.

According to the USFWS IPaC mapping database, marbled murrelet (*Brachyramphus marmoratus*), streaked horned lark (*Eremophila alpestris strigata*), yellow-billed cuckoo (*Coccyzus americanus*), bull trout (*Salvelinus confluentus*) and Taylor's checkerspot butterfly (*Euphydryas editha*) have the potential to occur within 300 feet of the subject property.

Marbled murrelet that occur in the state of Washington are year-round residents on coastal waters and primarily feed in waters within 500 feet of the shore out to 1.2 miles from shore at depths of less than one hundred feet. Potential suitable nesting habitat typically consists of tree stands 5 or more acres in size composed of 60% or more conifer cover with minimum 15-inch diameter at breast height (DBH). The subject property is not suitable for marbled murrelet nesting habitat due to a lack of significant tree stands, and its distance (approximately 7 miles) from the nearest marine shoreline.

Streaked horned lark are found primarily in prairie habitat or unvegetated to sparsely vegetated open habitats (Pearson & Anderson, 2015), in dune habitats along the coast of Washington; in prairies of western Washington and western Oregon; and on the sandy beaches and islands along the Columbia and Willamette Rivers (USFWS, 2019). Studies conducted by the USFWS indicate that sites used by larks are generally found in open (i.e., flat, treeless) landscapes 300 acres or more in size such as airports (USFWS, 2013). The open field areas on the subject property are not large enough to support streaked horn lark habitat. In addition, the field areas are regularly maintained for agricultural uses that limit the potential for streaked horned lark utilizing the subject property.

Yellow-billed cuckoo habitat consists of low to mid-level riparian forests dominated by cottonwoods and willows. Suitable habitat is approximately 100 to 198 acres and wider than 200 meters; marginal habitat is approximately 20 to 100 acres and 100 to 200 meters wide; and unsuitable habitat is smaller than approximately 37 acres and less than 100 meters wide (Wiles & Kalasz, 2017). The subject site is does not provide the required low to mid-level riparian forests for suitable yellow billed cuckoo habitat.

Bull trout require cold water temperatures, clean stream substrates, complex streams, and connectivity to river, lakes, and ocean habitats. There are no streams on or within 300 feet of the subject property, thus eliminating the potential for bull trout and their habitat.

Taylor's checkerspot butterfly is primarily found in open prairie and grass/oak woodland habitat (Potter, 2016). Taylor's checkerspot habitat is dependent upon food sources for larvae and nectar sources for adults. Despite the presence of open grass areas onsite, these areas are regularly maintained and modified due to agricultural activities, and likely do not provide suitable habitat or food sources for larvae or adults.

In addition, the WDFW PHS map identified winter steelhead (*Oncorhynchus mykiss*) and coho (*Oncorhynchus kisutch*) presence within the stream erroneously mapped onsite. No stream was identified on or within 300 feet of the subject property, thus eliminating the potential for steelhead, coho and their habitat. Waterfowl concentrations that are associated with wetlands and agricultural areas in Pierce County were mapped adjacent to the southeast corner of subject property. The priority area mapped is a distribution center parking lot and does not support waterfowl concentrations.

Chapter 6. Regulatory Considerations

The site investigations identified one wetland (Wetland A) on the subject property. No other wetlands, waterbodies, or priority habitats or species were identified on or within 300 feet of the subject property.

6.1 Local Critical Area Requirements

PMC 21.06.910 has adopted the current wetland rating system for western Washington (Hruby, 2014). Category IV wetlands have the lowest level of functions and are often heavily disturbed. Wetland A is classified as a Category IV wetland. PMC 21.06.930(2) establishes wetland buffers based on wetland rating, wetland habitat score, and the intensity of land uses proposed on the development site. Per PMC 21.06.930(2)(e), Category IV wetlands are subject to a standard 50-foot buffer for proposed high intensity land use. However, per PMC 21.06.910(4), Category IV wetlands under 10,000 square feet are not subject to the regulations identified in PMC 21.06. As a result, Wetland A is likely exempt from regulation by the City, and no buffer or mitigation is required by the City for wetland impacts.

Table 4. Wetland Buffer Summary.

Wetland	Category	Habitat Score	Proposed Land Use Intensity	Standard Buffer Width
A	IV	3	High	N/A

6.2 State and Federal Requirements

On January 18, 2023, USACE and EPA published a revised definition of "Waters of the United States" (USACE and EPA, 2023a). The revised rule became effective on March 20, 2023. On May 25, 2023, the U.S. Supreme Court issued a decision affecting the definition of Waters of the United States, or "WOTUS", in *Sackett Et Ux. V Environmental Protection Agency Et Al.* On August 29, 2023, the US EPA and USACE issued a final rule to amend the final "Revised Definition of 'Waters of the United States'" rule. The amendment conforms the definition of "Waters of the United States" to the U.S. Supreme Court's decision in the Sackett Et Ux. V Environmental Protection Agency Et Al case. The revised and amended definition of "Waters of the United States" is as follows:

(a) Waters of the United States means:

> *(1) Waters which are: (i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (ii) The territorial seas; or (iii) Interstate waters;*
>
> *(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;*
>
> *(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;*

> *(4) Wetlands adjacent to the following waters: (i) Waters identified in paragraph (a)(1) of this section; or (ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;*
>
> *(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section;*

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

> *(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;*
>
> *(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;*
>
> *(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;*
>
> *(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;*
>
> *(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;*
>
> *(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;*
>
> *(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and*
>
> *(8) Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.*

The 2023 revised and amended definition of Waters of the United States defines "adjacent" as "having a continuous surface connection."

Wetland A appears to lack a continuous surface connection to a WOTUS, and therefore is not likely to be considered an adjacent wetland. An Approved Jurisdictional Determination (AJD) will be sought from USACE to confirm lack of federal jurisdiction. Wetland A is also considered a natural water that is likely regulated by the WSDOE through the Revised Code of Washington (RCW) 90.48.

Chapter 7. Closure

The findings and conclusions documented in this report have been prepared for specific application to the PSE Todd Road site. They have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. Our work was also performed in accordance with the terms and conditions set forth in our proposal. The conclusions and recommendations presented in this report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Because of such changes, our observations and conclusions applicable to this project may need to be revised wholly or in part.

The critical area determinations by Soundview Consultants LLC are based on conditions present at the time of the site inspection and considered preliminary until the presence or absence and location of critical areas are validated by the jurisdictional agencies. Validation of the critical area determinations by the regulating agencies provides a certification, usually written, that the critical area boundaries or lack thereof verified are the boundaries that will be regulated by the agencies until a specific date or until the regulations are modified. Only the regulating agencies can provide this certification.

Since critical areas are dynamic communities affected by both natural and human activities, changes in critical area determinations and/or boundaries may be expected; therefore, critical area determinations cannot remain valid for an indefinite period of time. Local agencies typically recognize the validity of critical area determinations for a period of 5 years after completion of a wetland delineation and fish and wildlife habitat assessment report. Development activities on a site 5 years after the completion of this report may require revision of the critical area determinations and/or delineations. In addition, changes in government codes, regulations, or laws may occur. Because of such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

Chapter 8. References

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Appendix A – Methods and Tools

Table A1. Methods and tools used to prepare the report.

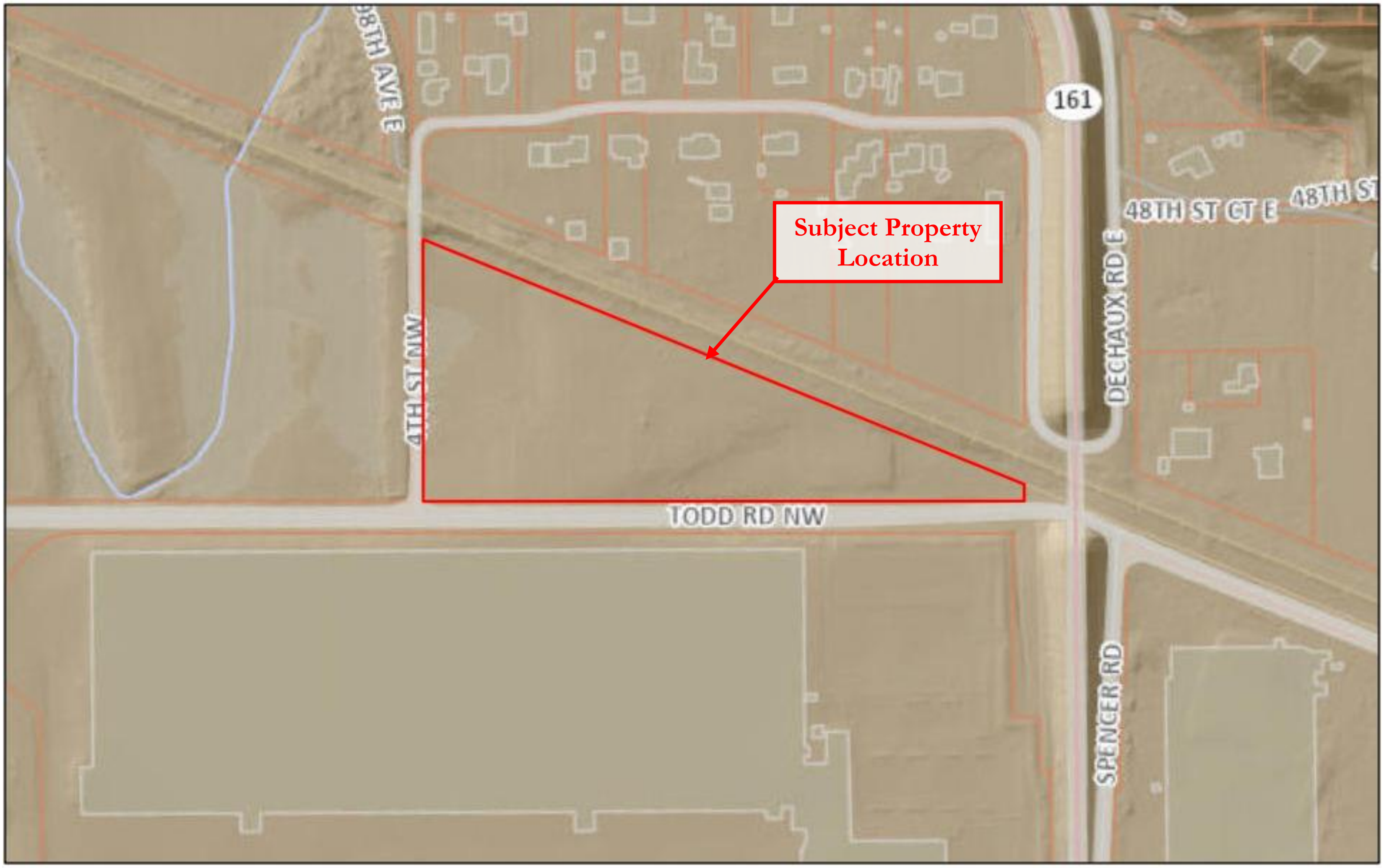
Parameter	Method or Tool	Website	Reference
Wetland Delineation	USACE 1987 Wetland Delineation Manual	http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf	**Environmental Laboratory.** 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
	Western Mountains, Valleys, and Coast Region Regional Supplement	http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/west_mt_finalsupp.pdf	**U.S. Army Corps of Engineers.** 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
Wetland Classification	USFWS / Cowardin Classification System	http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf https://www.fgdc.gov/standards/projects/wetlands/nvcs-2013	**Cowardin**, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. Government Printing Office, Washington, D.C. **Federal Geographic Data Committee.** 2013. Classification of Wetlands and Deepwater Habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.
	Hydrogeomorphic Classification (HGM) System	http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde4.pdf	**Brinson**, M. M. (1993). "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
Wetland Rating	Washington State Wetland Rating System	http://www.ecy.wa.gov/biblio/0406025.html	**Hruby, T**. 2014. Washington State wetland rating system for western Washington –Revised. Publication # 04-06-025.
Wetland Indicator Status	2020 National Wetland Plant List	http://wetland-plants.usace.army.mil/	Website.
Plant Names	USDA Plant Database	http://plants.usda.gov/	Website.
	Flora of the Pacific Northwest	http://www.pnwherbaria.org/florapnw.php	**Hitchcock**, C.L. & A. Cronquist, Ed. by D. Giblin, B. Ledger, P. Zika, and R. Olmstead. 2018. Flora of the Pacific Northwest, 2nd Edition. U.W. Press and Burke Museum. Seattle, Washington.
Soils Data	NRCS Soil Survey	http://websoilsurvey.nrcs.usda.gov/app/	Website GIS data based upon: **Zulauf, A.S.** 1979. Soil Survey of Pierce County Area, Washington. Natural Resource Conservation Service. Washington D.C
	Washington State Hydric Soils List	http://www.wa.nrcs.usda.gov/technical/soils/hydric_lists/hydsoil-wa-653.pdf	**Natural Resources Conservation Service.** 1983. Hydric Soils List: Pierce County, Washington. U.S. Department of Agriculture. Washington D.C.
	Soil Color Charts		**Munsell®** Color. 2000. Munsell® Soil Color Charts. New Windsor, New York.
	Field Indicators of Hydric Soils	https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053171.pdf	**NRCS.** 2018. *Field Indictors of Hydric Soils in the United States, Version 8.2. L.M. Vasialas, G.W. Hurt, and C.V. Noble (eds.).* USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.
	Washington Natural Heritage Program	http://data-wadnr.opendata.arcgis.com/dat	**Washington Natural Heritage Program** (Data published 07/19/17). Endangered, threatened, and sensitive plants of Washington. Washington State

Parameter	Method or Tool	Website	Reference
Threatened and Endangered Species		asets/wnhp-current-element-occurrences	Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA
	Washington Priority Habitats and Species	http://wdfw.wa.gov/hab/phspage.htm	**Priority Habitats and Species (PHS) Program** Map of priority habitats and species in project vicinity. Washington Department of Fish and Wildlife.
Species of Local Importance	NWIFC	http://geo.nwifc.org/swifd/	Website
Report Preparation	Puyallup Municipal Code (PMC)	https://www.codepublishing.com/WA/Puyallup	PMC Chapter 21.06 – Critical Areas.

Appendix B – Background Information

This Appendix includes a Pierce Contours Map (B1); NRCS Soil Survey Map (B2); DNR Stream Typing Map (B3); WDFW PHS Map (B4); WDFW and NWIFC SWIFD Map (B5); Puyallup Stream and Wetland Inventory (B6); Pierce County Stream and Wetland Inventory (B7); and USFWS NWI Map (B8).

