Snohomish County PUD No. 1

Burn Road 726 Zone Reservoir CW2252001

WE #965 WO #100099341

Stormwater Site Plan

May 2025

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ACKNOWLEDGEMENTS

This document was prepared under the direct supervision of:

05/29/2025

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ABBREVIATIONS AND ACRONYMS LIST

AADT	Average Annual Daily Traffic
bgs	below ground surface
BHC	BHC Consultants, LLC.
BMP	Best Management Practice
cfs	cubic feet per second
CESCL	Certified Erosion and Sediment Control Lead
DBH	diameter at breast height
District	Snohomish County PUD No. 1
DOH	Department of Health
HMA	Hot Mix Asphalt
LF	linear feet
LSIWS	Lake Stevens Integrated Water System
MG	million gallons
MR	Minimum Requirement
NAVD 88	North Atlantic Vertical Datum of 1988
NPGHS	Non-Pollution Generating Hard Surface
PGHS	Pollution-Generating Hard Surface
PUD	Public Utility District
SCC	Snohomish County Code
SEPA	State Environmental Policy Act
SPCC	Spill Prevention and Control Countermeasure
sf	square feet
SWPPP	Stormwater Pollution and Prevention Plan
TBD	To be determined
TDA	Threshold Discharge Area
TESC	Temporary Erosion Sedimentation Control
USDA NRCS	United State Department of Agriculture Natural Resources Conservation Service
WRIA	Water Resources Inventory Area
WSP	Water System Plan

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1. Executive Summary

The Snohomish County PUD No. 1 (District) Lake Stevens Integrated Water System (LSIWS) Public Water System ID #809071, is located approximately 22 miles northwest of Everett in Snohomish County. The LSIWS is the District's largest system which is projected to integrate Storm Lake Ridge and Creswell as growth occurs over the next 20 years.

The Project is located on District owned property at 12820 150th Street NE in Arlington, Washington (Parcel 31063200101300). The property is in the Northeast Quarter of Section 32, Township 31, Range 6 East. The Project site is shown on Figure 1.

The new 3.6-million gallon (MG) reservoir will be constructed on a new reinforced concrete foundation. The reservoir will be equipped with a roof vent, roof hatch, hand railings, and a gutter system around the top of the tank, two access manways, exterior ladder, interior ladder, interior access platform, inlet and outlet flanged connections with meter and valve vaults, water sampling station, overflow and drain piping connections, and tank level measuring equipment.

Vegetation within the footprint of the proposed tank and associated infrastructure will be stripped and removed from the Project site. Following the construction of the new reservoir, disturbed areas will be revegetated with native grass. Soil within vegetated areas will be amended to meet the requirements of BMP T5.13: Post-Construction Soil Quality and Depth. Straw mulch will be applied to seeded areas to reduce erosion potential until grass becomes established and promote seed germination. The on-site access driveway will be restored to its existing condition with gravel surfacing and extended using hot mix asphalt (HMA) pavement.

This Stormwater Site Plan has been prepared in accordance with the July 2021 Snohomish County Drainage Manual. The Project proposes adding 14,670 square feet (sf) of new hard surface area within two threshold discharge areas (TDA). According to Snohomish County Drainage Manual Figure 1.2 Minimum Requirements (MR) for Redevelopment Projects, MR #1 through MR #9 apply to this Project. Stormwater Best Management Practices (BMPs) to provide permanent stormwater control include BMP T5.13 Post-Construction Soil Quality and Depth, BMP T5.30 Full Dispersion, and BMP T9.10 Basic Biofiltration Swale.

2. Project Summary

2.1 Property Description

The Project is located on privately owned property on Burn Road and 150th Street NE in Arlington, Washington (Parcel 31063200101300). The site is approximately 6.0 acres in size and its location is shown on Figure 1. The site lies in the Northeast Quarter of Section 32, Township 31, Range 6 East. It is zoned as Rural Residential with one dwelling unit per 5 acres (R-5). Adjacent parcels to the west, south, and east are also zoned R-5.

2.2 Existing Conditions

The parcel is mostly wooded and is developed with a one-story garage building structure within the northern portion and is surrounded by vegetation and accessed via a gravel driveway on the north end of the parcel. The southern portion of the parcel is wooded and has been mapped as a wetland. Grass, shrubs, and both coniferous and deciduous trees are present on the site.

Within the District-owned parcel, existing impervious areas include a one-story garage building structure (1,100 sf), and multiple gravel driveways (11,965 sf). The gravel driveway areas include the access road on the south side of the parcel that is not used to access the Project site (Figure 1). Site areas are summarized in Table 2-1.

Table 2-1
Summary of Existing and Proposed Land Cover Areas

Condition	PGHS			NPGHS			Pervious			Total
	(sf)			(sf)			(sf)			(sf)
Existing	**11,965**			**1,100**			**249,215**			**262,280**
Proposed	**New**	**Repl.**	**Exist.**	**New**	**Repl.**	**Exist.**	**New**	**Repl.**	**Exist.**	
	10,300	520	11,445	3,850	0	1,100	0	0	234,065	262,280
Total	**22,265**			**4,950**			**234,065**			**262,280**

Notes:
1) Percent Existing Impervious Coverage: 4 percent (includes the existing driveway).
2) New + Replaced Hard Surface Area: 14,670 sf.

The topography of the Project area is relatively flat with the highest elevation at approximately 603 feet, referenced from the North Atlantic Vertical Datum of 1988 (NAVD 88). The Project site is located at a high point and has an overall gentle slope downward to the southwest and to the northeast.

According to the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) Web Soil Survey the site is underlain Tokul gravelly medial loam, which is Hydrological Soil Group C, per Snohomish County Drainage Manual. See Appendix A for the USDA NRCS Web Soil Survey. During the geotechnical investigation for the Project (see Appendix B), glacial till soils were encountered below a shallow horizon of loose silty sand with trace gravel, as well as roots that extended to about 6 inches below grade (ZipperGeo 2025). Weathered glacial till, consisting of medium dense, moist, gravelly silty sand was observed to approximately 5 feet below and dense to very dense unweathered till extended to the boring's 20.5-foot termination depth. The boring disclosed dense to very dense glacial till immediately below the shallow 6-inch deep loose silty sand horizon to the boring's 30.5-foot termination depth.

A 33 percent or steeper slope lies approximately 95 feet west of the proposed reservoir construction. The Project Geotechnical Report states that the site is underlain by low permeability glacial till to at least 28 feet below ground surface (bgs) and therefore, does not meet the criteria for a landslide hazard per the Snohomish County Code (SCC) 30.91L.040 (ZipperGeo, 2025).

A Critical Area Study (Wetland Resources Inc., 2023) identified four wetlands (Wetlands A, B, C and D) and two streams (Stream A and B) within 500 feet of the Project. According to the Study, Wetland A is a large depressional wetland that extends on to the southwestern subject property corner. The wetland drains north into a culvert under 150th Street NE and acts as a headwater wetland to Stream A. Wetland A is a Category II wetland with a standard buffer of 225 feet. Wetland D is located northwest of the intersection of 148th Street NE and Burn Road. It is a Category II wetland with a standard buffer of 110 feet. Wetland B and C are also depressional wetlands and are located outside of the property.

Stream A originates on the north side of the 150th Street NE at the drainage of Wetland A. The stream continues offsite and drains into the South Fork Stillaguamish River. Stream B originates from the center of Wetland C and flows south ultimately draining into the South Fork Stillaguamish River. The Critical Areas Study Map is provided for reference in Appendix C.

2.3 Developed Conditions

The proposed Work includes installing a new 3.6-MG welded steel reservoir (approximately 70 feet in diameter by approximately 140 feet tall) set on a new reinforced concrete foundation. The proposed reservoir site impervious areas include the existing one-story building (1,100 sf), existing unaffected gravel driveway located on the north end of the site along 150th Street NE (2,765 sf), proposed reservoir (3,850 sf), proposed asphalt driveway (7,120 sf), and proposed concrete apron (3,700 sf).

The Project was delineated into three separate TDA's based on the site topography, described in Section 2.4 of this Report. In total, the Project proposes adding 14,670 sf of impervious surface. The new plus-replaced hard surface area is estimated at 14,670 sf. Site areas are summarized in Table 2-1 located in Section 2.2 of this Report.

The existing gravel driveway with two entrances will be maintained during construction activities. No additional impervious areas are proposed to be added to the driveway entrances.

Disturbed areas for this Project will be kept to a minimum. Temporary Erosion and Sediment Control (TESC) Best Management Practices (BMPs) will be implemented during construction in accordance with the Construction Stormwater Pollution and Prevention Plan (SWPPP) prepared per Snohomish County stormwater management requirements under separate cover (BHC Consultants, LLC, 2025).

The vegetation within the footprint of the proposed reservoir will be removed from the Project site. This includes existing grass and 22 trees, including eight alders, seven fir, two hemlock, three cedar, and two clusters of maple trees. The Project proposes onsite disturbance of 58,000 sf (1.3 acres) and approximately 4,500 sf (0.1 acres) within the right of way for a total of 62,500 sf (1.4 acres).

The soil removed from the reservoir foundation will be hauled offsite for proper disposal. Soil removed from trench excavations will be used for trench backfill in non-asphalt areas unless identified as unsuitable for backfill. Unsuitable material will be waste hauled from the Project site and imported soil meeting backfill material standards will be installed. Trenching will be restored per the Snohomish County PUD No. 1 Standard details as shown on the Plans.

The proposed construction activities do not propose to alter the existing stormwater drainage function or downstream conveyance system.

The new 3.6-MG reservoir will be equipped with vents, roof hatch, hand railings with fall restraint, gutter system around the top of the tank, two access manways, exterior ladder with intermediate platforms, interior ladder, interior access platform, inlet and outlet flanged connections, water sampling port, overflow and drain piping connections (with required air gap), meters and seismic expansion joints on the inlet and outlet pipes, seismic valves on the inlet and outlet pipes, tank level measuring equipment, mixing capability to manage dead storage, and a cathodic protection system.

Other site improvements include an asphalt pavement, 14-foot-wide concrete apron surrounding the reservoir, split rail fence along the wetland buffer, and stormwater management system to address added hard surfaces (ex., reservoir and pavement).

Vegetation within the footprint of the proposed tank will be stripped and removed from the Project site. Following construction of the reservoir and water main, disturbed areas beyond the reservoir and access improvements will be restored with native grass. Soil within vegetated areas will be amended to meet the requirements of BMP T5.13: Post-Construction Soil Quality and Depth. Straw mulch will be applied to seeded areas to reduce erosion potential until grass becomes established and promote seed germination.

2.4 TDA Delineation

The Project area is divided into three distinct TDAs based on the site's topography. The proposed construction will take place exclusively within TDA #1 and TDA #2, so this Report will focus on these two TDAs. TDA #1 is 3.52 acres (153,300 sf) in size and is located on the west side of the parcel. TDA #2 is 1.66 acres (72,480 sf) in size and is located on the northeast corner of the parcel. TDA #3, 0.84 acres (36,500 sf) in size, is located along the south edge of the parcel and is a long narrow strip of land that is not affected by this Project. The specified TDA areas are shown in Table 2-2 and Table 2-3 below. See Figure 2: Existing and Proposed TDA's and Figure 3: Existing and Proposed Land Cover for map figures that show the proposed delineation.

Table 2-2
TDA #1 Existing and Proposed Land Cover Areas

Existing - TDA #1						
Item	**Coverage**	**Impervious (sf)**	**Pervious (sf)**	**Total (sf)**	**Coverage %**	**Impervious %**
Forest	Pervious		150,700	150,700	98.30	
Grass	Pervious		800	800	0.52	
Ex. Gravel Road	PGHS	1,800		1,800	1.17	
Total		**1,800**	**151,500**	**153,300**		**1%**
Area (ac)		**0.04**	**3.48**	**3.52**		
Proposed - TDA #1						
Item	**Coverage**	**Impervious (sf)**	**Pervious (sf)**	**Total (sf)**	**Coverage %**	**Impervious %**
Forest	Pervious		139,120	139,120	90.75	
Grass	Pervious		5,780	5,780	3.77	
Ex. Gravel Road	PGHS	1,800		1,800	1.17	
Reservoir	NPGHS	3,850		3,850	2.51	
Apron	PGHS	2,130		2,130	1.39	
HMA	PGHS	620		620	0.40	
Total		**8,400**	**144,900**	**153,300**		**5%**
Area (ac)		**0.19**	**3.33**	**3.52**		

Table 2-3
TDA #2 Existing and Proposed Land Cover Areas

Existing - TDA #2						
Item	**Coverage**	**Impervious (sf)**	**Pervious (sf)**	**Total (sf)**	**Coverage %**	**Impervious %**
Forest	Pervious		36,200	36,200	49.94	
Grass	Pervious		32,415	32,415	44.72	
Ex. Gravel Road	PGHS	2,765		2,765	3.81	
Ex. Building	NPGHS	1,100		1,100	1.52	
Total		**3,865**	**68,615**	**72,480**		**5%**
Area (ac)		**0.09**	**1.58**	**1.66**		
Proposed - TDA #2						
Item	**Coverage**	**Impervious (sf)**	**Pervious (sf)**	**Total (sf)**	**Coverage %**	**Impervious %**
Forest	Pervious		14,350	14,350	19.80	
Grass	Pervious		21,230	21,230	29.29	
Pasture	Pervious		24,965	24,965	34.44	
Ex. Gravel	PGHS	2,765		2,765	3.81	
Ex. Building	NPGHS	1,100		1,100		
HMA	PGHS	6,500		6,500	8.97	
Apron	PGHS	1,570		1,570	2.17	
Total		**11,935**	**60,545**	**72,480**		**16%**
Area (ac)		**0.27**	**1.39**	**1.66**		

The proposed reservoir is located within TDA #1 and TDA #2, as it is located at the crest of the site. As a result, the delineation of the proposed TDAs has been slightly adjusted to reflect on-site conditions. Specifically, the entire roof of the proposed reservoir is proposed to drain into TDA #1. To balance this change, an equivalent area has been added to TDA #2. Refer to Figure 3 for proposed delineation.

The two TDAs will manage on-site stormwater separately. TDA #1 will preserve 65 percent of the TDA in a forest condition; therefore, Full Dispersion will be used for this TDA and flow control is not required per BMP T5.30.

TDA #2 will be considered a separate project and will have the minimum requirement thresholds applied as per the 2021 Snohomish County Drainage Manual Volume V Runoff Treatment BMP's page 44:

> *"The portion of the developed area which is not managed through full dispersion can be considered a separate project site. It must be evaluated against the thresholds in Figures 1.1 and 1.2 of Volume I, whichever is appropriate, to determine the applicable minimum requirements."*

TDA #2 proposes 8,070 sf of new plus replaced impervious surface (6,500 sf of HMA and 1,570 sf of concrete apron around the reservoir).

3. Minimum Requirements

The Project is subject to Minimum Requirements (MR's) 1 through 9 in accordance with SCC 30.63A and the County's adopted stormwater management manual, the Snohomish County Drainage Manual (Snohomish County, 2021), dated July 2021. The flow chart shown in Figure 1.2 of Volume I of the Drainage Manual was used to determine the applicable MR's, see Figure 4: Minimum Requirements for Redevelopment Projects. The following bullets provide a narrative for each step of the flow chart.

- The Project is not exempt from all MR's per SCC 30.63A SCC.
- The Project is not exempt from all MR's except MR2 per Chapter 30.63A SCC.
- The Project redevelopment is not road related.
- The Project does add 2,000 sf or more of new plus replaced hard surface.
- The Project does add 5,000 sf or more of new hard surface, or convert ¾ acres or more of vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture.
- MR's 1-9 apply to new hard surface and converted vegetation area. In addition to adding 5,000 sf or more of new plus replaced hard surface.

As stated in Section 2.3, this Project will add 14,670 sf of impervious surface. New, plus replaced hard surface area is estimated at 14,670 sf. Site areas are summarized in Table 2-1.

As previously discussed in Section 2.3, the Project site consists of two TDA's. Where applicable, each TDA will be discussed for the minimum requirements.

3.1 Minimum Requirement #1 – Preparation of Stormwater Site Plans

- To comply with MR #1, information and analysis of the existing site conditions, a Site Project Plan Set, and an Off-Site Analysis was conducted. The following documents were prepared by BHC Consultants, LLC (BHC) in accordance with SCC 30.63A.400.
- Stormwater Site Plan (This Report)
- Construction SWPPP (BHC, 2025)
- State Environmental Policy Act (SEPA) Checklist

Other documents listed below were used as references:

- Snohomish County Drainage Inventory Mapping – Online Mapping Tool
- USDA NRCS Web Soil Survey (See A)
- Geotechnical Report (ZipperGeo, 2025)
- Critical Area Report (Wetland Resources, Inc., 2023)
- 2021 Snohomish County Drainage Manual

3.2 Minimum Requirement #2 – Stormwater Pollution Prevention Plan (SWPPP)

A Construction SWPPP will be prepared for this Project (BHC, 2025). It is anticipated that following the award of the Construction Contract, the Contractor will update the SWPPP and maintain the document throughout the course of Work, as needed.

All thirteen elements described in SCC 30.63A.450 through 30.63A.510 will be addressed as a stand-alone SWPPP document. Site disturbance will exceed the 1.0-acre threshold; therefore, coverage under the Department of Ecology's Construction Stormwater General Permit is anticipated to be required.

3.3 Minimum Requirement #3 – Source Control of Pollution

There will be no permanent sources of pollution resulting from the completed Project. Temporary pollutants may be present during construction of the Project. The Contractor is required by the terms of the Construction Contract to submit a Spill Prevention and Control Countermeasure (SPCC) Plan and maintain a copy of the plan on-site during construction.

Pollutants, including waste materials and demolition debris, that occur on-site will be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken so that the site will be kept clean, well-organized, and free of debris. Pollutants that could potentially be present on-site during construction are listed in Table 3-1.

Table 3-1
List of Potential Pollutants

Pollutant	Pollutant Source
Diesel and Gasoline Fuel	Construction Vehicles and Equipment
Engine Oil	Construction Vehicles and Equipment
Hydraulic Fluid	Construction Vehicles and Equipment
Engine Coolant	Construction Vehicles and Equipment
Reservoir Coating Materials	Reservoir Coating Equipment

The Contractor shall provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment.

Vehicles, equipment, and petroleum product storage/dispensing areas will be inspected regularly to detect leaks or spills, and to identify maintenance needs to prevent leaks or spills.

- On-site fueling tanks and petroleum product storage containers will include secondary containment.
- Spill prevention measures, such as drip pans, will be used when conducting maintenance and repair of vehicles or equipment.
- To perform emergency repairs on-site, temporary plastic will be placed beneath and, if raining, over the vehicle.
- Contaminated surfaces will be cleaned immediately following any discharge or spill incident.

The Pollution Prevention Team for this Project are listed in Table 3-2.

Table 3-2
Pollution Prevention Team

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	To be determined (TBD)	-
Project Engineer	Max Selin, Snohomish PUD	425-397-3033
Project Inspector	Lee Ervin, Snohomish PUD	425-359-1445
Emergency Ecology Contact	Northwest Regional Office	425-649-7000
Emergency Permittee/Owner Contact	Max Selin, Snohomish PUD	425-397-3033
Non-Emergency Owner Contact	Lee Ervin, Snohomish PUD	425-359-1445
Monitoring Personnel	TBD, same as CESCL	-
Ecology Regional Office	Northwest Regional Office	425-649-7000

3.4 Minimum Requirement #4 – Preservation of Natural Drainage Systems and Outfalls

The proposed development activity will not alter the existing drainage patterns. Following construction, stormwater will maintain the same conveyance route as the existing condition. Stormwater drainage patterns for the existing and proposed (developed) conditions are described in Sections 2.2 and 2.3, respectively.

3.5 Minimum Requirement #5 – On-site Stormwater Management

This Project triggers all thresholds and is required to comply with all Minimum Requirements #1 through #9. This Project will use the list approach and will consider the feasibility of all on-site stormwater management BMPs in List #2.

As stated in Section 2.3 the on-site stormwater management will be divided into two TDA's and Minimum Requirements #5 through #7 will be considered for each TDA.

3.5.1 TDA #1

On-site Stormwater Management BMPs from List #2 of the Snohomish County Drainage Manual will be applied for each type of surface in List #2. See Table 3-3 for the List #2 BMPs and the feasibility of each for this Project. TDA #1 will protect 65 percent of the forested state and therefore BMP T5.30: Full Dispersion is considered feasible. All hard surfaces in TDA #1 will be fully dispersed on site to native vegetation.

Where topography allows, a portion of the properties' impervious areas will be fully dispersed per BMP T5.30. The rest of the site will use roof runoff dispersion and sheet flow dispersion to satisfy Minimum Requirement #5.

Table 3-3
List #2 BMP TDA #1 Feasibility

List #2 BMPs	Comment Regarding Feasibility for this Project
BMPs for lawn and landscaped areas:	
1. Post-Construction Soil Quality and Depth in accordance with BMP T5.13 in volume V, Chapter 5.	Feasible: BMP T5.13 is feasible and will be applied to the design.
BMPs for roofs:	
1. Full Dispersion in accordance with BMP T5.30 in Volume V, Chapter 5 or Downspout Full Infiltration Systems in accordance with BMP T5.10A in Volume III, Chapter 3.	This Project will preserve 65 percent of the forested condition and therefore BMP T5.30 Full Dispersion is considered feasible. TDA #1 will be managed using Full Dispersion.
2. Bioretention in accordance with Volume V, Chapter 7.	This BMP was not considered because Full Dispersion is feasible, see item 1, above.
3. For single-family residential roofs and commercial roofs determined by Snohomish County to have similar runoff pollution characteristics to single-family residential roofs, Downspout Dispersion Systems in accordance with BMP T5.10B in Volume III, Chapter 3.	This BMP was not considered because Full Dispersion is feasible, see item 1, above.

List #2 BMPs	Comment Regarding Feasibility for this Project
4. For single-family residential roofs and commercial roofs determined by Snohomish County to have similar runoff pollution characteristics to single-family residential roofs, Perforated Stub-out Connections in accordance with BMP T5.10C in Volume III, Chapter 3.	This BMP was not considered because Full Dispersion is feasible, see item 1, above.
BMPs for other hard surfaces:	
1. Full Dispersion in accordance with BMP T5.30 in Volume V, Chapter 5.	This Project will preserve 65 percent of the forested condition and therefore BMP T5.30 Full Dispersion is considered feasible. TDA #1 will be managed using Full Dispersion.
2. Permeable pavement in accordance with BMP T5.15 in Volume V, Chapter 5. Note: This is not a requirement to pave these surfaces. Where pavement is proposed, it must be permeable to the extent feasible unless full dispersion is employed.	This BMP was not considered because Full Dispersion is feasible, see item 1, above.
3. Bioretention in accordance with Volume V, Chapter 7.	Feasible: Surface water runoff from hard surfaces will sheet flow into the vegetated area to the to the west of the driveway, towards Stream A.
4. Sheet Flow Dispersion in accordance with BMP T5.12, or Concentrated Flow Dispersion in accordance with BMPT5.11 in Volume V, Chapter 5.	This BMP was not considered because Full Dispersion is feasible, see item 1, above.

3.5.2 TDA #2

On-site Stormwater Management BMPs from List #2 of the Snohomish County Drainage Manual will be applied for each type of surface in List #2. See Table 3-4 for the List #2 BMPs and the feasibility of each for TDA #2. This TDA will use a combination of Sheet Flow Dispersion and biofiltration swales to manage the proposed hard surfaces.

Table 3-4
List #2 BMP TDA #2 Feasibility

List #2 BMPs	Comment Regarding Feasibility for this Project
BMPs for lawn and landscaped areas:	
1. Post-Construction Soil Quality and Depth in accordance with BMP T5.13 in volume V, Chapter 5.	Feasible: BMP T5.13 is feasible and will be applied to the design.

List #2 BMPs	Comment Regarding Feasibility for this Project
BMPs for roofs:	
1. Full Dispersion in accordance with BMP T5.30 in Volume V, Chapter 5 or Downspout Full Infiltration Systems in accordance with BMP T5.10A in Volume III, Chapter 3.	Infeasible: TDA #2 does not have a 65 percent forested condition and therefore full dispersion is considered infeasible.
2. Bioretention in accordance with Volume V, Chapter 7.	Infeasible: Per the geotechnical report, the soils are unsuitable for infiltration BMP's.
3. For single-family residential roofs and commercial roofs determined by Snohomish County to have similar runoff pollution characteristics to single-family residential roofs, Downspout Dispersion Systems in accordance with BMP T5.10B in Volume III, Chapter 3.	There are no roof areas within this TDA. All proposed roof areas on site will be managed within TDA #1.
4. For single-family residential roofs and commercial roofs determined by Snohomish County to have similar runoff pollution characteristics to single-family residential roofs, Perforated Stub-out Connections in accordance with BMP T5.10C in Volume III, Chapter 3.	There are no roof areas within this TDA. All proposed roof areas on site will be managed within TDA #1.
BMPs for other hard surfaces:	
1. Full Dispersion in accordance with BMP T5.30 in Volume V, Chapter 5.	TDA #2 does not have a 65 percent forested condition and therefore full dispersion is considered infeasible.
2. Permeable pavement in accordance with BMP T5.15 in Volume V, Chapter 5. Note: This is not a requirement to pave these surfaces. Where pavement is proposed, it must be permeable to the extent feasible unless full dispersion is employed.	Infeasible: The steep slopes near the edge of the roadway make permeable pavements infeasible.
3. Bioretention in accordance with Volume V, Chapter 7.	Infeasible: Per the geotechnical report, the soils are unsuitable for infiltration BMP's.
4. Sheet Flow Dispersion in accordance with BMP T5.12, or Concentrated Flow Dispersion in accordance with BMPT5.11 in Volume V, Chapter 5.	Due to the requirement of treatment for the proposed PHGS in this TDA, the Project will use a combination of Sheet Flow Dispersion and biofiltration swales to manage all proposed hard surfaces in TDA #2.

3.6 Minimum Requirement #6 – Runoff Treatment

According to Section I-2.5.6 of the Snohomish County Drainage Manual, stormwater treatment facilities must be constructed in any area with a total pollution-generating hard surface (PGHS) of 5,000 sf or more. This Project will create more than 5,000 sf of PGHS, which means that runoff treatment is required to be considered for each TDA.

3.6.1 TDA #1

TDA #1 will create less than 5,000 sf of PGHS and, therefore, is not required to comply with Minimum Requirement #6.

3.6.2 TDA #2

TDA #2 will create more than 5,000 sf of PGHS and, therefore, will need to comply with MR #6. Below is a step-by-step process for selecting the appropriate treatment facilities. See Figure 5: Water Quality Menu Selection Flowchart from the Snohomish County Drainage Manual, Volume 1, Chapter 4, Section 4.2, Step 5.

Step 5a: Determine the Receiving Waters and Pollutants of Concern Based on Off-Site Analysis.

Runoff generated by TDA #2 drains to an unnamed creek near Burn Road. Based on the July 2023 "Critical Area Technical Memorandum for Burn Road Reservoir" by Wetland Resources, Inc., the receiving water was determined to be non-fish bearing. It is not anticipated that the hard surfaces on site would generate pollutants which could contribute to the identified creek.

Step 5b: Determine if an Oil Control Facility is Required.

As the Project site is not a commercial or industrial site, does not contain commercial, industrial, petroleum storage or transfer facilities, and has average daily traffic counts of less than 100 vehicles per 1,000 sf of building area, oil control facilities are not required.

Step 5c: Determine if Infiltration for Pollutant Removal is Practicable.

Due to the unsuitable soil for infiltration, stormwater treatment using infiltration is not recommended. See the geotechnical report in Appendix B for more information.

Step 5d: Determine if Control of Phosphorous is Required.

Based on the July 2023 "Critical Area Technical Memorandum for Burn Road Reservoir" by Wetland Resources, Inc., the receiving water was determined to be non-fish bearing. Based on this review, Phosphorus control is not required at the Project site. See Figure 6: Wetland Protection Flow Chart.

Step 5e: Determine if Enhanced Treatment is Required.

As the Project site is neither a high Average Annual Daily Traffic (AADT) roadway, nor a commercial, industrial, or multi-family residential site, enhanced water quality treatment is not required.

Step 5f: Select a Basic Treatment Facility.

Basic water quality treatment facilities are required at the Project site. BMP T9.10 Basic Biofiltration Swale will be used to treat PGHS in TDA #2 and is discussed further in Section 5 of this Report.

3.7 Minimum Requirement #7 – Flow Control

According to Section I-2.5.7 of the Snohomish County Drainage Manual, stormwater flow control facilities must be constructed in any area with a total of effective impervious surface of 10,000 sf or more. This Project will create more than 10,000 sf of PGHS, which means that stormwater flow control is required to be considered for each TDA.

3.7.1 TDA #1

TDA #1 will fully disperse all hard surfaces per BMP T5.30 Full Dispersion. Impervious surfaces that are dispersed through at least 100 feet of native vegetation are considered ineffective impervious surfaces. Because TDA # 1 does not have any effective impervious surfaces it is not required to comply with MR #7.

3.7.2 TDA #2

TDA #2 proposes to create less than 10,000 sf of impervious surface, convert fewer than 3/4 acre of native vegetation into lawn or landscape, convert less than 2.5 acres of native vegetation into pasture, and increase the 100-year flow rate by less than 0.15 cubic feet per second (cfs). As a result, TDA #2 is not required to comply with MR #7. Table 3-5 summarizes predeveloped and mitigated flows within TDA #2, calculated using the Western Washington Hydrology Model (WWHM2012). For additional model output, please refer to Appendix D that includes the complete WWHM2012 report.

Table 3-5
TDA #2 Flow Frequency

Flow Frequency	Predeveloped Condition Peak Flow (cfs)	Mitigated Condition Peak Flow (cfs)
2-Year	0.18	0.23
5-Year	0.28	0.35
10-Year	0.36	0.43
25Year	0.48	0.55
50-Year	0.57	0.65
100-Year	**0.68**	**0.75**

3.8 Minimum Requirement #8 – Wetlands Protection

This Project is required to protect wetlands, as defined by thresholds in the Snohomish County Drainage Manual.

3.8.1 TDA #1

Stormwater from TDA #1 indirectly outfalls to offsite Wetland A, a Category II Wetland via Full Dispersion. This TDA does not trigger the requirement for flow control, and therefore, only the General Protection and Protection from Pollutants requirements are needed for this Project for MR #8. This is accomplished by meeting the requirements of the Snohomish County Drainage Manual, including a SWPPP as provided. For more information regarding the off-site wetland, please see Appendix C.

3.8.2 TDA #2

Stormwater from TDA #2 will not be discharged to wetlands.

3.9 Minimum Requirement #9 – Operation and Maintenance (O&M)

This Project is required to have an O&M manual, as defined by thresholds in the Snohomish County Drainage Manual. The property owner(s) will be responsible for operating and maintaining these proposed facilities as required to meet City and State requirements. The O&M Manual included in Appendix E of this Report contains applicable information needed to maintain the stormwater facilities constructed by this Project, as well as relevant operational and structural source control BMPs.

4. Upstream and Downstream Analysis

4.1 Upstream Analysis

The Project site is located at a high point within the property and there is no surface water running onto the site.

4.2 Downstream Analysis

Stormwater from the existing impervious area is directed north towards the gravel driveway and vegetated areas around the building for biofiltration. Existing site stormwater travels to the west towards Wetland A or to the east towards Wetlands B, C, and D. Stormwater from the proposed new reservoir roof will be dispersed to the west, towards Wetland A, if not infiltrated into the vegetated area around it. Stormwater from the access driveway within the site will be routed to the east towards Wetland B, C, and D. Existing conditions drainage patterns will be maintained in the post-project condition. According to the Critical Areas Study a riverine feature (Stream B) crosses the eastern portion of the property's panhandle near the Burn Road and 148th St intersection (WRI, 2023). Stream B is located in the vicinity of Wetlands B, C, and D. Stream B continues south adjacent to Burn Road before draining into the South Fork Stillaguamish River approximately 3.8 miles downstream of the property. Wetland A outlets to Stream A, which continues north and then drains to the east, eventually discharging into the South Fork of the Stillaguamish River approximately 2.4 miles from the site. The Project area falls within the Port Susan drainage basin within the Stillaguamish Watershed (WRIA 5:7). Appendix F provides maps to show downstream flow paths.

5. Permanent Stormwater Control Plan

5.1 Flow Control and Water Quality Design

5.1.1 Water Quality Treatment

TDA #2 has over 5,000 sf of PGHS surfaces, which requires the construction of stormwater quality treatment facilities in accordance with Volume I, Section 2.5.6 of the Snohomish County Drainage Manual. Treatment will be provided through a basic biofiltration swale located adjacent to the proposed driveway. This facility was sized using water quality treatment flows from WHM2012 and the sizing procedures outlined in the Snohomish County Drainage Manual. The WWHM2012 Model Report and biofiltration swale sizing calculations can be found in Appendix D. The facility geometry is detailed in Table 5-1 below. Additionally, the location of the Biofiltration Swale at the Project site is shown on Sheet C-5 of the Drawings.

Table 5-1
TDA #2 Biofiltration Swale Facility Dimensions

Feature	Dimension
Length	100 ft
Bottom Width	2 ft
Top Width	8 ft
Depth	1 ft
Side Slope	3:1

5.1.2 Flow Control

Since TDA #2 does not meet the required thresholds outlined in Section 3.7, this Project is not required to provide flow control.

6. Construction Stormwater Pollution Prevention Plan

All thirteen elements described in SCC 30.63A.450 through 30.63A.510 will be addressed as a stand-alone SWPPP document. Site disturbance will not exceed the 1.0-acre threshold; therefore, coverage under the Department of Ecology's Construction Stormwater General Permit is not required.

7. Operation and Maintenance (O&M) Manual

Proper inspection and maintenance of the biofiltration swale, catch basins, dispersion trench, rock pad, and conveyance channels will extend life and reduce the amount of sediment accumulated in these facilities over time within the conveyance system both upstream and downstream. This in turn will reduce the frequency of maintenance required for the conveyance system and increase its life.

The O&M plans for the Project are listed as follows:

- Facilities should be inspected annually and after major storms. The maintenance standards contained in Appendix E are measures for determining if maintenance actions are required as identified through the annual inspection. The inspection and maintenance schedule may require adjustment based upon observations made during inspection.
- Sediment should be removed from catch basins as recommended in Appendix E. Sediments should be tested for toxicants in compliance with current disposal requirements. According to Snohomish County Drainage Manual Volume VI - Stormwater Facility Maintenance, sediments must be disposed of in accordance with the Snohomish County Code and Washington State laws, including Minimum Functional Standards for Solid Waste Handling. For more information on disposal options refer to the Snohomish Health District or Snohomish County Solid Waste Department.
- Trash and debris should be removed periodically from catch basins, trash racks, and the biofiltration swale.
- The biofiltration swale should be mowed when the grass length exceeds 10-inches in height. Additional recommendations are provided in Appendix E.
- Ditches should be monitored for erosion and accumulated sediment. Displaced rock and soil should be replaced to the original lines and grades.
- Dispersion trenches and rock pads should be monitored for erosion and oversaturated areas periodically after storm events. Additional recommendations are provided in Appendix E.

8. References

BHC Consultants, LLC (BHC). Stormwater Pollution Prevention Plan (SWPPP) for Burn Road 726 Reservoir. May 2025

MurraySmith. (2022). Snohomish County PUD 2021 Water System Plan. December 2022.

Snohomish County. (2021). *Snohomish County Drainage Manual.* Snohomish County. July 2021.

Snohomish County. (n.d.). Snohomish County Unified Development Code – Chapter 30.63A – Drainage Code. Washington, Snohomish: Snohomish County.

United States of Agricultrue (USDA) Natural Resources Conservation Service (NRCS). (September 2023). *Web Soil Survey*. Retrieved from USDA: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Wetland Resources, Inc. (2023). *Critical Area Technical Memorandum for Burn Road Reservoir. July 2023.*

ZipperGeo Geoprofessional Consultants (ZipperGeo). (2025). *Geotechnical Engineering Report, Burn Road 726 Reservoir. May 2025.*

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FIGURES

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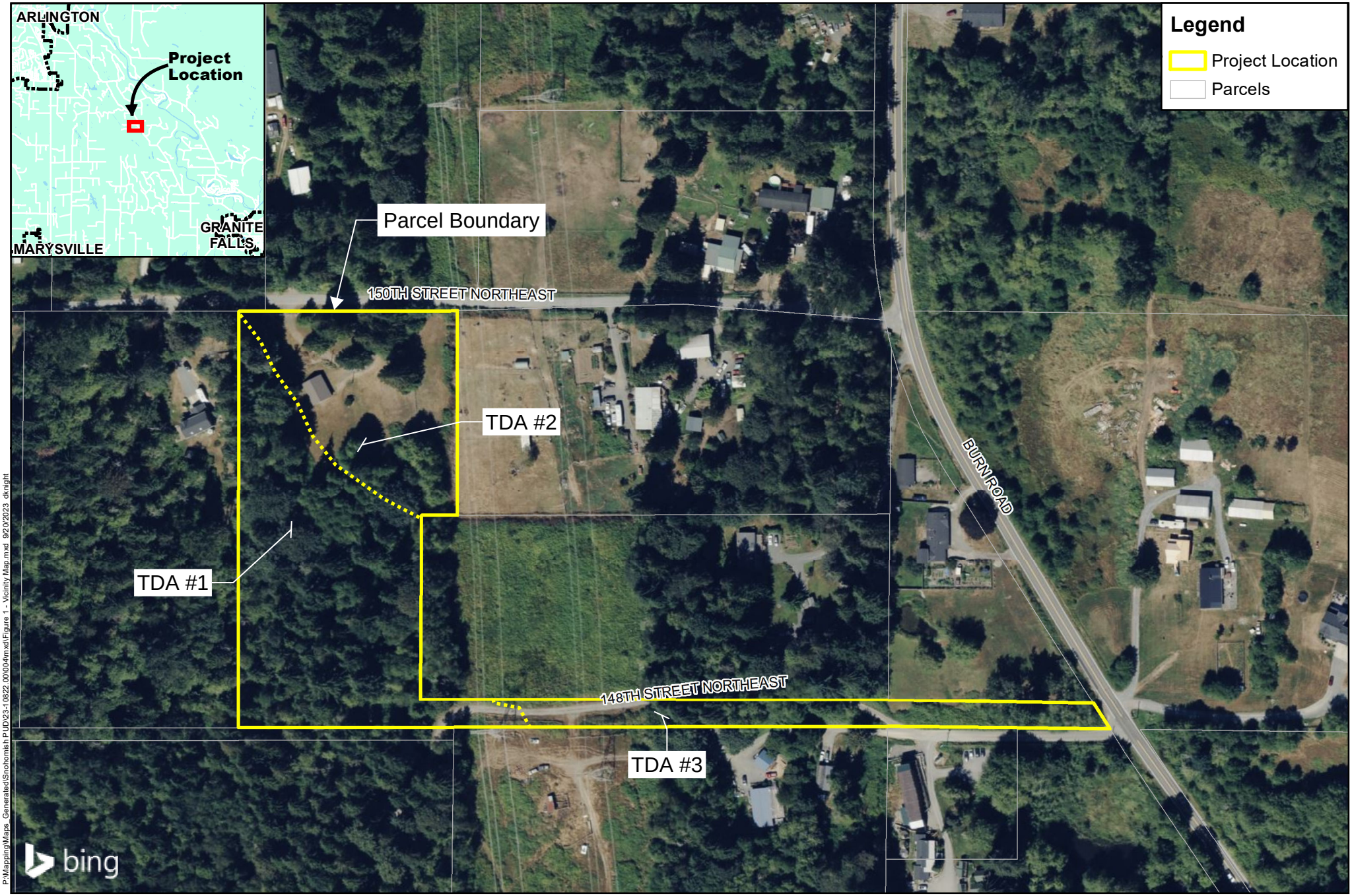


P:\Mapping\Maps_Generated\Snohomish PUD\23-10822.00\004\mxd\Figure 1 - Vicinity Map.mxd 9/20/2023 dknight

GIS Data Source: Snohomish County
This map is a geographic representation based on information available. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

bhc CONSULTANTS

0 50 100 200 Feet

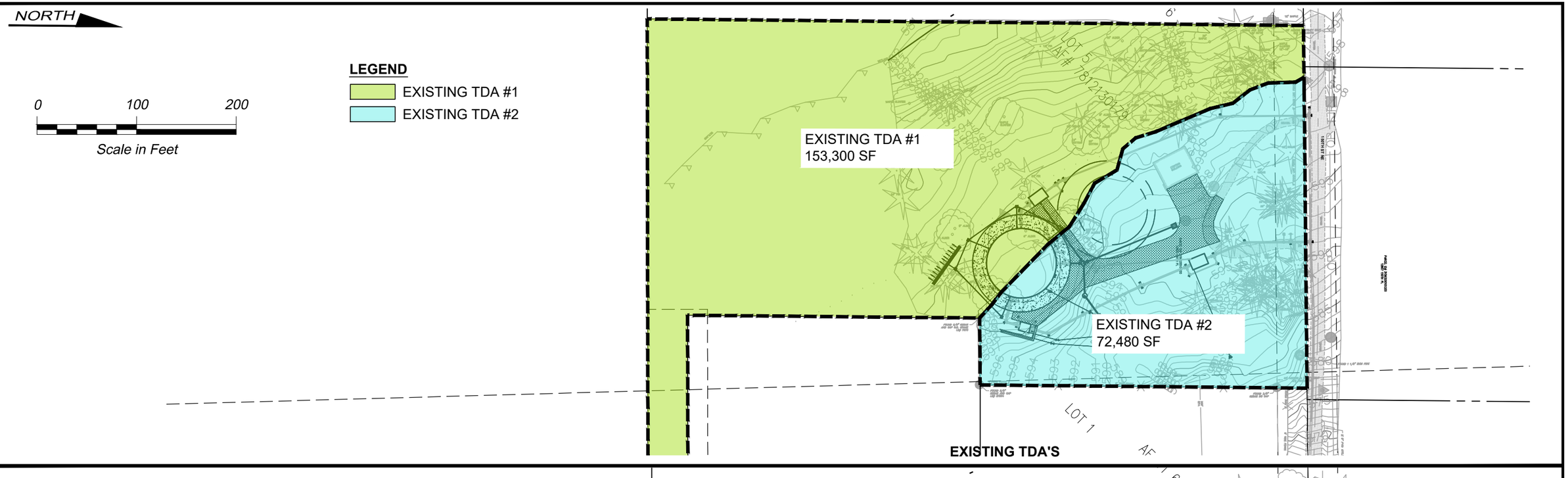
N

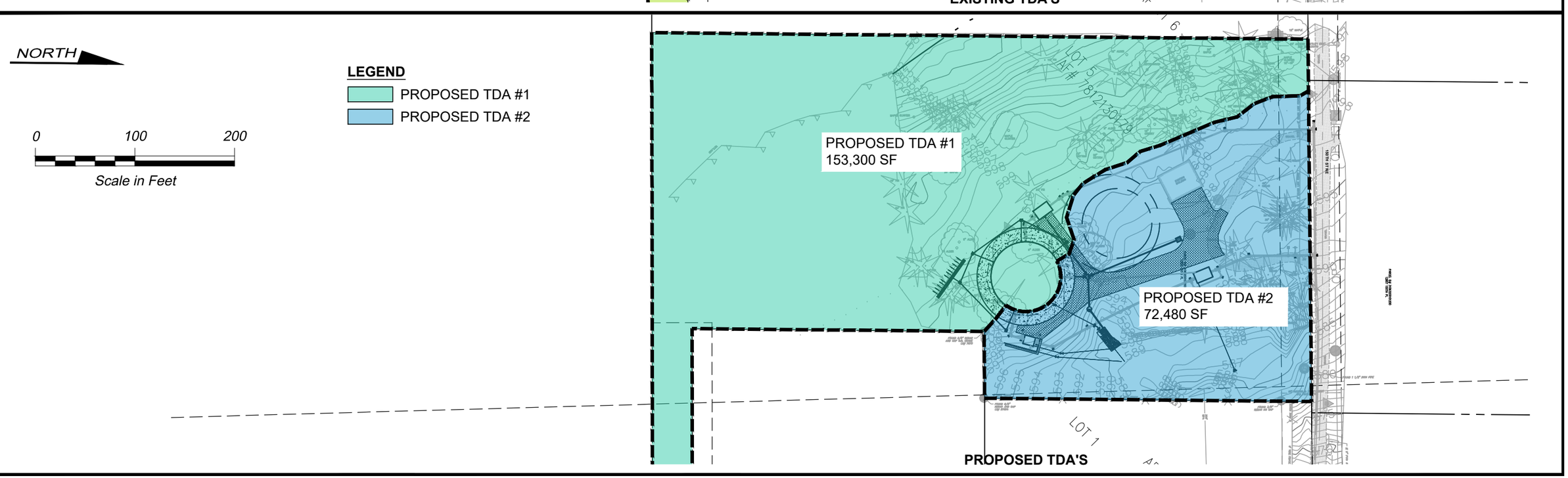
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO. 1

Vicinity Map

Burn Road 726 Zone Reservoir
Snohomish County PUD No. 1
May 2025

Figure 1





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SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO. 1

Existing and Proposed Threshold Discharge Areas

Stormwater Report

May 2025

Figure **2**

NORTH

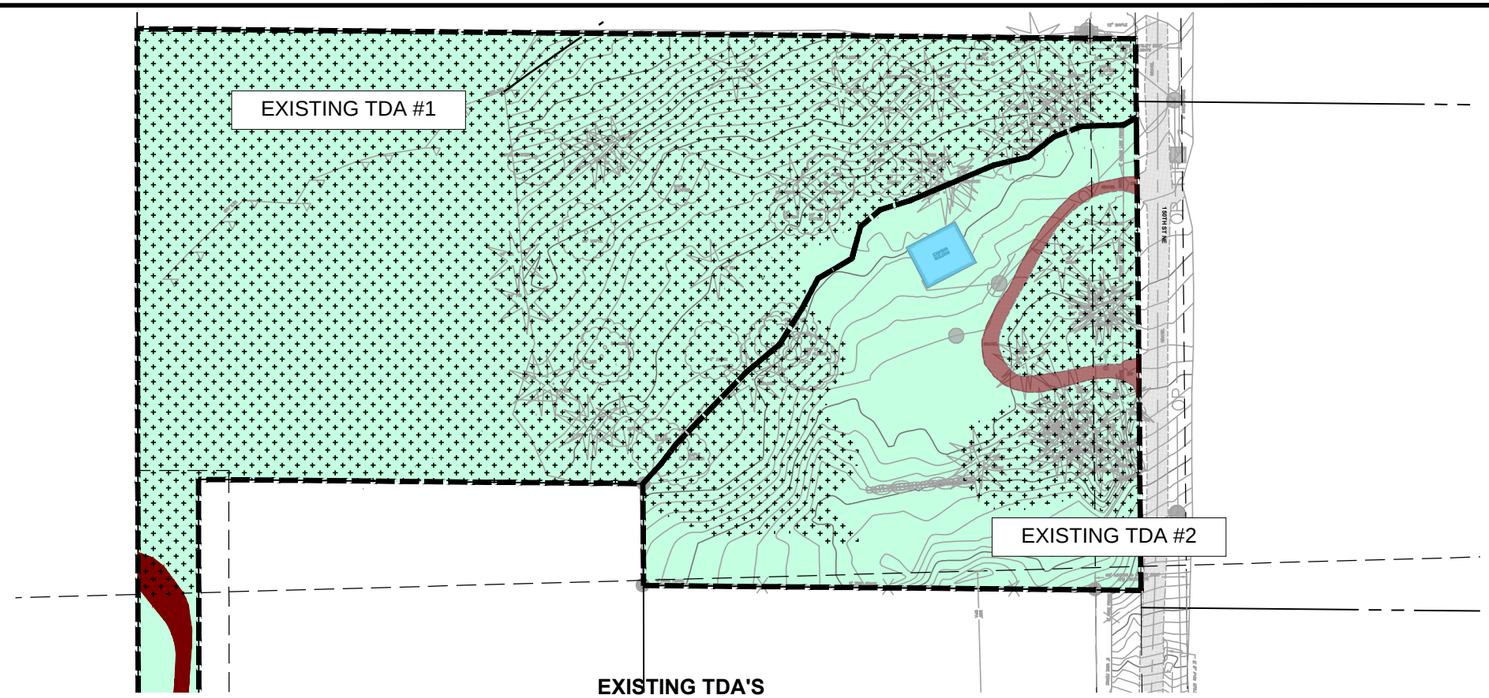
0 100 200

Scale in Feet

LEGEND

- EXISTING PGHS*
- EXISTING NPGHS*
- EXISTING PERVIOUS SURFACE
- EXISTING FOREST

*POLLUTION GENERATING HARD SURFACE
NON-POLLUTION GENERATING HARD SURFACE



EXISTING TDA'S

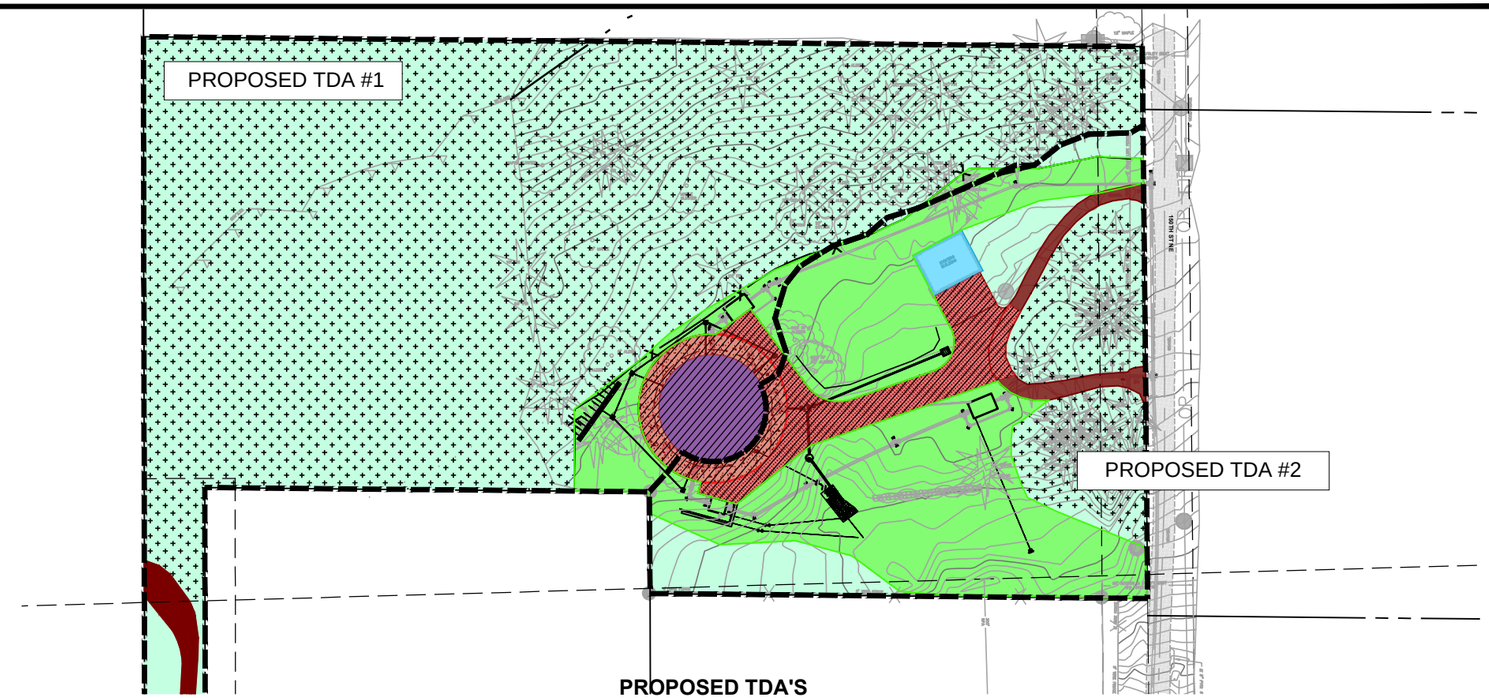
NORTH

0 100 200

Scale in Feet

LEGEND

- NEW PGHS
- NEW NPGHS
- UNAFFECTED PGHS
- UNAFFECTED NPGHS
- UNAFFECTED PERVIOUS
- RESTORED PERVIOUS
- NEW HARD SURFACE
- UNAFFECTED FOREST



PROPOSED TDA'S

bhc CONSULTANTS

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO. 1

Existing and Proposed Land Cover

Stormwater Report

May 2025

Figure

3

Figure 4 Minimum Requirements for Redevelopment Projects

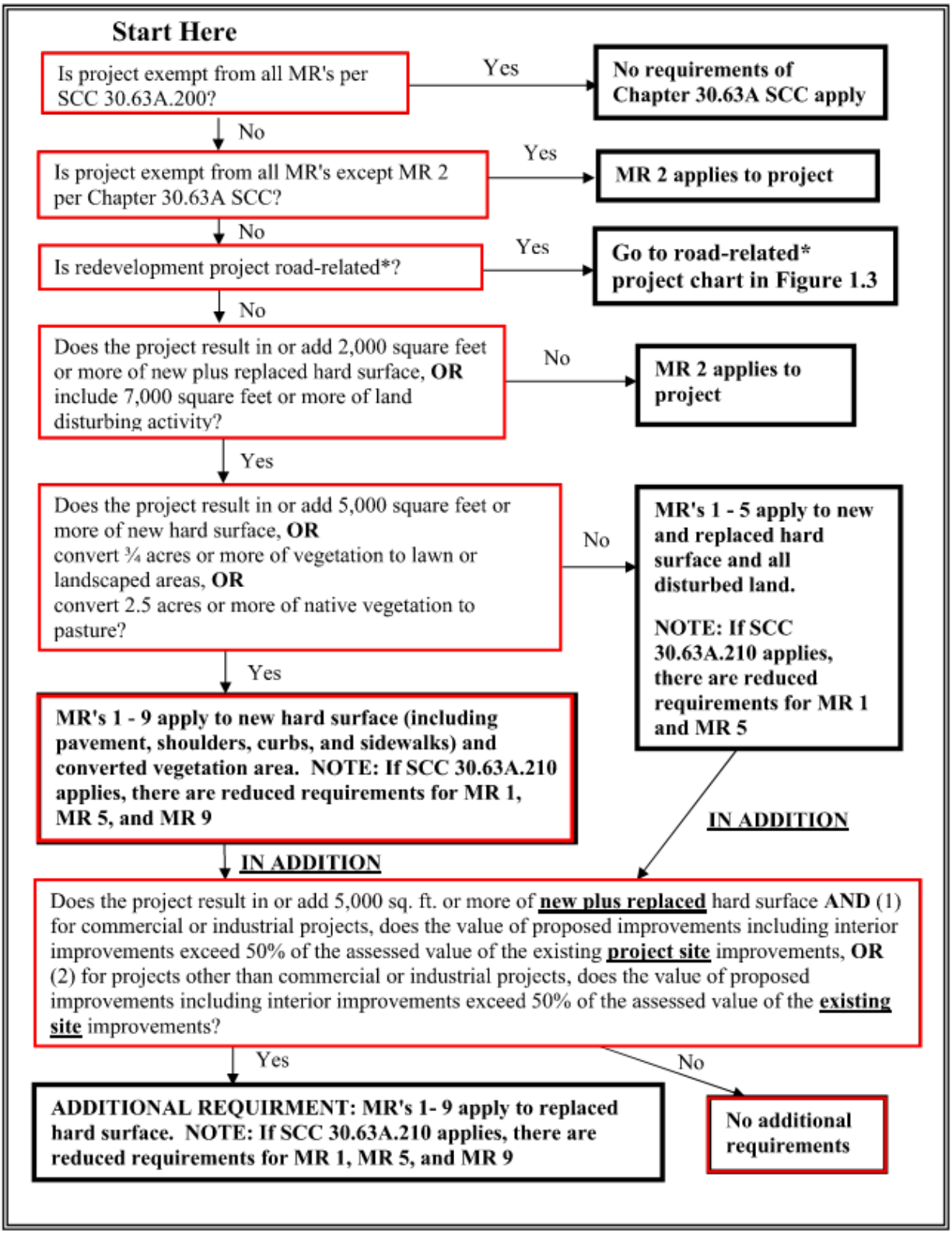


Figure 5 Water Quality Menu Selection Flow Chart

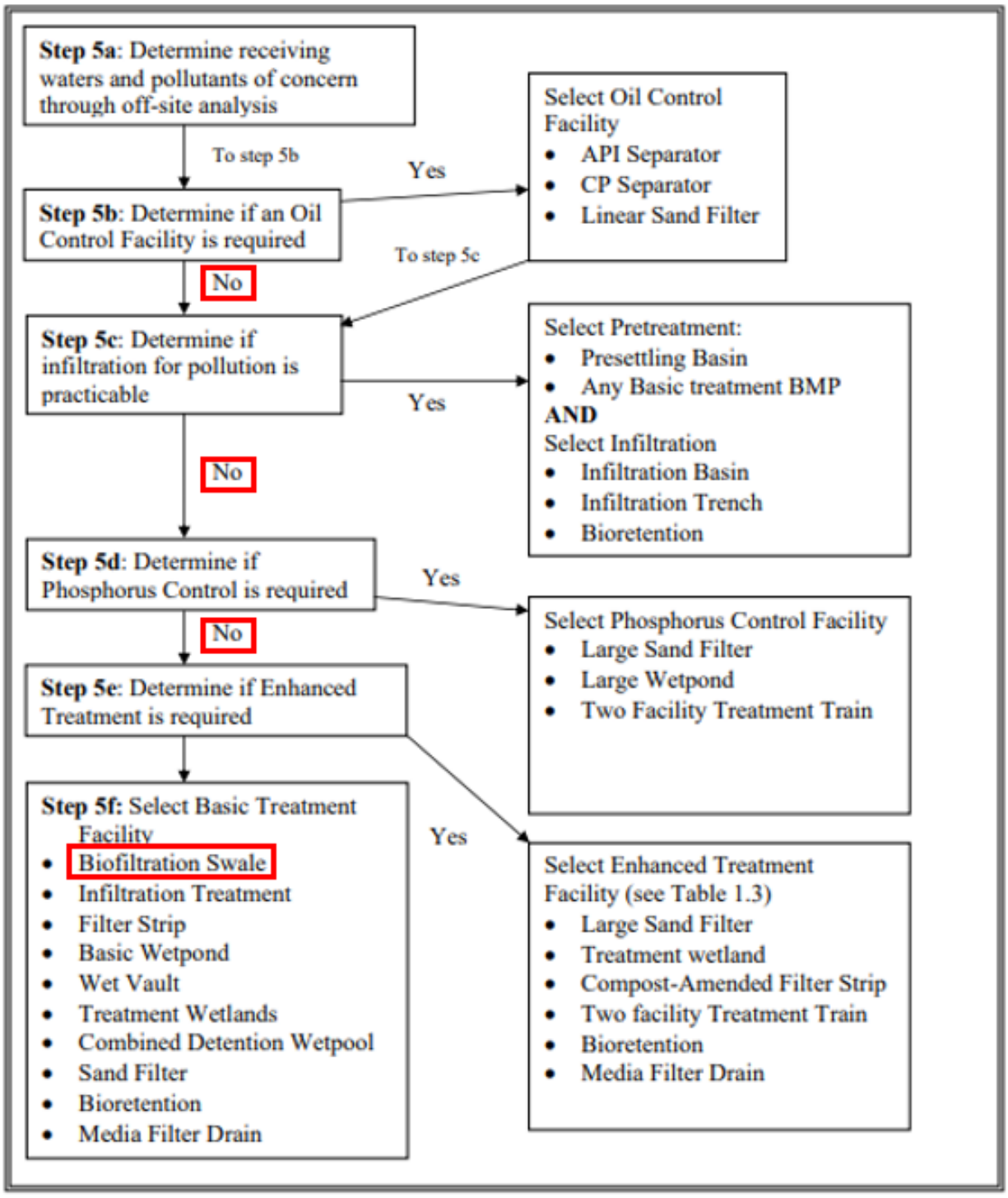
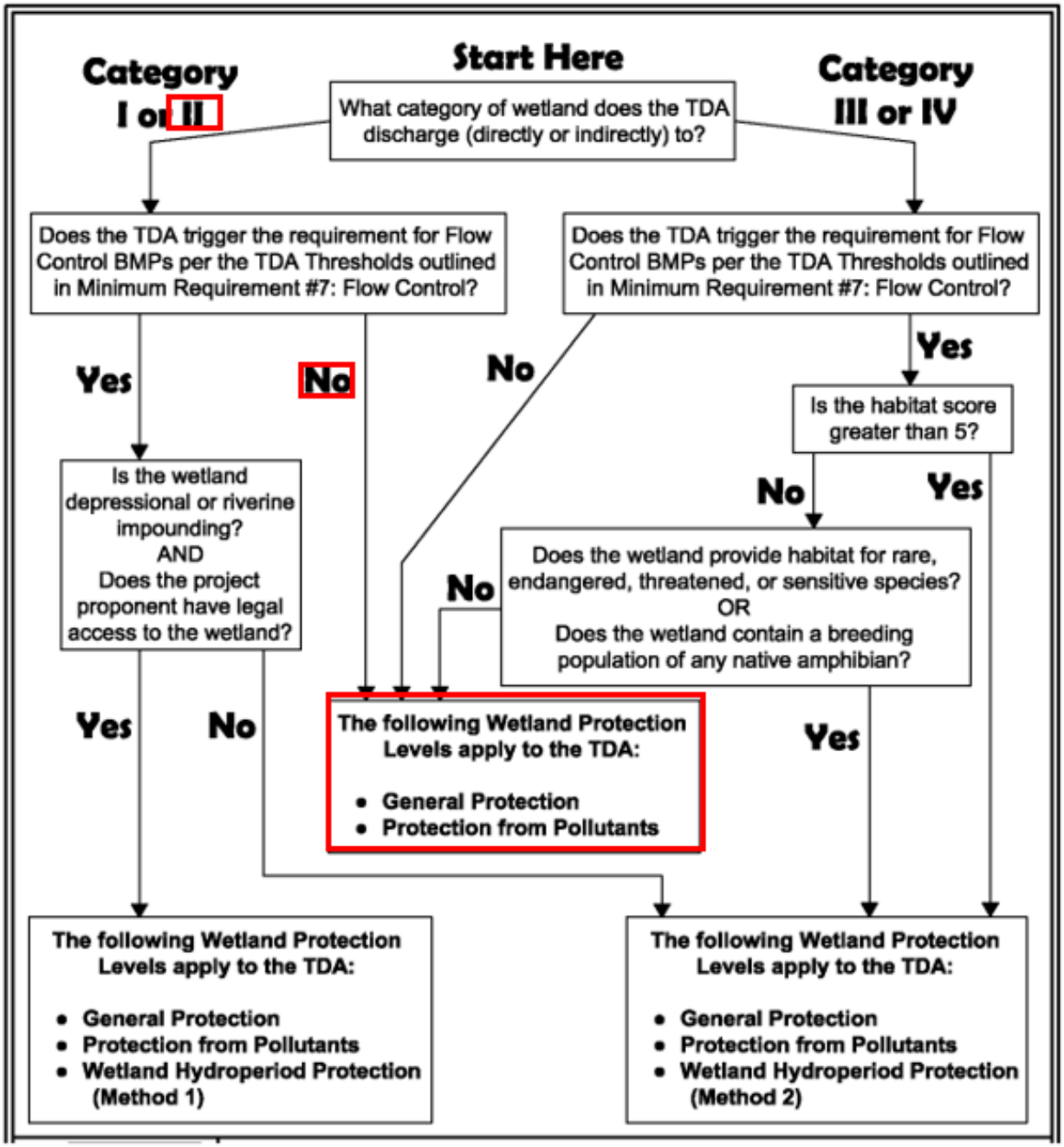


Figure 6 Wetland Protection Flow Chart



DRAWINGS

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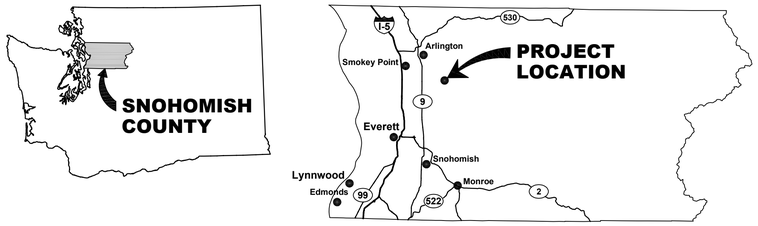
PUD NO. 1 OF SNOHOMISH COUNTY
BURN ROAD RESERVOIR
WE #965 WO #100099341

NE 1/4 SEC. 32, TWP 31 N., RNG. 06 E., W.M.
CITY OF ARLINGTON, SNOHOMISH COUNTY, WASHINGTON

MAY 2025

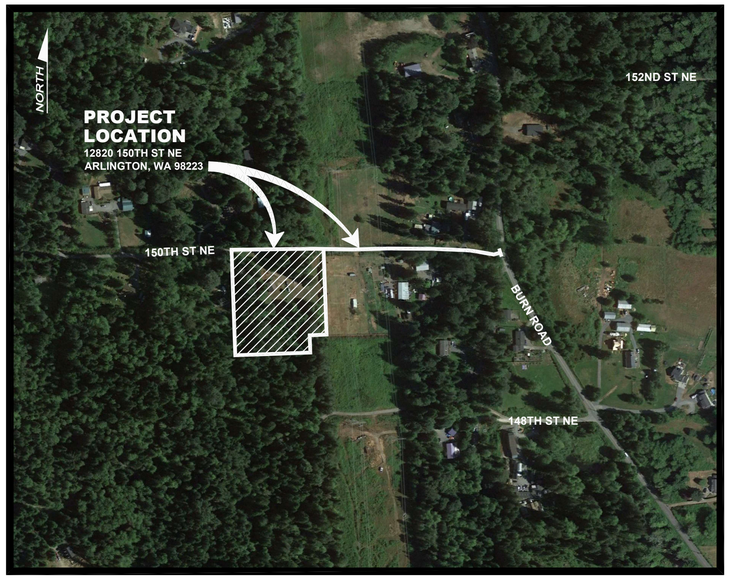
INDEX OF DRAWINGS

LOCATION MAPS



SNOHOMISH COUNTY

VICINITY MAP



PROJECT CONTACT INFORMATION

PROJECT MANAGER:	MAX SELIN, P.E. (425) 397-3033 WORK (425) 231-1663 CELL
WATER CONSTRUCTION INSPECTOR:	ZACH MCKINNEY (425) 239-0794 CELL
ADDRESS:	SNOHOMISH COUNTY PUD NO. 1 PO BOX 1107 EVERETT, WA 98206

PREPARED BY

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1601 Fifth Avenue, Suite 500
Seattle, Washington 98101

206.505.3400
206.505.3406 (fax)
www.bhcconsultants.com

IN ASSOCIATION WITH:

EVERGREEN COATING ENGINEERS, LLC - RESERVOIR DESIGN AND COATING SYSTEMS

NORTHWEST CORROSION ENGINEERS - CATHODIC PROTECTION

DAVID EVANS AND ASSOCIATES, INC - SURVEY

ZIPPER GEO ASSOCIATES, LLC - GEOTECHNICAL ENGINEERING

WETLAND RESOURCES, INC. - CRITICAL AREAS

EQUINOX RESEARCH AND CONSULTING INTERNATIONAL, INC. (ERCI) - CULTURAL RESOURCES

Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
COVER, PROJECT LOCATION MAPS, AND INDEX OF DRAWINGS

CARLA G. TALICH
STATE OF WASHINGTON
37426
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	PLS
CHECKED	CGT
SCALE	NTS

WO# 100099341

WE–	965
DWG #	G-1
SHEET	1
OF	37

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Xref Filename: | X23-10882_TB | Talich | X23-10882_Status | Rogers | Stevens | Gibson | McCroskey | Whitehood | Gillespie | Dahl |

SURVEY NOTES

1. **PURPOSE OF THIS SURVEY** THIS SURVEY WAS PERFORMED ON/DURING SEPTEMBER 2022 BY DAVID EVANS AND ASSOCIATES, INC., IN SUPPORT OF AN ENGINEERING SITE PLAN AND IS INTENDED TO BE USED FOR THIS PURPOSE. SPECIFIC INFORMATION SHOWN HEREON SHOULD BE VERIFIED AS TO ITS ACCURACY IF THIS SURVEY IS TO BE USED FOR PURPOSES OTHER THAN WHAT IT WAS INTENDED FOR.

2. **METHODOLOGY** FIELD MEASUREMENTS FOR THIS SURVEY WERE PERFORMED USING A TRIMBLE S7 TOTAL STATION AND A TRIMBLE R10 GPS RECEIVERS. THIS SURVEY COMPLIES WITH THE MINIMUM REQUIRED "ERROR OF CLOSURE" OF 1:10,000 FOR WASHINGTON STATE PLANE COORDINATES AS SET FORTH PER W.A.C. 332-130-090 (AND POSITIONAL TOLERANCE LEVELS OF LESS THAN 0.011 METERS).

3. **BASIS OF BEARING** WASHINGTON COORDINATE SYSTEM, NORTH ZONE, NAD83-2011 EPOCH 2010.00 COORDINATES AS ESTABLISHED BY THE WSRN.

4. **COORDINATE BASIS** ALL COORDINATES AND DISTANCES SHOWN OR DESCRIBED ON THIS SURVEY (INCLUDING THOSE OF RECORD) ARE WASHINGTON COORDINATE SYSTEM NORTH ZONE GROUND VALUES (UNLESS OTHERWISE NOTED) AND ARE BASED ON THE U.S. SURVEY FOOT. POSITIONS WERE DERIVED FROM THE WASHINGTON STATE REFERENCE NETWORK (WSRN). THE GEODETIC POLICY OF THE WSRN IS TO CONSTRAIN ALL WSRN STATIONS TO THE NATIONAL SPATIAL REFERENCE FRAMEWORK (NSRS) OF THE NATIONAL GEODETIC SURVEY (NGS). SOME OF THE WSRN STATIONS ARE NGS CORS, OTHERS HAVE BEEN BLUEBOOKED AT THE NGS, AND THE REST ARE CONSTRAINED TO NGS CORS THROUGH A RIGOROUS NETWORK ADJUSTMENT.