Appendix B1. Pierce County Contours Map



8/24/2023, 11:48:58 AM

🟥 Pierce - Parcels _Query result

FiveByFive

Pierce County

1:4,514

Pierce County WA, Maxar

Appendix B2. NRCS Soil Survey Map

8/24/2023, 11:53:23 AM

🟥 Pierce - Parcels _Query result

☐ USA Soils Map Units

29A: Pilchuck fine sand
54: Sultan silt loam
154: Puyallup fine sandy loam

1:4,514

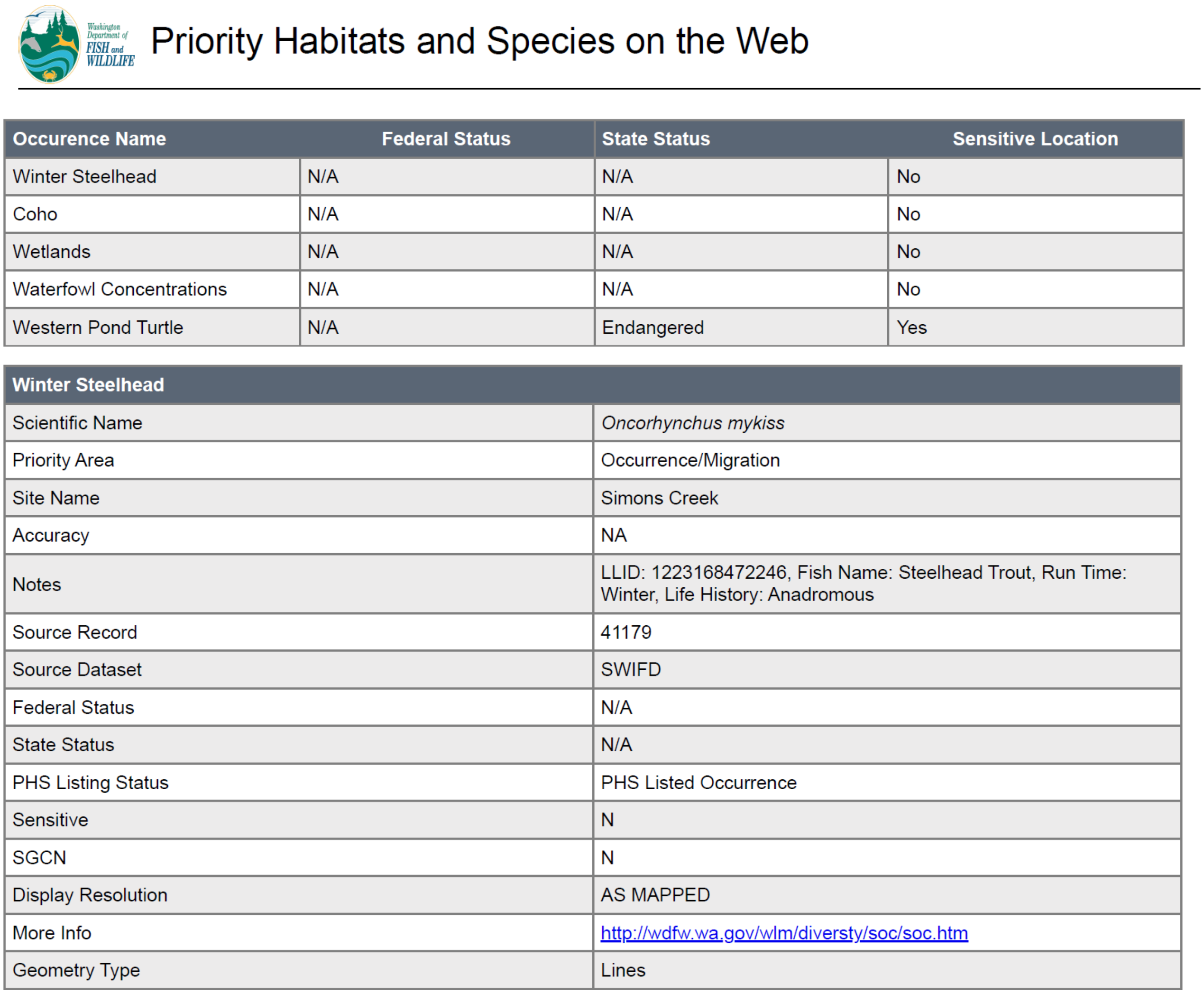
0 0.03 0.05 0.1 mi

0 0.04 0.08 0.16 km

Source: USDA NRCS, Esri, Maxar

Appendix B3. DNR Stream Typing Map

Appendix B4. WDFW PHS Map



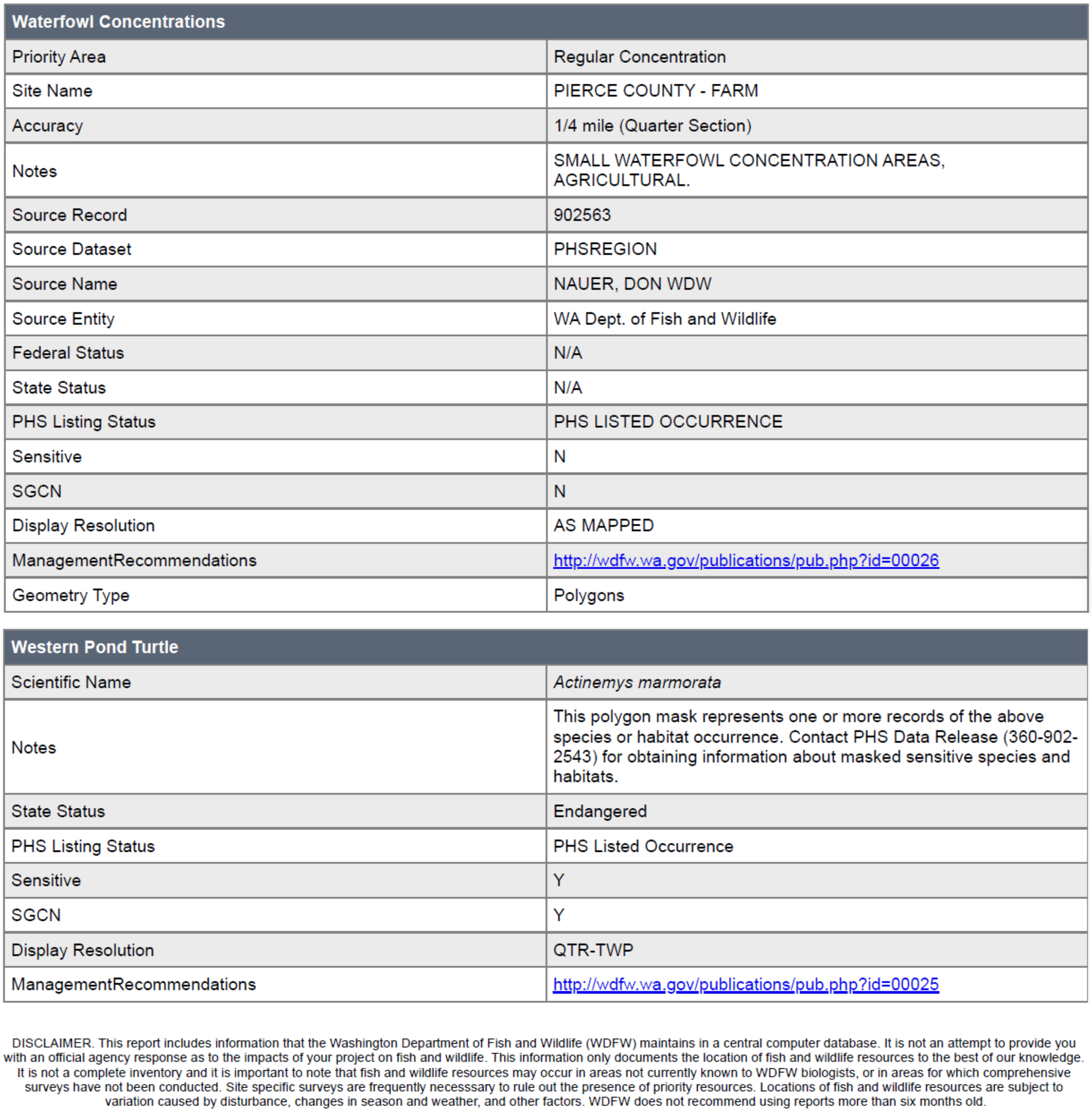
Priority Habitats and Species on the Web

Occurence Name	Federal Status	State Status	Sensitive Location
Winter Steelhead	N/A	N/A	No
Coho	N/A	N/A	No
Wetlands	N/A	N/A	No
Waterfowl Concentrations	N/A	N/A	No
Western Pond Turtle	N/A	Endangered	Yes

Winter Steelhead	
Scientific Name	*Oncorhynchus mykiss*
Priority Area	Occurrence/Migration
Site Name	Simons Creek
Accuracy	NA
Notes	LLID: 1223168472246, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	41179
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	Simons Creek
Accuracy	NA
Notes	LLID: 1223168472246, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	41177
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Wetlands	
Priority Area	Aquatic Habitat
Site Name	COMMENCEMENT BAY TRIBUTARY WETLANDS
Accuracy	1/4 mile (Quarter Section)
Notes	VARIOUS WETLANDS ASSOCIATED WITH SMALL COMMENCEMENT BAY OF SOUTH PUGET SOUND TRIBUTARIES INCLUDING HYLEBOS AND WAPATO CREEK DRAINAGES.
Source Record	902561
Source Dataset	PHSREGION
Source Name	NAUER, DON WDW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons



Waterfowl Concentrations

Priority Area	Regular Concentration
Site Name	PIERCE COUNTY - FARM
Accuracy	1/4 mile (Quarter Section)
Notes	SMALL WATERFOWL CONCENTRATION AREAS, AGRICULTURAL.
Source Record	902563
Source Dataset	PHSREGION
Source Name	NAUER, DON WDW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Western Pond Turtle

Scientific Name	*Actinemys marmorata*
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
State Status	Endangered
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	QTR-TWP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00025

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necesssary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

Appendix B5. WDFW and NWIFC SWIFD Map

Subject Property Location

8/24/2023, 12:21:47 PM

🟥 Pierce - Parcels _Query result

— All SalmonScape Species

1:4,514

County of King, Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, USDA, WDFW

Appendix B6. Puyallup Steam and Wetland Inventory

Appendix B7. Pierce County Stream and Wetland Inventory

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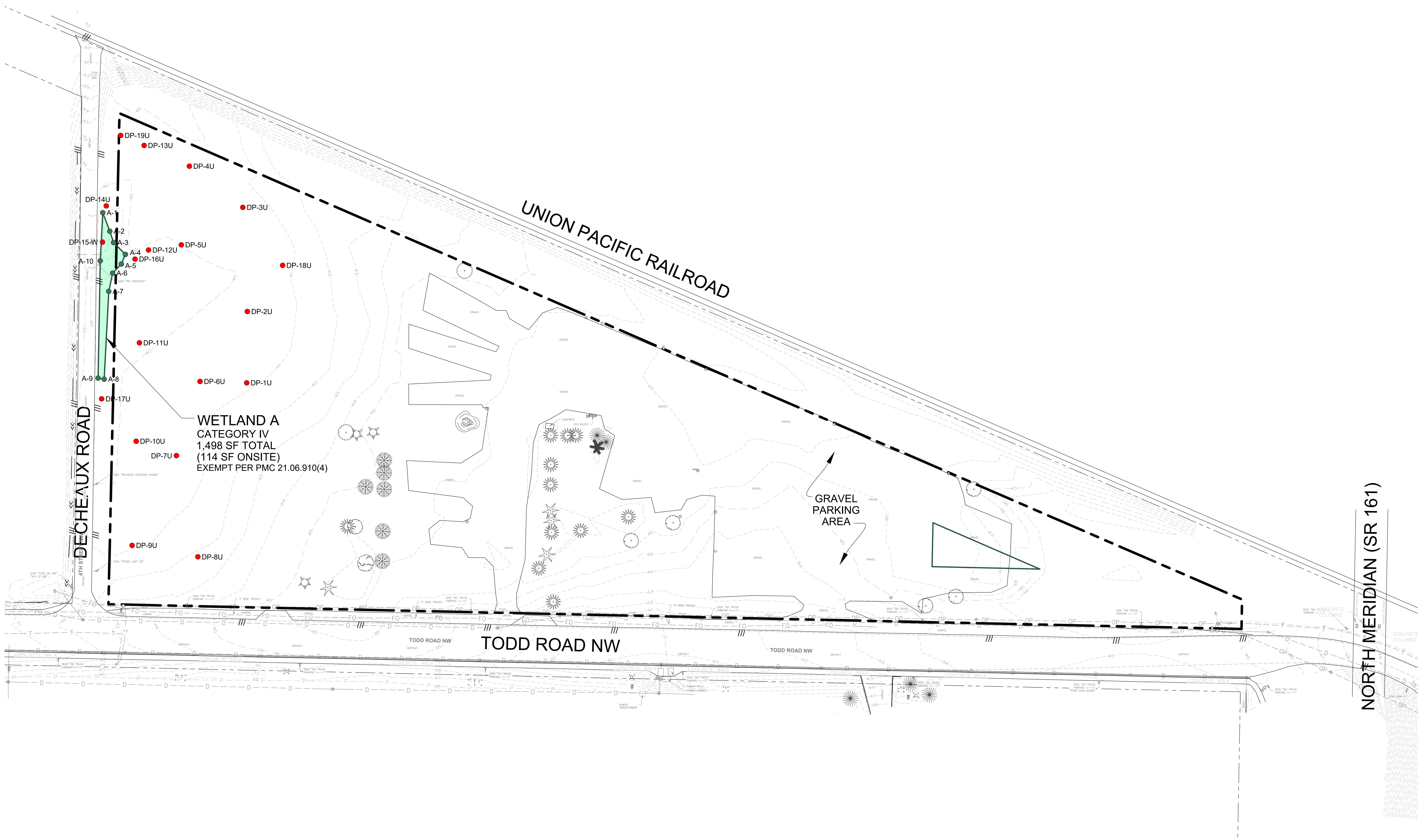
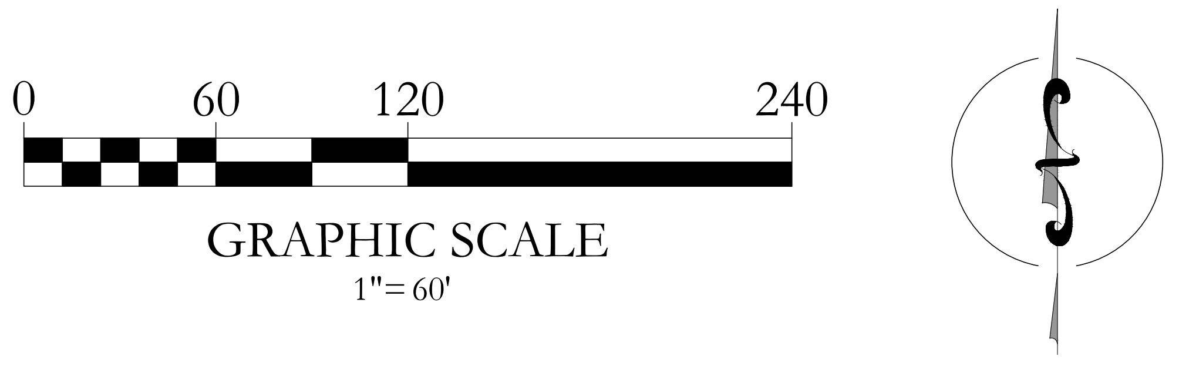
Appendix B8. USFWS NWI Map

Appendix C – Existing Conditions Exhibit

EXISTING CONDITIONS



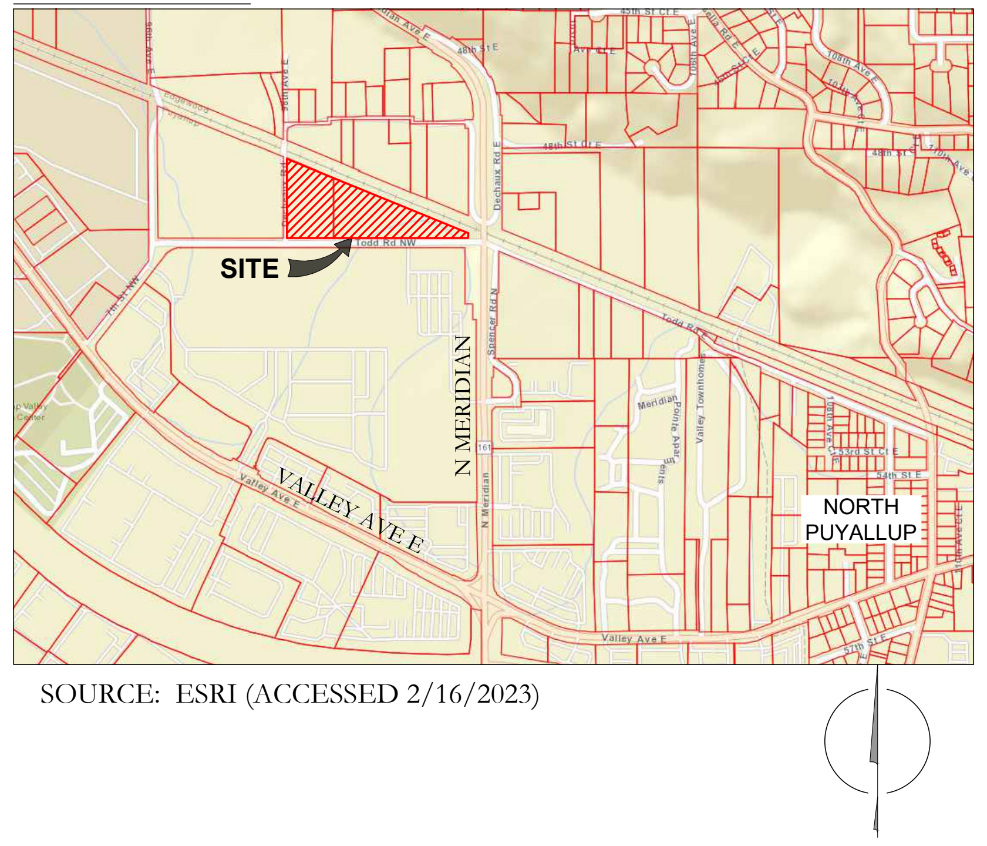


GRAPHIC SCALE
1"= 60'

PLAN LEGEND

— — - —	PROPERTY LINE
🟩	EXISTING WETLAND BOUNDARY
● W-#	WETLAND FLAG LOCATION
● DP-#	DATA PLOT LOCATION
- - - -	EXISTING CONTOUR

VICINITY MAP



SOURCE: ESRI (ACCESSED 2/16/2023)

LOCATION

THE SW ¼ OF SECTION 21,
TOWNSHIP 20N, RANGE 04E, WM

APPLICANT/OWNER

NAME: TRAMMELL CROW
ADDRESS: 600 UNIVERSITY STREET, SUITE 2912
SEATTLE, WA 98101
CONTACT: ALEX GARCIA MENDOZA
PHONE: (206) 694-5836
E-MAIL: AGARCIAMENDOZA@TRAMMELLCROW.COM

ENVIRONMENTAL CONSULTANT

SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WA 98355
(253) 514-8952

SHEET INDEX

SHEET NUMBER	SHEET TITLE
1	EXISTING CONDITIONS
2	EXISTING CONDITIONS (AERIAL)

SOURCE:

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
P. 253.514.8952
F. 253.514.8954
WWW.SOUNDVIEWCONSULTANTS.COM

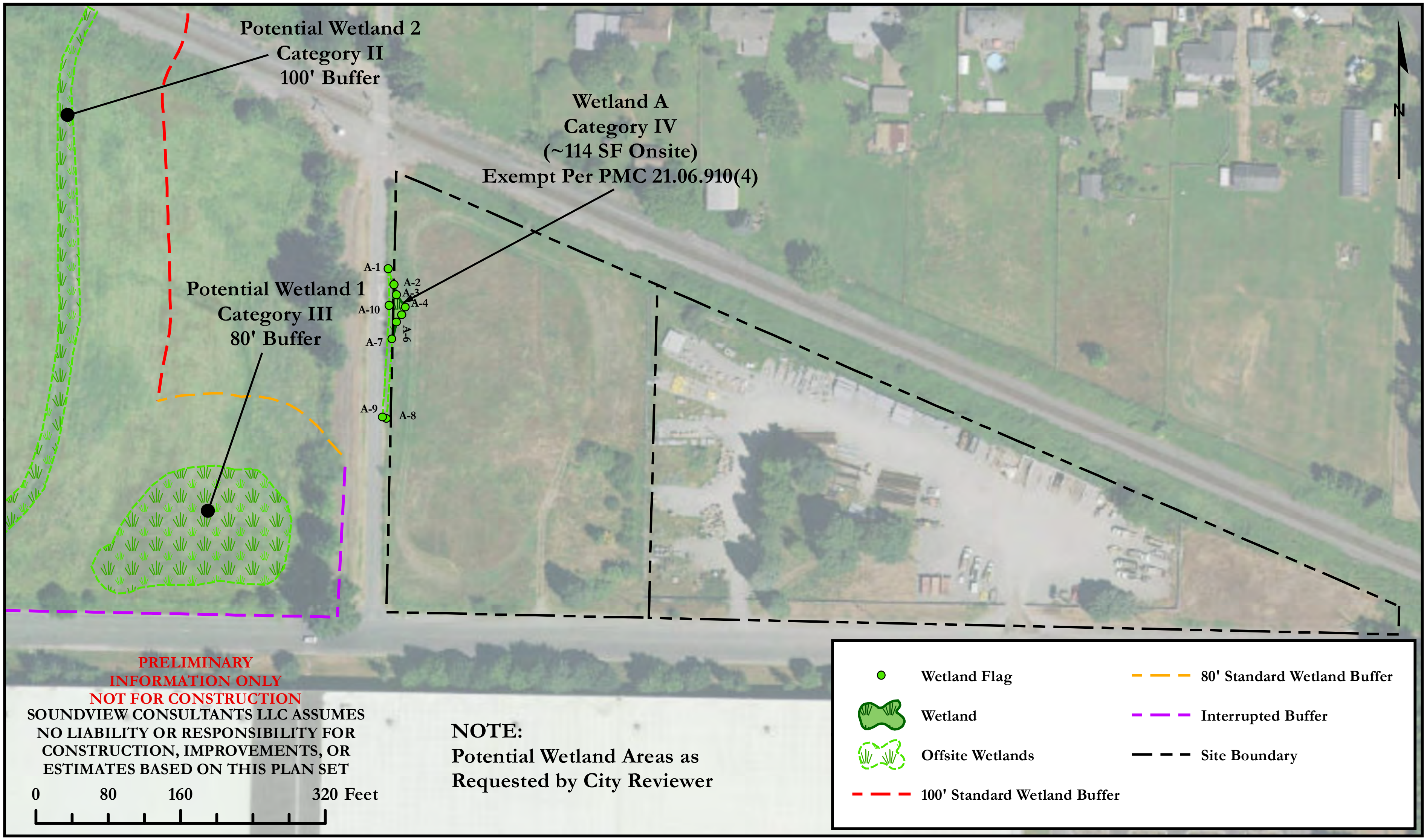
PSE TODD ROAD
325 TODD ROAD NW
PUYALLUP, WA 98371

PIERCE COUNTY
PARCEL NUMBERS:
0420211030

DATE: 08/24/2023
JOB: 1520.0006
BY: MW
SCALE: AS SHOWN
SHEET: 1

S:\CURRENT\1520 Trammell Crow\1520.0006 PSE Todd Road\Graphics & Maps\CAD\A - CURRENT SVC DRAWINGS\A - Current Base DWGs\1520.0006 (2023-08) base.dwg
Plotted August 24, 2023

EXISTING CONDITIONS



PRELIMINARY
INFORMATION ONLY
NOT FOR CONSTRUCTION
SOUNDVIEW CONSULTANTS LLC ASSUMES
NO LIABILITY OR RESPONSIBILITY FOR
CONSTRUCTION, IMPROVEMENTS, OR
ESTIMATES BASED ON THIS PLAN SET

NOTE:
Potential Wetland Areas as
Requested by City Reviewer

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
2907 Harborview Dr., Suite D, Gig Harbor, WA 98335
Phone: (253) 514-8952 Fax: (253) 514-8954
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PSE TODD ROAD

325 & 221 TODD ROAD NW
PUYALLUP, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420211002 & 0420211012

DATE: 12/20/2023
JOB: 1520.0006
BY: DDS
SCALE: 1 " = 160 '
FIGURE NO. 1

Appendix D – Data Forms

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

Project/Site: 1520.0006 PSE Todd Road City/County: Pierce Sampling Date: 2/1/2024 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-1

Investigator(s): A. Callender / M. DeCaro/ Casey Lanier Section, Township, Range: 47/4E/20N

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.212955 Long: -122.297979 Datum: WGS 84

Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: NA

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

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

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

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

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

Remarks:
No wetland criteria met. DP-1 is located centrally on the western parcel, to the east of Wetland A.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Dactylis glomerata	100	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	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% (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	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	100 (A)		400 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met.