5. **VERTICAL DATUM** NAVD 88

6. **CONTOUR INTERVAL** 1 FEET

7. **CONTOUR LINE ACCURACY AND LIMITATION OF USE** CONTOUR LINES REPRESENTED HEREON CONFORM TO NATIONAL MAP ACCURACY STANDARDS AND ARE SUITABLE FOR CIVIL ENGINEERING DESIGN.

8. **MONUMENTATION VISITATION** ALL SURVEY MONUMENTS AND OTHER SURVEY MARKERS SHOWN HEREON WERE VISITED DURING SEPTEMBER 2022 UNLESS OTHERWISE INDICATED.

9. **ENCUMBRANCES** THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT, ACCORDINGLY, ANY EASEMENTS OR RESTRICTIONS OF RECORD WHICH MAY BE REVEALED IN A TITLE REPORT HAVE NOT BEEN INCLUDED HEREON.

10. **SUBSURFACE CONDITIONS** UNDERGROUND UTILITIES WERE LOCATED BASED ON THE SURFACE EVIDENCE OF UTILITIES (PAINT MARKS, SAW CUTS IN PAVEMENT, COVERS, LIDS, ETC.) AND AS-BUILT INFORMATION PROVIDED BY THE UTILITY PURVEYORS. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, ELEVATION AND SIZE OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

11. **1-800-424-5555** MUST BE CALLED NOT LESS THAN 48 HOURS BEFORE BEGINNING EXCAVATION WHERE ANY UNDERGROUND UTILITIES MAY BE LOCATED. FAILURE TO DO SO COULD MEAN BEARING SUBSTANTIAL REPAIR COSTS. (UP TO THREE TIMES THE COST OF REPAIRS TO THE SERVICE).

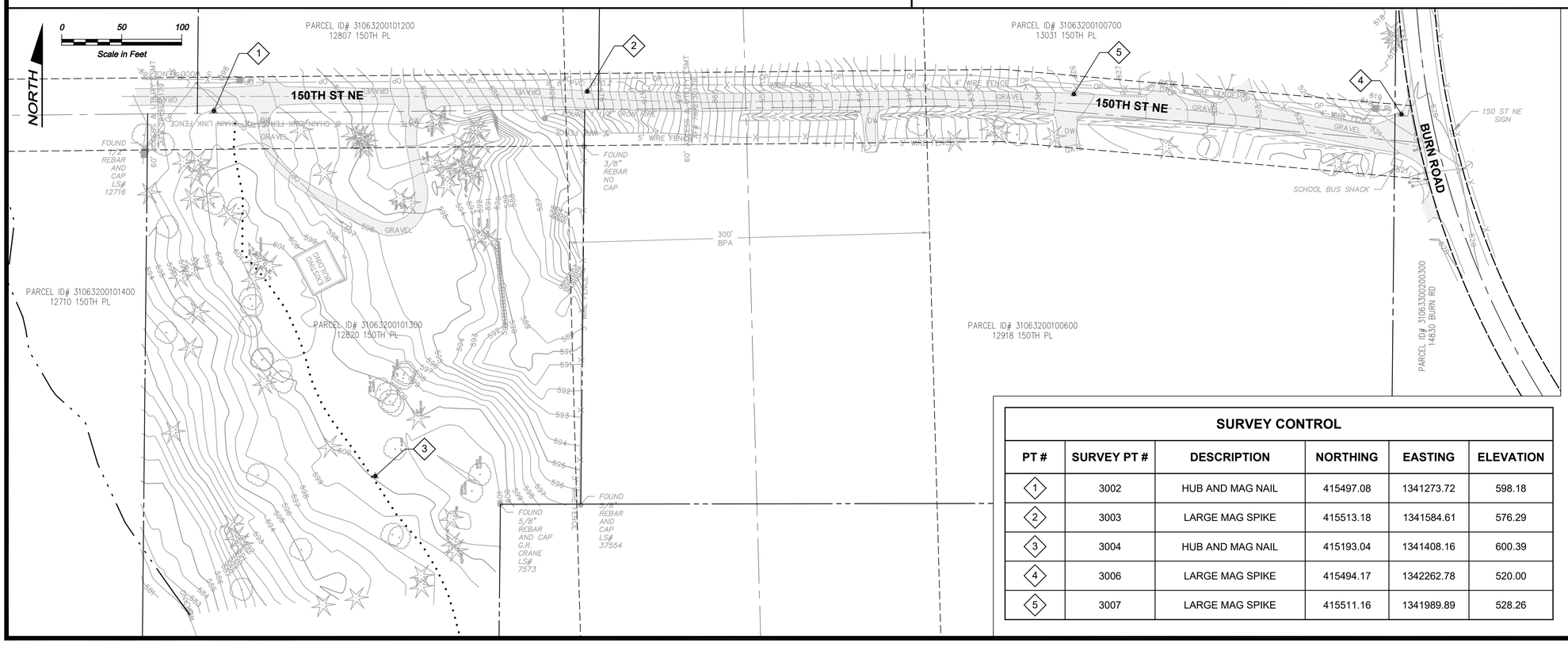
12. **PROPERTY LINES** PROPERTY LINES WERE TAKEN FROM AVAILABLE RECORDS OF SURVEYS AND PLATS.

PROJECT REFERENCE DOCUMENTS

1. CONTRACT SPECIFICATIONS
2. SNOHOMISH COUNTY ENGINEERING DESIGN AND DEVELOPMENT STANDARDS CURRENT EDITION.
   SNOHOMISH COUNTY PUD NO. 1 WATER UTILITY STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION. THE DISTRICT STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION ARE FOUND AT:
   https://www.snopud.com/wp-content/uploads/2021/08/wpp_stds.pdf
3. GEOTECHNICAL ENGINEERING REPORT (DRAFT) BURN ROAD 726 RESERVOIR PROJECT - ZIPPER GEO, LLC.
4. ARCHEOLOGICAL SURVEY REPORT - EQUINOX RESEARCH AND CONSULTING INTERNATIONAL, INC. (ERCI)
5. CRITICAL AREAS TECHNICAL MEMORANDUM - WETLAND RESOURCES, INC.
6. RECORD OF SURVEY - DAVID EVANS AND ASSOCIATES, INC.
7. SNOHOMISH COUNTY LAND DISTURBANCE PERMIT
8. SNOHOMISH COUNTY EDDS (ENGINEERING DESIGN & DEVELOPMENT STANDARDS)
9. SNOHOMISH COUNTY DRAINAGE MANUAL
10. SNOHOMISH COUNTY CONDITIONAL USE PERMIT

GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST VERSION OF THE DISTRICT'S STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION AND SNOHOMISH COUNTY EDDS. CONTRACTOR SHALL HAVE A COPY OF THESE DOCUMENTS AND A MINIMUM OF 2 SETS OF THE CONSTRUCTION DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT ON-SITE AT ALL TIMES.
2. BEFORE COMMENCING ANY CONSTRUCTION, THE CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING WITH THE DISTRICT'S ENGINEER AND CONSTRUCTION INSPECTOR.
3. CONSTRUCTION DRAWINGS MAY BE SUBJECT TO MINOR FIELD ADJUSTMENTS AS REQUIRED BY THE DISTRICT'S ENGINEER.
4. THE UTILITIES SHOWN ON THE DRAWING HAVE BEEN PLOTTED FROM AVAILABLE INFORMATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SITE CONDITIONS PRIOR TO CONSTRUCTION. IF A CONFLICT EXISTS BETWEEN WHAT IS SHOWN ON THESE DRAWINGS AND WHAT EXISTS IN THE FIELD, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE CORRECT LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION. THIS MAY BE DONE BY POTHOLING AND/OR CALLING THE UNDERGROUND UTILITIES LOCATING CENTER A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION AT 811 OR 1-800-424-5555 FOR THE UTILITIES PARTICIPATING IN ONE-CALL AND BY DIRECT CONTACT FOR ALL OTHER UTILITY COMPANIES. ANY CONFLICT WITH EXISTING UTILITIES SHALL BE MITIGATED AT THE SOLE EXPENSE OF THE CONTRACTOR.
6. ANY IMPACTS TO EXISTING DISTRICT FACILITIES DUE TO THE CONTRACTOR'S PROPOSED CHANGES TO THIS PLAN SET SHALL BE MITIGATED AT THE CONTRACTOR'S SOLE EXPENSE.
7. THE DISTRICT WILL SECURE ALL UTILITY RIGHT-OF-WAY AND DEMOLITION PERMIT(S) REQUIRED. THE CONTRACTOR SHALL SECURE ALL PERMITS REQUIRED FROM LOCAL AND STATE AGENCIES INCLUDING BUT NOT LIMITED TO LANE CLOSURE, TRAFFIC CONTROL, ALL MATTERS RELATED TO ASBESTOS WORK (IF APPLICABLE TO THE PROJECT), REMOVAL AND DISPOSAL. WORK ON ASBESTOS-CEMENT PIPE IF ENCOUNTERED, SHALL NOT COMMENCE WITHOUT PROPER PERMITS, CERTIFICATIONS, WORKER PROTECTIVE CLOTHING AND BREATHING APPARATUS, AND APPROVED ASBESTOS DISPOSAL BAGS.
8. THE CONTRACTOR SHALL SCHEDULE SHUTDOWNS WITH THE DISTRICT AT LEAST 5 WORKING DAYS IN ADVANCE TO ALLOW FOR CUSTOMER NOTIFICATION. CONNECTION TO THE DISTRICT WATER SYSTEM INCLUDING SWABBING WITH 200 PPM CHLORINE DISINFECTANT SHALL NOT BE DONE WITHOUT DISTRICT STAFF PRESENT.
9. CONTRACTOR SHALL PROVIDE A WATER TRUCK FOR HAUL AND DISPOSAL OF ALL CHLORINATED WATER TO AN APPROVED LOCATION AT THE CONTRACTOR'S SOLE EXPENSE. IN NO CIRCUMSTANCES SHALL WATER CONTAINING CHLORINE BE DISCHARGED INTO PUBLIC OR PRIVATE STORM DRAINAGE SYSTEMS, NATURAL SURFACE WATERS OR ANY AREA THAT LEADS TO PUBLIC OR PRIVATE STORM DRAINAGE SYSTEMS, AND/OR NATURAL SURFACE WATERS.
10. PRESSURE TEST SHALL BE FOR 2 HOURS AT 250 PSI. IF THE PRESSURE AT THE END OF THE 2-HOUR TEST (WITHOUT PUMPING) IS BETWEEN 245 AND 250 PSI, THEN HYDROSTATIC TESTING ALLOWANCE SHALL BE AS DESCRIBED IN TABULAR FORM IN AWWA C600. IF THE PRESSURE FALLS BELOW 245 PSI, THEN THE WATER PIPE BEING TESTED HAS FAILED. PRESSURE TEST SHALL BE AGAINST HYDRANT PORTS (WITH HYDRANT FULLY OPEN), AGAINST ALL CLOSED BLOW OFF ASSEMBLY CAPS WITH VALVE FULLY OPEN AND AGAINST ALL ANGLE METER STOPS. THE CURB STOP ON AIR RELEASE VALVES SHALL BE CLOSED FOR THE PRESSURE TEST AND THEN OPENED AFTER SATISFACTORY TESTING. PRESSURE TESTS SHALL NOT BE PERFORMED AGAINST DISTRIBUTION SYSTEM VALVES.
11. POURED IN PLACE CONCRETE BLOCKING SHALL BE PROVIDED AT ALL FITTINGS AND ANGLE POINTS, INCLUDING THOSE MECHANICALLY RESTRAINED UNLESS OTHERWISE SPECIFIED BY THE DISTRICT'S ENGINEER.
12. ALL MECHANICAL JOINTS, UNLESS OTHERWISE NOTED ON THE PLANS, SHALL USE MECHANICAL THRUST RESTRAINT FOLLOWERS. MECHANICAL THRUST RESTRAINT SHALL BE EBAA IRON MEGALUG/FLANGE, ROMAC, ROMAGRIP, STAR PIPE, STAGRIP, OR AS APPROVED BY THE DISTRICT. REFER TO GENERAL NOTE NO. 14. OF THE SNOHOMISH COUNTY PUD NO. 1 ENGINEERING STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION.
13. FIELD LOCK GASKETS ARE REQUIRED PER GENERAL NOTE NO. 14 OF SNOHOMISH COUNTY PUD NO. 1 WATER UTILITY STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION.
14. SURFACE RESTORATION SHALL BE PER SECTION 3.1.10 OF THE SNOHOMISH COUNTY PUD NO. 1 UTILITY STANDARDS AND SPECIFICATIONS.
15. THE CONTRACTOR SHALL COORDINATE THE LOCATION OF THE LAYDOWN AND STAGING AREA WITH THE DISTRICT'S ENGINEER.



SURVEY CONTROL

PT #	SURVEY PT #	DESCRIPTION	NORTHING	EASTING	ELEVATION
1	3002	HUB AND MAG NAIL	415497.08	1341273.72	598.18
2	3003	LARGE MAG SPIKE	415513.18	1341584.61	576.29
3	3004	HUB AND MAG NAIL	415193.04	1341408.16	600.39
4	3006	LARGE MAG SPIKE	415494.17	1342262.78	520.00
5	3007	LARGE MAG SPIKE	415511.16	1341989.89	528.26

811 **Call 48 Hours Before You Dig** 1-800-424-5555 UNDERGROUND SERVICE

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
GENERAL AND SURVEY NOTES

CARLA G. TALICH
STATE OF WASHINGTON
37426
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	PLS
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE– 965
DWG # G-2
SHEET 2
OF 36

LEGEND

EXISTING

- CENTERLINE
- RIGHT OF WAY
- PROPERTY LINE
- EASEMENT
- IRON PIPE (FOUND AS NOTED)
- REBAR (FOUND AS NOTED)
- CONTROL POINT (AS NOTED)
- CONTOUR (600)
- OVERHEAD POWER (OP)
- TELEPHONE (T)
- WATER (W)
- POWER POLE
- GUY POLE
- GUY ANCHOR
- WATER VALVE (WV)
- WATER METER (WM)
- TELEPHONE JUNCTION BOX (T)
- TELEPHONE RISER (TJR)
- STORM CULVERT
- FLAG POLE OR WETLAND FLAG (WF-1)
- WETLAND BOUNDARY (WET)
- DITCH
- TOE OF SLOPE
- TOP OF SLOPE
- EDGE OF GRAVEL
- ROCKERY
- FENCE LINE (TYPE AS NOTED)
- MAILBOX
- SIGN
- CONIFER TREE
- DECIDUOUS TREE
- GRAVEL SURFACE
- CONCRETE

PROPOSED

- PIPE
- SPLIT RAIL FENCE
- SILT FENCE
- WATTLE
- HIGH VISIBILITY FENCE
- CLEARING LIMIT
- TO BE REMOVED OR ABANDONED
- CONTOUR (360)
- SWALE
- WETLAND BUFFER
- APPROXIMATE WETLAND BOUNDARY

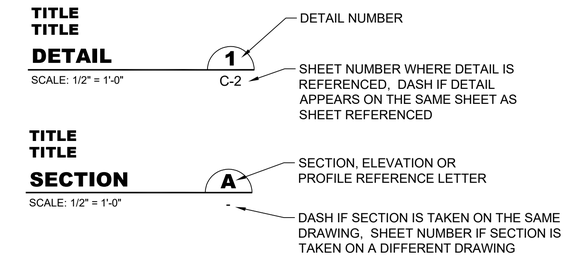
PROPOSED (CONTINUED)

- TYPE 2 CATCH BASIN
- CATCH BASIN INSERT
- FLEX EXPANSION JOINT
- TREE REMOVAL (12" CON)
- FLANGE FITTING - BEND
- MECHANICAL JOINT FITTING - BEND
- RESTRAINED JOINT FITTING - BEND
- FLANGE FITTING - TEE
- FLANGE FITTING - CROSS
- MECHANICAL JOINT FITTING - TEE
- MECHANICAL JOINT FITTING - CROSS
- RESTRAINED JOINT FITTING - TEE
- MECHANICAL JOINT FITTING - CROSS
- DIRECTION OF FLOW
- AIR-VACUUM RELEASE ASSEMBLY
- FIRE HYDRANT
- SAMPLE STATION
- FULL DEPTH HMA
- GRAVEL SURFACE
- CAST-IN PLACE CONCRETE
- PRE-CAST CONCRETE
- FOUNDATION MATERIAL
- STRUCTURAL FILL
- PIPE BEDDING
- CSTC
- CSBC
- DRAIN MATERIAL
- PREPARED SUBGRADE, TRENCH BACKFILL
- UNDISTURBED NATIVE GROUND
- COMPACTED BORROW
- SAND
- GROUT
- CONTROL DENSITY FILL
- TOPSOIL
- HYDROSEED, GRASSCRETE
- TEXTURED SURFACE
- QUARRY SPALLS

ABBREVIATIONS

ADA	AMERICAN WITH DISABILITIES ACT
APPROX	APPROXIMATELY
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BOLT CIRCLE
BGM	BURIED GAS MARKER
BO	BLOW-OFF
C/L	CENTERLINE
CB	CATCH BASIN
CDF	CONTROLLED DENSITY FILL
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CON	CONIFER
CONT	CONTINUE
COPO	CITY OF PORT ORCHARD
CPEP	CORRUGATED POLYETHYLENE PIPE
CSBC	CRUSHED SURFACING BASE COURSE
CSTC	CRUSHED SURFACING TOP COURSE
CULV	CULVERT
D	DRAIN
DBH	DIAMETER AT BREAST HEIGHT
DCD	CITY OF PORT ORCHARD DEPARTMENT OF COMMUNITY DEVELOPMENT
DI	DUCTILE IRON
DIP	DUCTILE IRON PIPE
DIA	DIAMETER
DR	DRAIN, DIMENSION RATIO
DWG	DRAWING
E	EAST, ELECTRICAL
EG	FOR EXAMPLE
EL	ELEVATION
ELEC	ELECTRICAL
ETC	ET CETERA
EEWS	EARTHQUAKE EARLY WARNING SYSTEM
EW	EACH WAY
EX	EXISTING
FCA	FLANGED COUPLING ADAPTER
FD	FLOOR DRAIN
FL	FLOOR, FLANGED, FLUORIDE
FT	FOOT
GA	GAUGE
GALV	GALVANIZED
GPS	GLOBAL POSITIONING SYSTEM
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
HMA	HOT MIX ASPHALT
HORIZ	HORIZONTAL
ICV	IRRIGATION CONTROL VALVE
IE	INVERT ELEVATION
INC	INCORPORATED
IPS	IRON PIPE SIZE
IRR	IRRIGATION
L	LENGTH
LF	LINEAR FEET
LLC	LIMITED LIABILITY COMPANY
MAX	MAXIMUM
MB	MAIL BOX
MDD	MAXIMUM DRY DENSITY
MIN	MINIMUM
MJ	MECHANICAL JOINT
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
N	NORTH
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NPS	NOMINAL PIPE SIZE
NTS	NOT TO SCALE
OC	ON CENTER
OH	OVERHEAD POWER
P	POWER
PE	POLYETHYLENE
PVC	POLYVINYL CHLORIDE
PG	PERFORMANCE GRADE
PN	PARCEL NUMBER
POMC	PORT ORCHARD MUNICIPAL CODE
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
R	RADIUS
RD	ROAD, ROOF DRAIN
RJ	RESTRAINED JOINT
RW	RECLAIMED WATER
S	SOUTH, SLOPE
SCH	SCHEDULE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SDR	STANDARD DIMENSION RATIO
SE	SOUTHEAST
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
SST	STAINLESS STEEL
STD	STANDARD
STL	STEEL
SWMMWW	STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON
T	TELEPHONE
TBM	TEMPORARY BENCH MARK
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
THK	THICK
TYP	TYPICAL
VERT	VERTICAL
W/	WITH
W	WEST, WATER, WELL
WA	WASHINGTON
WAC	WASHINGTON ADMINISTRATIVE CODE
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
WSRN	WASHINGTON STATE RESOURCE NETWORK

DESIGNATIONS



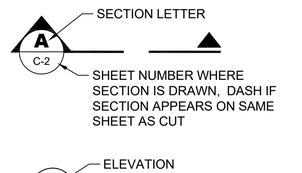
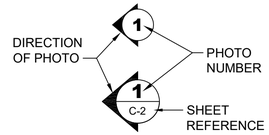
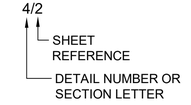


PHOTO REFERENCE



DETAIL/SECTION CALLOUT



EQUIPMENT DESIGNATIONS

EQUIPMENT IS IDENTIFIED AS FOLLOWS:

BOXED NUMBER DESIGNATES NEW EQUIPMENT TO BE SUPPLIED BY THE CONTRACTOR:

XX-XXXX

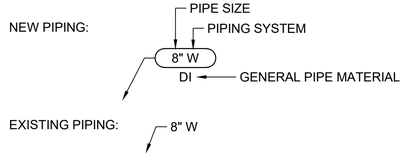
UNBOXED NUMBER DESIGNATES EXISTING EQUIPMENT:

XX-XXXX

EQUIPMENT LIST IS INCLUDED FOR THE CONVENIENCE OF THE ENGINEER AND CONTRACTOR, AND IS NOT INTENDED TO REPRESENT PRECISE LISTING OF ALL EQUIPMENT AND DEVICES TO BE PROVIDED UNDER THIS CONTRACT.

PIPING DESIGNATIONS

PIPING IS IDENTIFIED BY ITS SIZE FOLLOWED BY PIPING SYSTEM AS FOLLOWS:



FOR NEW PIPING MATERIAL, FITTINGS, AND VALVES, SEE SPECIFICATIONS.

PIPING SYSTEM DESIGNATIONS FOR EXISTING PIPING INDICATE TYPE OF SERVICE AND TYPE OF MATERIAL IF KNOWN. CONTRACTOR SHALL VERIFY ALL EXISTING PIPE MATERIAL AND NOT RELY ON THIS DESIGNATION PRIOR TO CONSTRUCTION.

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1-800-424-5555
UNDERGROUND SERVICE

No.	DATE	ISSUED FOR PERMIT	APPR.
	MAY 2025	REVISION	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

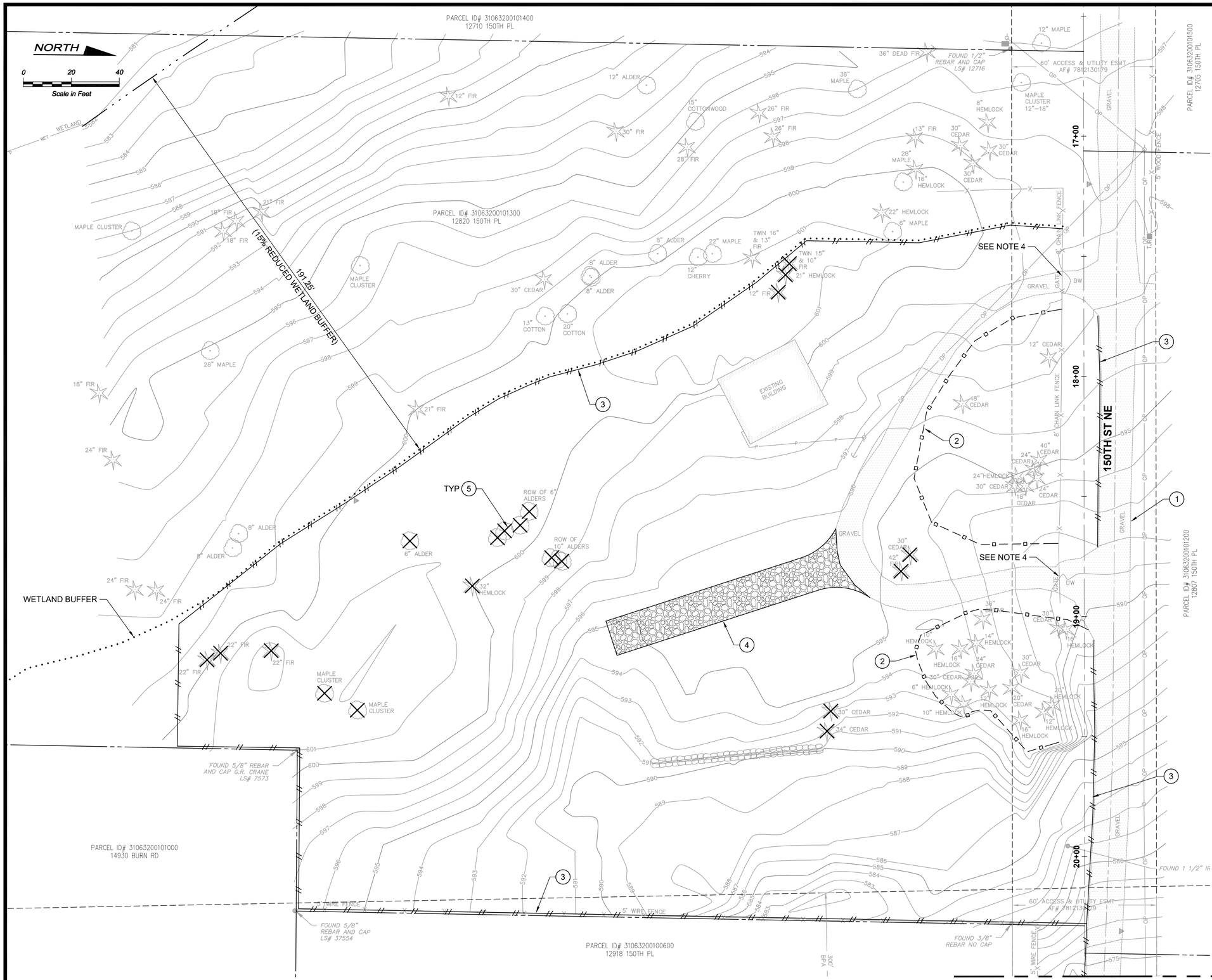
BURN ROAD RESERVOIR
LEGEND, ABBREVIATIONS, AND DESIGNATIONS

CARLA G. TALICH
STATE OF WASHINGTON
21606
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	PLS
CHECKED	CGT
SCALE	N/A

WO# 100099341

WE— 965
DWG # G-3
SHEET 3
OF 36



MATCHLINE STA 20+50 - SEE DWG EC-2

NOTES:

1. SEE DRAWING EC-3 FOR TESC NOTES AND DETAILS.
2. CONSTRUCTION ENTRANCE SHALL BE MAINTAINED THROUGH COMPLETION OF THE PROJECT.
3. WATER UTILITY EASEMENT INFORMATION IS AVAILABLE FROM THE PUD UPON REQUEST.
4. SAVE AND PROTECT EXISTING FENCE AND GATES.

CONSTRUCTION NOTES:

1. 150TH ST NE SHALL BE MAINTAINED DURING CONSTRUCTION AND RESTORED TO ITS PRECONSTRUCTION CONDITION, OR BETTER, UPON COMPLETION OF THE PROJECT. BEFORE WORK COMMENCES, 150TH ST NE, FROM BURN ROAD TO STATION 17+00, SHALL BE PHOTO DOCUMENTED. DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT, THE ROAD SURFACE SHALL BE REPAIRED AS NEEDED TO MATCH PRECONSTRUCTION CONDITIONS OR BETTER USING CSTC, PLACED AND COMPACTED WITH A MINIMUM THICKNESS OF 2 INCHES.
2. TREE PROTECTION/HIGH- VISIBILITY FENCE PER WSDOT STANDARD DETAIL I-10.10-01, OR APPROVED ALTERNATE.
3. SILT FENCE PER DETAIL 1/EC-3, OR STRAW WATTLE PER DETAIL 4/EC-3, OR APPROVED ALTERNATE. WATTLES SHALL BE USED DURING WATER MAIN INSTALLATION WITHIN 150TH ST NE UNLESS OTHERWISE APPROVED BY THE DISTRICT ENGINEER.
4. STABILIZED CONSTRUCTION ENTRANCE, PER DETAIL 2/EC-3. REMOVE PRIOR TO PAVEMENT INSTALLATION, AS REQUIRED BY THE DISTRICT.
5. REMOVE TREE

FINAL SITE STABILIZATION NOTES:

1. UNLESS OTHERWISE SPECIFIED, ANY DISTURBED AREA SHALL BE REVEGETATED BY HYDROSEEDING. SEE DWG C-2 FOR APPROXIMATE LIMITS, AND TABLE 4.4/C-7 FOR SEED MIX REQUIREMENTS.
2. MAINTAIN TESC FEATURES UNTIL FINAL ACCEPTANCE OR AS OTHERWISE DIRECTED BY THE DISTRICT ENGINEER.

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
EXISTING CONDITIONS AND TESC PLAN 1 OF 2

CARLA G. TAYLOR
STATE OF WASHINGTON
37426
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	PLS
CHECKED	CGT
SCALE	1"=20'–0"

WO# 100099341

WE–	965
DWG #	EC-1
SHEET	4
OF	36

Call 48 Hours Before You Dig
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1-800-424-5555
UNDERGROUND SERVICE

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Res\d_Filename: P23-10882_EC-1-2_Plot date: May 21, 2025-04:28:57pm_CAD User: abradley.
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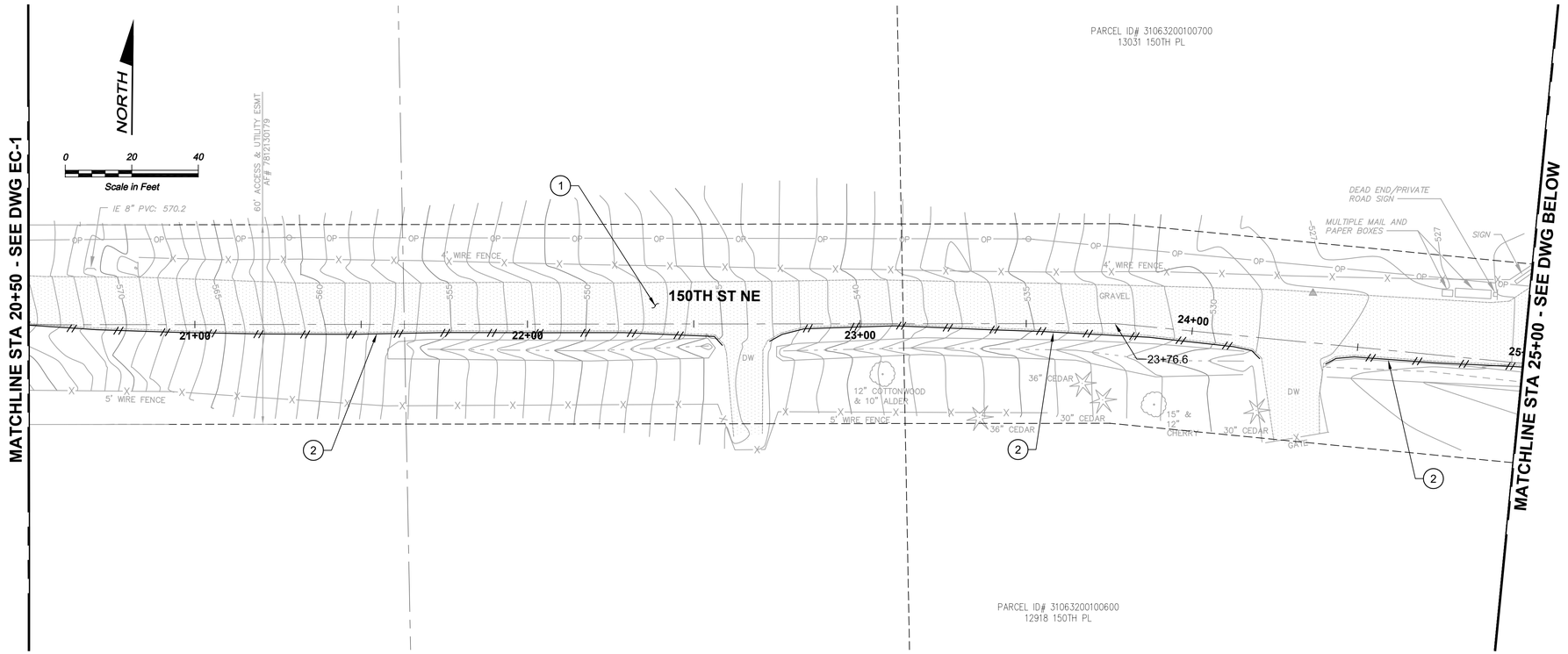

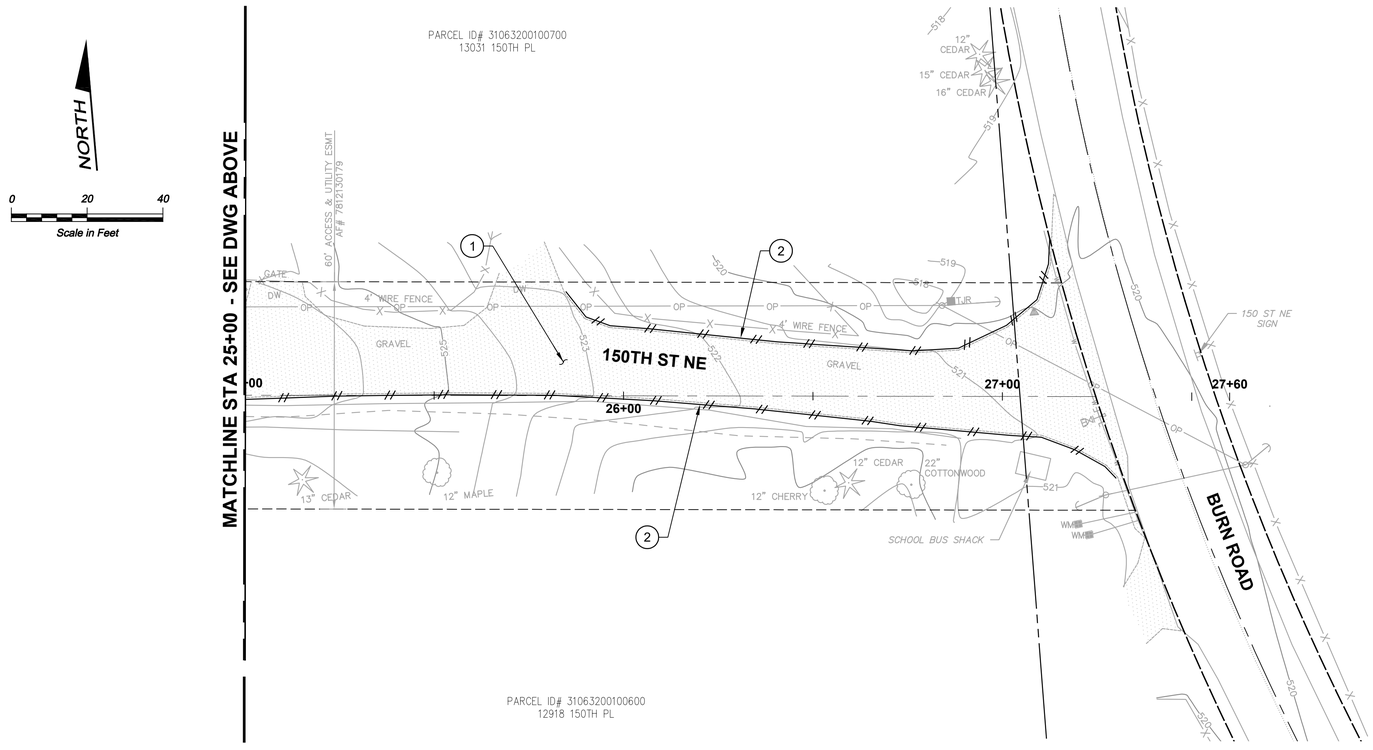

NOTES:

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2. WATER UTILITY EASEMENT INFORMATION IS AVAILABLE FROM THE PUD UPON REQUEST.

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2. SILT FENCE PER DETAIL 1/EC-3, OR STRAW WATTLE PER DETAIL 4/EC-3, OR APPROVED ALTERNATE. WATTLES SHALL BE USED DURING WATER MAIN INSTALLATION WITHIN 150TH ST NE UNLESS OTHERWISE APPROVED BY THE DISTRICT ENGINEER.

FINAL SITE STABILIZATION NOTES:

1. UNLESS OTHERWISE SPECIFIED, ANY DISTURBED AREA SHALL BE REVEGETATED BY HYDROSEEDING. SEE DWG C-2 FOR APPROXIMATE LIMITS, AND TABLE 4.4/C-7 FOR SEED MIX REQUIREMENTS.
2. MAINTAIN TESC FEATURES UNTIL FINAL ACCEPTANCE OR AS OTHERWISE DIRECTED BY THE DISTRICT ENGINEER.

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
EXISTING CONDITIONS AND TESC PLANS 2 OF 2

CARLA G. TAUSCH
STATE OF WASHINGTON
37426
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	PLS
CHECKED	CGT
SCALE	1"=20'-0"

WO# 100099341

WE–	965
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SHEET	5
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811
Call 48 Hours Before You Dig
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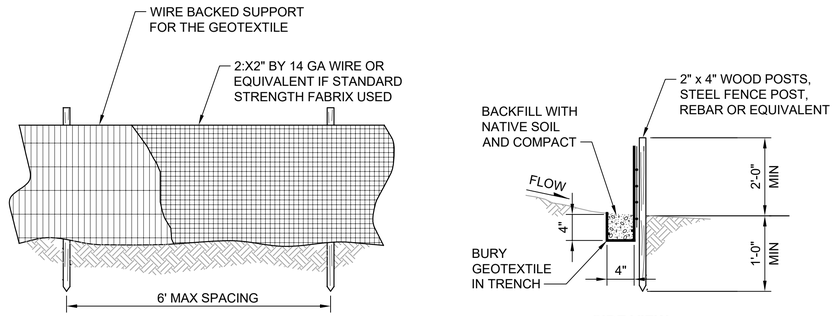
UNDERGROUND SERVICE

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resvd Filename: P23-10882_EC-1-2 Plot date: May 21, 2025-04:29:43pm CAD User: abradley;
Xref Filename: | X23-10882_Ex Topo | X23-10882_Status | X23-10882_TB | X23-10882_Ex Prof | Talich | X23-10882_Ex Prop-RW | X23-10882_Dwg Layout | Rogers | Stevens | Gibson | McCrosky | Wildhood | Gillespie | Dahl |

TESC NOTES AND BEST MANAGEMENT PRACTICES (BMP'S)

BEST MANAGEMENT PRACTICES (BMP'S) TO CONTROL EROSION SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION CONTROL MEASURES REQUIRED FOR THE PROJECT.
2. THE CONTRACTOR SHALL SUBMIT CERTIFIED AND SEDIMENT CONTROL LEAD (CESCL) INFORMATION TO THE DISTRICT NO LATER THAN THE PRE-CONSTRUCTION MEETING.
3. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROL (TESC) MEASURES SHALL BE IN ACCORDANCE WITH THE GOVERNING JURISDICTION'S STANDARDS WHERE THE WORK IS BEING CONSTRUCTED.
4. TESC MEASURES SHALL BE TAKEN BY THE CONTRACTOR DURING CONSTRUCTION TO PREVENT SILT AND DEBRIS FROM ENTERING EXISTING STORM DRAINAGE FACILITIES AND WATERWAYS IN COMPLIANCE WITH THE PLANS, SPECIFICATIONS, AND THE WASHINGTON STATE DEPARTMENTOF ECOLOGY STORM WATER MANGAMENT MANUAL FOR WESTERN WASHINGTON (SWMMWW) OR SNOHOMISH COUNTY DRAINAGE MANUAL, CURRENT EDITIONS, DEPENDING ON THE PROJECT LOCATION'S GOVERNING JURISDICTION.
5. THE DISTRICT WILL DEVELOP AND SUBMIT A PROJECT CONSTRUCTION STORM WATER POLLUTION PLAN (SWPPP) TO THE APPLICABLE GOVERNING JURISDICTION FOR APPROVAL PRIOR TO CONSTRUCTION. THE DISTRICT WILL TRANSFER THE SWPPP TO THE CONTRACTOR PRIOR TO CONSTRUCTION. THE CONTRACTOR WILL THEN BE RESPONSIBLE TO REVISE THE SWPPP AS NEEDED DURING CONSTRUCTION.
6. THE TESC MEASURES SHOWN ON THE PLANS REPRESENT THE MINIMUM REQUIREMENTS. ACTUAL TESC MEASURES SHALL BE DETERMINED AND FIELD LOCATED BY THE CONTRACTOR TO SUIT CONDITIONS AND SHALL BE IN COMPLIANCE WITH THE GOVERNING JURISDICTION'S STANDARDS WHERE THE WORK IS BEING CONSTRUCTED.
7. ALL REQUIRED EROSION/SEDIMENTATION CONTROL FACILITIES SHALL BE CONSTRUCTED AND IN OPERATION PRIOR TO EARTH DISTURBANCE AND/OR OTHER CONSTRUCTION TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT LEAVE THE PROJECT SITE, ENTER THE DRAINAGE SYSTEM, OR VIOLATE APPLICABLE WATER QUALITY STANDARDS. ALL EROSION AND SEDIMENT FACILITIES SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND POTENTIAL FOR PROJECT ONSITE EROSION HAS PASSED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION, MAINTENANCE, REPLACEMENT, AND ADDITIONS TO EROSION/SEDIMENTATION CONTROL SYSTEMS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATING THE CLEARING LIMITS AND ESTABLISHING THOSE BOUNDARIES WITH BRIGHT COLORED FLAGGING AS NEEDED. THE CONTRACTOR SHALL CLEAR TO ONLY THOSE LIMITS AS ESTABLISHED, APPROVED BY THE DISTRICT, AND FLAGGED IN THE FIELD. ALL FLAGGING SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF THE CONSTRUCTION.
9. ALL DISTURBED AREAS THAT HAVE BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE SHALL BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS PLANTING, OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER. INCLUSIVE SEEDING MAY PROCEED, WHENEVER IT IS IN THE INTEREST OF THE CONTRACTOR, BUT MUST BE AUGMENTED WITH MULCHING, NETTING, EROSION BLANKETS, OR OTHER APPROVED TREATMENT WHEN SEEDING OCCURS OUTSIDE THE SPECIFIED TIME PERIOD.
10. DEWATERING WATER SHALL BE HANDLED TO ENSURE DISCHARGE MEETS REGULATING WATER QUALITY STANDARDS. DEWATERING DISCHARGE AND OTHER TESC ACTIVITIES SHALL CONFORM TO THE APPROVED CONSTRUCTION SWPPP.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR STREET CLEANING AND/OR VACUUM SWEEPING (ONSITE AND OFFSITE), UPON THE DIRECTION OF THE DISTRICT, TO UNDERTAKE THE MEASURES DEEMED NECESSARY TO AFFECT SUCH CONTROL.
12. STORM DRAIN RUN OFF FROM THE CONSTRUCTION SITE SHALL NOT AFFECT ADJACENT PROPERTIES. WHERE POSSIBLE, THE CONTRACTOR SHALL MAINTAIN NATURAL VEGETATION FOR SILT CONTROL.
13. IN CASE EROSION OR SEDIMENTATION OCCURS TO ADJACENT PROPERTY OWNERS, ALL CONSTRUCTION WORK WITHIN THE AREA THAT MAY FURTHER AGGRAVATE THE SITUATION SHALL CEASE AND THE CONTRACTOR SHALL IMMEDIATELY COMMENCE RESTORATION METHODS. RESTORATION ACTIVITY WILL CONTINUE UNTIL SUCH TIME AS THE DISTRICT AND AFFECTED PROPERTY OWNERS ARE SATISFIED.
14. THE IMPLEMENTATION OF ALL TESC PLANS AND CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING ALL TESC FACILITIES IS THE RESPONSBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS APPROVED AND ACCEPTED BY THE DISTRICT.
15. SHOULD THE TESC MEASURES TAKEN AND/OR UPGRADED OR EXPANDED FACILITIES/MEASURED BE INADEQUATE TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR SHALL INSTALL ADDITIONAL FEATURES NECESSARY TO PROTECT ADJACENT PROPERTIES, SENSITIVE AREAS, NATURAL WATER COURSES AND/OR STORM DRAINAGE SYSTEMS.
16. THE TESC FACILITIES SHALL BE INSPECTED BY THE CONTRACTOR'S CESCL OF RECORD AFTER EACH STORM AND DAILY DURING PROLONGED RAINFALL. THE TESC FACILITIES SHALL BE MAINTAINED AS NECESSARY OR AS DIRECTED BY THE DISTRICT ENGINEER TO ENSURE THEIR CONTINUED FUNCTIONING. NECESSARY REPAIRS OR REPLACEMENT OF FACILITIES SHALL BE ACCOMPLISHED PROMPTLY. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT AND/OR WHEN THE LEVEL OF DEPOSITION REACHES APPROXIMATELY ONE-THIRD THE MAXIMUM POTENTIAL DEPTH.

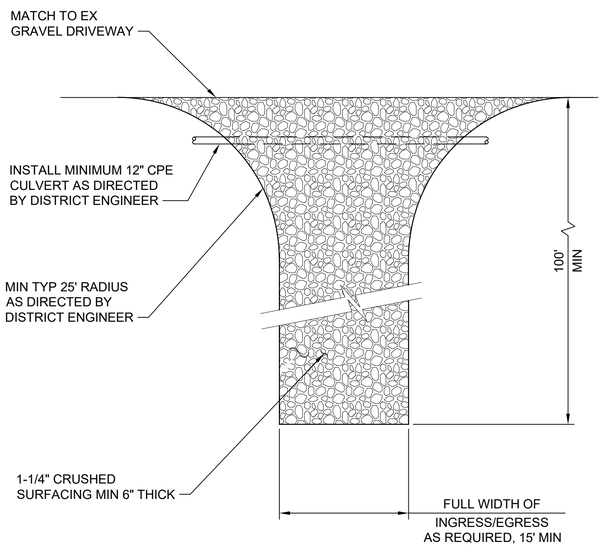


ELEVATION **SIDE VIEW**

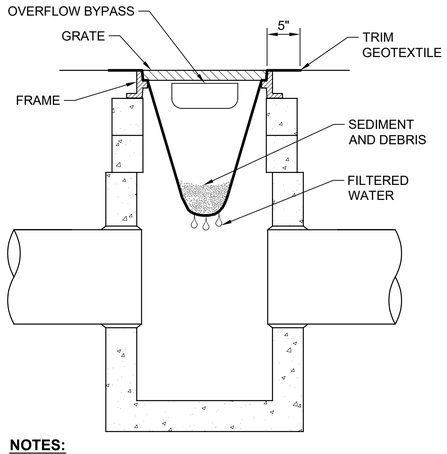
NOTES:

1. MAXIMIZE DETENTION OF STORMWATER BY PLACING FENCE AS FAR AWAY FROM THE TOE OF SLOPE AS POSSIBLE WITHOUT ENCROACHING ON SENSITIVE AREAS OR OUTSIDE OF THE CLEARING BOUNDARIES.
2. INSTALL SILT FENCING ALONG CONTOURS WHENEVER POSSIBLE.
3. INSTALL THE ENDS OF THE SILT FENCE TO POINT SLIGHTLY UP-SLOPE TO PREVENT SEDIMENT FROM FLOWING AROUND THE ENDS OF THE FENCE.

SILT FENCE
DETAIL 1
NTS TYP



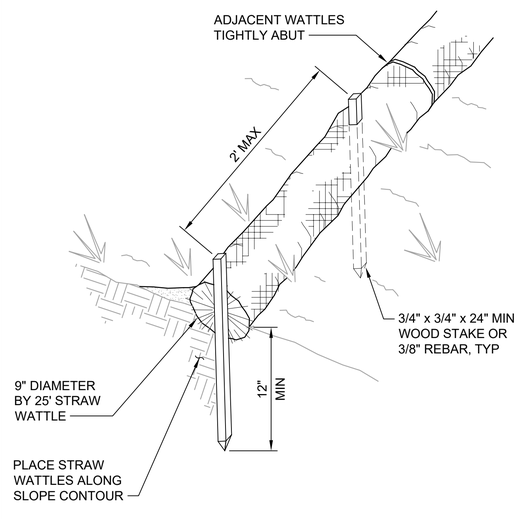
STABILIZED CONSTRUCTION ENTRANCE
DETAIL 2
TYP TYP



NOTES:

1. CONTRACTOR SHALL INSTALL CB FILTER INSERTS BEFORE START OF CONSTRUCTION AND REMOVE AND DISPOSE OF FILTERS AFTER CONSTRUCTION IS COMPLETE OR AS DIRECTED BY THE ENGINEER.
2. CHECK ALL INSERTS AFTER EVERY RAIN EVENT AND AT LEAST EVERY 2 WEEKS. REMOVE WHEN FILLED TO HALF-WAY MARK. REMOVE SEDIMENT AND RE-USE, OR REPLACE INSERT(S) IF DAMAGED OR PLUGGED.
3. ALL CB'S INSTALLED FOR THIS PROJECT SHALL HAVE STORM DRAIN INLET PROTECTION AT THE TIME OF INSTALLATION.

STORM DRAIN INLET PROTECTION
DETAIL 3
NTS TYP



TYPICAL WATTLE INSTALLATION
DETAIL 4
TYP TYP

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3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
TESC NOTES AND DETAILS

CARLA G. TALICH — STATE OF WASHINGTON — 25826 — REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	PLS
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

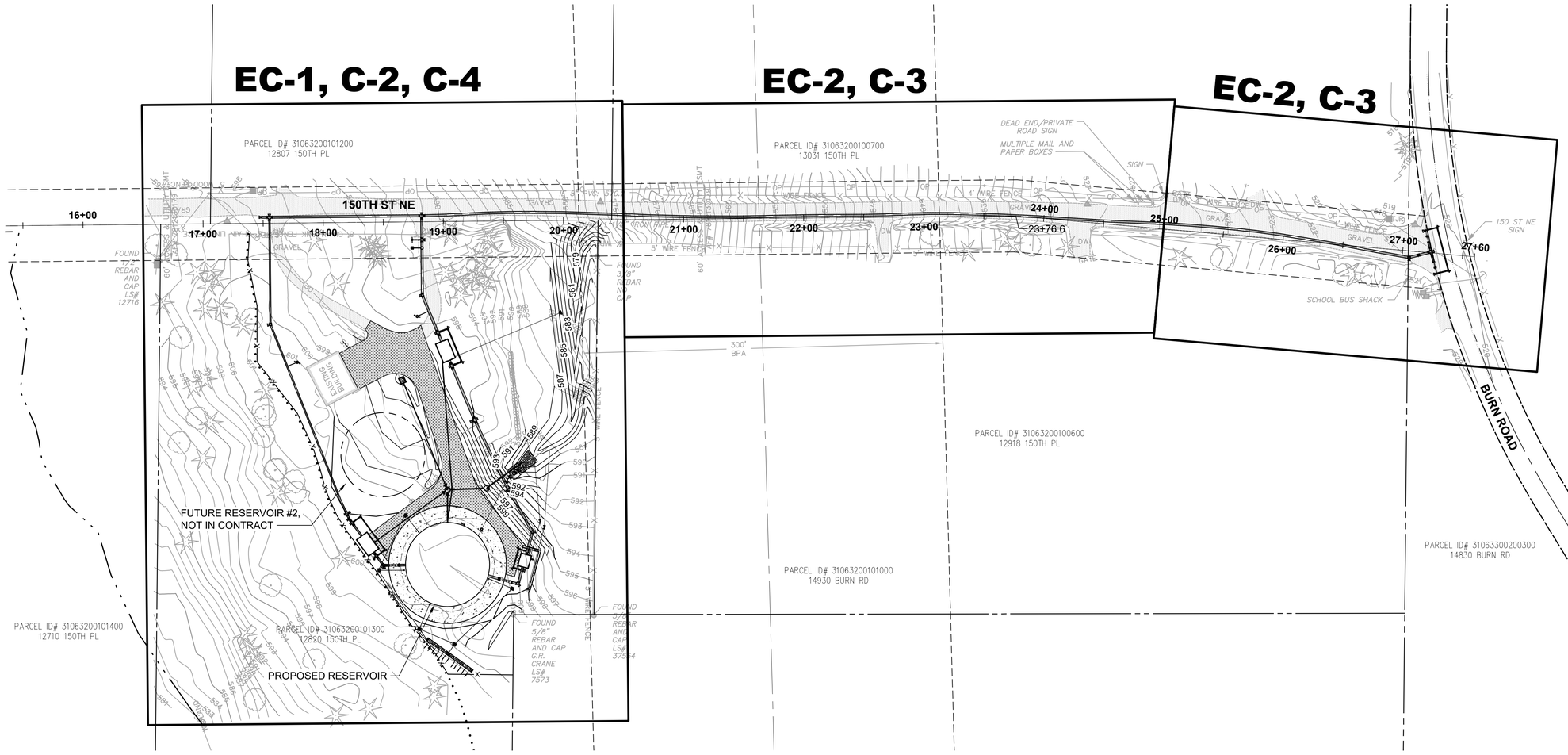
WE– 965
DWG # EC-3
SHEET 6
OF 36

NORTH

0 50 100

Scale in Feet

STA	NORTHING	EASTING
17+00 (BEGIN)	415343.35	1341432.78
19+00	415317.04	1341441.69
21+00	415290.12	1341448.43
23+00	415276.75	1341438.57
23+76.6 (VERTEX)	415303.23	1341527.69
25+00	415319.94	1341552.15
27+60 (END)	415330.31	1341559.98



No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
OVERALL SITE AND CIVIL KEY PLAN

MADISON TAYLOR MCCRORY
STATE OF WASHINGTON
20123392
REGISTERED PROFESSIONAL ENGINEER

05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	JL
CHECKED	CGT
SCALE	

WO# 100099341

WE–	965
DWG #	C-1
SHEET	7
OF	36

811

Call 48 Hours Before You Dig

1-800-424-5555

UNDERGROUND SERVICE

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resvd Filename: P23-10882_C-1 Plot date: May 21, 2025-04:31:34pm CAD User: abradley
Xref Filename: | X23-10882_Ex Topo | X23-10882_Ex Prop | X23-10882_Status | X23-10882_TB | X23-10882_Ex Prof | X23-10882_Prop Site | Tallich | Rogers | X23-10882_Dwg Layout | X23-10882_Prop Util | Stevens | Gibson | McCrosky | Wildhood | X23-10882_Prop Grad | Gillespie | Dahl |

NORTH

0 20 40

Scale in Feet

PARCEL ID# 31063200101400
12710 150TH PL

PARCEL ID# 31063200101300
12820 150TH PL

PARCEL ID# 31063200101500
12705 150TH PL

PARCEL ID# 31063200101200
12807 150TH PL

PARCEL ID# 31063200101000
14930 BURN RD

PARCEL ID# 31063200100600
12918 150TH PL

FOUND 1/2" REBAR AND CAP LS# 12716

60' ACCESS & UTILITY ESMT AF# 7812130179

WETLAND

15% REDUCED WETLAND BUFFER

191.25'

WETLAND BUFFER

20' REQUIRED PROPERTY LINE SETBACK

FUTURE RESERVOIR #2
(NOT IN CONTRACT)

RESERVOIR #1
3.6 MG WELDED STEEL RESERVOIR

MAT SLAB FOUNDATION, SEE STRUCTURAL

70'-0" Ø

EXISTING BUILDING

INLET METER AND VALVE VAULT, SEE DWG R-11

OUTLET SEISMIC VALVE VAULT, SEE DWG R-10

OUTLET METER AND VALVE VAULT, SEE DWG R-9

MODULAR BLOCK WALL, PER DETAIL 4/C-6

15 LF - 20" DI W, W/ 2 - 20" 45° VERT BENDS, PER DETAIL 2/R-9

FOUND 5/8" REBAR AND CAP G.R. CRANE LS# 7573

FOUND 5/8" REBAR AND CAP LS# 37554

FOUND 1 1/2" IRON PIPE

FOUND 3/8" REBAR NO CAP

107 1 - 16" 22.5° DI BEND, RJ x RJ W/ THRUST BLOCK

109 1 - 16" TEE, FL x FL
1 - 16" BFV, FL x RJ
1 - 16" BFV, FL x FL
1 - 16" ADAPTER, FL x RJ
1- 16" BLIND FLANGE
W/ THRUST BLOCKS

1 - 16" 11.25° DI BEND, RJ x RJ W/ THRUST BLOCK

1 - 16" 45° DI BEND, RJ x FL
1 - 16" 11.25° DI BEND, FL x RJ
W/ THRUST BLOCKS

110 1 - 16" FLEX EXPANSION JOINT

1 - 20" FLEX EXPANSION JOINT

1 - 20" 90° DI BEND, RJ x RJ W/ THRUST BLOCK

111 1 - 20" DI TEE, FL x FL
2 - 20" BFV, FL x RJ
1 - 20" BFV, FL x FL
1 - 20" BLIND FLANGE
W/ THRUST BLOCKS

112 1 - 20" 45° DI BEND, RJ x RJ W/ THRUST BLOCK

118 1 - 20" 11.25° DI BEND, RJ x RJ W/ VERTICAL THRUST BLOCK

113 1 - 20" DI TEE, FL x FL
2 - 20" BFV, FL x RJ
1 - 20" BFV, FL x FL
1 - 20" BLIND FLANGE
W/ THRUST BLOCKS

115 1 - 20" 22.5° DI BEND, RJ x RJ W/ THRUST BLOCK

116 1 - 20" CAP, RJ W/ THRUST BLOCKS STA 17+49, 5' LT

1 - 20" x 16" DI TEE, FL x FL W/ THRUST BLOCK
2 - 20" BFV, FL x RJ (E) AND (W)
1 - 16" BFV, FL x RJ
STA 17+55, 5' LT

1 - 20" DI TEE, FL x FL W/ THRUST BLOCK
2 - 20" BFV, FL x RJ (E) & (S)
1 - 20" ADAPTER, FL x RJ (W)
STA 18+82, 5' LT

2 1 - 20" x 6" DI TEE, RJ x FL W/ THRUST BLOCK
1 - FIRE HYDRANT ASSEMBLY

16" W DI INLET

20" W DI OUTLET

20" W DI

89 LF - 16" DI W

168 LF - 16" DI W

40 LF - 20" DI W

65 LF - 20" DI W

49 LF - 20" DI W

6 LF - 20" DI W

127' LF - 20" DI W

20 LF - 20" DI W

46 LF - 20" DI W

34 LF - 20" DI W

168 LF - 20" DI W

17+00

18+00

19+00

20+00

150TH ST NE

WSS

8' CHAIN LINK FENCE

5' WIRE FENCE

WOOD FENCE

GRAVEL GATE

GRAVEL

DW

OP

MATCHLINE STA 20+50 - SEE DWG C-3

NOTES:

1. CONTRACTOR SHALL HAVE PUD CREWS ONSITE TO RESTRAIN UTILITY POLES AS NEEDED FOR WATER MAIN INSTALLATION.
2. SEE DWG C-4 FOR DRAINAGE PLAN.

CONSTRUCTION NOTES:

1. INSTALL AIR-VAC ASSEMBLY AT WATER MAIN HIGH POINT PER PUD STANDARD DETAIL 401.
2. INSTALL NEW FIRE HYDRANT ASSEMBLY PER PUD STANDARD DETAIL 201.
3. 4" PVC PIPE W/ 1" POLYPIPE FOR TRANSDUCER, SEE DWGS R-5 AND R-9.
4. SAMPLING STATION PER DETAIL 3/R-5.
5. AIR/VAC VALVE VENT - SEE DWG R-10 FOR AIR/VAC VALVE INSTALLATION IN OUTLET SEISMIC VALVE VAULT.
6. AIR/VAC VALVE VENT - SEE DWG R-11 FOR AIR/VAC VALVE INSTALLATION IN INLET METER AND VALVE VAULT.
7. APPROXIMATE RESTORATION LIMITS. ALL DISTURBED PERVIOUS SURFACES SHALL BE RESTORED WITH A 6-INCH LAYER OF T5.13 SOIL PER SNOHOMISH COUNTY DRAINAGE MANUAL, VOLUME V RUNOFF TREATMENT BMP'S AND RESTORED PER NOTE 1 ON SHEET EC-1.

COORDINATE CONTROL

NO.	NORTHING	EASTING	NOTE
100	415211.31	1341457.29	SEE R-2 FOR BASE EL
101	415218.23	1341391.45	SEE R-11 FOR RIM EL
102	415231.93	1341381.38	SEE R-11 FOR RIM EL
103	415379.19	1341453.79	SEE R-10 FOR RIM EL
104	415394.88	1341447.25	SEE R-10 FOR RIM EL
105	415210.42	1341515.61	SEE R-9 FOR RIM EL
106	415221.03	1341518.53	SEE R-9 FOR RIM EL
107	415411.17	1341309.86	
108	415379.64	1341332.11	
109	415253.85	1341373.31	
110	415210.83	1341404.34	
111	415195.16	1341516.08	
112	415238.42	1341527.97	
113	415331.70	1341480.01	
114	415417.88	1341432.03	
115	415435.45	1341436.29	
116	415474.75	1341427.88	
117	415481.61	1341427.85	
118	415273.54	1341508.49	

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EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR SITE
WATER PLAN

MADISON TAYLOR MCCONNELL
STATE OF WASHINGTON
20123392
REGISTERED
PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
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DRAWN	PLS
CHECKED	CGT
SCALE	

WO# 100099341

WE–	965
DWG #	C-2
SHEET	8
OF	36

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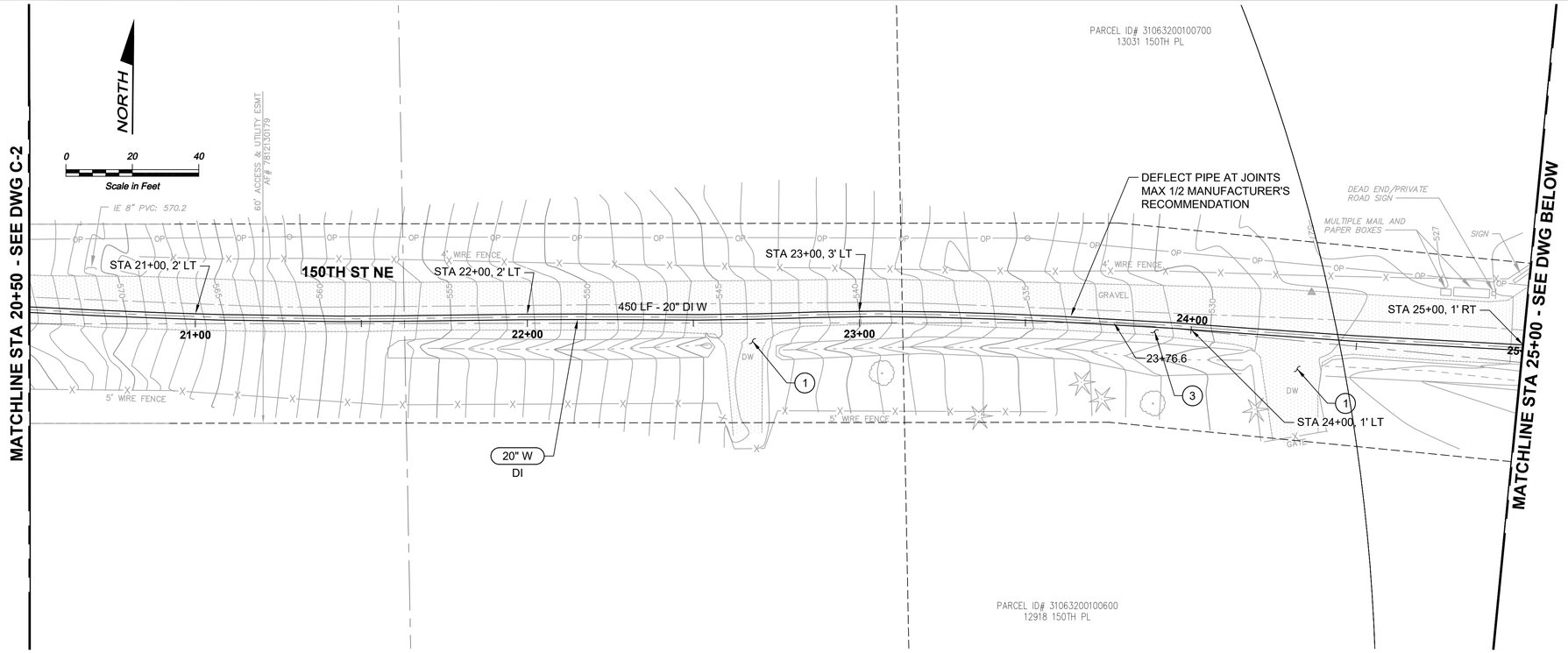
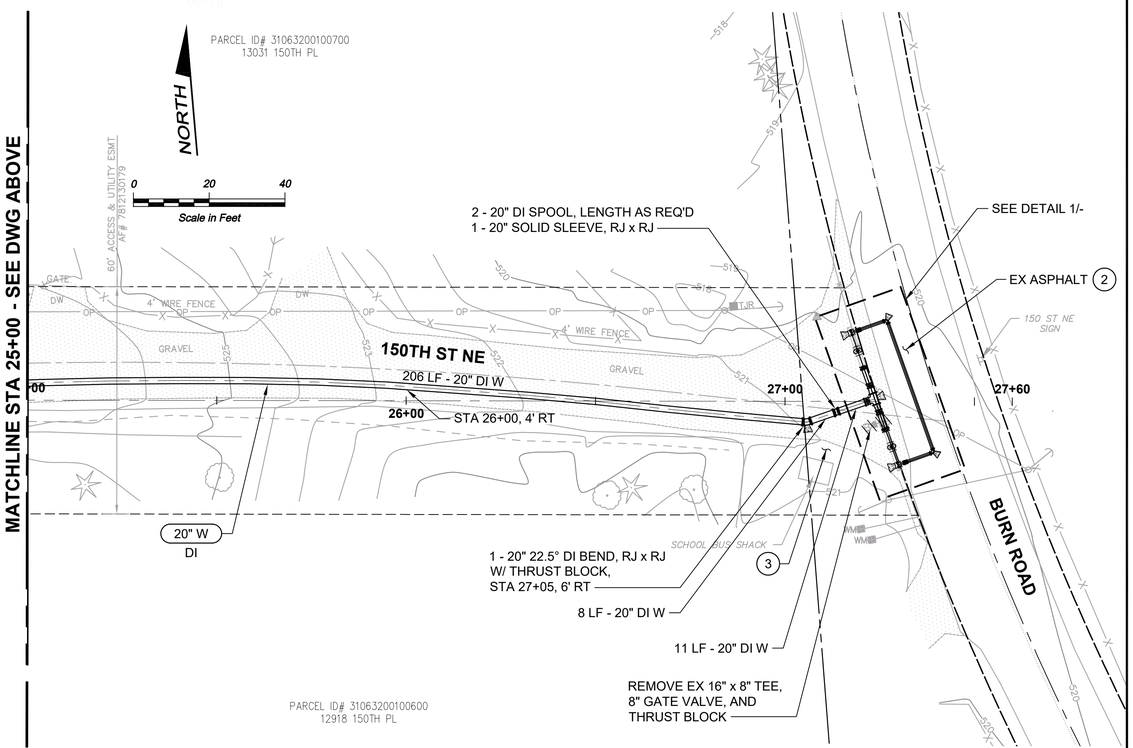
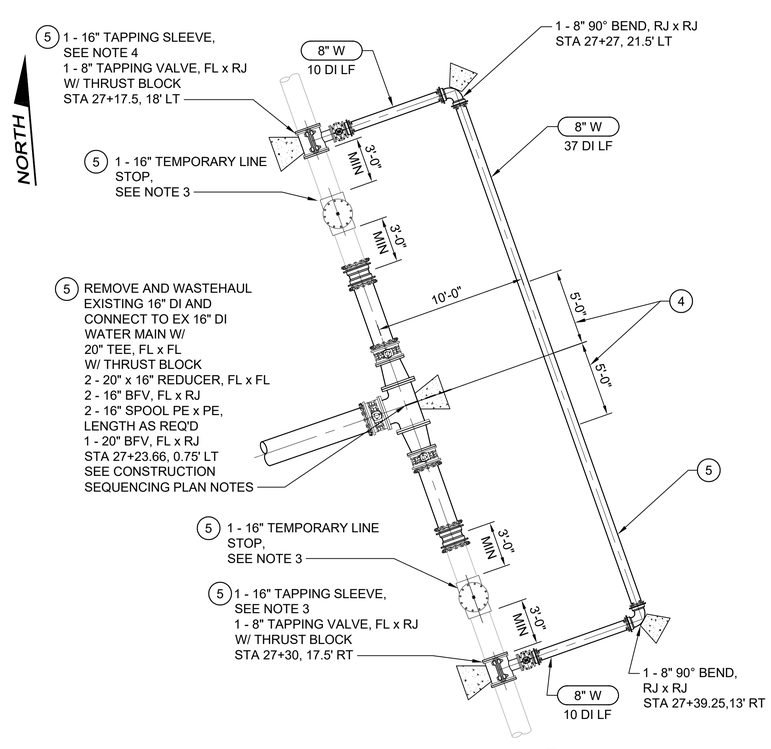
Xref Filename: | X23-10882_Ex Topo | X23-10882_TB | X23-10882_Ex Prof | Taitch | X23-10882_Ex Prop-RW | X23-10882_Prop Site | X23-10882_Prop Util | X23-10882_Ex Grad | Dahl | Top Util | X23-10882_Dwg Layout | McCrosky | X23-10882_Prop Grad | Rogers | Stevens | Gibson | Willthood | Gillespie | X23-10882_Ex Grad |







DETAIL 1
SCALE: 1" = 5'-0"

NOTES:

1. INSTALL NEW D.I. WATER MAIN CL52 PER PUD STANDARD DETAILS 801, 802, 803, AND DETAIL 1 SHEET C-6 . INSTALL RESTRAINED JOINTS AND FIELD-LOK GASKETS PER PUD STANDARDS AND SPECIFICATIONS GENERAL NOTE 14.
2. CONTRACTOR SHALL HAVE PUD CREWS ONSITE TO RESTRAIN UTILITY POLES AS NEEDED FOR WATER MAIN INSTALLATION.
3. EDGE OF TAPPING SLEEVES AND LINE STOP SLEEVES SHALL BE MINIMUM 2' CLEAR FROM EXISTING PIPE JOINTS. ADJUST SLEEVE LOCATIONS AS REQUIRED. CONTRACTOR SHALL POTHOLE OR EXPOSE EXISTING 16" WATER MAIN TO DETERMINE LOCATIONS OF EXISTING PIPE JOINTS.