SOIL

Sampling Point: DP-1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 4/2	100	-	-	-	-	FnSaLo	No mottles
6 - 18	10YR 5/3	98	7.5YR 4/6	2	C	M	SiLo	Mottles; relic features
18 - 20	10YR 5/2	90	7.5YR 4/6	10	C	M	SiLo	Mottles; relic features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Soils assessed in 2016.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☐ No ☒ Depth (inches): None
Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrolgoy criteria met in 2016 or 2024. No hydrology observed to 17-inches during February 2024 site investigation.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016
Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-2
Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5
Subregion (LRR): A2 Lat: 47.213179 Long: -122.298187 Datum: WGS 84
Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: NA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-2 is located on the western potion of the subject property to the east of Wetland A.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Phalaris arundinacea	84	Yes	FACW
2. Agrostis capillaris	10	No	FAC
3. Galium aparine	4	No	FACU
4. Cirsium sp.	2	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 5/3	100	-	-	-	-	SaLo	Sandy loam
4 - 8	10YR 4/2	100	-	-	-	-	SaLo	Sandy loam
8 - 18	10YR 4/2	99	10YR 4/6	1	C	M	SaLo	Sandy loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except 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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria 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 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): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary or secondary indicators observed during October 2015 site visit. No hydrology observed to 14-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-3

Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.213275 Long: -122.298651 Datum: WGS 84

Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: NA

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

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

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

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

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

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-3 is located on the northwestern potion of the subject property to the east of Wetland A.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Agrostis capillaris	50	Yes	FAC
2. Phalaris arudinacea	25	Yes	FACW
3. Poa pratensis	18	No	FAC
4. Ranunculus repens	6	No	FAC
5. Cirsium sp	1	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 2 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = __________

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-3

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 4/3	100	-	-	-	-	SaLo	Sandy loam
4 - 8	10YR 4/2	95	10YR 4/4	5	C	M	SaLo	Sandy loam; relict redox features
8 - 20	10YR 5/2	95	7.5YR 5/6	5	C	M	SaLo	Sandy loam; relict redox features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict, hard concentrations.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary indicators observed during October 2015 site visit, and only one secondary indicator met (FAC-Neutral Test). No hydrology observed to 15-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-4

Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.213374 Long: -122.298355 Datum: WGS 84

Soil Map Unit Name: Sultan Silt Loam NWI classification: NA

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

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

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

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

Hydrophytic Vegetation Present? Yes ☒ No ☐
Hydric Soil Present? Yes ☐ No ☒
Wetland Hydrology Present? Yes ☐ No ☒

Is the Sampled Area within a Wetland? Yes ☐ No ☒

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-4 is located on the northwestern potion of the subject property to the northeast of Wetland A.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Agrostis capillaris	75	Yes	FAC
2. Phalaris arundinacea	10	No	FACW
3. Poa pratensis	10	No	FAC
4. Ranunculus repens	3	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	98 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-4

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0 - 8	10YR 4/3	100	-	-	-	-	SaLo	Sandy loam
8 - 14	10YR 4/2	95	7.5YR 4/6	5	C	M	SaLo	Sandy loam; relict redox features
14 - 18	10YR 5/2	80	7.5YR 5/6	20	C	M	SaLo	Sandy loam; relict redox features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict features along old root channels.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☐ No ☒ Depth (inches): None
Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary indicators observed during October 2015 site visit, and only one secondary indicator met (FAC-Neutral Test). No hydrology observed to 16-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-5

Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.213254 Long: -122.29841 Datum: WGS 84

Soil Map Unit Name: Sultan Silt Loam NWI classification: NA

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

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

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

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

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

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-5 is located on the western central potion of the subject property to the east of Wetland A.**

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus armeniacus	2	Yes	FAC
2.			
3.			
4.			
5.			
= Total Cover	2		
Herb Stratum (Plot size: 10 ft)			
1. Phalaris arundinacea	98	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	98		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 2

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		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-5

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 4/3	100	-	-	-	-	SaLo	Sandy loam
2 - 14	10YR 4/2	85	10YR 4/6	15	C	M	SaLo	Sandy loam; relict redox features
14 - 18	10YR 5/2	75	7.5YR 5/6	25	C	M	SiLo	Silty loam; relict redox features

[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: None
Depth (inches): -

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict, hard concretions with sharp edges.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☐ No ☒ Depth (inches): None
Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

No wetland hydrology criteria met. No primary indicators observed during October 2015 site visit, and only one secondary indicator met (FAC-Neutral Test). No hydrology observed to 13-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-6

Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): ____

Subregion (LRR): A2 Lat: 47.212944 Long: -122.298446 Datum: WGS84

Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: NA

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

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes ☒ No ☐

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

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

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

Remarks: **No wetland criteria met. DP-6 is located on the south western potion of the subject property to the southeast of Wetland A.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Dactylis glomerata	100	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	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% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met.

SOIL

Sampling Point: DP-6

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 - 4	10YR 4/2	100	-	-	-	-	SiLo	Silty loam
4 - 8	10YR 4/3	100	-	-	-	-	SiLo	Silty loam
8 - 18	10YR 5/2	99	10YR 5/4	1	C	M	SiLo	Silty loam; relict redox features

[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: None
Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:
No hydric soil criteria met. Redox features observed were relict, hard concretions.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:
Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☐ No ☒ Depth (inches): None
Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:
No wetland hydrology criteria met. No primary or secondary indicators observed during October 2015 site visit. No hydrology observed to 14-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-7

Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.212738 Long: -122.298457 Datum: WGS 84

Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: NA

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

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

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

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

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

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-7 is located on the south western potion of the subject property to the southeast of Wetland A.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-7

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 - 7	10YR 5/3	100	-	-	-	-	SaLo	Sandy loam
7 - 14	10YR 4/2	95	10YR 4/6	5	C	M	SaLo	Sandy loam; relict redox features
14 - 20	10YR 5/2	80	7.5YR 5/6	20	C	M	SiLo	Silty loam; relict redox features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict, hard concretions and features along old root channels.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary or secondary indicators observed during October 2015 site visit. No hydrology observed to 16-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016
Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-8
Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5
Subregion (LRR): A2 Lat: 47.212529 Long: -122.298533 Datum: WGS 84
Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: NA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-8 is located on the south western potion of the subject property to the southeast of Wetland A.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 10 ft)			
1. Agrostis capillaris	80	Yes	FAC
2. Dactylis glomerata	18	No	FACU
3. Cirsium sp	1	No	FAC
4. Rumex crispus	1	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-8

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 4/3	100	-	-	-	-	SiLo	Silty loam
12 - 20	10YR 5/2	85	7.5YR 5/6	15	C	M	SiLo	Silty loam; relict redox features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict, hard concretions.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☐ No ☒ Depth (inches): None
Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary or secondary indicators observed during October 2015 site visit. No hydrology observed to 16-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016
Applicant/Owner: Trammel Crow/ Alex Garcia Mendoz State: WA Sampling Point: DP-9
Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5
Subregion (LRR): A2 Lat: 47.212568 Long: -122.298779 Datum: WGS 84
Soil Map Unit Name: Sultan Silt Loam NWI classification: NA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ☒ No ☐
Hydric Soil Present? Yes ☐ No ☒
Wetland Hydrology Present? Yes ☐ No ☒

Is the Sampled Area within a Wetland? Yes ☐ No ☒

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-9 is located on the south western corner of the subject property to the south of Wetland A.**

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 10 ft)			
1. Poa pratensis	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-9

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 - 4	10YR 4/3	100	-	-	-	-	SiLo	SiLo
4 - 18	10YR 5/2	70	10YR 5/6	30	C	M	SiLo	Silty loam; relict redox features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict, hard concretions.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? Yes ☐ No ☒ Depth (inches): None
(includes capillary fringe)

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

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

Remarks:

No wetland hydrology criteria met. No primary or secondary indicators observed during October 2015 site visit. No hydrology observed to 15-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-10

Investigator(s): A. Cal lender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.212811 Long: -122.298752 Datum: WGS 84

Soil Map Unit Name: Sultan Silt Loam NWI classification: NA

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

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

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

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

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

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-10 is located on the south western areaof the subject property to the south of Wetland A.**

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 10 ft)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-10

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 4/3	100	-	-	-	-	SiLo	Silty loam
12 - 18	10YR 5/2	70	10YR 5/6	30	C	M	SiLo	Silty loam; relict redox features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict, hard concretions.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary indicators observed during October 2015 site visit, and only one secondary indicator met (FAC-Neutral Test). No hydrology observed to 15-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/Pierce Sampling Date: 1/5/2023 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-11

Investigator(s): A. Cal lender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.212811 Long: -122.298752 Datum: WGS 84

Soil Map Unit Name: Sultan Silt Loam NWI classification: NA

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

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

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

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

Hydrophytic Vegetation Present? Yes ☒ No ☐
Hydric Soil Present? Yes ☐ No ☒
Wetland Hydrology Present? Yes ☐ No ☒

Is the Sampled Area within a Wetland? Yes ☐ No ☒

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-11 is located near the western edge of the subject property to the east of wetland A.**

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 10 ft)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-11

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 14	10YR 4/3	100	-	-	-	-	SiLo	Silty loam
14 - 18	5YR 4/1	100	-	-	-	-	SiLo	Silty loam
18 - 22	10YR 5/1	70	7.5YR 4/4	30	C		SiLo	Silty loam; relict redox features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict, hard concretions.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☐ No ☒ Depth (inches): None
Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary indicators observed during October 2015 site visit, and only one secondary indicator met (FAC-Neutral Test). No hydrology observed to 16-inches below ground surface during January 2023 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 12/8/2023 and 10/5/2016
Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-12
Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5
Subregion (LRR): A2 Lat: 47.213272 Long: -122.298632 Datum: WGS 84
Soil Map Unit Name: Sultan Silt Loam NWI classification: NA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation present. DP-12 is located on the western central potion of the subject property to the east of Wetland A.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-12

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0 - 12	10YR 4/3	100	-	-	-	-	SiLo	Silty loam
12 - 22	10YR 4/1	100	-	-	-	-	SiLo	Silty loam

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

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

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

Indicators for Problematic Hydric Soils[3]:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: None
Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria 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 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): None
Water Table Present? Yes ☐ No ☒ Depth (inches): None
Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary or secondary indicators observed during October 2015 site visit. No hydrology observed to 14-inches below ground surface during December 2023 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/1/2024 and 10/5/2016

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-13

Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.212738 Long: -122.298457 Datum: WGS 84

Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: NA

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

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

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

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

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

Remarks: **Not all three wetland criteria met; only hydrophytic vegetation criteria met. DP-13 is located near the northwest corner of the subject property to the northeast of wetland A.**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Agrostis capillaris	65	Yes	FAC
2. Phalaris arundinacea	20	Yes	FACW
3. Poa pratensis	10	No	FAC
4. Ranunculus repens	3	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	98 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

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	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

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

☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-13

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

Depth (inches)	Matrix		Redox Features					
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 4/3	90	2.5YR 3/3	10	C	M	SaLo	Sandy loam; relict redox features
6 - 12	10YR 4/2	90	7/5YR 4/6	10	C	M	SaLo	Sandy loam; relict redox features
12 - 18	10YR 5/2	70	7.5YR 5/6	30	C	M	SaLo	Sandy loam; relict redox features

[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: None

Depth (inches): -

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

No hydric soil criteria met. Redox features observed were relict, hard concretions.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary or secondary indicators observed during October 2015 site visit. No hydrology observed to 15-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup/ Pierce Sampling Date: 2/14/2018 & 1/5/2023

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-14

Investigator(s): A. Callender / M. DeCaro/ C. Lanier Section, Township, Range: 21 / 20N / 04E

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <5

Subregion (LRR): A2 Lat: 47.212738 Long: -122.298457 Datum: WGS 84

Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: NA

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

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

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

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

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

Remarks:
Not all three wetland criteria observed; no wetland hydrology present. Upland plot to Wetland A.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus armeniacus	5	Yes	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Ranunculus repens	75	Yes	FAC
2. Holcus lanatus	20	Yes	FAC
3. Trifolium repens	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	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% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria met through the dominance test.

SOIL

Sampling Point: DP-14

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	98	5YR 3/4	2	C	PL	SiLo	Silty loam
4 - 11	10YR 3/2	95	5YR 3/4	5	C	M/PL	SiLo	Silty loam
11 - 16+	10YR 5/2	95	7.5YR 4/6	5	C	M	SiLo	Silty loam

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

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

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

Indicators for Problematic Hydric Soils[3]:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: None

Depth (inches): -

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

Hydric soil criteria met through indicators A11 and F6.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☒ No ☐ Depth (inches): 15
Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 13

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

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

Remarks:

No wetland hydrology criteria met.
No evidence of groundwater within 16 inches of the soil surface during revisit on 1/5/2023 under normal wet season hydrologic conditions.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup / Pierce Sampling Date: 2/14/2018 & 1/5/2023

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-15

Investigator(s): Richard Peel, Kyla Caddey Section, Township, Range: 21 / 20N / 04E

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

Subregion (LRR): A2 Lat: 47.213301 Long: -122.29882291 Datum: WGS 84

Soil Map Unit Name: Sultan Silt Loam NWI classification: N/A

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 ☐

Hydric Soil Present? Yes ☒ No ☐

Wetland Hydrology Present? Yes ☒ No ☐

Is the Sampled Area within a Wetland? Yes ☒ No ☐

Remarks:
Wetland A plot. All three wetland criteria were observed.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 5 ft)			
1. Juncus effusus	30	Yes	FACW
2. Ranunculus repens	25	Yes	FAC
3. Holcus lanatus	25	Yes	FAC
4. Trifolium repens	15	No	FAC
5. Daucus carota	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 criteria observed through the dominance test.

SOIL

Sampling Point: DP-15

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 4/1	93	7.5YR 4/6	7	C	M,PL	SiLo	Silty loam
8 - 18	10YR 4/1	90	7.5YR 4/6	10	C	M,PL	SiLo	Silty loam

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

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

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

Indicators for Problematic Hydric Soils[3]:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: ________________

Depth (inches): ________________

Hydric Soil Present? Yes ☒ **No** ☐

Remarks:

Hydric soil criteria observed through indicator F3.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☒ No ☐ Depth (inches): 7 / 13
Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): Surface / 9

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

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

Remarks:

Hydrologic criteria observed through primary indicators A2 and A3 and secondary indicators B10, C9, and D2.
Water table observed at 13" BGS and saturation at 9" BGS during revisit on 1/5/2023 under normal wet season hydrologic conditions.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup / Pierce Sampling Date: 2/14/2018 & 1/5/2023
Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-16
Investigator(s): Richard Peel, Kyla Caddey Section, Township, Range: 21 / 20N / 04E
Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Convex Slope (%): 0
Subregion (LRR): A2 Lat: 47.213244 Long: -122.29870001 Datum: WGS 84
Soil Map Unit Name: Sultan Silt Loam NWI classification: N/A
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 ☐
Hydric Soil Present? Yes ☐ No ☒
Wetland Hydrology Present? Yes ☐ No ☒

Is the Sampled Area within a Wetland? Yes ☐ No ☒

Remarks: Upland plot to Wetland A. Not all three wetland criteria observed; only hydrophytic vegetation present. Data collected in mowed agricultural field.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 5 ft)			
1. Alopecurus pratensis	25	Yes	FAC
2. Agrostis capillaris	25	Yes	FAC
3. Holcus lanatus	25	Yes	FAC
4. Trifolium repens	15	No	FAC
5. Ranunculus repens	10	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	100		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
☐ 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 observed through the dominance test; however, vegetation observed consisted of FAC species typical of upland fields.