CONSTRUCTION NOTES:

1. DRIVEWAY RESTORATION PER SECTION 3.1.10 OF THE PUD STANDARDS AND SPECIFICATIONS.
2. TRENCH PATCH EXISTING PAVEMENT PER DETAIL 2/C-6. INSTALL 2" MIN HALF WIDTH OVERLAY PER SNOHOMISH COUNTY ENGINEERING AND DEVELOPMENT DESIGN STANDARDS SECTION 8-05.C
3. ALL DISTURBED PERVIOUS SURFACES SHALL BE RESTORED WITH A 6-INCH LAYER OF T5.13 SOIL PER SNOHOMISH COUNTY DRAINAGE MANUAL, VOLUME V RUNOFF TREATMENT BMP'S.
4. BACKFILL WATER MAIN TRENCH WITH CDF. POLYWRAP PIPE PRIOR TO PLACEMENT OF CDF. ENSURE NO PIPE JOINTS ARE LOCATED IN CDF BACKFILL AREA.
5. 8" BYPASS LINE, INCLUDING 16" INSERTION VALVES SHALL BE INSTALLED, TESTED, DISINFECTED, AND OPERATIONAL PRIOR TO CUTTING IN 20" TEE.

CONSTRUCTION SEQUENCING PLAN NOTES:

1. THE FOLLOWING SEQUENCING PLAN IS PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL SUBMIT CONSTRUCTION SEQUENCING AND TESTING PLAN PRIOR TO STARTING WORK. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
   - A. POTHOLE AND HOT TAPE EXISTING MAINS PRIOR TO CONFIRMING EXISTING MAIN DEPTH, DIAMETER, MATERIAL, AND PIPE THICKNESS CLASS. REPORT ANY DISCREPANCIES TO OWNER.
   - B. INSTALL, TEST, AND DISINFECT 8-INCH BYPASS LINE.
   - C. INSTALL, TEST, AND DISINFECT 8-INCH TAPPING TEE AND VALVES.
   - D. CONNECT BYPASS LINE TO 8-INCH TAPPING TEES.
   - E. COORDINATE WITH OWNER TO PUT 8-INCH BYPASS LINE IN SERVICE TO PROVIDE CONTINUAL SERVICE TO BURN ROAD.
   - F. INSTALL AND TEST INSERTION VALVES.
   - G. CLOSE INSERTION VALVES.
   - H. REMOVE EXISTING 16" DI WATER MAIN AND CONNECT TO EXISTING SYSTEM AS SHOWN.
   - I. INSTALL, TEST, AND DISINFECT NEW 20-INCH WATER MAIN ALONG 150TH ST NE AND ON SITE.
   - J. ONCE NEW WATER MAINS ARE ACCEPTED BY THE OWNER, MAKE FINAL CONNECTION TO EXISTING 16" MAIN IN BURN ROAD.

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3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
WATER PLANS

MADISON TAYLOR MCCOY
STATE OF WASHINGTON
20123392
REGISTERED
PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
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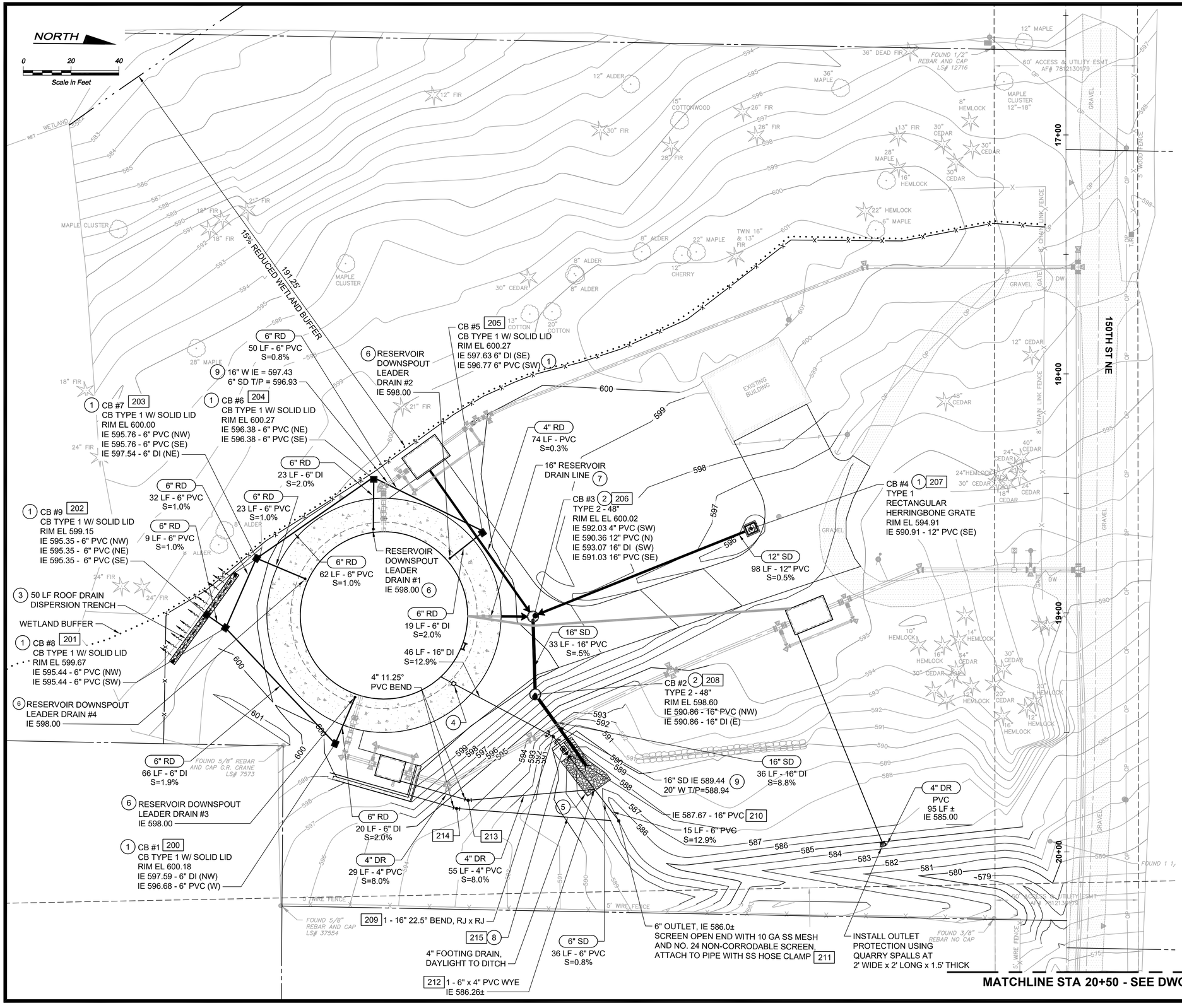
DRAWN	PLS
CHECKED	CGT
SCALE	

WO# 100099341

WE–	965
DWG #	C-3
SHEET	9
OF	36



NOTES:

1. SEE DWG C-2 FOR WATER PLAN. SEE DWG C-5 FOR GRADING AND PAVING PLAN.
2. CATCH BASIN INSERTS PER DETAIL 3/EC-3 SHALL BE INSTALLED IN ALL NEW CATCH BASINS.
3. FOR GRADING CONTROL POINTS STARTING WITH NUMBER 300, SEE DWG C-5.
4. FOR PAVING CONTROL POINTS STARTING WITH NUMBER 400, SEE DWG C-5.
5. FOR FENCE CONTROL POINTS STARTING WITH NUMBER 500, SEE DWG C-5.

CONSTRUCTION NOTES:

1. INSTALL CB TYPE 1 PER WSDOT STANDARD PLAN B-05.20-00 WITH FRAME PER WSDOT STANDARD PLAN B-30.10-03. PROVIDE LID TYPE AS NOTED ON THE PLANS.
   a. SOLID LID PER WSDOT STANDARD PLAN B-30.20-04.
   b. RECTANGULAR HERRINGBONE GRATE PER WSDOT STANDARD PLAN B-30.50-03.
2. INSTALL CB TYPE 2 PER WSDOT STANDARD PLAN B-10.20-00 WITH PAMREX 36" LOCKING DI FRAME AND COVER PRODUCT NO 621132.
3. INSTALL ROOF DRAIN DISPERSION TRENCH PER DETAIL 1/C-7.
4. STEEL INSULATION COUPLING, SEE SECTION C/R-6
5. INSTALL ROCK OUTFALL PROTECTION PER DETAIL 2/C-7.
6. INSTALL RESERVOIR DOWNSPOUT LEADER DRAIN PER DETAIL 3/R-7.
7. INSTALL 16" RESERVOIR DRAIN LINE PER DETAIL 1/R-5. INSTALL INLINE CHECK VALVE PRIOR TO DISCHARGE TO CATCH BASIN.
8. INSTALL RESERVOIR OVERFLOW DISCHARGE PER DETAIL 4/C-7.
9. PROVIDE 6" MINIMUM VERTICAL CLEARANCE WITH ETHAFOAM PAD.
10. INSTALL SPLIT RAIL FENCE PER DETAIL 5/C-6.
11. INSTALL HMA PER DETAIL 3/C-6.
12. DRIVEWAY RESTORATION PER SECTION 3.1.10 OF THE PUD STANDARDS AND SPECIFICATIONS.

COORDINATE CONTROL

NO.	NORTHING	EASTING
200	415191.40	1341511.17
201	415145.03	1341463.05
202	415137.15	1341457.73
203	415157.86	1341433.89
204	415206.62	1341399.19
205	415252.18	1341422.34
206	415273.67	1341457.29
207	415364.66	1341419.66
208	415274.77	1341489.8
209	415282.56	1341507.4
210	415296.21	1341519.16
211	415310.34	1341542.39
212	415300.02	1341529.33
213	415247.19	1341534.35
214	415242.4	1341537.82
215	415286.96	1341512.77

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EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR SITE DRAINAGE PLAN

ADDISON TAYLOR MCCRORY
STATE OF WASHINGTON
20128392
REGISTERED
PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
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SCALE	

WO# 100099341

WE–	965
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SHEET	10
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811
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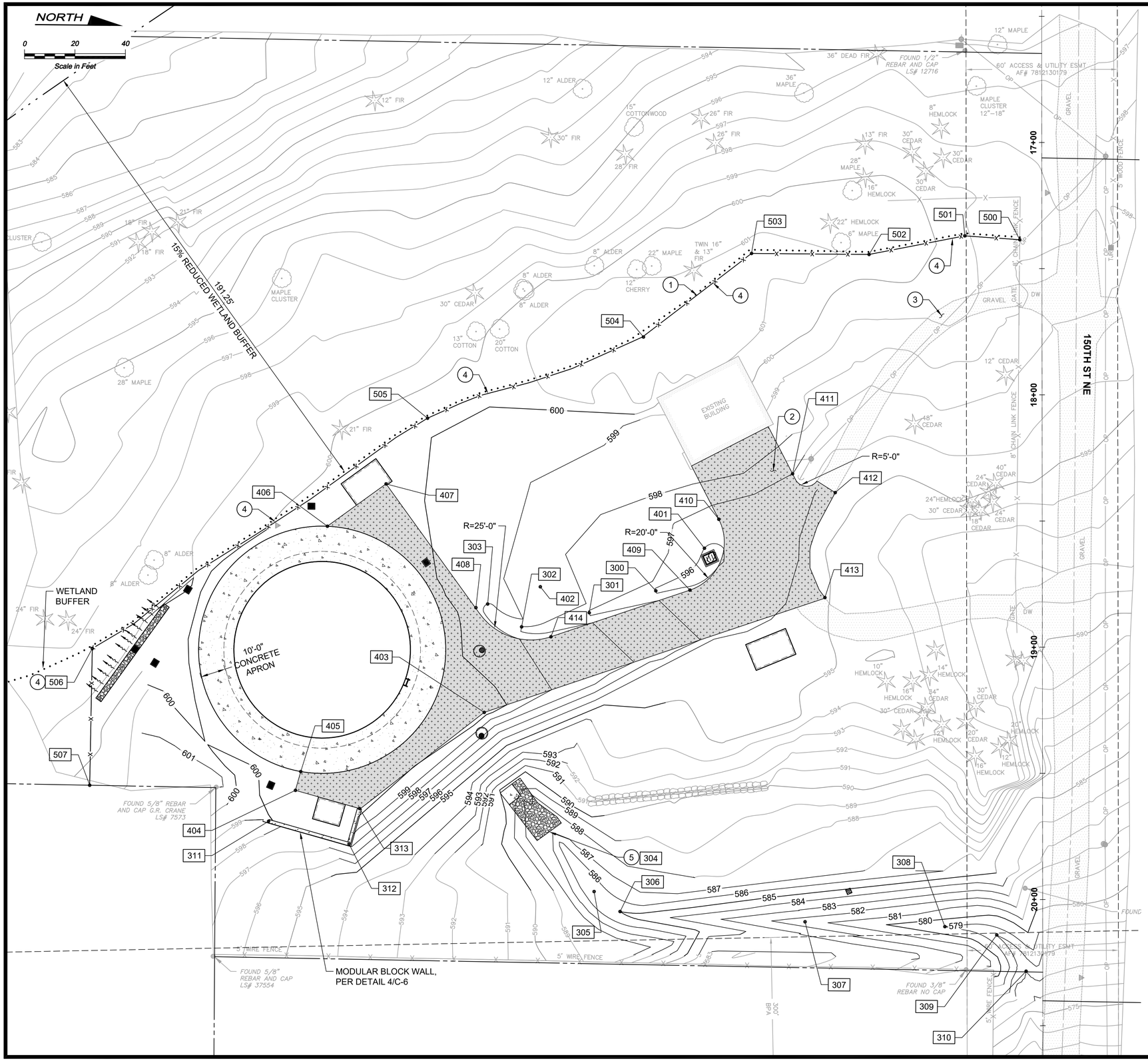

NOTES:

1. SEE DWG C-2 FOR WATER PLAN. SEE DWG C-4 FOR DRAINAGE PLAN.

CONSTRUCTION NOTES:

1. INSTALL SPLIT RAIL FENCE PER DETAIL 5/C-6.
2. INSTALL HMA PER DETAIL 3/C-6.
3. DRIVEWAY RESTORATION PER SECTION 3.1.10 OF THE PUD STANDARDS AND SPECIFICATIONS.
4. INSTALL CAPA SIGN PER DETAIL 5/C-6. MIN SPACING 100 FT.

COORDINATE CONTROL - SPLIT RAIL FENCE

NO.	NORTHING	EASTING
500	415486.41	1341292.39
501	415464.61	1341291.04
502	415426.72	1341298.75
503	415380.13	1341298.75
504	415337.58	1341332.23
505	415252.28	1341365.17
506	415120.17	1341457.57
507	415119.63	1341511.77

COORDINATE CONTROL - PAVING

NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
401	415362.49	1341415.74	N/A	RADIUS CENTER
402	415297.68	1341431.67	N/A	RADIUS CENTER
403	415275.76	1341484.54	600.5	PAVEMENT CORNER
404	415201.20	1341513.08	600.35	PAVEMENT CORNER
405	415203.25	1341505.62	600.36	PAVEMENT CORNER
406	415212.95	1341408.32	600.36	PAVEMENT CORNER
407	415236.06	1341391.33	601.00	PAVEMENT CORNER
408	415272.10	1341440.07	599.52	EDGE OF PAVEMENT
409	415356.88	1341432.37	596.50	EDGE OF PAVEMENT
410	415368.07	1341404.20	596.25	EDGE OF PAVEMENT
411	415397.17	1341385.91	597.00	EDGE OF PAVEMENT
412	415414.13	1341393.24	595.50	PAVEMENT CORNER
413	415301.96	1341451.33	595.10	PAVEMENT CORNER
414	415301.96	1341451.33	598.65	EDGE OF PAVEMENT

COORDINATE CONTROL - GRADING

NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
300	415343.35	1341432.78	596.00	BIOFILTRATION SWALE CL
301	415317.04	1341441.69	597.00	BIOFILTRATION SWALE CL
302	415290.12	1341448.43	598.00	BIOFILTRATION SWALE CL
303	415276.75	1341438.57	599.00	BIOFILTRATION SWALE CL
304	415303.23	1341527.69	583.25±	SWALE CL
305	415319.94	1341552.15	585.65±	SWALE CL
306	415330.31	1341559.98	585.00±	SWALE CL
307	415403.66	1341563.41	581.40±	SWALE CL
308	415459.11	1341564.84	579.00±	SWALE CL
309	415479.71	1341567.95	578.05±	SWALE CL
310	415491.44	1341582.21	MATCH EX	CONNECT TO EX DITCH
311	415190.65	1341525.44	600.6	TOP OF WALL
312	415222.64	1341534.16	600.6	TOP OF WALL
313	415226.66	1341520.07	600.6	TOP OF WALL

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BURN ROAD RESERVOIR
RESERVOIR SITE GRADING AND PAVING PLAN

MADISON TAYLOR MCCRACKEN
STATE OF WASHINGTON
20123392
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
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SCALE	

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WE– 965
DWG # C-5
SHEET 11
OF 36

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resvd Filename: P23-10882_C-5 Plot date: May 21, 2025-04:44:22pm CAD User: abradley
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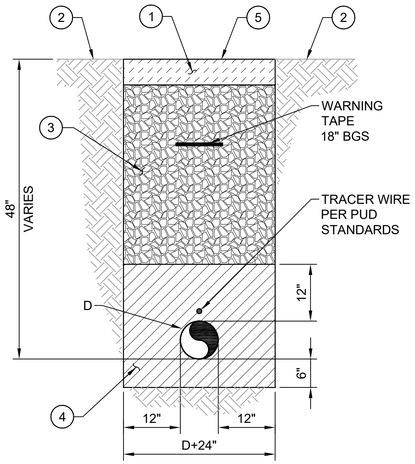


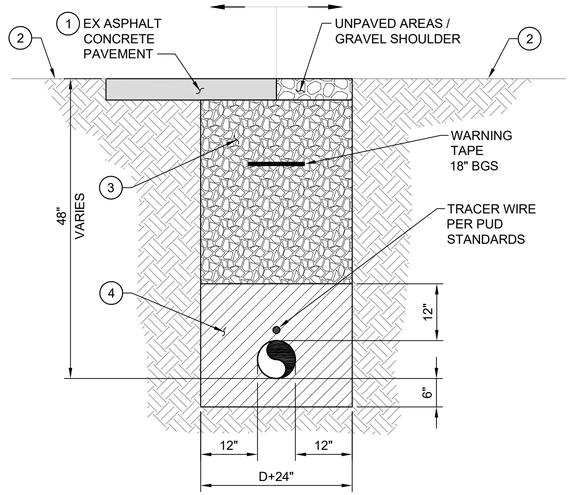
CONSTRUCTION NOTES:

1. INSTALL 6-INCH LAYER OF T5.13 SOIL PER SNOHOMISH COUNTY DRAINAGE MANUAL, VOLUME V RUNOFF TREATMENT BMP'S IN VEGETATED TRENCH AREAS.
2. EXISTING UNDISTURBED SOIL.
3. NATIVE MATERIAL, BANK RUN GRAVEL, CSTC, OR CDF.
4. PIPE BEDDING, CSTC.
5. HYDROSEED, SEE TABLE 4.4, SHEET C-7 FOR SEED MIX.

TYPICAL TRENCH SECTION IN VEGETATED AREAS

DETAIL 1

NTS TYP



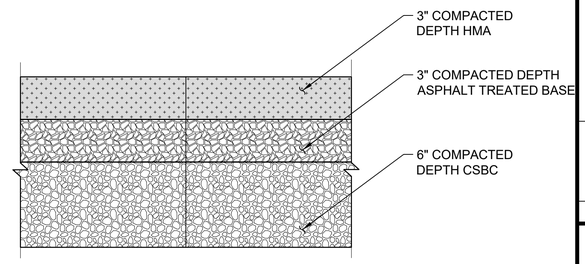
CONSTRUCTION NOTES:

1. HMA, 6" COMPACTED DEPTH OR MATCH EXISTING, WHICHEVER IS GREATER. NEAT LINE CUT EXISTING ASPHALT. TACK AND SEAL EDGES.
2. EXISTING UNDISTURBED SOIL.
3. NATIVE MATERIAL, BANK RUN GRAVEL, CSTC OR CONTROL DENSITY FILL CDF.
4. PIPE BEDDING, CSTC.

TYPICAL TRENCH SECTION IN IMPERVIOUS AREA

DETAIL 2

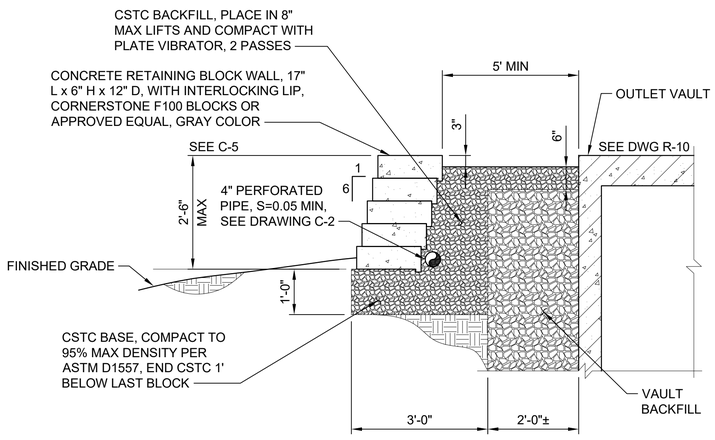
NTS TYP



HMA PAVEMENT

DETAIL 3

NTS TYP



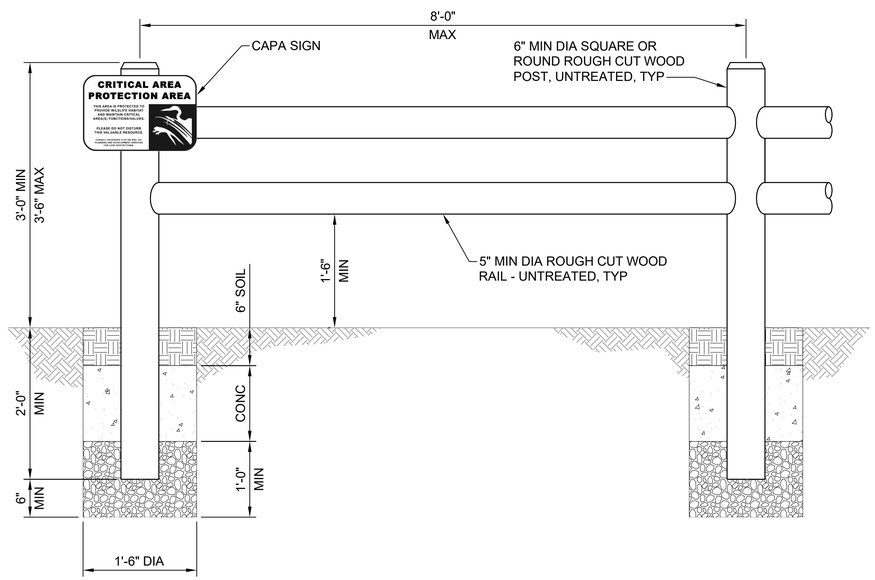
NOTES:

1. COMPACT BASE SUBGRADE. EXCAVATE SOFT AREAS AND BACKFILL WITH CSBC.
2. INSTALL WALL BLOCK PER MANUFACTURER'S RECOMMENDATION.

CONCRETE WALL BLOCK

DETAIL 4

NTS C-2



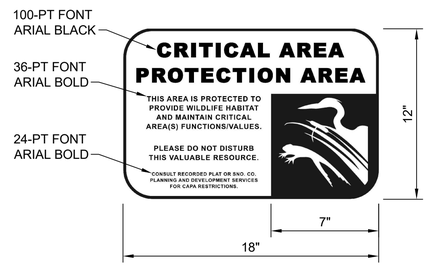
SPLIT RAIL FENCE AND SIGNAGE

DETAIL 5

NTS C-2

NOTES:

1. SIGN SHALL BE ALUMINUM WITH WHITE REFLECTIVE BACKGROUND.
2. COLOR FOR FONT, IMAGE, AND BORDER: GREEN C= 79 M-33 Y=84 K=21 OR BLACK C=80 M=70 Y=70 K=100
3. CAPA SIGNS SHALL BE PLACED NO GREATER THAN 100 FEET APART ALONG THE SPLIT RAIL FENCE.
4. ALL SIGNS MUST BE SECURE AND PERMANENT. INSTALL WITH MINIMUM OF TWO GALVANIZED OR STAINLESS STEEL WOOD LAG BOLTS.



CAPA SIGN

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
CIVIL DETAILS 1 OF 2

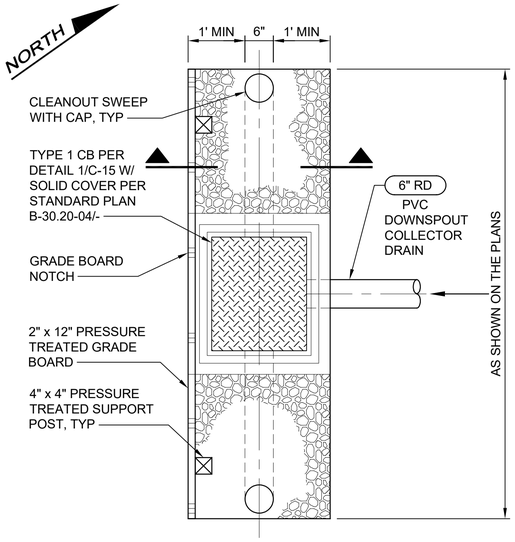
CARLA G. TALICH — STATE OF WASHINGTON — 37426 — REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

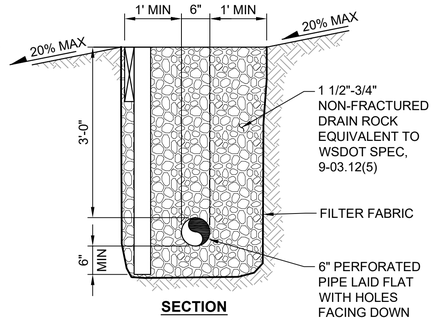
WO# 100099341

WE–	965
DWG #	C-6
SHEET	12
OF	36

811 Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE



PLAN



SECTION

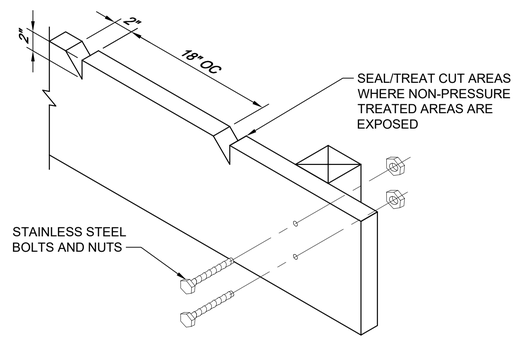
NOTES:

1. THIS TRENCH SHALL BE CONSTRUCTED TO PREVENT POINT DISCHARGE AND/OR EROSION.
2. PROVIDE AT LEAST 1'-0" SUMP BELOW PIPE INVERTS IN TYPE 1 CB FOR SEDIMENT ACCUMULATION.
3. TRENCH AND GRADE BOARD SHALL BE LEVEL. ALIGN TO FOLLOW CONTOURS OF SITE.
4. GRADE BOARD SUPPORT POST SPACING AS REQUIRED BY SOIL CONDITIONS.
5. THE END OF EACH PIPE RUN SHALL HAVE AN ACCESSIBLE CLEAN OUT SWEEP. PIPE END SHALL BE VISIBLE.

FLOW DISPERSION TRENCH

DETAIL 1

NTS C-4

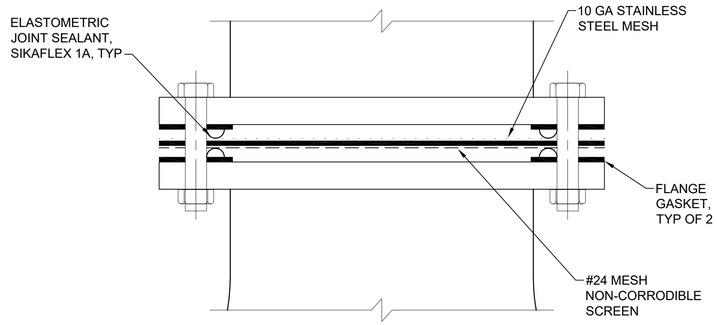


GRADE BOARD WITH NOTCHES

TABLE 4.4*
LOW-GROWING TURF SEED MIX

DESCRIPTION	% WEIGHT	% PURITY	% GERMINATION
DWARF TALL FESCUE (SEVERAL VARIETIES) *FESTUCA ARUNDINACEA VAR*	45	98	90
DWARF PERENNIAL RYE (BARCLAY) *LOLIUM PERENNE VAR BARCLAY*	30	98	90
RED FESCUE *FESTUCA RUBRA*	20	98	90
COLONIAL BENTGRASS *AGROSTIS TENUIS*	5	98	90

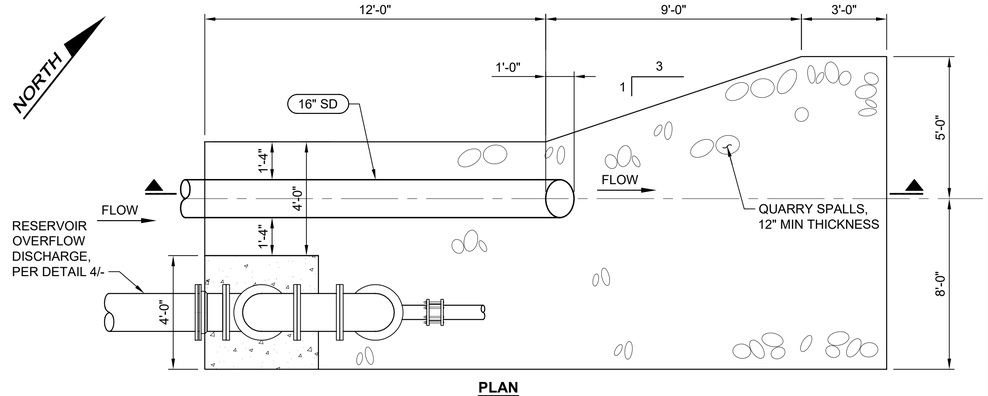
**REFERENCE: SNOHOMISH COUNTY DRAINAGE MANUAL VOLUME II, TABLE 4.4, JULY 2021.*



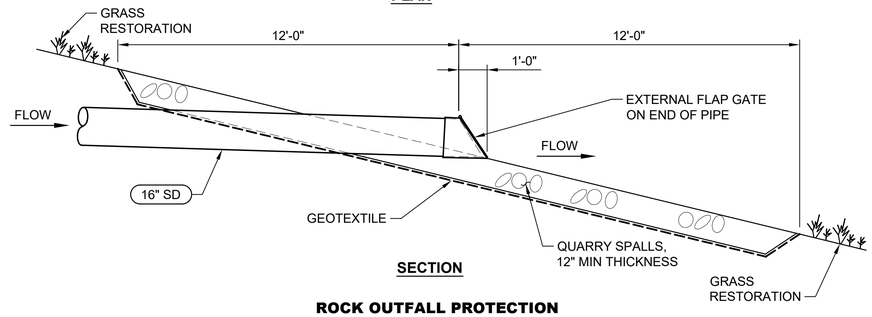
RESERVOIR OVERFLOW DISCHARGE SCREEN

DETAIL 2

SCALE: 3" = 1'-0" TYP



PLAN

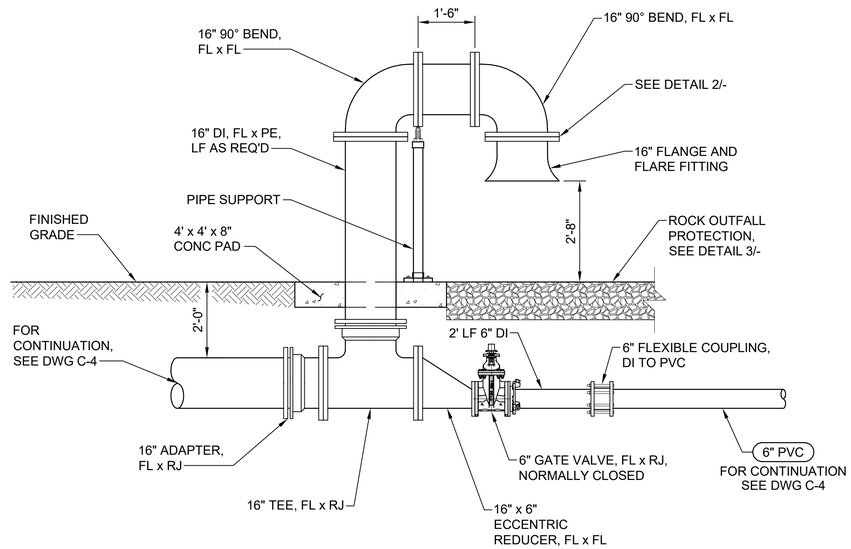


SECTION

ROCK OUTFALL PROTECTION

DETAIL 3

NTS C-2



RESERVOIR OVERFLOW DISCHARGE

DETAIL 4

SCALE: 1/2" = 1'-0" TYP

Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
CIVIL DETAILS 2 OF 2

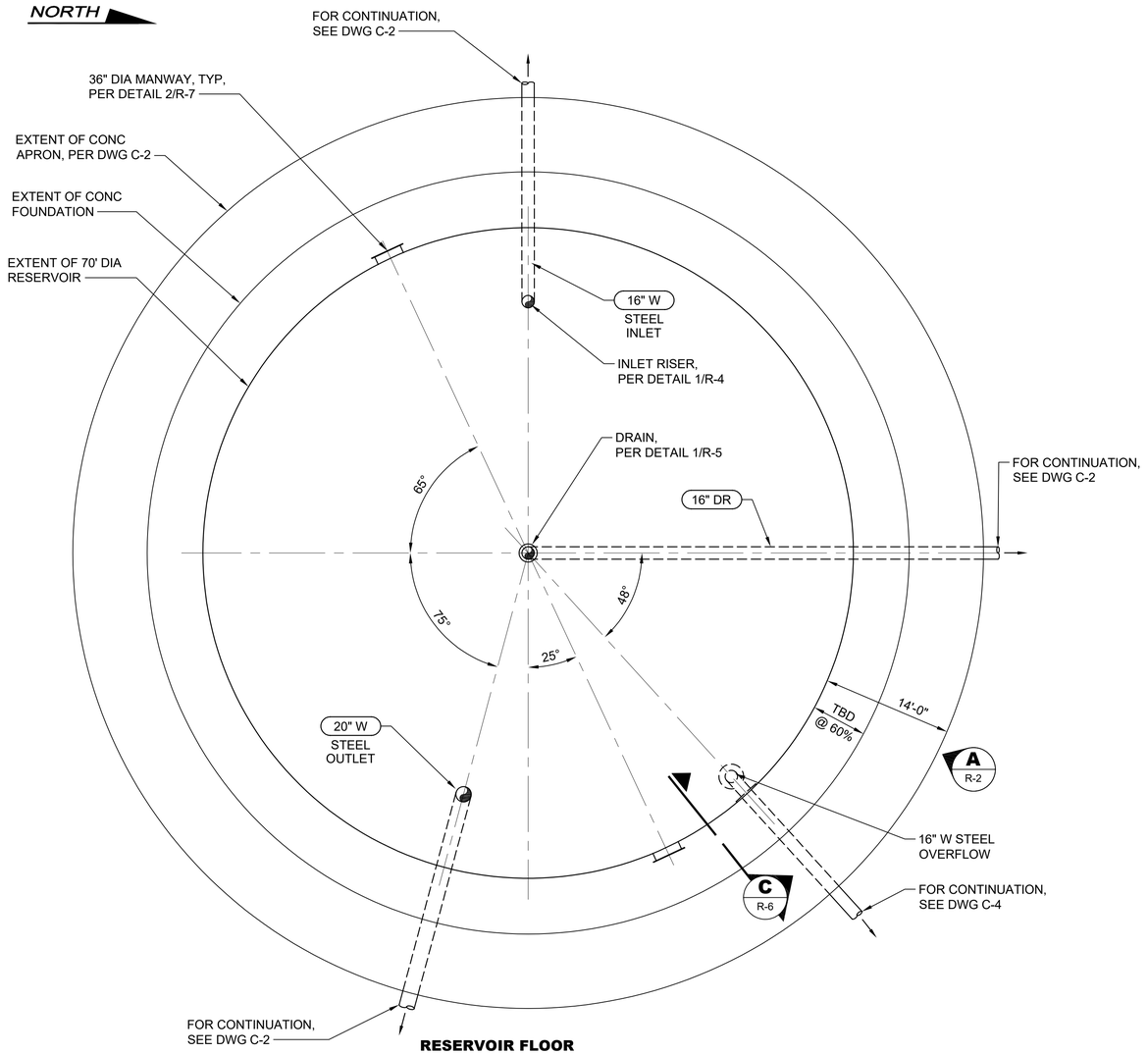
CARLA G. TALTON
STATE OF WASHINGTON
37426
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE–	965
DWG #	C-7
SHEET	11
OF	36