SOIL

Sampling Point: DP-16

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 - 10	10YR 3/2	98	10YR 3/4	2	C	M	SiLo	Silty loam
10 - 16	10YR 3/2	100	-	-	-	-	SiLo	Silty loam

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

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

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

Indicators for Problematic Hydric Soils[3]:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:
Depth (inches):

Hydric Soil Present? Yes ☐ **No** ☒

Remarks:

No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☐ No ☒ Depth (inches): None
Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No hydrologic criteria observed.
No evidence of groundwater within 16 inches of the soil surface during revisit on 1/5/2023 under normal wet season hydrologic conditions.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup / Pierce Sampling Date: 02/14/2018 and 2/1/2024
Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-17
Investigator(s): Emily Swaim, Richard Peel Section, Township, Range: 21 / 20N / 04E
Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Concave Slope (%): 0
Subregion (LRR): A2 Lat: 47.212887 Long: -122.29881423 Datum: WGS 84
Soil Map Unit Name: Sultan Silt Loam NWI classification: N/A
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 plot to Wetland A. Not all three wetland criteria observed. Data collected in mowed agricultural field.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Holcus lanatus	50	Yes	FAC
2. Trifolium pratense	30	Yes	FACU
3. Ranunculus repens	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	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: 67% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 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 observed through dominance test; however, vegetation observed consisted of FAC-FACU species typical of upland fields.

SOIL

Sampling Point: DP-17

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 - 4	10YR 3/2	99	7.5YR 3/4	1	C	M,PL	SiLo	Silty loam
4 - 14	10YR 3/2	93	7.5YR 3/4	7	C	M,PL	SiLo	Silty loam
14 - 16	10YR 5/1	97	7.5YR 5/6	3	C	PL,M	SiCl	Silty clay

[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 criteria observed through indicator F6.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None
Water Table Present? Yes ☒ No ☐ Depth (inches): 15
Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 13

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

No hydrologic indicators observed.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup / Pierce Sampling Date: 02/14/2018 and 2/1/2024

Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-18

Investigator(s): Emily Swaim,Richard Peel, Casey Lanier Section, Township, Range: 21 / 20N / 04E

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

Subregion (LRR): A2 Lat: 47.213243 Long: -122.29810953 Datum: WGS 84

Soil Map Unit Name: Puyallup Fine Sandy Loam NWI classification: N/A

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 ☐
Hydric Soil Present? Yes ☐ No ☒
Wetland Hydrology Present? Yes ☐ No ☒

Is the Sampled Area within a Wetland? Yes ☐ No ☒

Remarks:
Not all three wetland criteria were observed; only hydrophytic vegetation present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Holcus lanatus	35	Yes	FAC
2. Trifolium repens	30	Yes	FAC
3. Agrostis capillaris	20	Yes	FAC
4. Ranunculus repens	15	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	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% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
☐ 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 observed through the dominance test; however, vegetation observed consisted of FAC species typical of upland fields.

SOIL

Sampling Point: DP-18

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 3/3	100	-	-	C	PL,M	SiLo	Silty loam
5 - 18	10YR 4/2	97	7.5YR 4/3	3	C	PL,M	SiLo	Silty loam; redox not distinct or prominent

[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 criteria observed. Redox concentrations are not distinct or prominent to meet indicators A11 or F3.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

No wetland hydrology criteria met. No primary or secondary indicators observed during February 208 site visit. No hydrology observed to 15-inches below ground surface during February 2024 site visit.

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

Project/Site: 1520.0006/ PSE Todd Road City/County: Puyallup / Pierce Sampling Date: 02/14/2018 and 2/1/2024
Applicant/Owner: Trammel Crow/ Alex Garcia Mendoza State: WA Sampling Point: DP-19
Investigator(s): Emily Swaim, Richard Peel, Casey Lanier Section, Township, Range: 21 / 20N / 04E
Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Concave Slope (%): 0
Subregion (LRR): A2 Lat: 47.213576 Long: -122.29878344 Datum: WGS 84
Soil Map Unit Name: Sultan Silt Loam NWI classification: N/A
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:
Not all three wetland criteria observed; only hydrophytic vegetation present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Trifolium repens	60	Yes	FAC
2. Ranunculus repens	40	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
☐ 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 observed through the dominance test; however, vegetation observed consisted of FAC species typical of upland fields..

SOIL

Sampling Point: DP-19

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/2	100	-	-	-	-	SiLo	Silty loam
8 - 15	10YR 3/2	98	10YR 3/4	2	C	PL,M	SiLo	Silty loam
15 - 18	10YR 4/2	97	7.5YR 4/6	3	C	PL,M	Silt	

[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 observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

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

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

Remarks:

No wetland hydrology criteria met. No primary or secondary indicators observed during February 208 site visit. No hydrology observed to 15-inches below ground surface during February 2024 site visit.

Appendix E – Wetland Rating Forms

RATING SUMMARY – Western Washington

Name of wetland (or ID #): A Date of site visit: 2/14/18 & 1/5/23

Rated by Richard Peel, Emily Swaim, Kyla Caddey Trained by Ecology? ✔ Yes ___No Date of training 3/2016 & 10/2016

HGM Class used for rating Depressional Wetland has multiple HGM classes? ___Y ✔ N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map ESRI ArcGIS

OVERALL WETLAND CATEGORY IV (based on functions ✔ or special characteristics___)

1. Category of wetland based on FUNCTIONS

_______**Category I** – Total score = 23 - 27
_______**Category II** – Total score = 20 - 22
_______**Category III** – Total score = 16 - 19
X **Category IV** – Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			Circle the appropriate ratings	
Site Potential	L	L	L	
Landscape Potential	M	M	L	
Value	H	M	L	**TOTAL**
Score Based on Ratings	6	5	3	14

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	N/A

Wetland name or number A

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

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

Riverine Wetlands

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

Lake Fringe Wetlands

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

Slope Wetlands

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

Wetland name or number A

HGM Classification of Wetlands in Western Washington

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

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

1. Are the water levels in the entire unit usually controlled by tides except during floods?

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

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

☐**NO – Saltwater Tidal Fringe (Estuarine)** ☐**YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒NO – go to 3 ☐**YES** – The wetland class is **Flats**

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

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

☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

☐The wetland is on a slope (*slope can be very gradual*),

☐The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

☐The water leaves the wetland **without being impounded**.

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

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

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

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

☐The overbank flooding occurs at least once every 2 years.

Wetland name or number A

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

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

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

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

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

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

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

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

Wetland name or number A

DEPRESSIONAL AND FLATS WETLANDS

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

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

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

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

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

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

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

NOTES and FIELD OBSERVATIONS:

Septic tank decommissioned, removed, and backfilled in 2018

Wetland name or number A

DEPRESSIONAL AND FLATS WETLANDS

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

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	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 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	0
Total for D 4 Add the points in the boxes above	5

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

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	0
Total for D 5 Add the points in the boxes above	2

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

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* 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 sub-basin that is immediately down-gradient of unit. points = 2 • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 Flooding from groundwater is an issue in the sub-basin. points = 1 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 There are no problems with flooding downstream of the wetland. points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	1

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

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

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

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

____Aquatic bed
__×__Emergent
____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
3 structures: points = 2
2 structures: points = 1
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 ¼ 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**

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

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

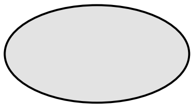
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species points = 2
5 - 19 species points = 1
< 5 species points = 0

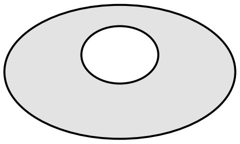
1

H 1.4. Interspersion of habitats

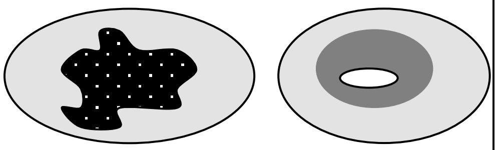
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always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



None = 0 points

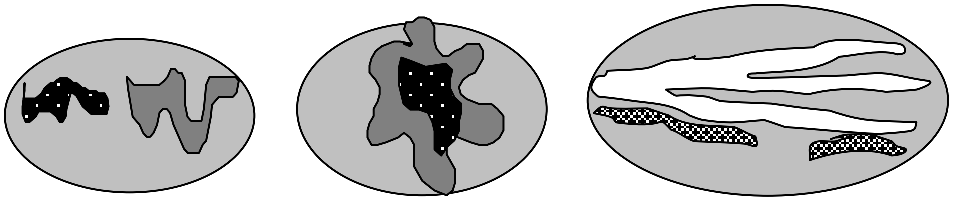


Low = 1 point



Moderate = 2 points

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



0

Wetland name or number A

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 ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* __×__Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	1
Total for H 1 — Add the points in the boxes above	3

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** _X_**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:* 0.00 % undisturbed habitat **+** [(% moderate and low intensity land uses) 0.83 /2] = 0.415 % If total accessible habitat is: $> {}^{1}/_{3}$ (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 3.52 % undisturbed habitat **+** [(% moderate and low intensity land uses) 26.07 /2] = 16.555 % Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	-1

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** _X_**< 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.* 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	0

Rating of Value If score is:___**2 = H** ___**1 = M** _X_**0 = L** *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: http://wdfw.wa.gov/conservation/phs/list/)

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

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

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **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.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.

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**

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 non-native plant species. (If non-native 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**

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**

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**

Wetland name or number A

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**

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**

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 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 is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category 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**

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**

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**

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**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

Wetland name or number A

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RATING SUMMARY – Western Washington

Name of wetland (or ID #): 1 Date of site visit: 12/2023

Rated by Jon Pickett Trained by Ecology? ✔ Yes ___No Date of training 11/2018

HGM Class used for rating Depressional Wetland has multiple HGM classes?___Y ✔ N

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

Source of base aerial photo/map ESRI ArcGIS

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

1. Category of wetland based on FUNCTIONS

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

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

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

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

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			Circle the appropriate ratings	
Site Potential	L	L	L	
Landscape Potential	M	M	L	
Value	H	H	M	**TOTAL**
Score Based on Ratings	6	6	4	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	**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	N/A

Wetland name or number 1

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

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

Riverine Wetlands

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

Lake Fringe Wetlands

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

Slope Wetlands

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

HGM Classification of Wetlands in Western Washington

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

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

1. Are the water levels in the entire unit usually controlled by tides except during floods?

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

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

☐**NO – Saltwater Tidal Fringe (Estuarine)** ☐**YES – Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒NO – go to 3 ☐**YES** – The wetland class is **Flats**

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

3. Does the entire wetland unit **meet all** of the following criteria?
   - ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   - ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   - ☐The wetland is on a slope (*slope can be very gradual*),
   - ☐The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   - ☐The water leaves the wetland **without being impounded**.

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

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   - ☐The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   - ☐The overbank flooding occurs at least once every 2 years.

Wetland name or number 1

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

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

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

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

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

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

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

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

Wetland name or number 1

DEPRESSIONAL AND FLATS WETLANDS

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

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

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

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

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

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

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

NOTES and FIELD OBSERVATIONS:

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

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

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	0
Total for D 5 Add the points in the boxes above	1

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

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* 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 sub-basin that is immediately down-gradient of unit. points = 2 • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 Flooding from groundwater is an issue in the sub-basin. points = 1 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 There are no problems with flooding downstream of the wetland. points = 0	2
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	2

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

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

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

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

____Aquatic bed — 4 structures or more: points = 4
_×_Emergent — 3 structures: points = 2
____Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points = 1
____Forested (areas where trees have > 30% cover) — 1 structure: points = 0
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

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 ¼ ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated — 4 or more types present: points = 3
____Seasonally flooded or inundated — 3 types present: points = 2
____Occasionally flooded or inundated — 2 types present: points = 1
_×_Saturated only — 1 type present: points = 0
____Permanently flowing stream or river in, or adjacent to, the wetland
____Seasonally flowing stream in, or adjacent to, the wetland
____**Lake Fringe wetland** — **2 points**
____**Freshwater tidal wetland** — **2 points**

0

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

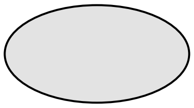
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species — points = 2
5 - 19 species — points = 1
< 5 species — points = 0

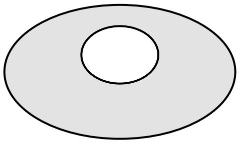
1

H 1.4. Interspersion of habitats

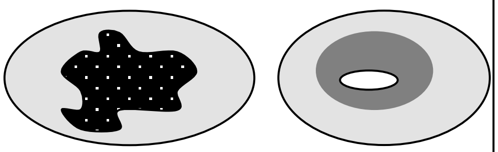
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always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



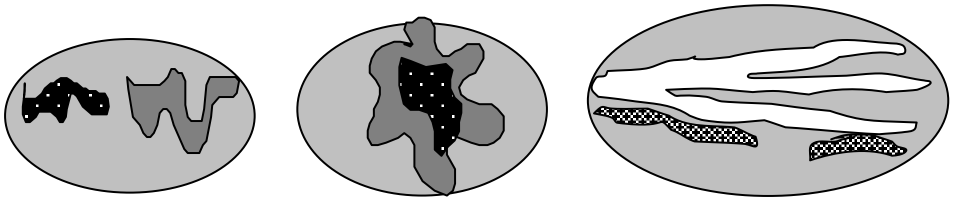
None = 0 points



Low = 1 point



Moderate = 2 points



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

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 ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____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:___**15-18 = H** ___**7-14 = M** _X_**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:* 0.00 % undisturbed habitat **+** [(% moderate and low intensity land uses) .68 /2] **=** 0.34 % If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 3.99 % undisturbed habitat **+** [(% moderate and low intensity land uses) 23.63 /2] **=** 15.805 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** _X_**< 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.* 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	1

Rating of Value If score is:___**2 = H** _X_**1 = M** ___**0 = L** *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: http://wdfw.wa.gov/conservation/phs/list/)

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

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

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

X **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

X **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

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

— **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.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.

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**

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 non-native plant species. (If non-native 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**

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**

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**

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**

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**

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 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 is larger than $^1/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category 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**

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**

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**

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**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

Wetland name or number 1

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RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland 2 Offsite Date of site visit: 12/2023

Rated by Jon Pickett Trained by Ecology? ✔ Yes ___No Date of training 10/2018

HGM Class used for rating Riverine Wetland has multiple HGM classes? ___Y ✔ N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map ESRI ArcGIS

OVERALL WETLAND CATEGORY II (based on functions ✔ or special characteristics___)

1. Category of wetland based on FUNCTIONS

_______**Category I** – Total score = 23 - 27
X **Category II** – Total score = 20 - 22
_______**Category III** – Total score = 16 - 19
_______**Category IV** – Total score = 9 - 15

FUNCTION	**Improving Water Quality**	**Hydrologic**	**Habitat**	
			Circle the appropriate ratings	
Site Potential	M	M	L	
Landscape Potential	H	M	L	
Value	H	H	H	**TOTAL**
Score Based on Ratings	8	7	5	20

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	N/A

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

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

Riverine Wetlands

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

Lake Fringe Wetlands

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

Slope Wetlands

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

Wetland name or number Wetland 2 Offsite

HGM Classification of Wetlands in Western Washington

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

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

1. Are the water levels in the entire unit usually controlled by tides except during floods?

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

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

☐**NO – Saltwater Tidal Fringe (Estuarine)** ☐**YES – Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒NO – go to 3 ☐**YES** – The wetland class is **Flats**

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

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

☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

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

☐The wetland is on a slope (*slope can be very gradual*),

☐The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

☐The water leaves the wetland **without being impounded**.

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

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

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

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

☒The overbank flooding occurs at least once every 2 years.

☐ 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.

We

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

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

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

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 cover >$^{3}/_{4}$ area of wetland Depressions cover > ½ area of wetland Depressions present but cover < ½ area of wetland No depressions present	 points = 8 points = 4 points = 2 points = 0	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 Trees or shrubs > $^{1}/_{3}$ area of the wetland Herbaceous plants (> 6 in high) > $^{2}/_{3}$ area of the wetland Herbaceous plants (> 6 in high) > $^{1}/_{3}$ area of the wetland Trees, shrubs, and ungrazed herbaceous < $^{1}/_{3}$ area of the wetland	 points = 8 points = 6 points = 6 points = 3 points = 0	6
Total for R 1	Add the points in the boxes above	8

Rating of Site Potential If score is:___**12-16 = H** _X_**6-11 = M** ___**0-5 = L** *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 No = 0	2
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	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 No = 0	1
R 2.4. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	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 Other sources ____________________	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	5

Rating of Landscape Potential If score is:_X_**3-6 = H** ___**1 or 2 = M** ___**0 = L** *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 No = 0	1
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	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 No = 0	0
Total for R 3	Add the points in the boxes above	2

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

Wetland name or number Wetland 2 Offsite

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 If the ratio is 10-20 points = 6 If the ratio is 5-<10 points = 4 If the ratio is 1-<5 points = 2 If the ratio is < 1 points = 1	2
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 OR emergent plants $>{}^{2}/_{3}$ area points = 7 Forest or shrub for $>{}^{1}/_{10}$ area OR emergent plants $>{}^{1}/_{3}$ area points = 4 Plants do not meet above criteria points = 0	7
Total for R 4 Add the points in the boxes above	9

Rating of Site Potential If score is:___**12-16 = H** _X_**6-11 = M** ___**0-5 = L** *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 No = 1	0
R 5.2. Does the up-gradient watershed include a UGA or incorporated area? Yes = 1 No = 0	1
R 5.3. Is the up-gradient stream or river controlled by dams? Yes = 0 No = 1	1
Total for R 5 Add the points in the boxes above	2

Rating of Landscape Potential If score is:___**3 = H** _X_**1 or 2 = M** ___**0 = L** *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 sub-basin immediately down-gradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0	2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for R 6 Add the points in the boxes above	2

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

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

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

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

____Aquatic bed 4 structures or more: points = 4
_×_Emergent 3 structures: points = 2
____Scrub-shrub (areas where shrubs have > 30% cover) 2 structures: points = 1
____Forested (areas where trees have > 30% cover) 1 structure: points = 0
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

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 ¼ ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated 4 or more types present: points = 3
_×_Seasonally flooded or inundated 3 types present: points = 2
____Occasionally flooded or inundated 2 types present: points = 1
____Saturated only 1 type present: points = 0
_×_Permanently flowing stream or river in, or adjacent to, the wetland
____Seasonally flowing stream in, or adjacent to, the wetland
____**Lake Fringe wetland** **2 points**
____**Freshwater tidal wetland** **2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

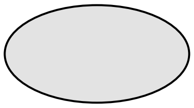
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species points = 2
5 - 19 species points = 1
< 5 species points = 0

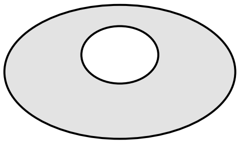
0

H 1.4. Interspersion of habitats

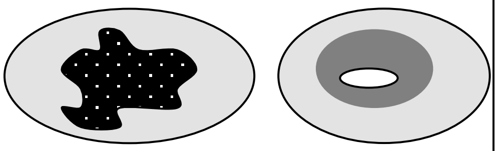
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always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



None = 0 points

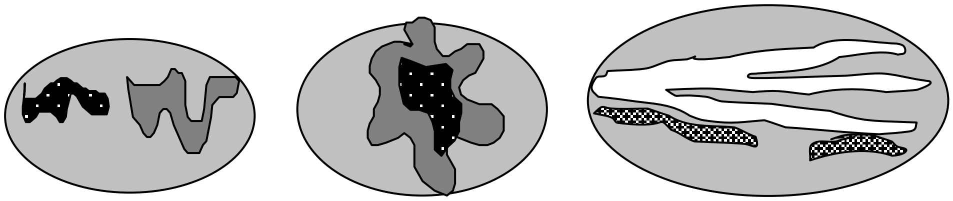


Low = 1 point



Moderate = 2 points

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



0

Wetland name or number ____Wetland 2 Offsite

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 ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)*

____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:____**15-18 = H** ____**7-14 = M** _X_**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: 0.00 % undisturbed habitat **+** [(% moderate and low intensity land uses) .68 /2] **=** 0.34 ____%

If total accessible habitat is:

> $^1/_3$ (33.3%) of 1 km Polygon	points = 3
20-33% of 1 km Polygon	points = 2
10-19% of 1 km Polygon	points = 1
< 10% of 1 km Polygon	points = 0

0

H 2.2. Undisturbed habitat in 1 km Polygon around the wetland.

Calculate: 3.99 % undisturbed habitat **+** [(% moderate and low intensity land uses) 23.63 /2] **=** 15.805 %

Undisturbed habitat > 50% of Polygon	points = 3
Undisturbed habitat 10-50% and in 1-3 patches	points = 2
Undisturbed habitat 10-50% and > 3 patches	points = 1
Undisturbed habitat < 10% of 1 km Polygon	points = 0

1

H 2.3. Land use intensity in 1 km Polygon: If

> 50% of 1 km Polygon is high intensity land use	points = (- 2)
≤ 50% of 1 km Polygon is high intensity	points = 0

-2

Total for H 2 Add the points in the boxes above -1

Rating of Landscape Potential If score is:____**4-6 = H** ____**1-3 = M** _X_**< 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.*

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:_X_**2 = H** ____**1 = M** ____**0 = L** *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: http://wdfw.wa.gov/conservation/phs/list/)

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

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

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

X **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

X **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

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

— **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.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type | **Category**

Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.

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**

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 non-native plant species. (If non-native 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**

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**

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**

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**

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**

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 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 is larger than $^1/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category 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**

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**

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**

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**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

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Appendix F – Wetland Rating Maps

COWARDIN MAP

NOTE: Potential Wetland Areas as Requested by City Reviewer

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions

2907 Harborview Dr., Suite D, Gig Harbor, WA 98335
Phone: (253) 514-8952 Fax: (253) 514-8954
www.soundviewconsultants.com

TODD ROAD

325 TODD ROAD NORTHWEST
PUYALLUP, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420211030

DATE: 12/13/2023
JOB: 1520.0006
BY: DDS
SCALE: 1 " = 220 '
FIGURE NO. 1 of 6

HYDROPERIOD MAP

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Phone: (253) 514-8952 Fax: (253) 514-8954
www.soundviewconsultants.com

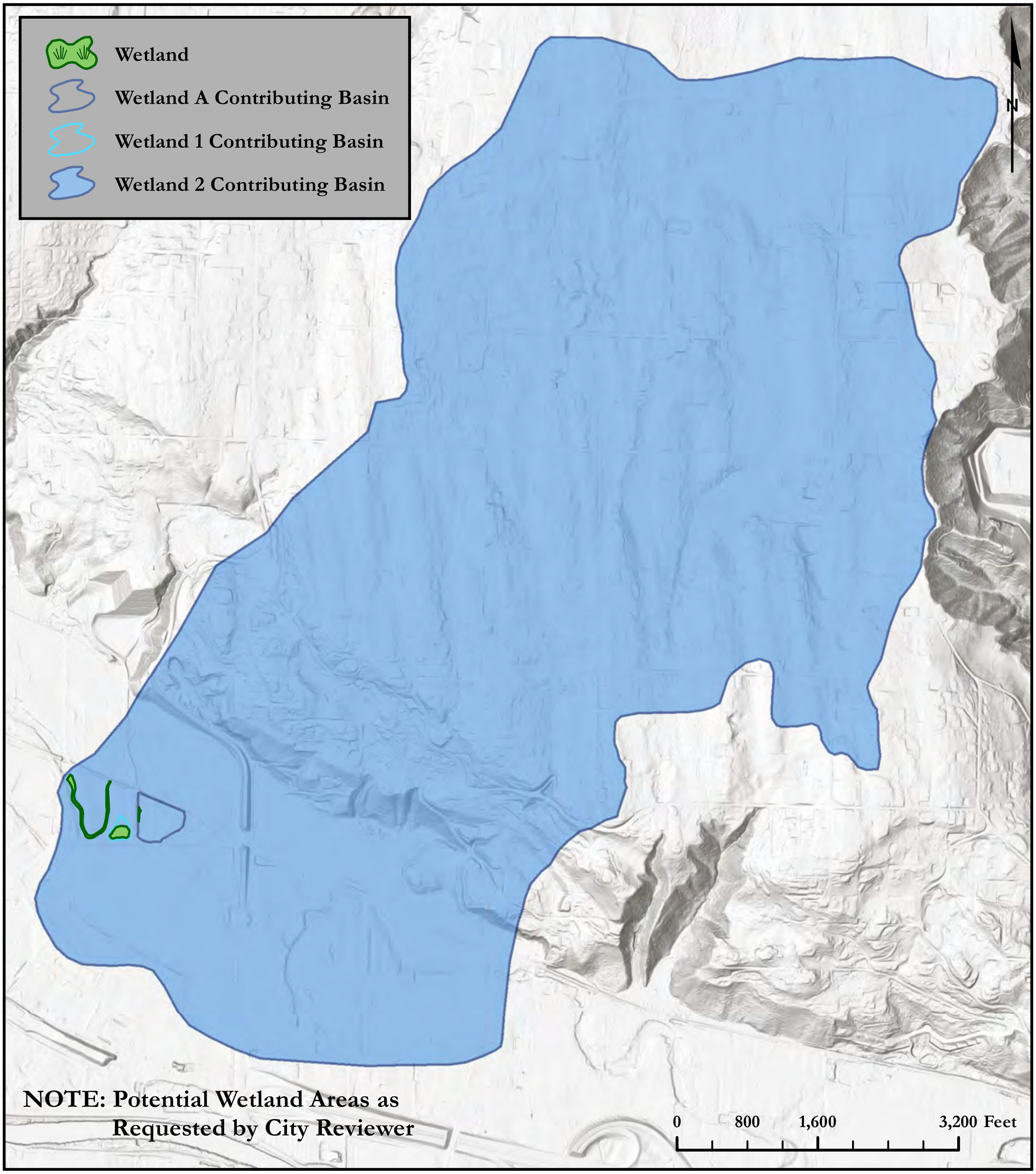
TODD ROAD

325 TODD ROAD NORTHWEST
PUYALLUP, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420211030

DATE: 12/13/2023
JOB: 1520.0006
BY: DDS
SCALE: 1 " = 170 '
FIGURE NO. 2 of 6

CONTRIBUTING BASIN MAP



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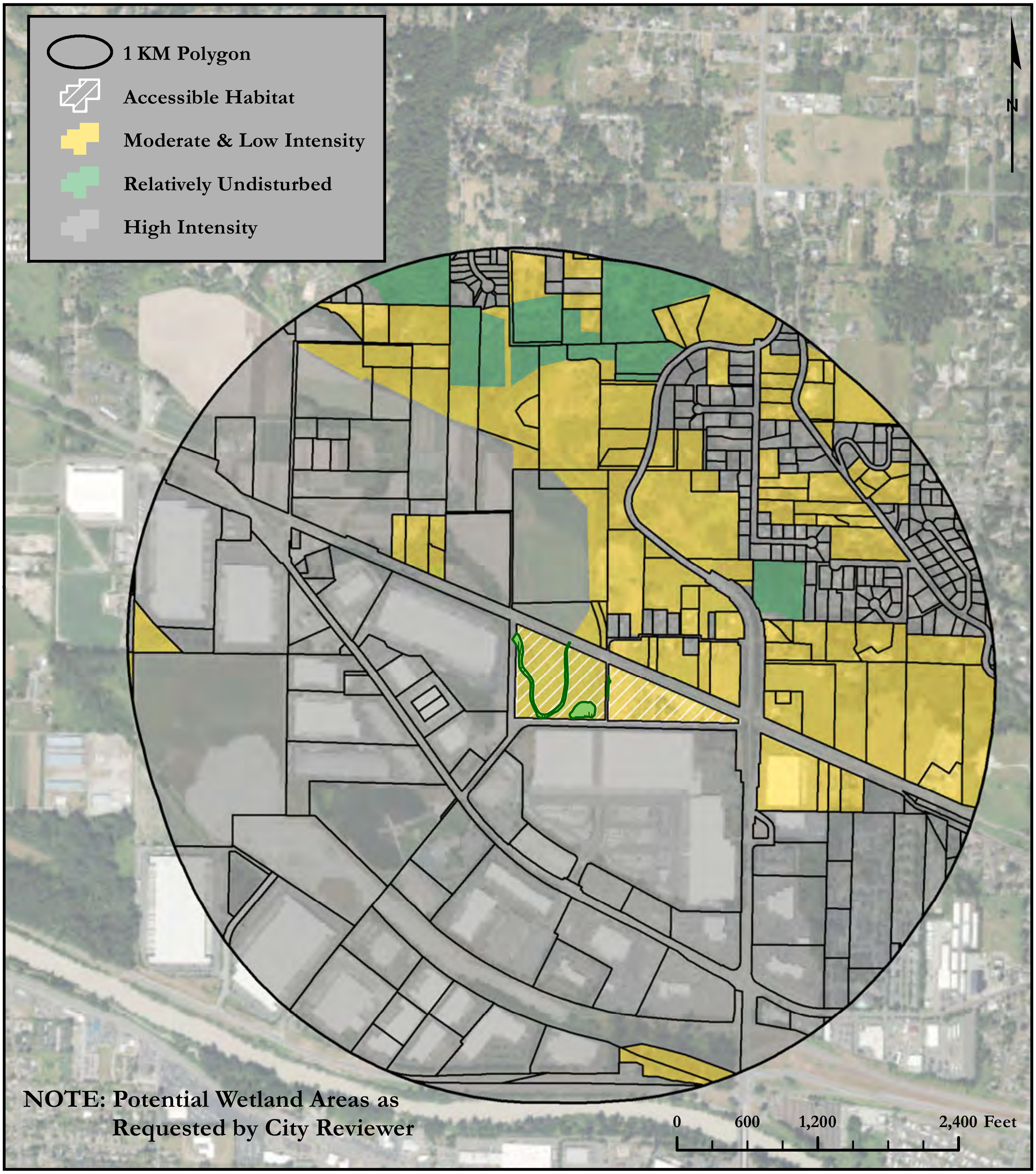
TODD ROAD

325 TODD ROAD NORTHWEST
PUYALLUP, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420211030

DATE: 12/13/2023
JOB: 1520.0006
BY: DDS
SCALE: 1 " = 1,600 '
FIGURE NO. 3 of 6

HABITAT MAP



NOTE: Potential Wetland Areas as Requested by City Reviewer

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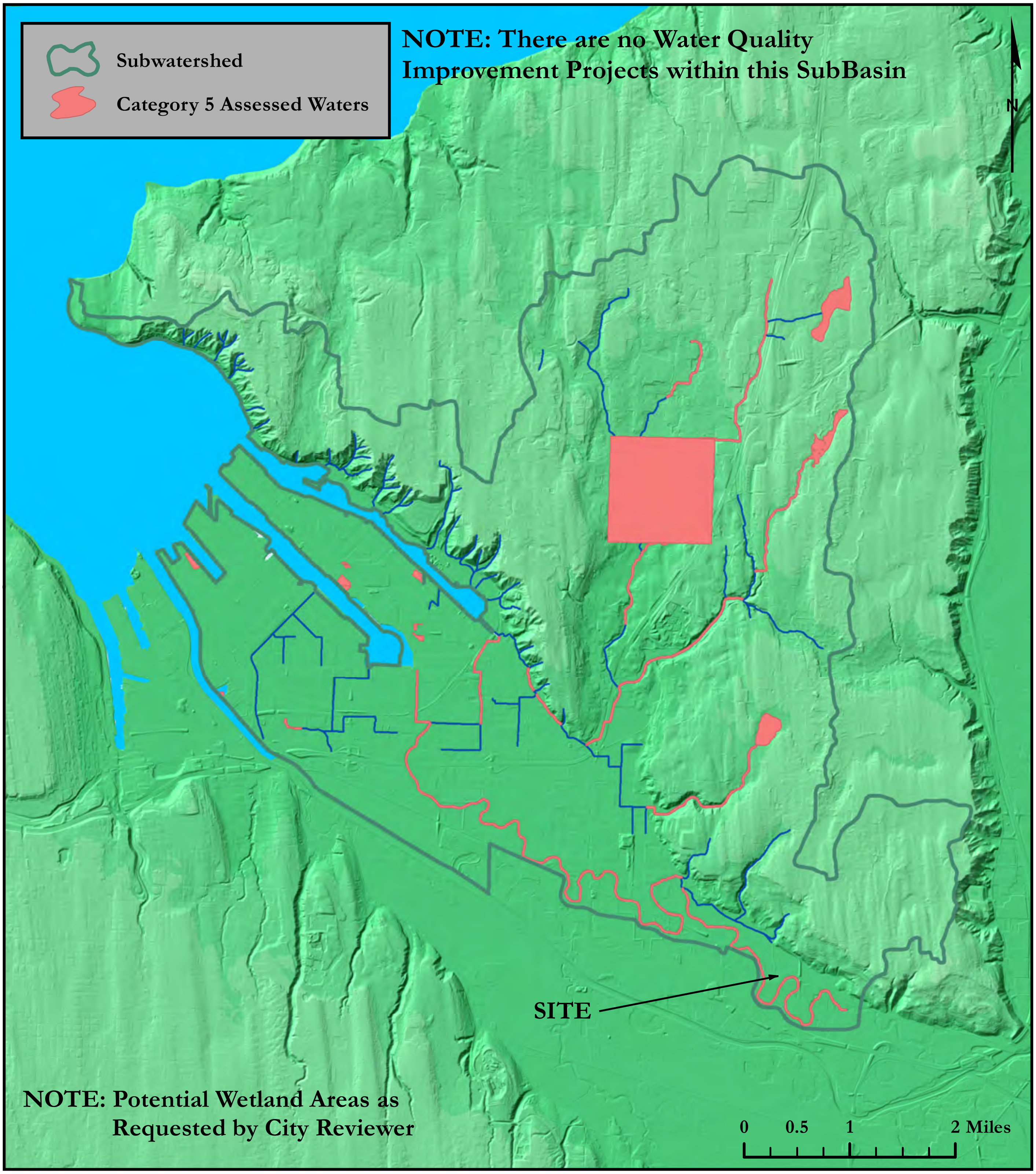
TODD ROAD

325 TODD ROAD NORTHWEST
PUYALLUP, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420211030

DATE: 12/13/2023
JOB: 1520.0006
BY: DDS
SCALE: 1 " = 1,200 '
FIGURE NO. 4 of 6

303(D) MAP



NOTE: There are no Water Quality Improvement Projects within this SubBasin

NOTE: Potential Wetland Areas as Requested by City Reviewer

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Phone: (253) 514-8952 Fax: (253) 514-8954
www.soundviewconsultants.com

TODD ROAD

325 TODD ROAD NORTHWEST
PUYALLUP, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420211030

DATE: 12/13/2023
JOB: 1520.0006
BY: DDS
SCALE: 1 " = 1 mi
FIGURE NO. 5 of 6

CONTRIBUTING BASIN AND HABITAT DATA

CONTRIBUTING BASIN DATA:

NOTE: Potential Wetland Areas as Requested by City Reviewer

D.4.0 - D.5.3		
	Area of Contributing Basin (SF)	209,948
	Area of Wetland A (SF)	1,131
	Percent of Wetland A within Contributing Basin	**0.539%**
	Is the area of Intensive Human Land Use within Contributing Basin for Wetland 1 Greater Than 25%	**NO**
	Area of Contributing Basin (SF)	41,507
	Area of Potential Offsite Wetland 1 (SF)	22,870
	Percent of Potential Offsite Wetland 1 within Contributing Basin	**55.099%**
	Is the area of Intensive Human Land Use within Contributing Basin for Potential Offsite Wetland 1 Greater Than 25%	**NO**
	Area of Contributing Basin (SF)	69,702,292
	Area of Potential Offsite Wetland 2 (SF)	37,733
	Percent of Potential Offsite Wetland 2 within Contributing Basin	**0.054%**
	Is the area of Intensive Human Land Use within Contributing Basin for Potential Offsite Wetland 1 Greater Than 25%	**YES**

HABITAT DATA:

H.2		
H.2.1	Wetland A	
	Abutting Undisturbed Habitat	0.00%
	Abutting Moderate & Low Intensity Land Uses	0.68%
	Accessible Habitat	**0.34%**
H.2		
H.2.1	Potential Offsite Wetlands 1 & 2	
	Abutting Undisturbed Habitat	0.00%
	Abutting Moderate & Low Intensity Land Uses	1.04%
	Accessible Habitat	**0.52%**
H.2.2	All Wetlands	
	Undisturbed Habitat	3.99%
	Moderate & Low Intensity Land Uses	23.63%
	Undisturbed Habitat in 1 KM Polygon	**15.80%**
H.2.3	All Wetlands	
	High Intensity Land Use in 1 KM Polygon	**72.38%**

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www.soundviewconsultants.com

TODD ROAD

325 TODD ROAD NORTHWEST
PUYALLUP, WA 98371

PIERCE COUNTY PARCEL NUMBERS:
0420211030

DATE: 12/13/2023
JOB: 1520.0006
BY: DDS
SCALE: NONE
FIGURE NO. 6 of 6

Appendix G – Qualifications

All field inspections, habitat assessments, wetland delineations, and supporting documentation, including this ***Wetland, Stream, and Fish and Wildlife Habitat Assessment*** prepared for the ***PSE Todd Road*** project were prepared by, or under the direction of Jon Pickett of SVC. In addition, the field investigations were performed by Garrett Jordan and Kyla Caddey, report preparation was completed by Kramer Canup, and additional project oversight and quality assurance / quality control was completed by Rachael Hyland.