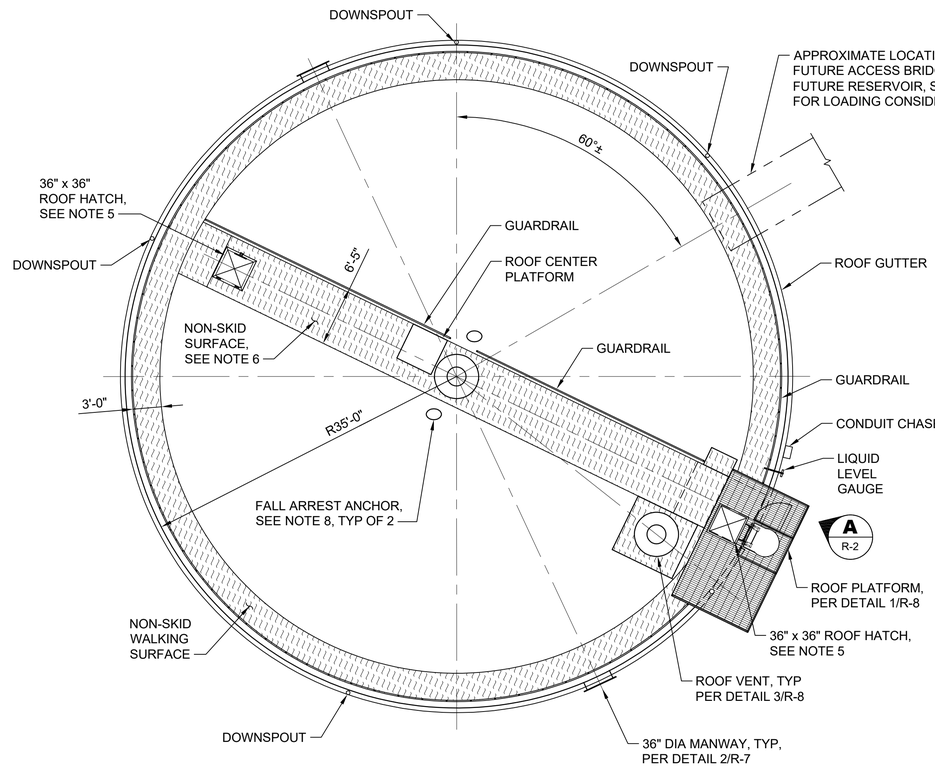
Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Res\Vd Filename: P23-10882_C-7 Plot date: May 21, 2025-04:45:40pm CAD User: abradley.
Xref Filename: | X23-10882_TB | Talton | X23-10882_Status | Stevens | Rogers | Gibson | McCrosky | Wildhood | Gillespie | Dahl |



RESERVOIR FLOOR

PLAN 1

SCALE: 1/8" = 1'-0" C-2



RESERVOIR ROOF

PLAN 2

SCALE: 1/8" = 1'-0" C-2

NOTES:

1. THE DESIGN OF THE RESERVOIR AND APPURTENANCES SHALL MEET THE REQUIREMENTS OF THE AWWA D100 STANDARD.
2. ALL SIZES OF MATERIALS AND WELDING AS SHOWN ARE MINIMUM REQUIREMENTS. MATERIAL SIZES AND WELDS REQUIRED FOR THE RESERVOIR AND APPURTENANCES SHALL BE PROVIDED BY THE RESERVOIR DESIGNER.
3. REFER TO STRUCTURAL DRAWINGS FOR DESIGN LOADS APPLICABLE TO THE RESERVOIR AND RESERVOIR FOUNDATION.
4. REFER TO SPECIFICATIONS FOR APPLICABLE STANDARDS, DESIGN REQUIREMENTS, AND MATERIAL.
5. ROOF HATCH SHALL BE INSTALLED WITH A GASKET PER THE SPECIFICATIONS.
6. NON-SKID WALKING SURFACE SHALL BE PROVIDED AS SHOWN ON THE PLANS AND DESCRIBED IN SECTION 09 97 10 OF THE SPECIFICATIONS.
7. DESIGN RESERVOIR FOR GRAVITY AND SEISMIC LOADING FOR A FUTURE BRIDGE SUPPORT. PREPARE ROOF SHELL FOR POINT LOADS FROM BRIDGE CONNECTIONS. ASSUME FUTURE BRIDGE WILL BE 3 FT WIDE AND APPROXIMATELY 60 FT LONG. IT SHALL INCLUDE METAL GRADING AND HANDRAILS. ASSUME LIVE LOADING TO BE 50PSF.
8. FALL ARREST ANCHORS SHALL HAVE 12 INCHES TALL POSTS AND BE OSHA COMPLIANT FOR 5000 LBS. RESTRAINT. PROVIDE REPAD REINFORCEMENT AS REQUIRED.

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR FLOOR AND ROOF PLANS

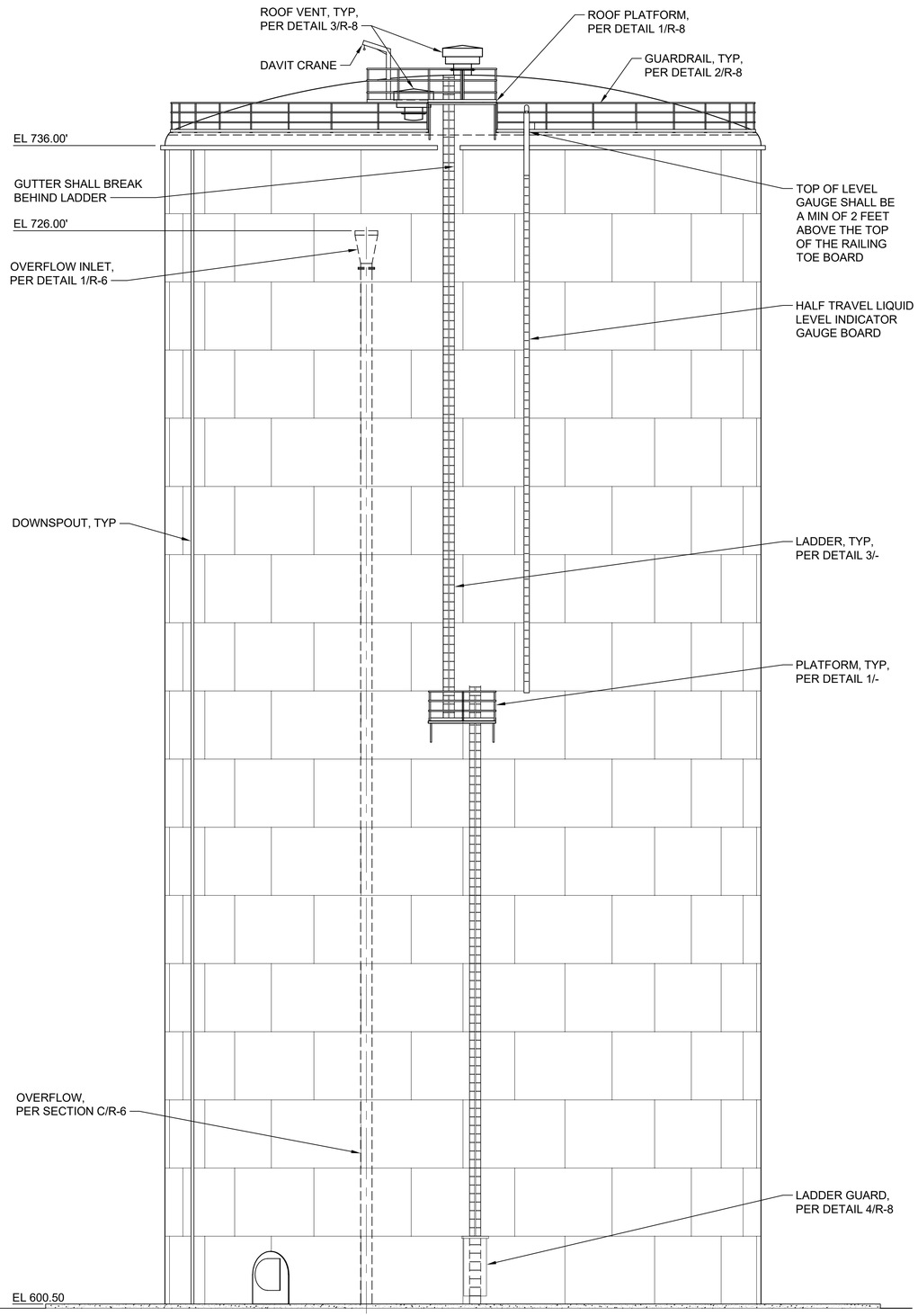
LANCE D. STEVENS — STATE OF WASHINGTON — 45274 — REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

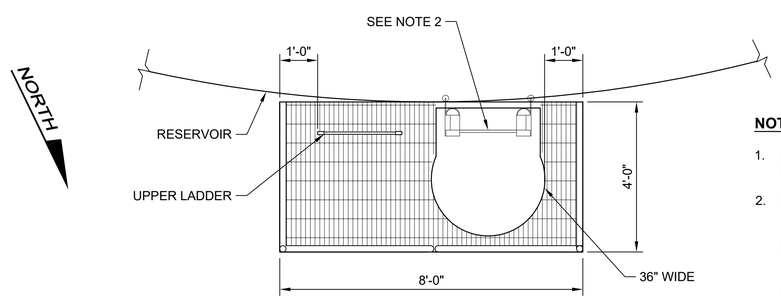
WO# 100099341

WE–	965
DWG #	R-1
SHEET	14
OF	37

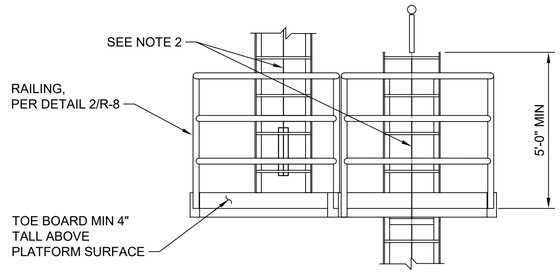
811 Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE



ELEVATION A
SCALE: 3/8" = 1'-0" R-1



PLAN

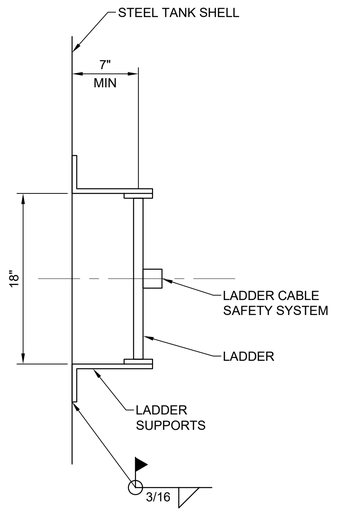


ELEVATION

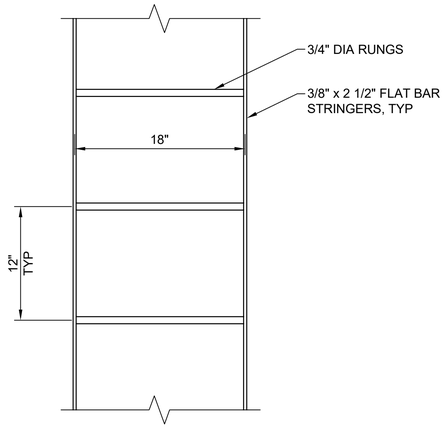
PLATFORM
DETAIL 1
NTS TYP

NOTES:

1. LADDERS SHALL BE INSTALLED AT A PITCH OF 90° FROM THE HORIZONTAL.
2. PROVIDE LADDER SAFETY DEVICE WITH CABLE VERTICAL SAFETY SYSTEM COMPATIBLE WITH 3M DBI-SALA LAD-SAF DETACHABLE CABLE TRAVELER 6160030. SAFETY SYSTEM SHALL INCLUDE D-RING ANCHORAGE ASSEMBLY AT TOP OF EACH LADDER RUN.



EXTERIOR LADDER
DETAIL 2
NTS TYP



LADDER
DETAIL 3
NTS TYP

Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR ELEVATION AND LADDER DETAILS

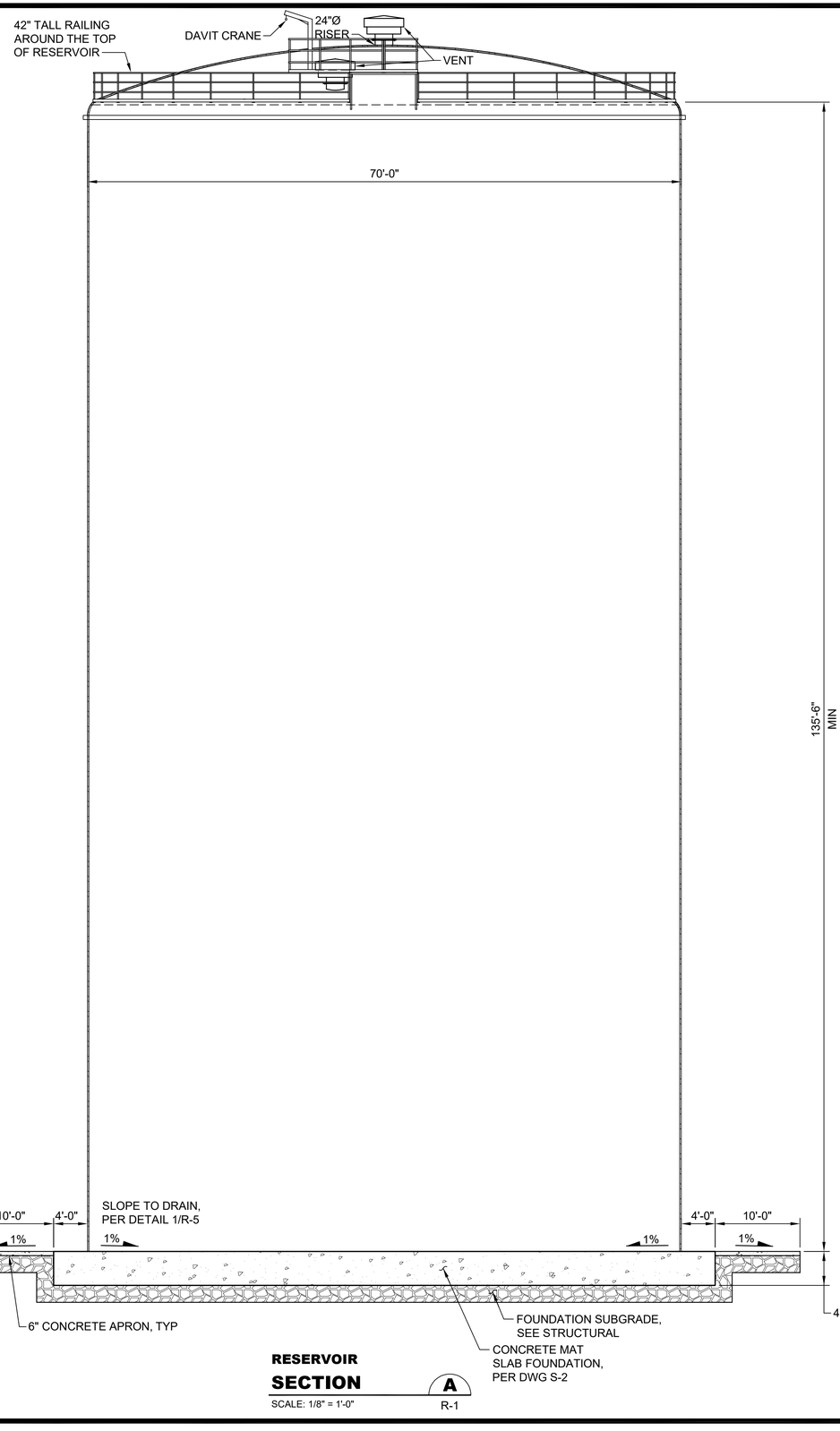
LANCE D. STEVENS
STATE OF WASHINGTON
45274
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE–	965
DWG #	R-2
SHEET	15
OF	37

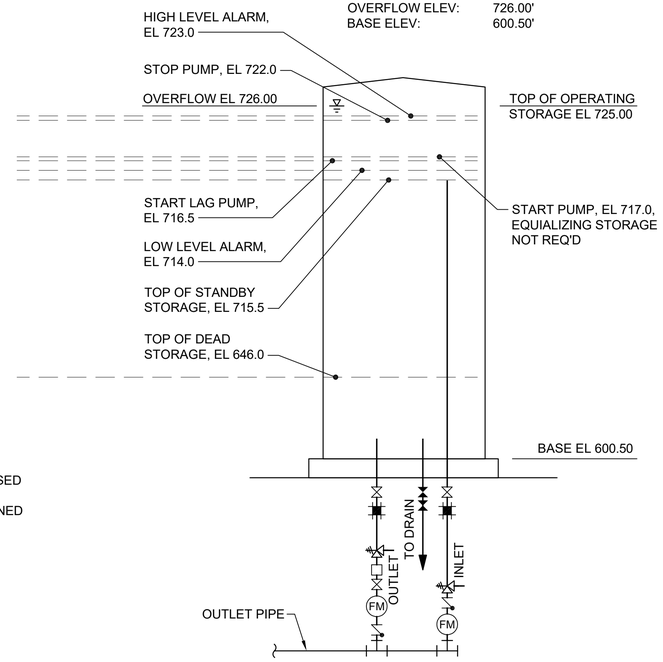
Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resvd Filename: P23-10882_R-2 Plot date: May 21, 2025-05:00:14pm CAD User: abradley
Xref Filename: | X23-10882_TB | Talich | X23-10882_Status | Stevens | X23-10882_Prop Rsvr | Rogers | Gibson | McCroskty | Wildhood | Gillespie | Dahl |



RESERVOIR
SECTION **A**
SCALE: 1/8" = 1'-0" R-1

BURN ROAD

VOLUME:	3.6M GALS
DIAMETER:	70'
MIN SHELL HEIGHT:	135.5'
OVERFLOW ELEV:	726.00'
BASE ELEV:	600.50'



LEGEND

- FLEXIBLE EXPANSION JOINT
- GATE VALVE, NORMALLY CLOSED
- GATE VALVE, NORMALLY OPENED
- CHECK VALVE
- SEISMIC VALVE
- AIR/VAC VALVE
- (FM) FLOW METER

RESERVOIR WATER PIPING SCHEMATIC
DETAIL **1**
NTS

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR RESERVOIR SECTIONS AND WATER PIPING SCHEMATIC

LANCE D. STEVENS — STATE OF WASHINGTON — 45274 — REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	SJF
DRAWN	SO
CHECKED	
SCALE	N/A

WO# 100099341

WE–	965
DWG #	R-3
SHEET	16
OF	37

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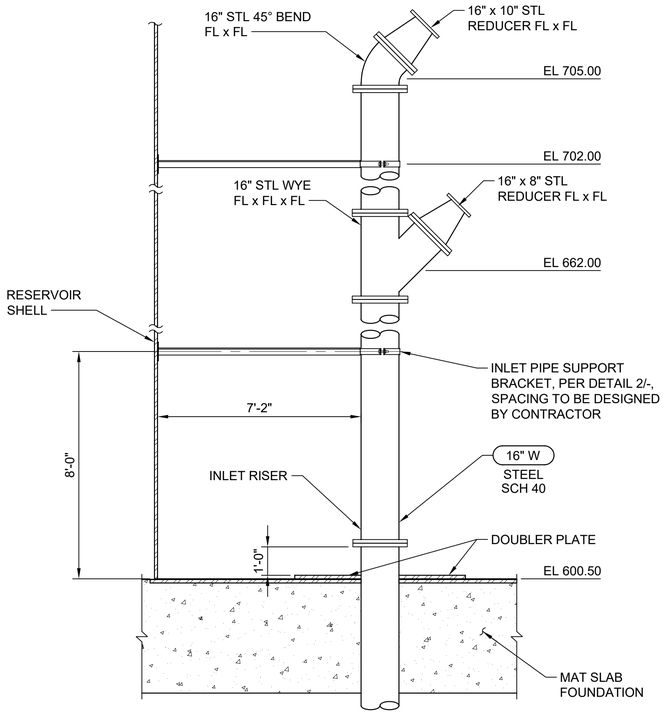
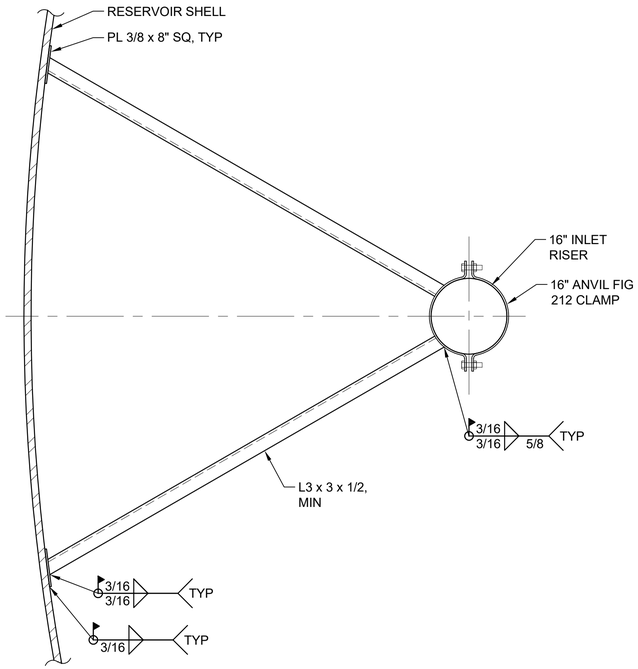
UNDERGROUND SERVICE



INLET RISER

DETAIL 1

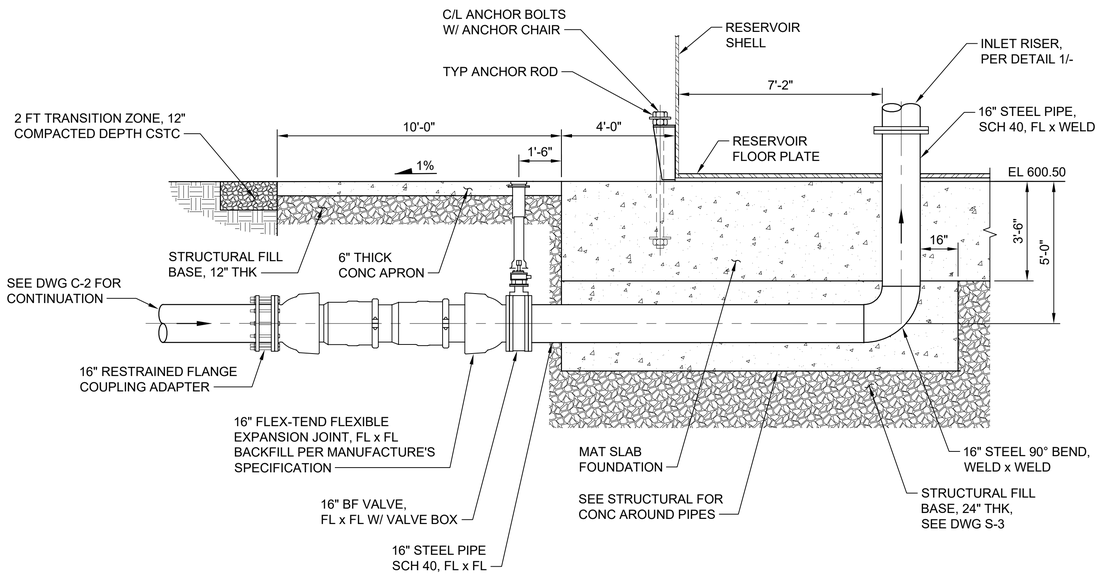
SCALE: 3/8" = 1'-0" R-1



INLET SUPPORT

DETAIL 2

NTS -



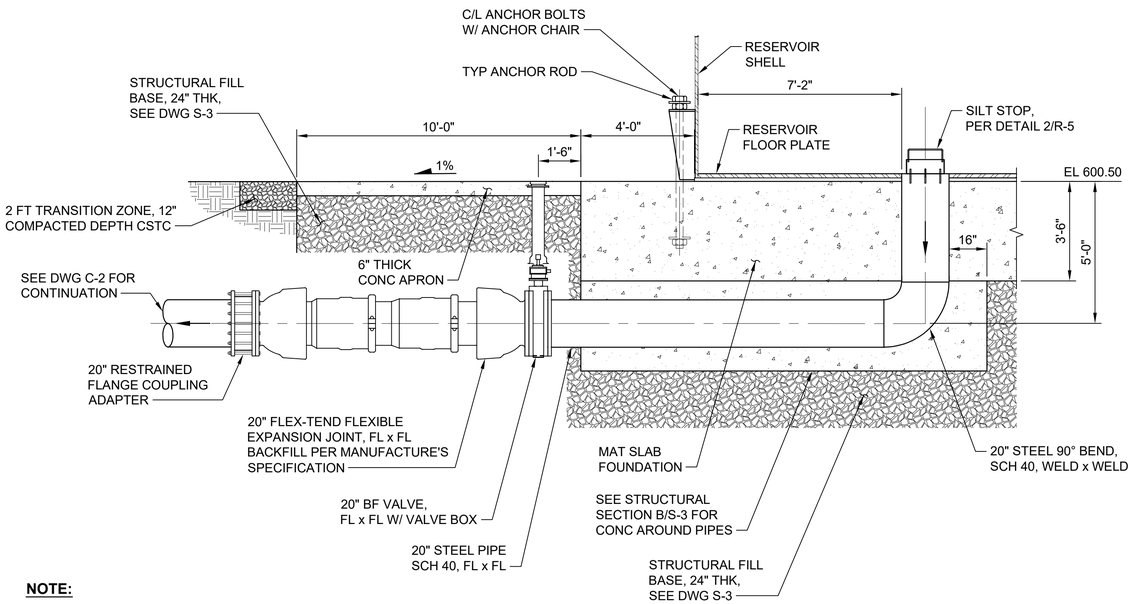
NOTE:

1. INSTALL DIELECTRIC KIT AT STEEL AND DUCTILE IRON PIPE CONNECTIONS.

RESERVOIR INLET

SECTION A

SCALE: 3/8" = 1'-0" C-2



NOTE:

1. INSTALL DIELECTRIC KIT AT STEEL AND DUCTILE IRON PIPE CONNECTIONS.

RESERVOIR OUTLET

SECTION B

SCALE: 3/8" = 1'-0" C-2

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR INLET AND OUTLET PIPING DETAILS AND SECTIONS

JOHN T. GILLESPIE
STATE OF WASHINGTON
31993
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE–	965
DWG #	R-4
SHEET	17
OF	37

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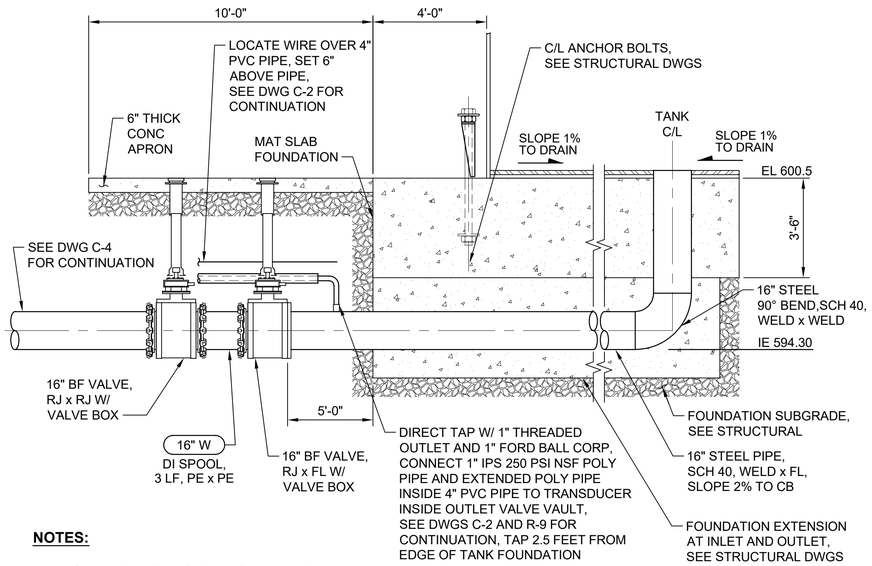
UNDERGROUND SERVICE

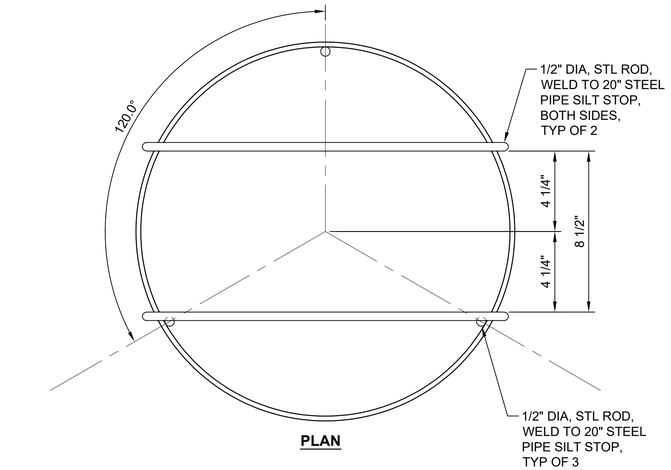
Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resv\d Filename: P23-10882_R-4 Plot date: May 21, 2025-05:01:24pm CAD User: abradley.
Xref Filename: | X23-10882_TB | Talich | X23-10882_Status | Stevens | Rogers | Gibson | McCrosky | Widhood | Gillespie | Dahl |



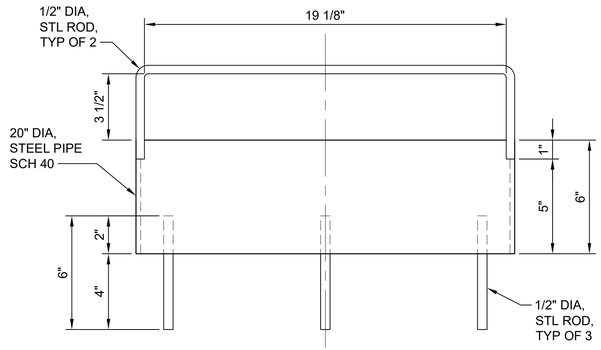
NOTES:

1. INSTALL DIELECTRIC KIT AT STEEL AND DUCTILE IRON PIPE CONNECTIONS.

TANK DRAIN
DETAIL 1
NTS C-2

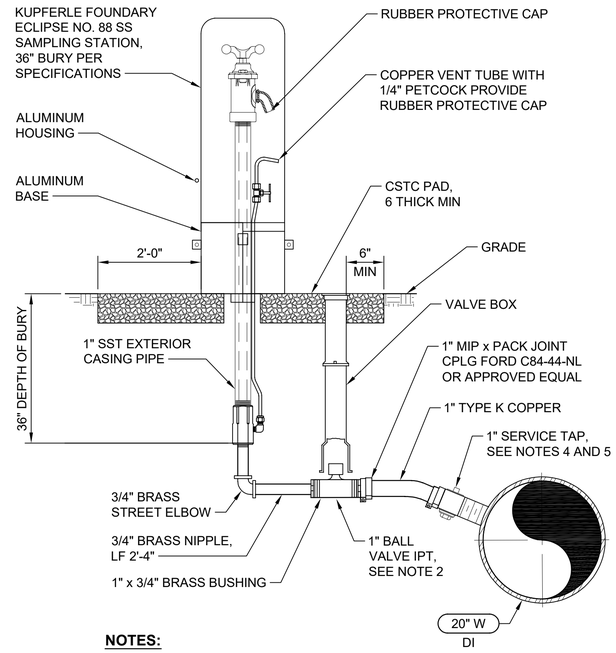


PLAN



SECTION

SILT STOP
DETAIL 2
NTS R-4



NOTES:

1. DO NOT BACKFILL UNTIL ALL FITTINGS HAVE BEEN INSPECTED BY THE DISTRICT.
2. BALL VALVE SHALL BE FORD B11-444-NL (1 FEMALE IRON PIPE THREADS BOTH ENDS BALL VALVE) WITH FORD QT67 2" GATE VALVE OPERATING NUT.
3. ALL FITTINGS SHALL BE LEAD FREE BRASS.
4. DIRECT TAP ON DI PIPE, NO SADDLE.