Jon Pickett

Principal
Professional Experience: 15 years

Jon Pickett is a Principal and Senior Scientist with a diverse background in environmental and shoreline compliance and permitting, wetland and stream ecology, fish and wildlife biology, mitigation compliance and design, and environmental planning and land use due diligence. Jon oversees a wide range of large-scale industrial, commercial, and multi-family residential projects throughout Western Washington, providing environmental permitting and regulatory compliance assistance for land use entitlement projects from feasibility through mitigation compliance. Jon performs wetland, stream, and shoreline delineations and fish & wildlife habitat assessments; conducts code and regulation analysis and review; prepares reports and permit applications and documents; provides environmental compliance recommendation; and provides restoration and mitigation design.

Jon earned a Bachelor of Science degree in Natural Resource Sciences from Washington State University and Bachelor of Science and Minor in Forestry from Washington State University. Jon has received 40-hour wetland delineation training (Western Mountains, Valleys, & Coast and Arid West Regional Supplements) and regularly performs wetland, stream, and shoreline delineations. Jon is a Whatcom County Qualified Wetland Specialist and Wildlife Biologist and is a Pierce County Qualified Wetland Specialist. He has been formally trained by WSDOE in the use of the Washington State Wetland Rating System 2014, How to Determine the Ordinary High-Water Mark (Freshwater and Marine), Using Field Indicators for Hydric Soils, and the Using the Credit-Debit Method for Estimating Mitigation Needs.

Kyla Caddey, PWS, Certified Ecologist

Senior Environmental Scientist
Professional Experience: 8 years

Kyla Caddey is a Senior Environmental Scientist with a diverse background in stream and wetland ecology, wildlife ecology and conservation, wildlife and natural resource assessments and monitoring, and riparian habitat restoration at various public and private entities. Kyla has field experience performing in-depth studies in both the Pacific Northwest and Central American ecosystems which included various environmental science research and statistical analysis. Kyla has advanced expertise in federal- and state-listed endangered, threatened, and sensitive species surveys and assessment of aquatic and terrestrial systems throughout the Puget Sound region. She has completed hundreds of wetland delineations and has extensive knowledge and interest in hydric soil identification. As the senior writer, she provides informed project oversight and performs final quality assurance / quality control on various types of scientific reports for agency submittal, including: Biological Assessments/Evaluations; Wetland, Shoreline, and Fish and Wildlife Habitat Assessments; Mitigation Plans, and Mitigation Monitoring Reports. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; prepares scientific reports; and provides environmental permitting and regulatory compliance assistance to support a wide range of commercial, industrial, and multi-family residential land use projects.

Kyla earned a Bachelor of Science degree in Environmental Science and Resource Management from the University of Washington, Seattle with a focus in Wildlife Conservation and a minor in Quantitative Science. She has also completed additional coursework in Comprehensive Bird Biology from Cornell University. Ms. Caddey is a Certified Professional Wetland Scientist (PWS #3479) through the Society of Wetland Scientists and Certified Ecologist through the Ecological Society of America. She has received 40-hour wetland delineation training (Western Mtns, Valleys, & Coast and Arid West Regional Supplement), is a Pierce County Qualified Wetland Specialist and Wildlife Biologist, and is a USFWS-approved Mazama pocket gopher survey biologist. Kyla has been formally trained through the Washington State Department of Ecology, Coastal Training Program, and the Washington Native Plant Society in winter twig and grass, sedge, and rush identification for Western WA; Using the Credit-Debit Method in Estimating Wetland Mitigation Needs; How to Determine the Ordinary High Water Mark; Using Field Indicators for Hydric Soils; How to Administer Development Permits in Washington Shorelines; Puget Sound Coastal Processes; and Forage Fish Survey Techniques. Additionally, she has received formal training in preparing WSDOT Biological Assessments.

Rachael Hyland, PWS, Certified Ecologist

Senior Environmental Scientist
Professional Experience: 10 years

Rachael Hyland is a Senior Environmental Scientist with extensive wetland and stream delineation and regulatory coordination experience. Rachael has a background in wetland and ecological habitat assessments in various states, most notably Washington, Connecticut, Massachusetts, Rhode Island, and Ohio. She has experience in assessing wetland, stream, riparian, and tidal systems, as well as complicated agricultural and disturbed sites. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects. She also has extensive knowledge of bats and their associated habitats and white nose syndrome (*Pseudogymnoascus destructans*), a fungal disease affecting bats which was recently documented in Washington.

Rachael earned a Bachelor of Science degree in Ecology and Evolutionary Biology from the University of Connecticut, with additional ecology studies at the graduate level. Rachael is a Professional Wetland Scientist (PWS #3480) through the Society of Wetland Scientists as well as a Certified Ecologist through the Ecological Society of America. She has completed 40-hour wetland delineation training for Western Mountains, Valleys, & Coast and Arid West Regional Supplement, in addition to formal training for the Northcentral and Northeast supplement, and experience with the Midwest, Eastern Mountains and Piedmont, and Atlantic and Gulf Coast supplements. She has also received formal training from the Washington State Department of Ecology in the Using the Revised 2014 Wetland Rating System for Western Washington, How to Determine the Ordinary High Water Mark, Navigating SEPA, Selecting Wetland Mitigation Sites Using a Watershed Approach, Wetland Classification, and Using the Credit-Debit Method for Estimating Mitigation Needs. Rachael has also received training from the Washington State Department of Transportation in Biological Assessment Preparation for Transportation Projects and is listed by WSDOT as a junior author for preparing Biological Assessments. Rachael is a Pierce County Qualified Wetland Specialist and Wildlife Biologist

Kramer Canup

Environmental Scientist
Professional Experience: 10 years

Kramer Canup is an Environmental Scientist with a professional background in project management, habitat restoration, vegetation monitoring, invasive plant management, monitoring protocol development, grant writing, tropical ecology, wildlife monitoring and environmental education. Kramer brings years of experience coordinating logistics for a variety of habitat restoration projects, vegetation monitoring programs, along with study abroad and backpacking courses. Previously, Kramer has managed riparian and upland habitat restoration projects and vegetation monitoring programs for the Green Seattle Partnership, the University of Washington, and the Pierce Conservation District, and he has taught study abroad courses in the Peruvian Amazon and Andes for the University of Washington. Kramer currently performs wetland delineations, conducts environmental code analysis, and prepares various environmental compliance documentation including fish and wildlife habitat assessments, biological evaluations, and permit applications.

Kramer has completed Basic Wetland Delineator Training with the Wetland Training Institute and received 40-hour USACE wetland delineation training. Kramer has been formally trained through the Washington State Department of Ecology, Coastal Training Program, How to Determine the Ordinary High Water Mark, and Using the Washington State Wetland Rating System. Beyond Kramer's project management, coordination, and delineation skills, he brings over 10 years of experience performing ecological field work such as vegetation monitoring, plant installation and invasive weed control.

Garrett M. Jordan

Environmental Scientist
Professional Experience: 2 years

Garrett M. Jordan is an Environmental Scientist with a background in conducting critical habitat investigations, wetland delineations, botanical surveys, avian surveys, and threatened & endangered species surveys. He has considerable experience in production of wetland delineations and Biological Assessments and Evaluations for projects regulated by the U.S. Army Corps of Engineers and the Washington State Department of Ecology. Garrett has completed wetland delineation training with Portland State University and OHWM training with Washington's Coastal Training Program. . In addition, Garrett is a FAA trained remote pilot for unmanned aircraft and has extensive experience in utilizing GIS to collect, manage and analyze spatial and temporal field data.

WWHM2012 Project Reports

```
                        WWHM2012
                     PROJECT REPORT
Project Name: 2023-12-01 Pond Design
Site Name: PSE OTC
Site Address: Todd Road
City      : Puyallup
Report Date: 12/5/2023
Gage      : 38 IN CENTRAL
Data Start : 10/01/1901
Data End : 09/30/2059
Precip Scale: 1.00
Version Date: 2023/03/31
Version : 4.2.19
_____________________________________________________________________

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year
_____________________________________________________________________

High Flow Threshold for POC 1: 50 year
_____________________________________________________________________

PREDEVELOPED LAND USE

Name    : On-site Pre
Bypass: No

GroundWater: No

Pervious Land Use            acre
 C, Forest, Flat               5.79

Pervious Total                 5.79

Impervious Land Use          acre
 PARKING FLAT                  0.306

Impervious Total               0.306

Basin Total                    6.096
_____________________________________________________________________

Element Flows To:
Surface                Interflow              Groundwater
_____________________________________________________________________

Name    : Off-Site Pre
Bypass: No

GroundWater: No

Pervious Land Use            acre
 C, Forest, Flat               .249

Pervious Total                 0.249
```

Impervious Land Use	**acre**
PARKING FLAT	**0.162**

Impervious Total **0.162**

Basin Total **0.411**

Element Flows To:

Surface	**Interflow**	**Groundwater**

MITIGATED LAND USE

Name : On-site Post
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
C, Pasture, Flat	**1.022**

Pervious Total **1.022**

Impervious Land Use	**acre**
ROADS FLAT	**2.506**
ROOF TOPS FLAT	**0.987**
POND	**0.574**

Impervious Total **4.067**

Basin Total **5.089**

Element Flows To:

Surface	**Interflow**	**Groundwater**
Vault 1	Vault 1	

Name : Vault 1
Width : 147 ft.
Length : 147 ft.
Depth: 4.3 ft.
Discharge Structure
Riser Height: 3.3 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.042 ft.
Notch Height: 1.500 ft.
Orifice 1 Diameter: 1.52 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	**Outlet 2**

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.496	0.000	0.000	0.000
0.0478	0.496	0.023	0.013	0.000
0.0956	0.496	0.047	0.019	0.000
0.1433	0.496	0.071	0.023	0.000
0.1911	0.496	0.094	0.027	0.000
0.2389	0.496	0.118	0.030	0.000
0.2867	0.496	0.142	0.033	0.000
0.3344	0.496	0.165	0.036	0.000
0.3822	0.496	0.189	0.038	0.000
0.4300	0.496	0.213	0.041	0.000
0.4778	0.496	0.237	0.043	0.000
0.5256	0.496	0.260	0.045	0.000
0.5733	0.496	0.284	0.047	0.000
0.6211	0.496	0.308	0.049	0.000
0.6689	0.496	0.331	0.051	0.000
0.7167	0.496	0.355	0.053	0.000
0.7644	0.496	0.379	0.054	0.000
0.8122	0.496	0.402	0.056	0.000
0.8600	0.496	0.426	0.058	0.000
0.9078	0.496	0.450	0.059	0.000
0.9556	0.496	0.474	0.061	0.000
1.0033	0.496	0.497	0.062	0.000
1.0511	0.496	0.521	0.064	0.000
1.0989	0.496	0.545	0.065	0.000
1.1467	0.496	0.568	0.067	0.000
1.1944	0.496	0.592	0.068	0.000
1.2422	0.496	0.616	0.069	0.000
1.2900	0.496	0.639	0.071	0.000
1.3378	0.496	0.663	0.072	0.000
1.3856	0.496	0.687	0.073	0.000
1.4333	0.496	0.711	0.075	0.000
1.4811	0.496	0.734	0.076	0.000
1.5289	0.496	0.758	0.077	0.000
1.5767	0.496	0.782	0.078	0.000
1.6244	0.496	0.805	0.079	0.000
1.6722	0.496	0.829	0.081	0.000
1.7200	0.496	0.853	0.082	0.000
1.7678	0.496	0.876	0.083	0.000
1.8156	0.496	0.900	0.084	0.000
1.8633	0.496	0.924	0.087	0.000
1.9111	0.496	0.948	0.091	0.000
1.9589	0.496	0.971	0.096	0.000
2.0067	0.496	0.995	0.101	0.000
2.0544	0.496	1.019	0.106	0.000
2.1022	0.496	1.042	0.112	0.000
2.1500	0.496	1.066	0.118	0.000
2.1978	0.496	1.090	0.125	0.000
2.2456	0.496	1.114	0.131	0.000
2.2933	0.496	1.137	0.138	0.000
2.3411	0.496	1.161	0.145	0.000
2.3889	0.496	1.185	0.152	0.000
2.4367	0.496	1.208	0.159	0.000
2.4844	0.496	1.232	0.166	0.000
2.5322	0.496	1.256	0.174	0.000
2.5800	0.496	1.279	0.181	0.000

```
2.6278      0.496      1.303      0.188      0.000
2.6756      0.496      1.327      0.196      0.000
2.7233      0.496      1.351      0.203      0.000
2.7711      0.496      1.374      0.211      0.000
2.8189      0.496      1.398      0.219      0.000
2.8667      0.496      1.422      0.228      0.000
2.9144      0.496      1.445      0.237      0.000
2.9622      0.496      1.469      0.247      0.000
3.0100      0.496      1.493      0.256      0.000
3.0578      0.496      1.516      0.266      0.000
3.1056      0.496      1.540      0.276      0.000
3.1533      0.496      1.564      0.286      0.000
3.2011      0.496      1.588      0.355      0.000
3.2489      0.496      1.611      0.368      0.000
3.2967      0.496      1.635      0.382      0.000
3.3444      0.496      1.659      0.533      0.000
3.3922      0.496      1.682      0.829      0.000
3.4400      0.496      1.706      1.215      0.000
3.4878      0.496      1.730      1.666      0.000
3.5356      0.496      1.753      2.167      0.000
3.5833      0.496      1.777      2.699      0.000
3.6311      0.496      1.801      3.245      0.000
3.6789      0.496      1.825      3.788      0.000
3.7267      0.496      1.848      4.309      0.000
3.7744      0.496      1.872      4.792      0.000
3.8222      0.496      1.896      5.224      0.000
3.8700      0.496      1.919      5.594      0.000
3.9178      0.496      1.943      5.900      0.000
3.9656      0.496      1.967      6.143      0.000
4.0133      0.496      1.990      6.337      0.000
4.0611      0.496      2.014      6.578      0.000
4.1089      0.496      2.038      6.770      0.000
4.1567      0.496      2.062      6.956      0.000
4.2044      0.496      2.085      7.137      0.000
4.2522      0.496      2.109      7.313      0.000
4.3000      0.496      2.133      7.485      0.000
4.3478      0.496      2.156      7.654      0.000
4.3956      0.000      0.000      7.818      0.000
___________________________________________________________________

Name   : Off-site Bypass
Bypass: Yes

GroundWater: No

Pervious Land Use            acre
 C, Pasture, Flat              .172

Pervious Total                0.172

Impervious Land Use          acre
 SIDEWALKS FLAT               0.239

Impervious Total              0.239

Basin Total                   0.411
```

```
Element Flows To:
Surface               Interflow               Groundwater

Name   : On-site Bypass
Bypass: Yes

GroundWater: No

Pervious Land Use           acre
 C, Pasture, Flat             .972

Pervious Total                0.972

Impervious Land Use         acre
 DRIVEWAYS FLAT               0.035

Impervious Total              0.035

Basin Total                   1.007

Element Flows To:
Surface               Interflow               Groundwater

                     ANALYSIS RESULTS

                Stream Protection Duration

Predeveloped Landuse Totals for POC #1
Total Pervious Area:6.039
Total Impervious Area:0.468

Mitigated Landuse Totals for POC #1
Total Pervious Area:2.166
Total Impervious Area:4.341

Flow Frequency Return Periods for Predeveloped.  POC #1
Return Period         Flow(cfs)
2 year                  0.230311
5 year                  0.323076
10 year                 0.389942
25 year                 0.480697
50 year                 0.552917
100 year                0.629145

Flow Frequency Return Periods for Mitigated.  POC #1
Return Period         Flow(cfs)
2 year                  0.172184
5 year                  0.233314
10 year                 0.279916
25 year                 0.346204
```

```
50 year                 0.401274
100 year                0.461497
___________________________________________________________________

Stream Protection Duration
Annual Peaks for Predeveloped and Mitigated.   POC #1
Year         Predeveloped    Mitigated
<Omitted to conserve paper>
___________________________________________________________________

Stream Protection Duration
Ranked Annual Peaks for Predeveloped and Mitigated.   POC #1
Rank     Predeveloped        Mitigated
<Omitted to conserve paper>
___________________________________________________________________

Stream Protection Duration
POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs) Predev  Mit Percentage Pass/Fail
0.1152    23030    22991   99     Pass
0.1196    21002    19922   94     Pass
0.1240    19169    17512   91     Pass
0.1284    17124    14964   87     Pass
0.1328    15750    13280   84     Pass
0.1373    14166    11529   81     Pass
0.1417    13086    10305   78     Pass
0.1461    11773    9075    77     Pass
0.1505    10886    8199    75     Pass
0.1550    10066    7474    74     Pass
0.1594    9174     6770    73     Pass
0.1638    8504     6266    73     Pass
0.1682    7728     5712    73     Pass
0.1726    7147     5310    74     Pass
0.1771    6537     4843    74     Pass
0.1815    6105     4493    73     Pass
0.1859    5645     4181    74     Pass
0.1903    5072     3782    74     Pass
0.1947    4692     3539    75     Pass
0.1992    4270     3249    76     Pass
0.2036    3971     3058    77     Pass
0.2080    3634     2788    76     Pass
0.2124    3400     2596    76     Pass
0.2169    3159     2411    76     Pass
0.2213    2876     2205    76     Pass
0.2257    2685     2081    77     Pass
0.2301    2480     1925    77     Pass
0.2345    2315     1800    77     Pass
0.2390    2159     1686    78     Pass
0.2434    1982     1547    78     Pass
0.2478    1838     1450    78     Pass
0.2522    1699     1331    78     Pass
0.2567    1580     1243    78     Pass
0.2611    1460     1146    78     Pass
```

```
0.2655    1365     1058     77      Pass
0.2699    1283     986      76      Pass
0.2743    1174     905      77      Pass
0.2788    1097     844      76      Pass
0.2832    997      739      74      Pass
0.2876    917      663      72      Pass
0.2920    825      577      69      Pass
0.2965    758      513      67      Pass
0.3009    706      457      64      Pass
0.3053    649      401      61      Pass
0.3097    591      356      60      Pass
0.3141    545      313      57      Pass
0.3186    502      285      56      Pass
0.3230    468      258      55      Pass
0.3274    426      225      52      Pass
0.3318    389      204      52      Pass
0.3362    341      182      53      Pass
0.3407    303      161      53      Pass
0.3451    268      147      54      Pass
0.3495    252      136      53      Pass
0.3539    233      114      48      Pass
0.3584    211      99       46      Pass
0.3628    196      90       45      Pass
0.3672    181      83       45      Pass
0.3716    163      78       47      Pass
0.3760    147      65       44      Pass
0.3805    140      60       42      Pass
0.3849    127      56       44      Pass
0.3893    118      53       44      Pass
0.3937    111      51       45      Pass
0.3982    94       47       50      Pass
0.4026    90       47       52      Pass
0.4070    84       43       51      Pass
0.4114    80       38       47      Pass
0.4158    74       37       50      Pass
0.4203    70       35       50      Pass
0.4247    64       33       51      Pass
0.4291    56       29       51      Pass
0.4335    51       25       49      Pass
0.4379    50       22       44      Pass
0.4424    48       20       41      Pass
0.4468    47       19       40      Pass
0.4512    38       17       44      Pass
0.4556    34       16       47      Pass
0.4601    33       16       48      Pass
0.4645    31       15       48      Pass
0.4689    31       14       45      Pass
0.4733    27       12       44      Pass
0.4777    25       10       40      Pass
0.4822    22       9        40      Pass
0.4866    21       6        28      Pass
0.4910    19       5        26      Pass
0.4954    17       4        23      Pass
0.4999    16       3        18      Pass
0.5043    14       2        14      Pass
0.5087    14       0        0       Pass
0.5131    12       0        0       Pass
```

```
0.5175      10          0         0        Pass
0.5220      9           0         0        Pass
0.5264      9           0         0        Pass
0.5308      9           0         0        Pass
0.5352      9           0         0        Pass
0.5397      9           0         0        Pass
0.5441      8           0         0        Pass
0.5485      6           0         0        Pass
0.5529      6           0         0        Pass
```

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0.4612 **acre-feet**
On-line facility target flow: 0.5984 **cfs.**
Adjusted for 15 min: 0.5984 **cfs.**
Off-line facility target flow: 0.3442 **cfs.**
Adjusted for 15 min: 0.3442 **cfs.**

LID Report

```
LID Technique                 Used for    Total Volume   Volume    Infiltration  Cumulative
Percent     Water Quality  Percent       Comment
                              Treatment?  Needs          Through   Volume        Volume
Volume                     Water Quality
                                          Treatment      Facility  (ac-ft.)       Infiltration
Infiltrated                Treated
                                          (ac-ft)        (ac-ft)                 Credit
_____________________________________________________________________________________
Vault  1 POC                       N      1584.19                                      N
0.00
Total Volume Infiltrated                  1584.19        0.00      0.00
0.00        0.00           0%            No Treat. Credit
Compliance with LID Standard 8
Duration Analysis Result = Failed
```

Perlnd and Implnd Changes

No changes have been made.