SAMPLING STATION
DETAIL 3
NTS C-2

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

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PUBLIC UTILITY DISTRICT NO. 1
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EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR DRAIN AND SAMPLING STATION DETAILS

05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE–	965
DWG #	R-5
SHEET	18
OF	37

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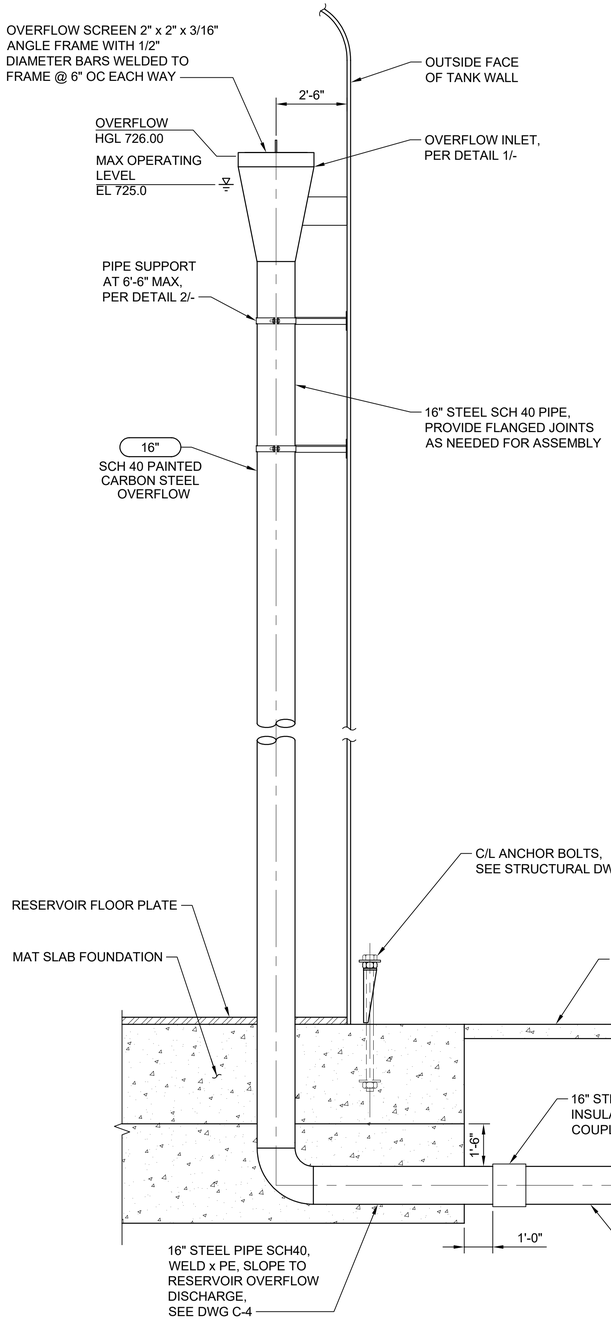
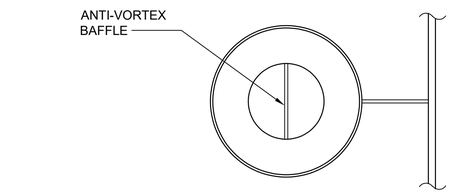
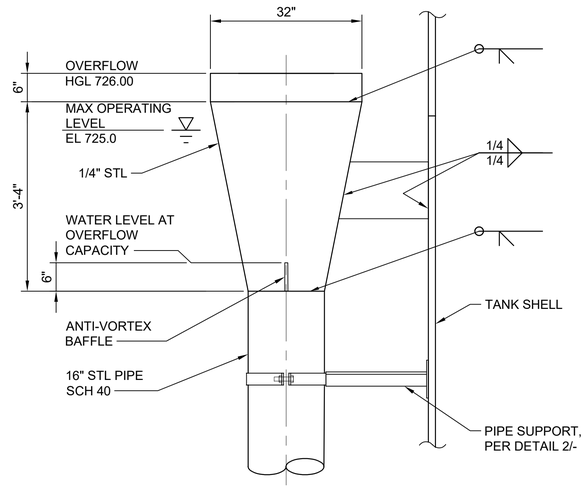
1-800-424-5555
UNDERGROUND SERVICE



SECTION C
SCALE: 3/8" = 1'-0" R-1

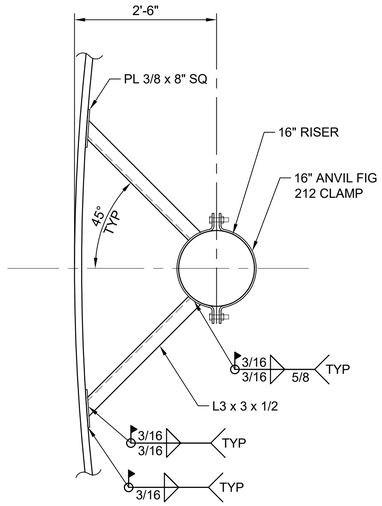


PLAN

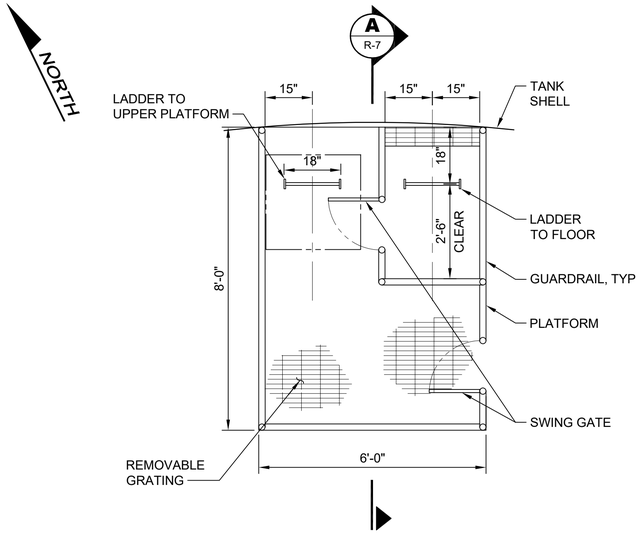


ELEVATION

OVERFLOW INLET
DETAIL 1
SCALE: 3/4" = 1'-0" -



OVERFLOW SUPPORT
DETAIL 2
NTS -



LOWER INTERIOR PLATFORM
DETAIL 3
SCALE: 1/2" = 1'-0" R-6

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

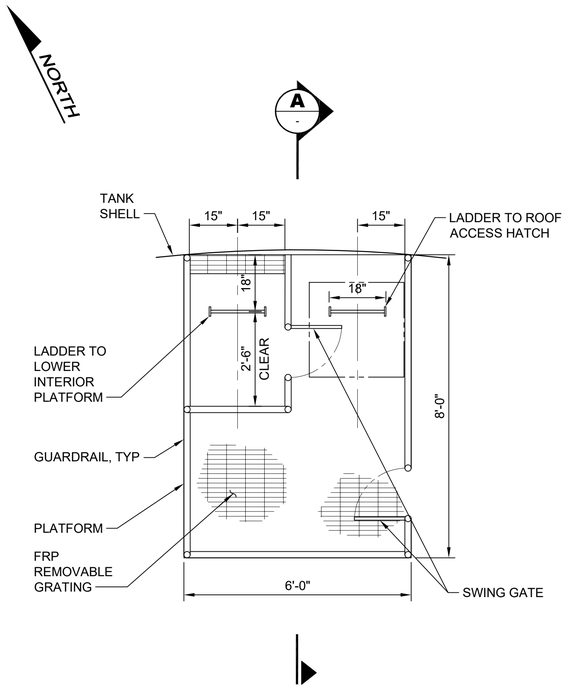
SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR OVERFLOW SECTIONS AND DETAILS

LANCE D. STEVENS — STATE OF WASHINGTON — 45274 — REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN
WO# 100099341	
WE–	965
DWG #	R-6
SHEET	19
OF	37

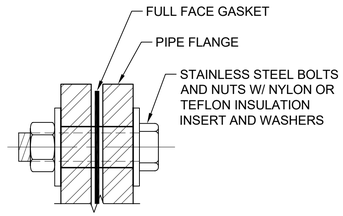
811 **Call 48 Hours Before You Dig**
1-800-424-5555
UNDERGROUND SERVICE



UPPER INTERIOR PLATFORM

PLAN 1

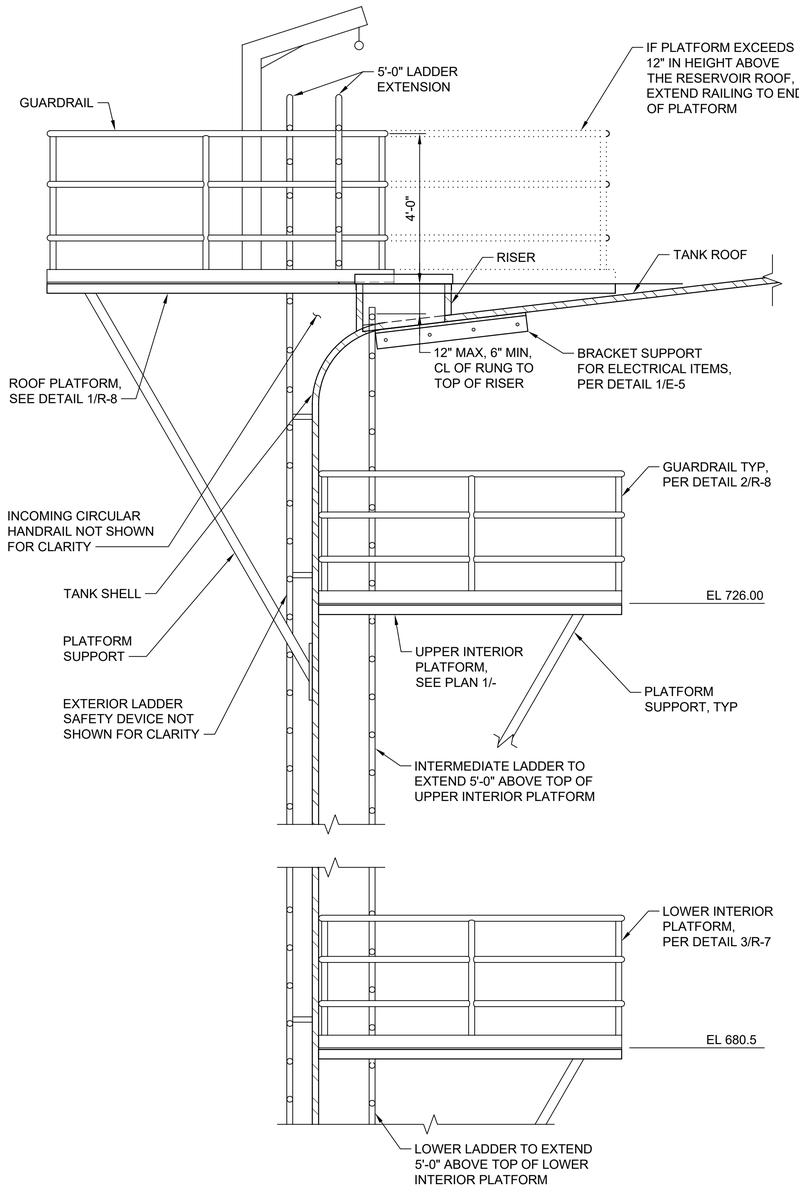
SCALE: 1/2" = 1'-0" -



DIELECTRIC COUPLING

DETAIL 4

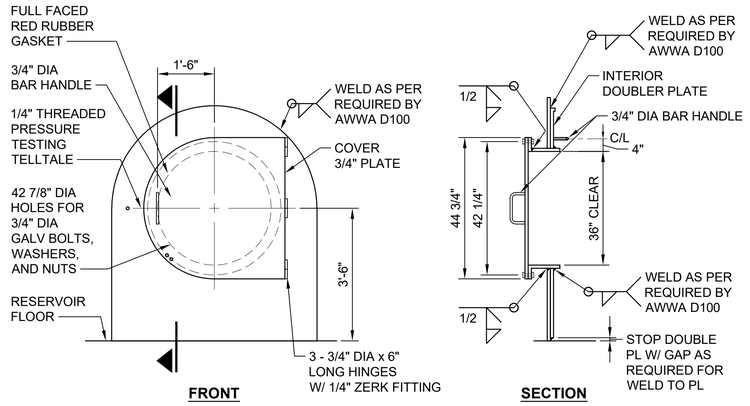
NTS TYP



INTERIOR AND ROOF PLATFORM

SECTION A

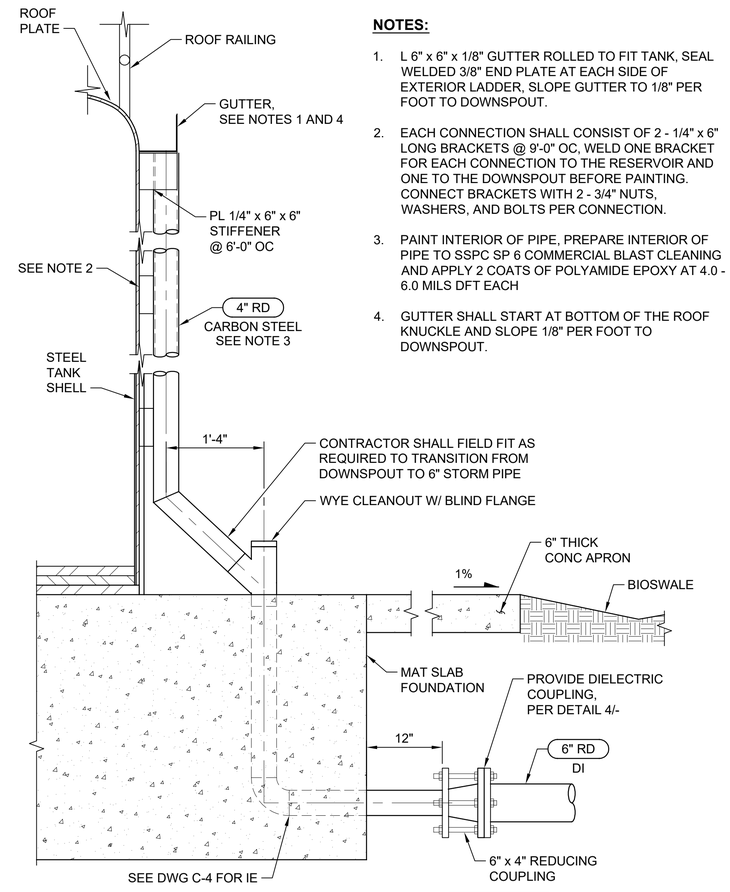
SCALE: 1/2" = 1'-0" -



36" DIAMETER MANWAY

DETAIL 2

SCALE: 1/2" = 1'-0" R-1



NOTES:

1. L 6" x 6" x 1/8" GUTTER ROLLED TO FIT TANK, SEAL WELDED 3/8" END PLATE AT EACH SIDE OF EXTERIOR LADDER, SLOPE GUTTER TO 1/8" PER FOOT TO DOWNSPOUT.
2. EACH CONNECTION SHALL CONSIST OF 2 - 1/4" x 6" LONG BRACKETS @ 9'-0" OC, WELD ONE BRACKET FOR EACH CONNECTION TO THE RESERVOIR AND ONE TO THE DOWNSPOUT BEFORE PAINTING. CONNECT BRACKETS WITH 2 - 3/4" NUTS, WASHERS, AND BOLTS PER CONNECTION.
3. PAINT INTERIOR OF PIPE, PREPARE INTERIOR OF PIPE TO SSPC SP 6 COMMERCIAL BLAST CLEANING AND APPLY 2 COATS OF POLYAMIDE EPOXY AT 4.0 - 6.0 MILS DFT EACH
4. GUTTER SHALL START AT BOTTOM OF THE ROOF KNUCKLE AND SLOPE 1/8" PER FOOT TO DOWNSPOUT.

RAIN GUTTER AND DOWNSPOUT

DETAIL 3

NTS TYP

Call 48 Hours Before You Dig

1-800-424-5555

UNDERGROUND SERVICE

No.	DATE	REVISION	APPR.
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SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
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WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR DETAILS
1 OF 2

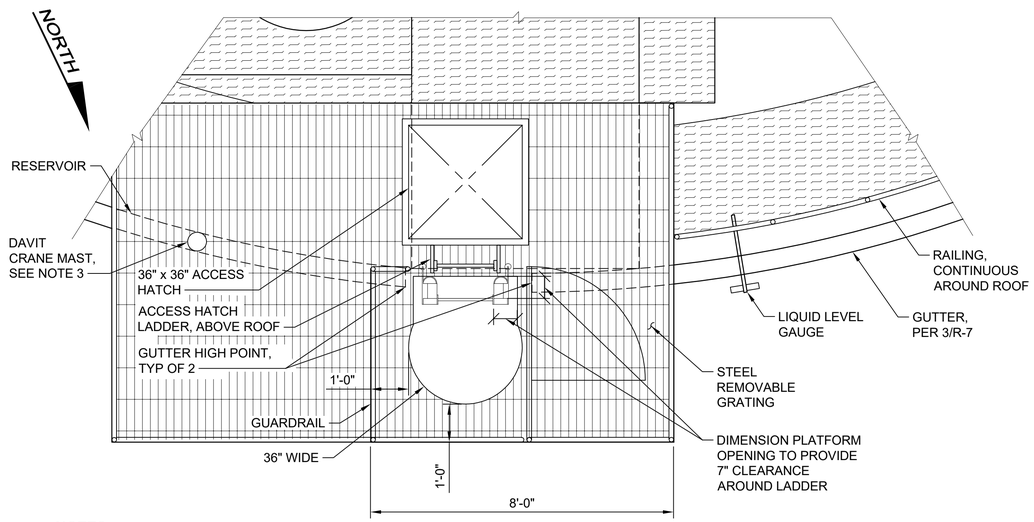
LANCE D. STEVENS — STATE OF WASHINGTON — 45574 — REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE–	965
DWG #	R-7
SHEET	20
OF	37

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resvd_Filename: P23-10882_R-7_Plot date: May 21, 2025-05:03:32pm_CAD User: sbradley.
Xref Filename: | X23-10882_TB | Talich | X23-10882_Status | Stevens | Rogers | Gilson | McCrosky | Wildhood | Gillespie | Dahl |

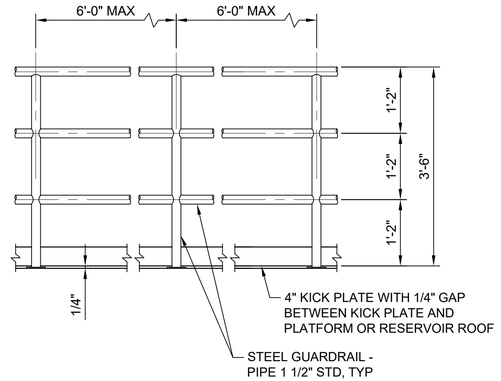


PLAN

NOTES:

1. LADDERS SHALL BE INSTALLED AT A PITCH OF 90° FROM THE HORIZONTAL.
2. PROVIDE LADDER SAFETY DEVICE WITH CABLE VERTICAL SAFETY SYSTEM COMPATIBLE WITIH 3M DBI-SALA LAD-SAF DETACHABLE CABLE TRAVELER 6160030. SAFETY SYSTEM SHALL INCLUDE D-RING ANCHORAGE SYSTEM AT TOP OF EACH LADDER RUN.
3. MAST SHALL BE POSITIONED SO THE CRANE HOOK SWINGS OVER THE CENTER OF THE ACCESS HATCH AND THE LADDER WELL.

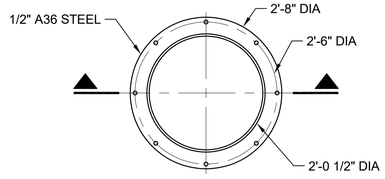
PLATFORM, LADDER, AND RAILING AT ROOF
DETAIL 1
NTS R-1



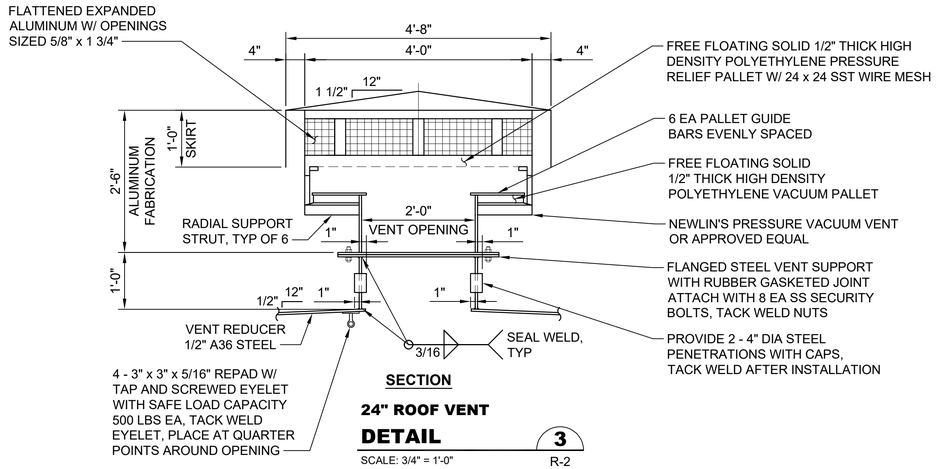
NOTES:

1. GUARDRAIL SHALL BE SET APPROXIMATELY 8" FROM EDGE OF SHELL. CONTRACTOR TO VERIFY IN FIELD.

TYPICAL RAILING
DETAIL 2
NTS TYP

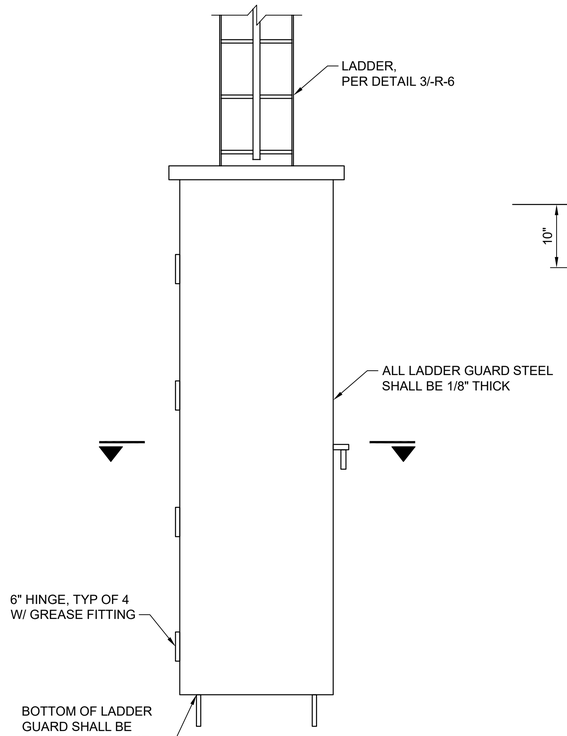


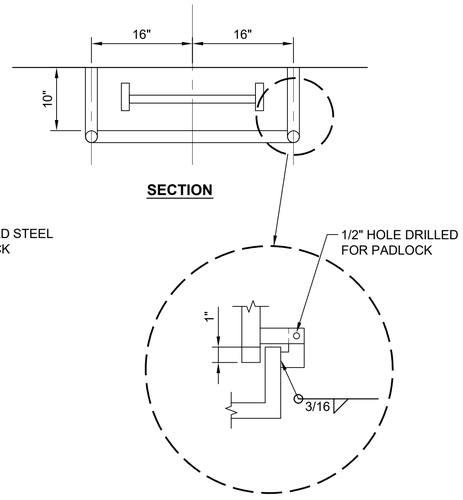
FLANGED STEEL VENT SUPPORT PLAN



SECTION

24" ROOF VENT
DETAIL 3
SCALE: 3/4" = 1'-0" R-2





SECTION

LADDER GUARD
DETAIL 4
NTS TYP

Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

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WASHINGTON 98258 (425) 397-3000
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EVERETT, WASHINGTON 98206

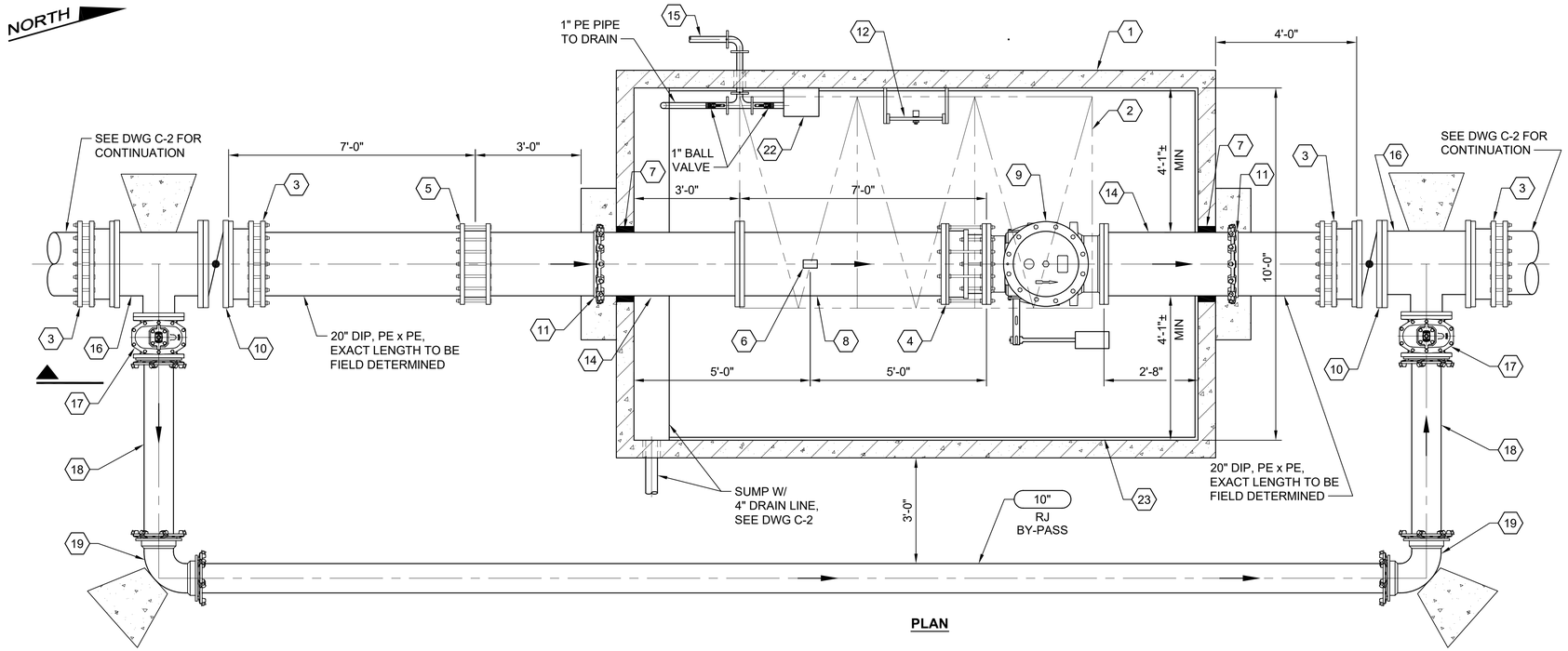
BURN ROAD RESERVOIR
RESERVOIR DETAILS
2 OF 2

LANCE D. STEVENS — STATE OF WASHINGTON — 45574 — REGISTERED PROFESSIONAL ENGINEER
05/21/2025

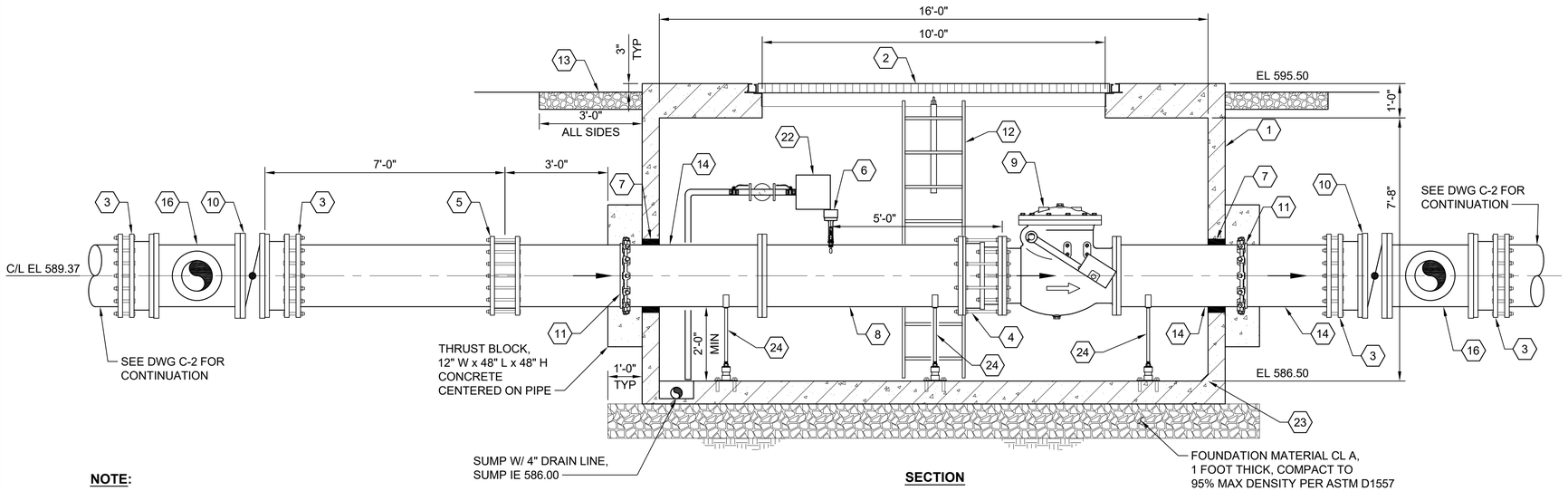
DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE–	965
DWG #	R-8
SHEET	21
OF	37



PLAN



SECTION

NOTE:

SEE ELECTRICAL FOR CONDUITS AND WIRING TO AND INSIDE VAULTS. CONDUIT PENETRATIONS TO BE SEALED COMPLETELY WITH NON-SHRINK GROUT.

OUTLET METER AND VALVE VAULT

DETAIL 1 C-2

SCALE: 1/2" = 1'-0"

MATERIAL LIST

1. 16' L x 10' W x 7'-8" H CONCRETE VAULT - PRECAST VAULT BY OLDCASTLE OR EQUAL. COAT INTERIOR AND EXTERIOR OF THE VAULT PER SPECIFICATION SECTION 09 97 15. COAT PIPING AND PIPE STANDS PER SPECIFICATION SECTION 09 97 10
2. ALUMINUM ACCESS HATCH - H-20 RATED 72" x 120" TRIPLE LEAF WITH SPRING ASSIST, LOCKING LATCH, PAD LOCK HASP, 180° OPEN
3. 20" FCA, RESTRAINED
4. 20" RESTRAINED DISMANTLING JOINT
5. 20" RESTRAINED COUPLING, ROMAC RC400 OR APPROVED EQUAL
6. SEAMETRICS EX 2.50 INSERTION MAGNETIC FLOW METER, DIRECT TAP OR APPROVED EQUAL
7. LINK SEAL WITH HYDROPHILIC FOAM, TYP
8. 20" DI SPOOL, FL x FL, L = 9'
9. 20" SWING CHECK VALVE, FL x FL
10. 20" BUTTERFLY VALVE, FL x FL
11. EBAA IRON #1100 SDB MEGALUG-MID SPAN RESTRAINT, POLYWRAP PRIOR TO PLACEMENT OF CONCRETE OR ROMAC 611 BELL CLAMP
12. GALVANIZED STEEL LADDER SHALL BE A BOLT-ON LADDER PER VAULT MANUFACTURER AND SHALL BE SIZED AS SHOWN. LADDER SHALL ALSO INCLUDE A LADDER-UP, BILCO LU2, GALVANIZED STEEL, OR APPROVED EQUAL
13. CSBC, 6" THICK, COMPACT TO 95% MAX DENSITY PER ASTM D1557, SEE DETAIL 2/C-6 FOR CSBC LIMIT
14. 20" DI SPOOL, FL x PE, LENGTH TO FIT
15. 4" PVC PIPE W/ 1" POLYPIPE FOR TRANSDUCER, SEE DWG'S C-2 AND R-5 AND ELECTRICAL
16. 20" x 10" DI TEE, FL x FL W/ THRUST BLOCK
17. 10" GATE VALVE, FL x RJ
18. 10" DI SPOOL, PE x PE, LENGTH TO FIT
19. 10" DI 90° BEND, RJ x RJ W/ THRUST BLOCK
20. NOT USED
21. NOT USED
22. TRANSDUCER W/ READOUT PAD, EXACT LOCATION TO BE FIELD DETERMINED WITH SNOHOMISH PUD, SEE ELECTRICAL
23. CONTRACTOR SHALL GROUT IN A 1" x 1" TRANSITION COVE AROUND THE WALL TO FLOOR JOINT AT ALL WALLS EXCEPT OVER THE SUMP
24. ADJUSTABLE PIPE SADDLE FOAM, TYP

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR OUTLET VALVE AND METER VAULT DETAILS

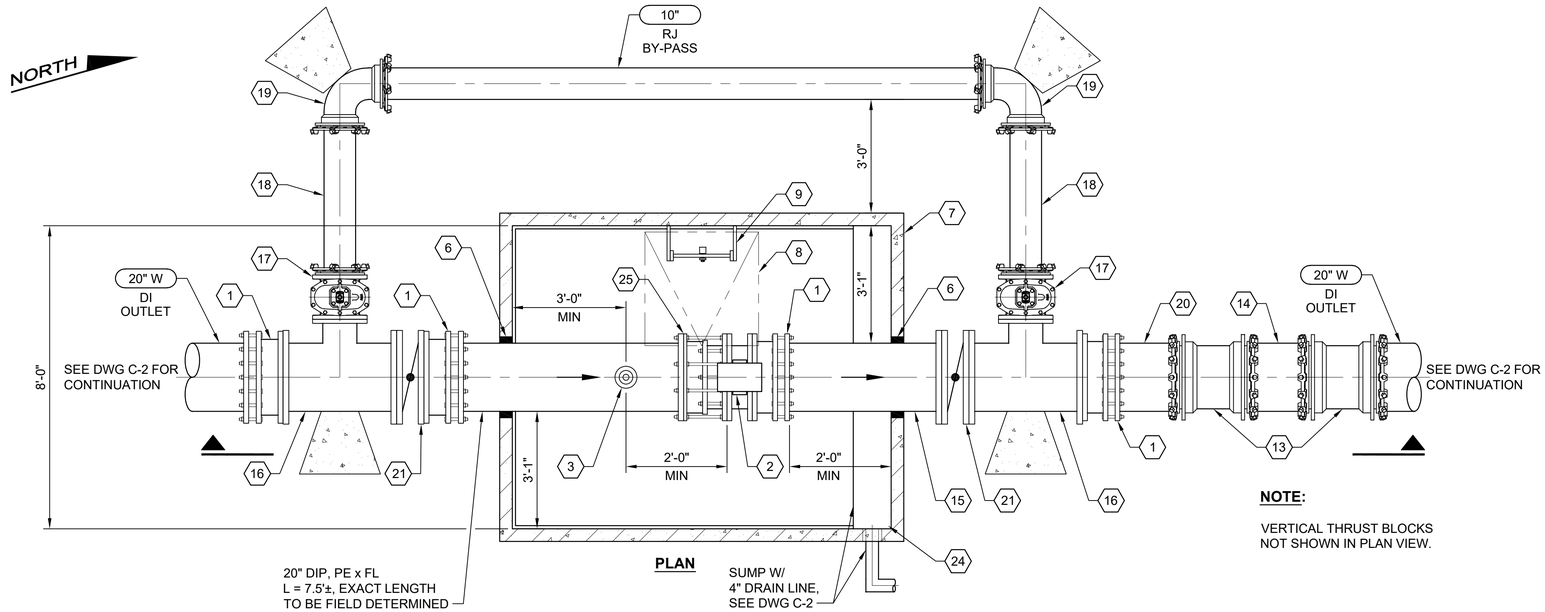
JOHN C. GILLESPIE III
STATE OF WASHINGTON
31993
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

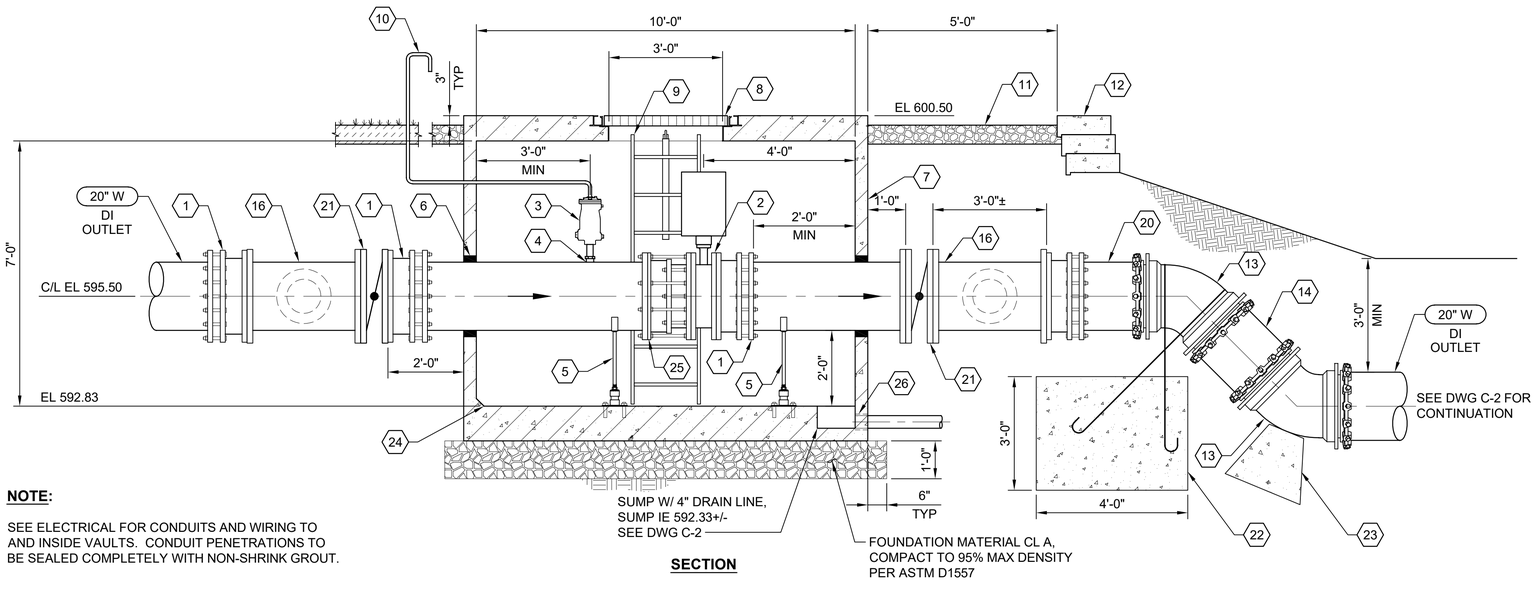
DATE	May 2025
DESIGNED	MTM
DRAWN	PLS
CHECKED	CGT
SCALE	1/2"=1'-0"

WO# 100099341

WE-	965
DWG #	R-9
SHEET	22
OF	37

811 **Call 48 Hours Before You Dig**
1-800-424-5555
UNDERGROUND SERVICE





NOTE:

SEE ELECTRICAL FOR CONDUITS AND WIRING TO AND INSIDE VAULTS. CONDUIT PENETRATIONS TO BE SEALED COMPLETELY WITH NON-SHRINK GROUT.