WWHM2012
PROJECT REPORT

Project Name: 2023-12-01 Additional Area
Site Name: PSE OTC
Site Address: Todd Road
City : Puyallup
Report Date: 12/5/2023
Gage : 38 IN CENTRAL
Data Start : 10/01/1901
Data End : 09/30/2059
Precip Scale: 1.00
Version Date: 2023/03/31
Version : 4.2.19

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1: 50 year

PREDEVELOPED LAND USE

Name : On-site Pre **These are additional area inflows**
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
Pervious Total	**0**

Impervious Land Use	**acre**
PARKING FLAT	**0.306**
Impervious Total	**0.306**
Basin Total	**0.306**

Element Flows To:

Surface	**Interflow**	**Groundwater**

Name : Off-Site Pre **These are additional area inflows**

Bypass: No

GroundWater: No

Pervious Land Use	**acre**
Pervious Total	**0**

Impervious Land Use	**acre**

```
 PARKING FLAT                  0.162

Impervious Total               0.162

Basin Total                    0.162
_____________________________________________________________________

Element Flows To:
Surface                Interflow                Groundwater
_____________________________________________________________________

MITIGATED LAND USE

Name   : On-site Post These are flows to be mitigated

Bypass: No

GroundWater: No

Pervious Land Use            acre
 C, Pasture, Flat              1.688

Pervious Total                 1.688

Impervious Land Use          acre
 ROADS FLAT                    2.506
 ROOF TOPS FLAT                0.987
 DRIVEWAYS FLAT                0.035
 POND                          0.574

Impervious Total               4.102

Basin Total                    5.79
_____________________________________________________________________

Element Flows To:
Surface                Interflow                Groundwater
_____________________________________________________________________

Name   : Off-site Bypass These are flows to be mitigated
Bypass: No

GroundWater: No

Pervious Land Use            acre
 C, Pasture, Flat              .01

Pervious Total                 0.01

Impervious Land Use          acre
 SIDEWALKS FLAT                0.239

Impervious Total               0.239

Basin Total                    0.249
_____________________________________________________________________
```

```
Element Flows To:
Surface                 Interflow                Groundwater

_____________________________________________________________________

                     ANALYSIS RESULTS

                Stream Protection Duration
_____________________________________________________________________

Predeveloped Landuse Totals for POC #1
Total Pervious Area:0
Total Impervious Area:0.468
_____________________________________________________________________

Mitigated Landuse Totals for POC #1
Total Pervious Area:1.698
Total Impervious Area:4.341
_____________________________________________________________________

Flow Frequency Return Periods for
Predeveloped.  POC #1
These are additional area inflows
Return Period           Flow(cfs)
2 year                    0.164011
5 year                    0.220156
10 year                   0.260963
25 year                   0.316812
50 year                   0.361635
100 year                  0.409305

Flow Frequency Return Periods for
Mitigated.  POC #1
These are flows to be mitigated
Return Period           Flow(cfs)
2 year                    1.540333
5 year                    2.06763
10 year                   2.450872
25 year                   2.975392
50 year                   3.396354
100 year                  3.844052
_____________________________________________________________________

Stream Protection Duration
Annual Peaks for Predeveloped and Mitigated.  POC #1
Year         Predeveloped    Mitigated
<Omitted to conserve paper>
_____________________________________________________________________

Stream Protection Duration
Ranked Annual Peaks for Predeveloped and Mitigated.  POC #1
Rank      Predeveloped        Mitigated
<Omitted to conserve paper>
_____________________________________________________________________

Stream Protection Duration
POC #1
The Facility FAILED
```

Additional Area Inflow Check:

Existing 100-year peak flow rate from the additional area cannot exceed 50% of the 100-year developed peak flow rate from the area requiring mitigation.

Existing 100-year peak flow rate from additional area = 0.41 cfs

Developed 100-year peak flow rate from area requiring mitigation = 3.84 cfs

0.41 / 3.84 = 10.7% (less than 50%)

Facility FAILED duration standard for 1+ flows.

Flow(cfs) Predev Mit Percentage Pass/Fail
<Omitted to conserve paper>

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow. The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

Water Quality BMP Flow and Volume for POC #1
<Omitted to conserve paper>

LID Report

<Omitted to conserve paper>

Perlnd and Implnd Changes
No changes have been made.

WWHM2012
PROJECT REPORT

Project Name: Bioretention-1
Site Name:
Site Address:
City :
Report Date: 12/5/2023
Gage : 38 IN CENTRAL
Data Start : 10/01/1901
Data End : 09/30/2059
Precip Scale: 1.00
Version Date: 2023/03/31
Version : 4.2.19

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1: 50 year

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
C, Forest, Flat	.714
Pervious Total	0.714

Impervious Land Use	**acre**
Impervious Total	0
Basin Total	0.714

Element Flows To:

Surface	**Interflow**	**Groundwater**

MITIGATED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
C, Pasture, Flat	.174
Pervious Total	0.174

Impervious Land Use	acre
ROADS FLAT	0.54
Impervious Total	**0.54**
Basin Total	**0.714**

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 1	Surface oretention 1	

Name : Bioretention 1
Bottom Length: 160.00 ft.
Bottom Width: 2.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: SMMWW 12 in/hr
Material thickness of second layer: 1.5
Material type for second layer: GRAVEL
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 5.9
Offset (in.): 6
Flow Through Underdrain (ac-ft.): 224.687
Total Outflow (ac-ft.): 245.584
Percent Through Underdrain: 91.49
Discharge Structure
Riser Height: 0.2 ft.
Riser Diameter: 10 in.

Element Flows To:

Outlet 1	Outlet 2

Bioretention 1 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0817	0.0000	0.0000	0.0000
0.0407	0.0809	0.0001	0.0000	0.0000
0.0813	0.0798	0.0003	0.0000	0.0000
0.1220	0.0787	0.0005	0.0000	0.0000
0.1626	0.0776	0.0007	0.0000	0.0000
0.2033	0.0765	0.0009	0.0000	0.0000
0.2440	0.0754	0.0011	0.0000	0.0000
0.2846	0.0743	0.0014	0.0000	0.0000
0.3253	0.0732	0.0016	0.0000	0.0000
0.3659	0.0721	0.0019	0.0000	0.0000
0.4066	0.0710	0.0022	0.0000	0.0000
0.4473	0.0699	0.0025	0.0000	0.0000
0.4879	0.0688	0.0029	0.0000	0.0000
0.5286	0.0678	0.0032	0.0000	0.0000
0.5692	0.0667	0.0036	0.0000	0.0000
0.6099	0.0656	0.0040	0.0000	0.0000
0.6505	0.0646	0.0044	0.0000	0.0000
0.6912	0.0635	0.0048	0.0000	0.0000

0.7319	0.0624	0.0052	0.0000	0.0000
0.7725	0.0614	0.0057	0.0000	0.0000
0.8132	0.0603	0.0062	0.0000	0.0000
0.8538	0.0593	0.0067	0.0000	0.0000
0.8945	0.0582	0.0072	0.0000	0.0000
0.9352	0.0572	0.0077	0.0000	0.0000
0.9758	0.0561	0.0083	0.0000	0.0000
1.0165	0.0551	0.0088	0.0000	0.0000
1.0571	0.0540	0.0094	0.0000	0.0000
1.0978	0.0530	0.0100	0.0000	0.0000
1.1385	0.0520	0.0106	0.0000	0.0000
1.1791	0.0509	0.0113	0.0030	0.0000
1.2198	0.0499	0.0119	0.0032	0.0000
1.2604	0.0489	0.0126	0.0037	0.0000
1.3011	0.0479	0.0133	0.0042	0.0000
1.3418	0.0468	0.0140	0.0047	0.0000
1.3824	0.0458	0.0147	0.0053	0.0000
1.4231	0.0448	0.0155	0.0060	0.0000
1.4637	0.0438	0.0162	0.0067	0.0000
1.5044	0.0428	0.0170	0.0074	0.0000
1.5451	0.0418	0.0177	0.0082	0.0000
1.5857	0.0408	0.0184	0.0091	0.0000
1.6264	0.0398	0.0192	0.0100	0.0000
1.6670	0.0388	0.0200	0.0109	0.0000
1.7077	0.0378	0.0208	0.0119	0.0000
1.7484	0.0368	0.0216	0.0130	0.0000
1.7890	0.0358	0.0224	0.0141	0.0000
1.8297	0.0348	0.0233	0.0152	0.0000
1.8703	0.0338	0.0241	0.0164	0.0000
1.9110	0.0328	0.0250	0.0177	0.0000
1.9516	0.0319	0.0259	0.0190	0.0000
1.9923	0.0309	0.0269	0.0204	0.0000
2.0330	0.0299	0.0278	0.0217	0.0000
2.0736	0.0289	0.0288	0.0252	0.0000
2.1143	0.0280	0.0297	0.0252	0.0000
2.1549	0.0270	0.0307	0.0252	0.0000
2.1956	0.0260	0.0317	0.0252	0.0000
2.2363	0.0251	0.0328	0.0252	0.0000
2.2769	0.0241	0.0338	0.0252	0.0000
2.3176	0.0232	0.0349	0.0252	0.0000
2.3582	0.0222	0.0359	0.0252	0.0000
2.3989	0.0213	0.0370	0.0252	0.0000
2.4396	0.0203	0.0382	0.0252	0.0000
2.4802	0.0194	0.0393	0.0252	0.0000
2.5209	0.0184	0.0404	0.0252	0.0000
2.5615	0.0175	0.0416	0.0252	0.0000
2.6022	0.0166	0.0428	0.0252	0.0000
2.6429	0.0156	0.0440	0.0252	0.0000
2.6835	0.0147	0.0452	0.0252	0.0000
2.7242	0.0138	0.0465	0.0252	0.0000
2.7648	0.0128	0.0477	0.0252	0.0000
2.8055	0.0119	0.0490	0.0252	0.0000
2.8462	0.0110	0.0503	0.0252	0.0000
2.8868	0.0101	0.0516	0.0252	0.0000
2.9275	0.0092	0.0530	0.0252	0.0000
2.9681	0.0083	0.0543	0.0252	0.0000
3.0000	0.0073	0.0554	0.0252	0.0000

Surface oretention 1 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
3.0000	0.0817	0.0554	0.0000	0.0222	0.0000
3.0407	0.0828	0.0588	0.0000	0.0222	0.0000
3.0813	0.0839	0.0621	0.0000	0.0234	0.0000
3.1220	0.0851	0.0656	0.0000	0.0240	0.0000
3.1626	0.0862	0.0691	0.0000	0.0246	0.0000
3.2033	0.0873	0.0726	0.0017	0.0252	0.0000
3.2440	0.0884	0.0762	0.0814	0.0258	0.0000
3.2846	0.0896	0.0798	0.2163	0.0264	0.0000
3.3253	0.0907	0.0834	0.3846	0.0270	0.0000
3.3659	0.0918	0.0872	0.5719	0.0276	0.0000
3.4066	0.0930	0.0909	0.7638	0.0282	0.0000
3.4473	0.0941	0.0947	0.9455	0.0288	0.0000
3.4879	0.0952	0.0986	1.1040	0.0295	0.0000
3.5286	0.0964	0.1025	1.2301	0.0301	0.0000
3.5692	0.0975	0.1064	1.3217	0.0307	0.0000
3.6099	0.0987	0.1104	1.3871	0.0313	0.0000
3.6505	0.0998	0.1144	1.4681	0.0319	0.0000
3.6912	0.1010	0.1185	1.5330	0.0325	0.0000
3.7000	0.1012	0.1194	1.5951	0.0326	0.0000

Name : Surface oretention 1

Element Flows To:

Outlet 1	**Outlet 2**
Bioretention 1	

ANALYSIS RESULTS

Stream Protection Duration

Predeveloped Landuse Totals for POC #1
Total Pervious Area:0.714
Total Impervious Area:0

Mitigated Landuse Totals for POC #1
Total Pervious Area:0.174
Total Impervious Area:0.54

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.015046
5 year	0.023407
10 year	0.02795
25 year	0.032574
50 year	0.035323
100 year	0.037583

Flow Frequency Return Periods for Mitigated.   POC #1

Return Period	Flow(cfs)
2 year	0.133086
5 year	0.191791
10 year	0.229281
25 year	0.274827
50 year	0.307426
100 year	0.338928

Stream Protection Duration
Annual Peaks for Predeveloped and Mitigated.   POC #1
Year   Predeveloped   Mitigated
<Omitted to conserve paper>

Stream Protection Duration
Ranked Annual Peaks for Predeveloped and Mitigated.   POC #1
Rank   Predeveloped   Mitigated
<Omitted to conserve paper>

Stream Protection Duration
POC #1
The Facility FAILED

Facility FAILED duration standard for 1+ flows.

Flow(cfs) Predev Mit Percentage Pass/Fail
<Omitted to conserve paper>

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow. The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0.0555 **acre-feet**
On-line facility target flow: 0.0421 **cfs.**
Adjusted for 15 min: 0.0421 **cfs.**
Off-line facility target flow: 0.02 **cfs.**
Adjusted for 15 min: 0.02 **cfs.**

LID Report

```
LID Technique                 Used for    Total Volume   Volume    Infiltration  Cumulative
Percent     Water Quality   Percent      Comment
                              Treatment?  Needs          Through   Volume        Volume
Volume                      Water Quality
                                          Treatment      Facility  (ac-ft.)       Infiltration
Infiltrated                 Treated
                                          (ac-ft)        (ac-ft)                 Credit
oretention 1 POC                     N       223.48                                    N
0.00
Total Volume Infiltrated                  223.48         0.00      0.00
0.00        0.00            0%           No Treat. Credit
Compliance with LID Standard 8
Duration Analysis Result = Failed
```

Perlnd and Implnd Changes

No changes have been made.

WWHM2012
PROJECT REPORT

Project Name: Bioretention-2
Site Name:
Site Address:
City :
Report Date: 12/5/2023
Gage : 38 IN CENTRAL
Data Start : 10/01/1901
Data End : 09/30/2059
Precip Scale: 1.00
Version Date: 2023/03/31
Version : 4.2.19

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1: 50 year

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
C, Forest, Flat	**2.102**
Pervious Total	**2.102**

Impervious Land Use	**acre**
Impervious Total	**0**
Basin Total	**2.102**

Element Flows To:

Surface	**Interflow**	**Groundwater**

MITIGATED LAND USE

Name : Basin 2
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
C, Pasture, Flat	**.285**
Pervious Total	**0.285**

Impervious Land Use	acre
ROADS FLAT	1.817
Impervious Total	**1.817**
Basin Total	**2.102**

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 2	Surface oretention 2	

Name : Bioretention 2
Bottom Length: 550.00 ft.
Bottom Width: 2.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: SMMWW 12 in/hr
Material thickness of second layer: 1.5
Material type for second layer: GRAVEL
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 5.9
Offset (in.): 6
Flow Through Underdrain (ac-ft.): 731.033
Total Outflow (ac-ft.): 791.672
Percent Through Underdrain: 92.34
Discharge Structure
Riser Height: 0.2 ft.
Riser Diameter: 10 in.

Element Flows To:

Outlet 1	Outlet 2

Bioretention 2 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.2608	0.0000	0.0000	0.0000
0.0407	0.2582	0.0005	0.0000	0.0000
0.0813	0.2549	0.0011	0.0000	0.0000
0.1220	0.2516	0.0017	0.0000	0.0000
0.1626	0.2483	0.0023	0.0000	0.0000
0.2033	0.2451	0.0031	0.0000	0.0000
0.2440	0.2418	0.0039	0.0000	0.0000
0.2846	0.2385	0.0047	0.0000	0.0000
0.3253	0.2352	0.0056	0.0000	0.0000
0.3659	0.2320	0.0066	0.0000	0.0000
0.4066	0.2287	0.0076	0.0000	0.0000
0.4473	0.2254	0.0087	0.0000	0.0000
0.4879	0.2222	0.0098	0.0000	0.0000
0.5286	0.2189	0.0110	0.0000	0.0000
0.5692	0.2157	0.0122	0.0000	0.0000
0.6099	0.2124	0.0135	0.0000	0.0000
0.6505	0.2092	0.0149	0.0000	0.0000
0.6912	0.2059	0.0163	0.0000	0.0000

```
0.7319      0.2027      0.0178      0.0000      0.0000
0.7725      0.1994      0.0194      0.0000      0.0000
0.8132      0.1962      0.0210      0.0000      0.0000
0.8538      0.1929      0.0226      0.0000      0.0000
0.8945      0.1897      0.0243      0.0000      0.0000
0.9352      0.1865      0.0261      0.0000      0.0000
0.9758      0.1832      0.0279      0.0000      0.0000
1.0165      0.1800      0.0298      0.0000      0.0000
1.0571      0.1768      0.0318      0.0000      0.0000
1.0978      0.1736      0.0338      0.0000      0.0000
1.1385      0.1704      0.0359      0.0000      0.0000
1.1791      0.1671      0.0380      0.0101      0.0000
1.2198      0.1639      0.0402      0.0109      0.0000
1.2604      0.1607      0.0424      0.0126      0.0000
1.3011      0.1575      0.0447      0.0144      0.0000
1.3418      0.1543      0.0471      0.0163      0.0000
1.3824      0.1511      0.0495      0.0184      0.0000
1.4231      0.1479      0.0520      0.0206      0.0000
1.4637      0.1447      0.0545      0.0230      0.0000
1.5044      0.1415      0.0569      0.0256      0.0000
1.5451      0.1383      0.0593      0.0283      0.0000
1.5857      0.1351      0.0618      0.0312      0.0000
1.6264      0.1319      0.0643      0.0343      0.0000
1.6670      0.1288      0.0669      0.0375      0.0000
1.7077      0.1256      0.0695      0.0410      0.0000
1.7484      0.1224      0.0722      0.0445      0.0000
1.7890      0.1192      0.0749      0.0483      0.0000
1.8297      0.1161      0.0777      0.0523      0.0000
1.8703      0.1129      0.0806      0.0564      0.0000
1.9110      0.1097      0.0835      0.0608      0.0000
1.9516      0.1066      0.0864      0.0653      0.0000
1.9923      0.1034      0.0895      0.0700      0.0000
2.0330      0.1002      0.0925      0.0747      0.0000
2.0736      0.0971      0.0956      0.0866      0.0000
2.1143      0.0939      0.0988      0.0866      0.0000
2.1549      0.0908      0.1020      0.0866      0.0000
2.1956      0.0876      0.1053      0.0866      0.0000
2.2363      0.0845      0.1087      0.0866      0.0000
2.2769      0.0813      0.1121      0.0866      0.0000
2.3176      0.0782      0.1155      0.0866      0.0000
2.3582      0.0751      0.1190      0.0866      0.0000
2.3989      0.0719      0.1226      0.0866      0.0000
2.4396      0.0688      0.1262      0.0866      0.0000
2.4802      0.0657      0.1298      0.0866      0.0000
2.5209      0.0625      0.1336      0.0866      0.0000
2.5615      0.0594      0.1373      0.0866      0.0000
2.6022      0.0563      0.1412      0.0866      0.0000
2.6429      0.0532      0.1450      0.0866      0.0000
2.6835      0.0501      0.1490      0.0866      0.0000
2.7242      0.0470      0.1530      0.0866      0.0000
2.7648      0.0439      0.1570      0.0866      0.0000
2.8055      0.0407      0.1611      0.0866      0.0000
2.8462      0.0376      0.1653      0.0866      0.0000
2.8868      0.0345      0.1695      0.0866      0.0000
2.9275      0.0314      0.1738      0.0866      0.0000
2.9681      0.0283      0.1781      0.0866      0.0000
3.0000      0.0253      0.1816      0.0866      0.0000
```

Surface oretention 2 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
3.0000	0.2608	0.1816	0.0000	0.0764	0.0000
3.0407	0.2641	0.1922	0.0000	0.0764	0.0000
3.0813	0.2674	0.2030	0.0000	0.0805	0.0000
3.1220	0.2707	0.2140	0.0000	0.0826	0.0000
3.1626	0.2740	0.2251	0.0000	0.0847	0.0000
3.2033	0.2773	0.2363	0.0017	0.0867	0.0000
3.2440	0.2806	0.2476	0.0814	0.0888	0.0000
3.2846	0.2839	0.2591	0.2163	0.0909	0.0000
3.3253	0.2872	0.2707	0.3846	0.0930	0.0000
3.3659	0.2905	0.2824	0.5719	0.0950	0.0000
3.4066	0.2939	0.2943	0.7638	0.0971	0.0000
3.4473	0.2972	0.3063	0.9455	0.0992	0.0000
3.4879	0.3005	0.3185	1.1040	0.1012	0.0000
3.5286	0.3038	0.3308	1.2301	0.1033	0.0000
3.5692	0.3072	0.3432	1.3217	0.1054	0.0000
3.6099	0.3105	0.3557	1.3871	0.1074	0.0000
3.6505	0.3138	0.3684	1.4681	0.1095	0.0000
3.6912	0.3172	0.3813	1.5330	0.1116	0.0000
3.7000	0.3179	0.3841	1.5951	0.1120	0.0000

Name : Surface oretention 2

Element Flows To:

Outlet 1	**Outlet 2**
Bioretention 2	

ANALYSIS RESULTS

Stream Protection Duration

Predeveloped Landuse Totals for POC #1
Total Pervious Area:2.102
Total Impervious Area:0

Mitigated Landuse Totals for POC #1
Total Pervious Area:0.285
Total Impervious Area:1.817

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.044295
5 year	0.06891
10 year	0.082285
25 year	0.095898
50 year	0.103989
100 year	0.110643

```
Flow Frequency Return Periods for Mitigated.  POC #1
Return Period          Flow(cfs)
2 year                   0.362804
5 year                   0.522916
10 year                  0.622504
25 year                  0.740557
50 year                  0.823065
100 year                 0.901234
___________________________________________________________________

Stream Protection Duration
Annual Peaks for Predeveloped and Mitigated.  POC #1
Year         Predeveloped    Mitigated
<Omitted to conserve paper>
___________________________________________________________________

Stream Protection Duration
Ranked Annual Peaks for Predeveloped and Mitigated.  POC #1
Rank     Predeveloped        Mitigated
<Omitted to conserve paper>
___________________________________________________________________

Stream Protection Duration
POC #1
The Facility FAILED

Facility FAILED duration standard for 1+ flows.

Flow(cfs) Predev  Mit Percentage Pass/Fail
<Omitted to conserve paper>
_____________________________________________________
```

```
 The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2
year flow or more than a 10% increase from the 2 year to the 50 year flow. The development has an
increase in flow durations for more than  50% of the flows for the range of the duration
analysis.
_____________________________________________________

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0.1815 acre-feet
On-line facility target flow: 0.1206 cfs.
Adjusted for 15 min: 0.1206 cfs.
Off-line facility target flow: 0.0654 cfs.
Adjusted for 15 min: 0.0654 cfs.
___________________________________________________________________
```

```
 LID Report

LID Technique                    Used for    Total Volume   Volume    Infiltration  Cumulative
Percent      Water Quality   Percent        Comment
                             Treatment?  Needs          Through   Volume        Volume
Volume                       Water Quality
                                         Treatment      Facility  (ac-ft.)       Infiltration
Infiltrated                  Treated
                                         (ac-ft)        (ac-ft)                 Credit
oretention 2 POC                     N      720.42                                    N
0.00
Total Volume Infiltrated                 720.42         0.00      0.00
0.00        0.00           0%           No Treat. Credit
Compliance with LID Standard 8
Duration Analysis Result = Failed
```

Perlnd and Implnd Changes

No changes have been made.

WWHM2012
PROJECT REPORT

Project Name: Bioretention-3
Site Name:
Site Address:
City :
Report Date: 12/5/2023
Gage : 38 IN CENTRAL
Data Start : 10/01/1901
Data End : 09/30/2059
Precip Scale: 1.00
Version Date: 2023/03/31
Version : 4.2.19

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1: 50 year

PREDEVELOPED LAND USE

Name : Basin 3
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
C, Forest, Flat	**.129**
Pervious Total	**0.129**

Impervious Land Use	**acre**
Impervious Total	**0**
Basin Total	**0.129**

Element Flows To:

Surface	**Interflow**	**Groundwater**

MITIGATED LAND USE

Name : Basin 3
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
C, Pasture, Flat	**.009**
Pervious Total	**0.009**

Impervious Land Use	acre
ROADS FLAT	0.12
Impervious Total	0.12
Basin Total	0.129

Element Flows To:

Surface	Interflow	Groundwater
Surface oretention 3	Surface oretention 3	

Name : Bioretention 3
Bottom Length: 45.00 ft.
Bottom Width: 2.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: SMMWW 12 in/hr
Material thickness of second layer: 1.5
Material type for second layer: GRAVEL
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 5.9
Offset (in.): 6
Flow Through Underdrain (ac-ft.): 50.407
Total Outflow (ac-ft.): 52.936
Percent Through Underdrain: 95.22
Discharge Structure
Riser Height: 0.2 ft.
Riser Diameter: 10 in.

Element Flows To:

Outlet 1	Outlet 2

Bioretention 3 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.028926	0.000000	0.0000	0.0000
0.0407	0.028562	0.000041	0.0000	0.0000
0.0813	0.028101	0.000087	0.0000	0.0000
0.1220	0.027642	0.000138	0.0000	0.0000
0.1626	0.027186	0.000193	0.0000	0.0000
0.2033	0.026733	0.000254	0.0000	0.0000
0.2440	0.026283	0.000320	0.0000	0.0000
0.2846	0.025835	0.000392	0.0000	0.0000
0.3253	0.025390	0.000468	0.0000	0.0000
0.3659	0.024948	0.000550	0.0000	0.0000
0.4066	0.024509	0.000637	0.0000	0.0000
0.4473	0.024072	0.000730	0.0000	0.0000
0.4879	0.023638	0.000828	0.0000	0.0000
0.5286	0.023207	0.000932	0.0000	0.0000
0.5692	0.022778	0.001041	0.0000	0.0000
0.6099	0.022352	0.001155	0.0000	0.0000
0.6505	0.021929	0.001276	0.0000	0.0000
0.6912	0.021509	0.001402	0.0000	0.0000

```
0.7319       0.021091     0.001534     0.0000       0.0000
0.7725       0.020676     0.001671     0.0000       0.0000
0.8132       0.020264     0.001815     0.0000       0.0000
0.8538       0.019855     0.001964     0.0000       0.0000
0.8945       0.019448     0.002120     0.0000       0.0000
0.9352       0.019044     0.002281     0.0000       0.0000
0.9758       0.018643     0.002449     0.0000       0.0000
1.0165       0.018244     0.002622     0.0000       0.0000
1.0571       0.017849     0.002802     0.0000       0.0000
1.0978       0.017456     0.002988     0.0000       0.0000
1.1385       0.017065     0.003180     0.0000       0.0000
1.1791       0.016678     0.003379     0.0008       0.0000
1.2198       0.016293     0.003584     0.0009       0.0000
1.2604       0.015911     0.003795     0.0010       0.0000
1.3011       0.015532     0.004013     0.0012       0.0000
1.3418       0.015155     0.004237     0.0013       0.0000
1.3824       0.014781     0.004468     0.0015       0.0000
1.4231       0.014410     0.004705     0.0017       0.0000
1.4637       0.014041     0.004950     0.0019       0.0000
1.5044       0.013676     0.005177     0.0021       0.0000
1.5451       0.013313     0.005411     0.0023       0.0000
1.5857       0.012953     0.005651     0.0026       0.0000
1.6264       0.012595     0.005898     0.0028       0.0000
1.6670       0.012240     0.006150     0.0031       0.0000
1.7077       0.011888     0.006409     0.0034       0.0000
1.7484       0.011539     0.006674     0.0036       0.0000
1.7890       0.011192     0.006946     0.0040       0.0000
1.8297       0.010849     0.007224     0.0043       0.0000
1.8703       0.010507     0.007509     0.0046       0.0000
1.9110       0.010169     0.007800     0.0050       0.0000
1.9516       0.009833     0.008098     0.0053       0.0000
1.9923       0.009501     0.008402     0.0057       0.0000
2.0330       0.009170     0.008714     0.0061       0.0000
2.0736       0.008843     0.009032     0.0071       0.0000
2.1143       0.008518     0.009356     0.0071       0.0000
2.1549       0.008196     0.009688     0.0071       0.0000
2.1956       0.007877     0.010026     0.0071       0.0000
2.2363       0.007561     0.010372     0.0071       0.0000
2.2769       0.007247     0.010724     0.0071       0.0000
2.3176       0.006936     0.011084     0.0071       0.0000
2.3582       0.006627     0.011450     0.0071       0.0000
2.3989       0.006322     0.011824     0.0071       0.0000
2.4396       0.006019     0.012204     0.0071       0.0000
2.4802       0.005719     0.012592     0.0071       0.0000
2.5209       0.005422     0.012988     0.0071       0.0000
2.5615       0.005127     0.013390     0.0071       0.0000
2.6022       0.004835     0.013800     0.0071       0.0000
2.6429       0.004546     0.014217     0.0071       0.0000
2.6835       0.004259     0.014642     0.0071       0.0000
2.7242       0.003976     0.015074     0.0071       0.0000
2.7648       0.003695     0.015514     0.0071       0.0000
2.8055       0.003416     0.015961     0.0071       0.0000
2.8462       0.003141     0.016416     0.0071       0.0000
2.8868       0.002868     0.016879     0.0071       0.0000
2.9275       0.002598     0.017349     0.0071       0.0000
2.9681       0.002331     0.017827     0.0071       0.0000
3.0000       0.002066     0.018207     0.0071       0.0000
```

Surface oretention 3 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
3.0000	0.028926	0.018207	0.0000	0.0063	0.0000
3.0407	0.029392	0.019393	0.0000	0.0063	0.0000
3.0813	0.029861	0.020597	0.0000	0.0066	0.0000
3.1220	0.030332	0.021821	0.0000	0.0068	0.0000
3.1626	0.030807	0.023064	0.0000	0.0069	0.0000
3.2033	0.031284	0.024326	0.0017	0.0071	0.0000
3.2440	0.031764	0.025608	0.0814	0.0073	0.0000
3.2846	0.032246	0.026909	0.2163	0.0074	0.0000
3.3253	0.032732	0.028230	0.3846	0.0076	0.0000
3.3659	0.033220	0.029571	0.5719	0.0078	0.0000
3.4066	0.033711	0.030932	0.7638	0.0079	0.0000
3.4473	0.034204	0.032312	0.9455	0.0081	0.0000
3.4879	0.034700	0.033713	1.1040	0.0083	0.0000
3.5286	0.035199	0.035134	1.2301	0.0085	0.0000
3.5692	0.035701	0.036576	1.3217	0.0086	0.0000
3.6099	0.036206	0.038037	1.3871	0.0088	0.0000
3.6505	0.036713	0.039520	1.4681	0.0090	0.0000
3.6912	0.037223	0.041023	1.5330	0.0091	0.0000
3.7000	0.037333	0.041351	1.5951	0.0092	0.0000

Name : Surface oretention 3

Element Flows To:

Outlet 1	**Outlet 2**
Bioretention 3	

ANALYSIS RESULTS

Stream Protection Duration

Predeveloped Landuse Totals for POC #1
Total Pervious Area:0.129
Total Impervious Area:0

Mitigated Landuse Totals for POC #1
Total Pervious Area:0.009
Total Impervious Area:0.12

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.002718
5 year	0.004229
10 year	0.00505
25 year	0.005885
50 year	0.006382
100 year	0.00679

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.027743
5 year	0.045471
10 year	0.056524
25 year	0.06927
50 year	0.077826
100 year	0.085607

Stream Protection Duration
Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated

<Omitted to conserve paper>

Stream Protection Duration
Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated

<Omitted to conserve paper>

Stream Protection Duration
POC #1
The Facility FAILED

Facility FAILED duration standard for 1+ flows.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail

<Omitted to conserve paper>

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow. The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0.0118 **acre-feet**
On-line facility target flow: 0.0065 **cfs.**
Adjusted for 15 min: 0.0065 **cfs.**
Off-line facility target flow: 0.0042 **cfs.**
Adjusted for 15 min: 0.0042 **cfs.**

LID Report

```
LID Technique                  Used for    Total Volume   Volume     Infiltration  Cumulative
Percent     Water Quality   Percent       Comment
                               Treatment?  Needs          Through    Volume        Volume
Volume                      Water Quality
                                           Treatment      Facility   (ac-ft.)       Infiltration
Infiltrated                 Treated
                                           (ac-ft)        (ac-ft)                  Credit
oretention 3 POC                     N      48.17                                        N
0.00
Total Volume Infiltrated                   48.17          0.00       0.00
0.00        0.00           0%            No Treat. Credit
Compliance with LID Standard 8
Duration Analysis Result = Failed
```

____

Perlnd and Implnd Changes

No changes have been made.

____

Impervious Surface Table

Complete the following table as applicable to the proposed project (include onsite and offsite improvements):

Description[a]	Onsite	Offsite	Total
Existing Conditions			
Total Project Area[b] (ft²)	268,786	17,883	286,669
Existing hard surface (ft²)	86,084	12,457	98,541
Existing vegetation area (ft²)	182,702	5,426	188,128
Proposed Conditions			
Total Project Area[b] (ft²)	268,786	17,883	286,669
Amount of new hard surface (ft²)	153,684	10,399	164,083
Amount of new pollution generating hard surface (PGHS)[c] (ft²)	78,135	2,522	80,657
Amount of replaced hard surface (ft²)	0	0	0
Amount of replaced PGHS[d] (ft²)	0	0	0
Amount of new plus replaced hard surface (ft²)	153,684	10,399	164,083
Amount of new + replaced PGHS (ft²)	78,135	2,522	80,657
Amount of existing hard surfaces converted to vegetation (ft²)	13,343	7,055	20,398
Amount of Land Disturbed (ft²)	262,395	17,883	280,278
Vegetation to Lawn/Landscaped (acres)	1.688	0.010	1.698
Native Vegetation to Pasture (acres)	0	0	0
Existing hard surface to remain unaltered (ft²)	0	0	0
Existing vegetation area to remain unaltered (ft²)	6,391	0	6,391

a. All terms are defined in the 2019 Ecology Manual glossary.

b. The total project area in the existing condition should typically match the total project area in the proposed condition.

c. The “amount of new PGHS” should be part of or all of “amount of new hard surfaces”

d. The “amount of replaced PGHS” should be part of or all of the “amount of replaced hard surfaces”.