OUTLET SEISMIC VALVE VAULT

DETAIL 1

SCALE: 1/2" = 1'-0" C-2

MATERIAL LIST

1. 20" FCA, RESTRAINED
2. 20" BUTTERFLY VALVE , FL x FL, W/ SEISMIC ACTUATOR, SEE ELECTRICAL
3. 1" AIR/ VAC VALVE WITH COVER, APCO MODEL 143-C, VAL-MATIC 201C, CRISPIN CRUL-10, ARI, GOLDEN ANDERSON 945 OR APPROVED EQUAL, VENT PIPING SHOWN IN SECTION
4. 1" MUELLER 300 CORP STOP WITH END THREADS OR APPROVED EQUAL, DIRECT TAP TO PIPE
5. ADJUSTABLE PIPE SADDLE SUPPORT
6. LINK SEAL WITH HYDROPHILIC FOAM, TYP
7. 10' L x 8' W x 7' H CONCRETE VAULT - PRECAST VAULT BY OLDCASTLE OR EQUAL, 810-LA. COAT INTERIOR AND EXTERIOR OF THE VAULT PER SPECIFICATION SECTION 09 97 15. COAT PIPING AND PIPE STANDS PER SPECIFICATION SECTION 09 97 10.
8. ALUMINUM ACCESS HATCH - H-20 RATED, 36" x 36" SINGLE LEAF WITH SPRING ASSIST, LOCKING LATCH, PAD LOCK HASP, FULL 180° OPEN
9. GALVANIZED STEEL LADDER SHALL BE A BOLT-ON LADDER PER VAULT MANUFACTURER AND SHALL BE SIZED AS SHOWN, LADDER SHALL ALSO INCLUDE A LADDER-UP, BILCO LU2, GALVANIZED STEEL, OR APPROVED EQUAL
10. 2" GALVANIZED STEEL AIR\VAC VALVE VENT LINE, PROVIDE ALL NIPPLES, ELLS, UNIONS, 2" GALVANIZED GOOSE NECK PIPE WITH GALVANIZED SCREEN, AND 2" GALVANIZED PIPE, CORE DRILL VAULT AND FILL ANNULAR SPACE, COMPLETE, WITH NON-SHRINK GROUT, SEE SNOHOMISH PUD STANDARD DETAIL 401 FOR PIPING DETAIL FROM AIR/VAC VALVE TO GOOSE NECK VENT
11. CSBC, 6" THICK, COMPACT TO 95% MAX DENSITY PER ASTM D1557, SEE DWG C-2 FOR CSBC LIMIT
12. MODULAR BLOCK WALL PER DETAIL 4/C-6 AND DWG C-2
13. 20" DI 45° VERTICAL BEND W/ THRUST BLOCK, RJ x RJ
14. 20" DI SPOOL, PE x PE, LENGTH TO FIT
15. 20" DI SPOOL, FL x PE, LENGTH TO FIT
16. 20" x 10" DI TEE, FL x FL W/ THRUST BLOCK
17. 10" GATE VALVE, FL x RJ
18. 10" DI SPOOL, PE x PE, LENGTH TO FIT
19. 10" 90° DI BEND, RJ x RJ, LENGTH TO FIT
20. 20" DI SPOOL, PE x PE, L = 3'-0"
21. 20" BUTTERFLY VALVE, FL x FL
22. VERTICAL BEND THRUST BLOCK, 4'W x 5'L x 3'H, 3000 PSI CONCRETE, USE #6 REBAR (EPOXY COATED) AND EMBED INTO CONCRETE 24". REBAR SHALL LOOP OVER PIPE.
23. VERTICAL BEND THRUST BLOCK, 3'W x 4'L x 2'H, 3,000PSI CONCRETE, PLACE THRUST BLOCK AGAINST UNDISTURBED SOIL
24. CONTRACTOR SHALL GROUT IN A 1" x 1" TRANSITION COVE AROUND THE WALL TO FLOOR JOINT ON ALL SIDES EXCEPT OVER THE SUMP.
25. 20" RESTRAINED DISMANTLING JOINT
26. CORE DRILL AND FILL ANNULAR SPACE WITH NON-SHRINK GROUT

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BURN ROAD RESERVOIR
RESERVOIR OUTLET SEISMIC VALVE VAULT DETAILS

JOHN T. GILLESPIE III
STATE OF WASHINGTON
31993
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	PLS
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE– 965
DWG # R-10
SHEET 23
OF 37

811 Call 48 Hours Before You Dig
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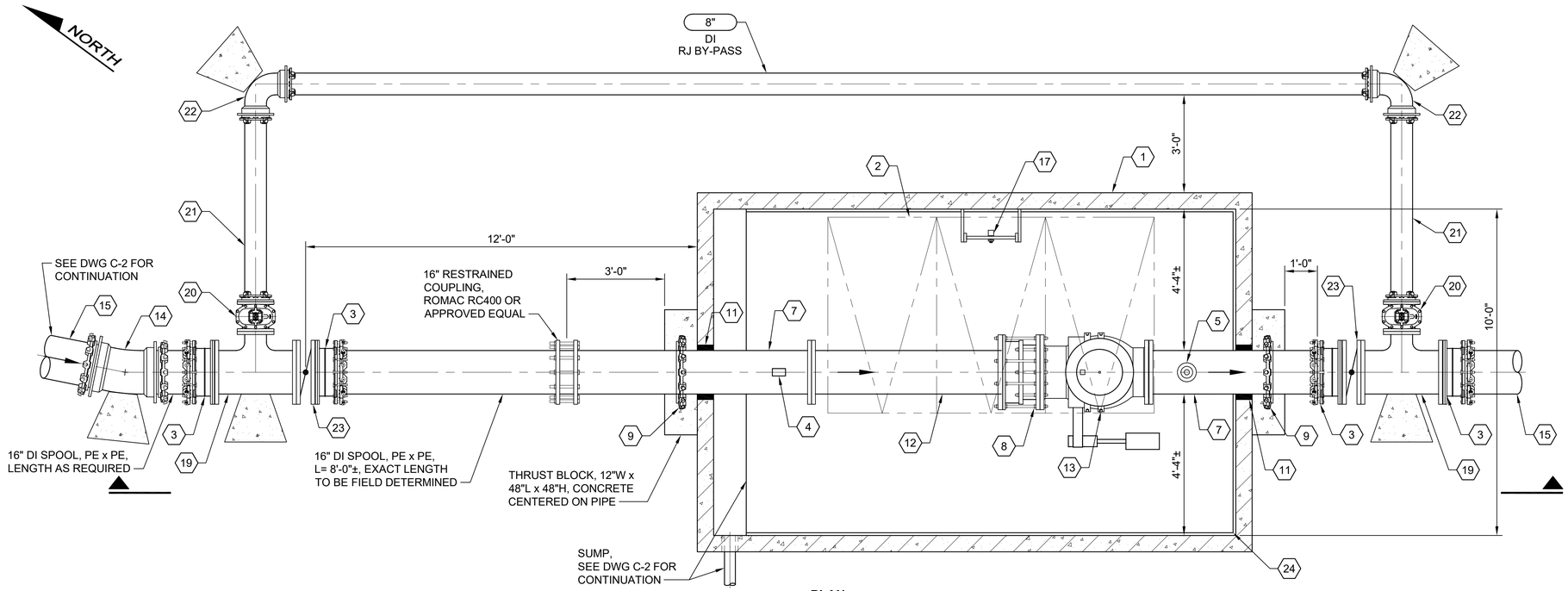
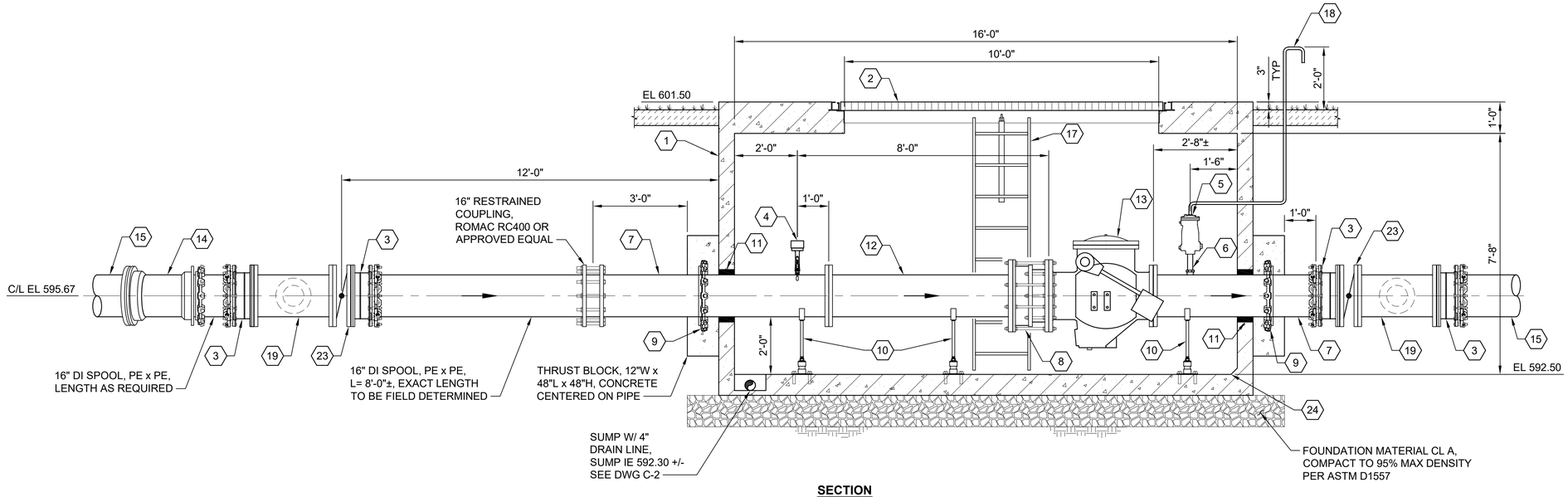
UNDERGROUND SERVICE



PLAN



SECTION

NOTE:

BY-PASS NOT SHOWN IN SECTION.

INLET METER AND VALVE VAULT

DETAIL 1

SCALE: 1/2" = 1'-0" C-2

NOTE:

1. SEE ELECTRICAL FOR CONDUITS AND WIRING TO AND INSIDE VAULTS. CONDUIT PENETRATIONS TO BE SEALED COMPLETELY WITH NON-SHRINK GROUT.

MATERIAL LIST:

1. 16' L x 10' W x 7'-8" H CONCRETE VAULT - PRECAST VAULT BY OLDCASTLE OR EQUAL. COAT INTERIOR AND EXTERIOR OF THE VAULT PER SPECIFICATION SECTION 09 97 15. COAT PIPING AND PIPE STANDS PER SPECIFICATION SECTION 09 97 10.
2. ALUMINUM ACCESS HATCH - H-20 RATED 72" x 120" TRIPLE LEAF WITH SPRING ASSIST, LOCKING LATCH, PAD LOCK HASP, 180° OPEN
3. 16" FCA, RESTRAINED
4. SEAMETRICS EX250 INSERTION MAGMETER, DIRECT TAP OR APPROVED EQUAL
5. 1" AIR/ VAC VALVE WITH COVER, APCO MODEL 143-C, VAL-MATIC 201C, CRISPINCRUL-10, ARI, GOLDEN ANDERSON 945 OR APPROVED EQUAL, VENT LINE NOT SHOWN IN PLAN VIEW
6. 1" MUELLER 300 CORP STOP WITH END THREADS OR APPROVED EQUAL, DIRECT TAP TO PIPE
7. 16" DI SPOOL, FL x PE, LENGTH TO FIT
8. 16" RESTRAINED DISMANTLING JOINT
9. EBAA IRON #1100 SDB MEGALUG-MID SPAN RESTRAINT, POLYWRAP PRIOR TO PLACEMENT OF CONCRETE OR ROMAC 611 BELL CLAMP
10. ADJUSTABLE PIPE SADDLE SUPPORT
11. LINK SEAL WITH HYDROPHILIC FOAM, TYP
12. 16" DI SPOOL, FL x FL, L = 7' ±
13. 16" SWING CHECK VALVE, FL x FL
14. 16" DI 11.25° BEND, RJ x RJ W/ THRUST BLOCK
15. 16" DI PIPE, SEE DWG C-2 FOR CONTINUATION
16. NOT USED
17. GALVANIZED STEEL LADDER SHALL BE A BOLT-ON LADDER PER VAULT MANUFACTURER AND SHALL BE SIZED AS SHOWN, LADDER SHALL ALSO INCLUDE A LADDER-UP, BILCO LU2, GALVANIZED STEEL, OR APPROVED EQUAL
18. 2" GALVANIZED STEEL AIR\VAC VALVE VENT LINE, PROVIDE ALL NIPPLES, ELLS, UNIONS, 2" GALVANIZED GOOSE NECK PIPE WITH GALVANIZED SCREEN, AND 2" GALVANIZED PIPE, CORE DRILL VAULT AND FILL ANNULAR SPACE, COMPLETE, WITH NON-SHRINK GROUT, SEE SNOHOMISH PUD STANDARD DETAIL 401 FOR PIPING DETAIL FROM AIR/VAC VALVE TO GOOSE NECK VENT
19. 16" x 8" DI TEE, FL x FL, W/ THRUST BLOCK
20. 8" GATE VALVE, FL x RJ
21. 8" DI SPOOL, PE x PE, LENGTH TO FIT
22. 8" DI 90° BEND, RJ x RJ, W/ THRUST BLOCK
23. 16" BUTTERFLY VALVE, FL x FL
24. CONTRACTOR SHALL GROUT IN A 1" x 1" TRANSITION COVE AROUND THE WALL TO FLOOR JOINT AT ALL WALLS EXCEPT OVER THE SUMP

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BURN ROAD RESERVOIR
RESERVOIR
INLET VALVE VAULT DETAIL

JOHN F. GILLESPIE III
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31993
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DRAWN	EDM
CHECKED	CGT
SCALE	1/2"=1'-0"

WO# 100099341

WE–	965
DWG #	R-11
SHEET	24
OF	37

811
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Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Res\d Filename: P23-10882_R-11 Plot date: May 21, 2025-05:07:49pm CAD User: abradley
Xref Filename: | X23-10882_TB | Talich | X23-10882_Status | Stevens | X23-10882_Prop Vaults | Rogers | Gibson | McCrosky | Wildhood | Gillespie | Dahl |

GENERAL STRUCTURAL NOTES

A. GENERAL

1. SCOPE
   THE GENERAL STRUCTURAL NOTES AND TYPICAL STRUCTURAL DETAILS ARE GENERAL AND APPLY TO TO THE ENTIRE PROJECT EXCEPT WHERE THERE ARE SPECIFIC INDICATIONS OR MODIFICATIONS TO THE CONTRARY.

2. APPLICABLE SPECIFICATIONS AND CODES
   ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE BUILDING CODE, (SEE BELOW). THE PROVISIONS OF THE BUILDING CODE SHALL SUPERSEDE THE PLANS AND SPECIFICATIONS EXCEPT WHERE THE PLANS AND SPECIFICATIONS ARE MORE RESTRICTIVE.

   IN ADDITION TO THE BUILDING CODE, CONSTRUCTION SHALL CONFORM TO OTHER STANDARDS AND CODES AS REFERENCED ON THE DRAWINGS OR IN THE SPECIFICATIONS.

3. DIMENSIONS
   STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL AND ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

   REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR SIZE AND LOCATION OF ALL OPENINGS FOR DUCTS, PIPING, CONDUITS, ETC., NOT SHOWN. ALL OPENINGS IN STRUCTURAL MEMBERS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER. REFER TO CIVIL DRAWINGS AND SPECIFICATIONS FOR SUBGRADE INFORMATION AND CRITERIA. VERIFY ALL DIMENSIONS WITH CIVIL, MECHANICAL, AND ELECTRICAL DRAWINGS.

4. PROVISIONS FOR EQUIPMENT
   MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, PIPE SLEEVES AND, PENETRATIONS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS, BUT REQUIRED BY OTHER CONTRACT DRAWINGS SHALL BE PROVIDED FOR, PRIOR TO CASTING CONCRETE.

5. CONSTRUCTION LOADS
   STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON THE COMPLETED STRUCTURES. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED BY BRACING AND SUPPORTS WHEREVER EXCESSIVE CONSTRUCTION LOADS MAY OCCUR.

6. DRAINAGE SURFACES
   SLOPE DRAINAGE SURFACES UNIFORMLY TO DRAIN. SLOPE SHALL BE 1/4" PER FOOT, EXCEPT WHERE NOTED OTHERWISE ON THE PLANS. AT CONTRACTOR'S OPTION, BOTTOM OF SLAB MAY BE LEVEL AND MAINTAIN A MINIMUM THICKNESS AT FLOOR DRAINS.

B. STRUCTURAL DESIGN DATA

1. GENERAL

   A. BUILDING CODE: 2021 INTERNATIONAL BUILDING CODE WITH SNOHOMISH COUNTY PUD AND BY REFERENCE THE MORE STRINGENT OF AWWA D100-11, WELDED CARBON STEEL TANKS FOR WATER STORAGE, AND ASCE 7-16, MINIMUM DESIGN LOADS FOR AND BUILDINGS AND OTHER STRUCTURES.

   B. RISK CATEGORY IV
   C. C. LOCATION: 48.132° N, 122.058° W, EL: 600
   D. WATER: OVERFLOW HEIGHT = 126'-0"

2. DESIGN LOADS

   A. SNOW LOAD
   GROUND SNOW LOAD Pg: 34.5 PSF
   FLAT-ROOF SNOW LOAD Pf: 28.7 PSF
   SNOW EXPOSURE FACTOR Ce: 0.9
   SNOW LOAD IMPORTANCE FACTOR: Is = 1.2
   THERMAL FACTOR Ct = 1.1

   B. WIND DESIGN DATA
   BASIC WIND SPEED (3 SECOND GUST): 109 MPH
   WIND EXPOSURE: B ALL DIRECTIONS
   INTERNAL PRESSURE COEFFICIENT: ENCLOSED. GCpi = +/- .18
   INTERNAL PRESSURE: ± 7 PSF

B. STRUCTURAL DESIGN DATA (cont.)

E. EARTHQUAKE DESIGN DATA:

SEISMIC IMPORTANCE FACTOR: Ie = 1.50
SEISMIC DESIGN CATEGORY: D
SITE CLASS C
S_S = 1.026
S_1 = 0.366
F_a = 1.2
F_v = 1.5
S_{DS} = 0.821
S_{D1} = 0.413

3.6 MG TANK:
RESPONSE MODIFICATION FACTOR (Ri): 3
RESPONSE MODIFICATION FACTOR (Rc): 1.5
ANALYSIS PROCEDURE: IN ACCORDANCE WITH AWWA D100-11
DESIGN BASE SHEAR (V): 8084KIPS (ASD)

F. SOILS DATA:

SOILS EXPLORATION INFORMATION IS CONTAINED IN GEOTECHNICAL ENGINEERING REPORT - PROPOSED BURN ROAD 726 RESERVOIR 12820 - 150TH STREET NE, ARLINGTON, WASHINGTON. PREPARED BY ZIPPERGEO, DATED MAY 2025. PROJECT NO. 2630.01.

FROST DEPTH: 18 INCHES
SLIDING FRICTION COEFFICIENT: 0.35
ALLOWABLE BEARING PRESSURE: 18,000 PSF

C. CONCRETE

1. SPECIFICATION
   SEE SPECIFICATIONS FOR COMPLETE REQUIREMENTS FOR MIX DESIGNS, FORMING, REINFORCEMENT, PLACING, CURING, AND FINISHING.

2. DESIGN STRESSES

   A. CAST-IN-PLACE CONCRETE
   - STRUCTURAL CONCRETE: 4000 PSI AT 28 DAYS
   - PLAIN CONCRETE: 3000 PSI AT 28 DAYS

   STRUCTURAL CONCRETE SHALL BE USED FOR FOUNDATIONS, WALLS, SLABS, EQUIPMENT PADS, AND ALL LOAD BEARING CONCRETE. ALL OTHER CONCRETE SHALL BE PLAIN CONCRETE.

   B. REINFORCING STEEL SHALL BE ASTM A615 DEFORMED BARS, GRADE 60. WELDED WIRE FABRIC SHALL BE ASTM A185 SMOOTH WIRE - fy = 60 KSI MINIMUM.

3. BAR SPLICES
   SPLICES OF REINFORCING STEEL BARS SHALL BE IN ACCORDANCE WITH THE BUILDING CODE AND SHALL BE CLASS B, UNLESS OTHERWISE NOTED. THE LENGTH OF LAP SPLICE OF BARS OF DIFFERENT DIAMETER SHALL BE BASED ON THE SMALLER DIAMETER.

4. STANDARD HOOKS
   BARS ENDING IN RIGHT ANGLE BENDS OR HOOKS SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING CODE.

5. SLOPING SLABS
   MONOLITHIC SLABS WITH TOPS THAT ARE SLOPED SHALL HAVE BOTTOMS SLOPED THE SAME AMOUNT, MAINTAINING A UNIFORM SLAB THICKNESS, UNLESS OTHERWISE NOTED.

6. CHAMFERS
   EXCEPT AS OTHERWISE NOTED, EXPOSED CONCRETE CORNERS AND EDGES SHALL HAVE 3/4" CHAMFERS. RE-ENTRANT CORNERS SHALL NOT HAVE FILLETS.

7. CONSTRUCTION JOINTS
   ENGINEER APPROVAL IS REQUIRED FOR ANY CONSTRUCTION JOINTS NOT SHOWN ON THE DRAWINGS. CONSTRUCTION JOINTS SHALL BE DETAILED AS SHOWN ON THE DRAWINGS.

D. NON-SHRINK GROUT

GROUT FOR BASE PLATES, EQUIPMENT ANCHORAGE AND GENERAL PURPOSES SHALL BE APPROVED, NON-SHRINK CEMENTITIOUS GROUT CONTAINING NATURAL AGGREGATES DELIVERED TO THE JOB SITE IN FACTORY PREPACKAGED CONTAINERS REQUIRING ONLY THE ADDITION OF WATER, ASTM C1107 TYPE B OR C.

E. FOUNDATION PREPARATION

FOUNDATIONS, UNLESS NOTED OTHERWISE IN THE GEOTECHNICAL REPORT, SHALL BEAR ON UNDISTURBED, DENSE ALLUVIAL SOIL. IF UNDISTURBED, DENSE ALLUVIAL SOIL IS NOT FOUND AT THE BOTTOM OF THE FOOTING ELEVATION. WEAK MATERIAL SHALL BE REMOVED AND REPLACED WITH COMPACTED BACKFILL IN ACCORDANCE WITH THE SPECIFICATIONS. PROVIDE GRADED CRUSHED OR NATURAL ROCK BASE COURSE BENEATH CONCRETE SLABS OR FOOTINGS WHERE INDICATED.

BACKFILL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D 1557.

F. SPECIAL INSPECTION

IN ADDITION TO THE INSPECTIONS REQUIRED BY SECTION 1701 OF THE IBC, SPECIAL INSPECTIONS SHALL BE PROVIDED DURING CONSTRUCTION OF THE FOLLOWING WORK:

1. ANCHOR BOLTS: INSTALLED IN CONCRETE PRIOR TO AND DURING THE PLACEMENT OF CONCRETE AROUND BOLTS.

2. ALL CONCRETE: SHALL BE INSPECTED IN ACCORDANCE WITH REQUIREMENTS OF 2021 IBC PARAGRAPH 1705.3.

3. PLACEMENT: OF ALL REINFORCING STEEL SHALL BE INSPECTED.

G. DEFERERED STRUCTURAL SUBMITTALS

SOME STRUCTURAL SYSTEMS ARE DEFINED AS VENDOR-DESIGNED COMPONENTS PER STRUCTURAL DOCUMENTS. THE ELEMENTS OF DESIGN ARE DEFERRED SUBMITTAL COMPONENTS AND HAVE NOT BEEN PERMITTED UNDER THE BASE BUILDING APPLICATION. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT THE STAMPED COMPONENT SYSTEM DOCUMENTS TO THE BUILDING OFFICIAL FOR APPROVAL.

DOCUMENTS FOR PREFERRED SUBMITTAL ITEMS SHALL BE SUBMITTED TO THE ENGINEER, WHO SHALL REVIEW THEM FOR GENERAL CONFORMANCE TO THE DESIGN OF THE BUILDING. THE CONTRACTOR SHALL SUBMIT THESE REVIEWED DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL.

THE FOLLOWING LIST INCLUDES THE ITEMS THAT ARE DEFINED AS DEFERRED STRUCTURAL SUBMITTAL COMPONENTS. REFER TO THE ARCHITECTURAL, MECHANICAL. ELECTRICAL, AND CIVIL DRAWINGS FOR ADDITIONAL DEFERRED SUBMITTAL COMPONENTS.

DEFERRED STRUCTURAL SUBMITTAL COMPONENTS: RESERVOIR TANK INCLUDING ANCHOR BOLTS TO FOUNDATION.

H. STRUCTURAL OBSERVATIONS

THE ENGINEER OF RECORD SHALL PROVIDE VISUAL OBSERVATION OF THE STRUCTURAL SYSTEM, FOR GENERAL CONFORMANCE TO THE APPROVED PLANS AND SPECIFICATIONS, AT SIGNIFICANT CONSTRUCTION STAGES AND AT THE COMPLETION OF THE STRUCTURAL SYSTEM. STRUCTURAL OBSERVATION DOES NOT INCLUDE OR WAIVE THE RESPONSIBILITY FOR THE INSPECTIONS REQUIRED BY IBC SECTIONS 109, 1704 OR OTHER SECTIONS OF THE INTERNATIONAL BUILDING CODE. STRUCTURAL OBSERVATION REPORTS SHALL BE ISSUED TO THE OWNER, ARCHITECT, CONTRACTOR, AND BUILDING OFFICIAL AT THE SIGNIFICANT CONSTRUCTION STAGES.

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR

GENERAL STRUCTURAL NOTES

KENNETH E. DAHL
STATE OF WASHINGTON
23044
REGISTERED
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MDW
DRAWN	AWB
CHECKED	KED
SCALE	N/A

WO# 100099341

WE- 965
DWG # S-1
SHEET 25
OF 36

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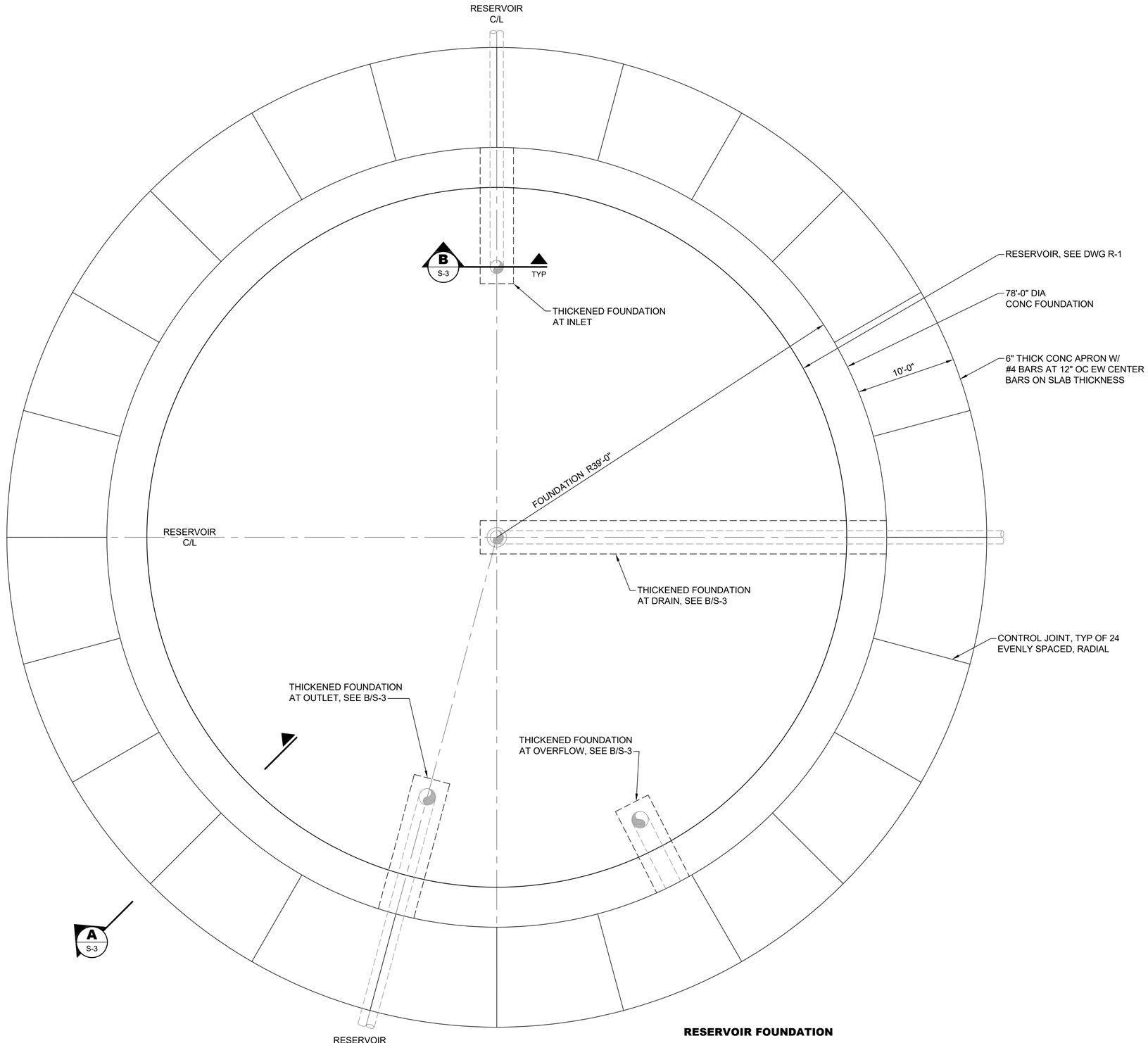
UNDERGROUND SERVICE

NORTH



RESERVOIR FOUNDATION
PLAN 1
SCALE: 3/16" = 1'-0"

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
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EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR FOUNDATION PLAN

KENNETH E. DAHL
STATE OF WASHINGTON
23044
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MDW
DRAWN	AWB
CHECKED	KED
SCALE	3/16"=1'-0"
WO# 100099341	
WE–	965
DWG #	S-2
SHEET	26
OF	36

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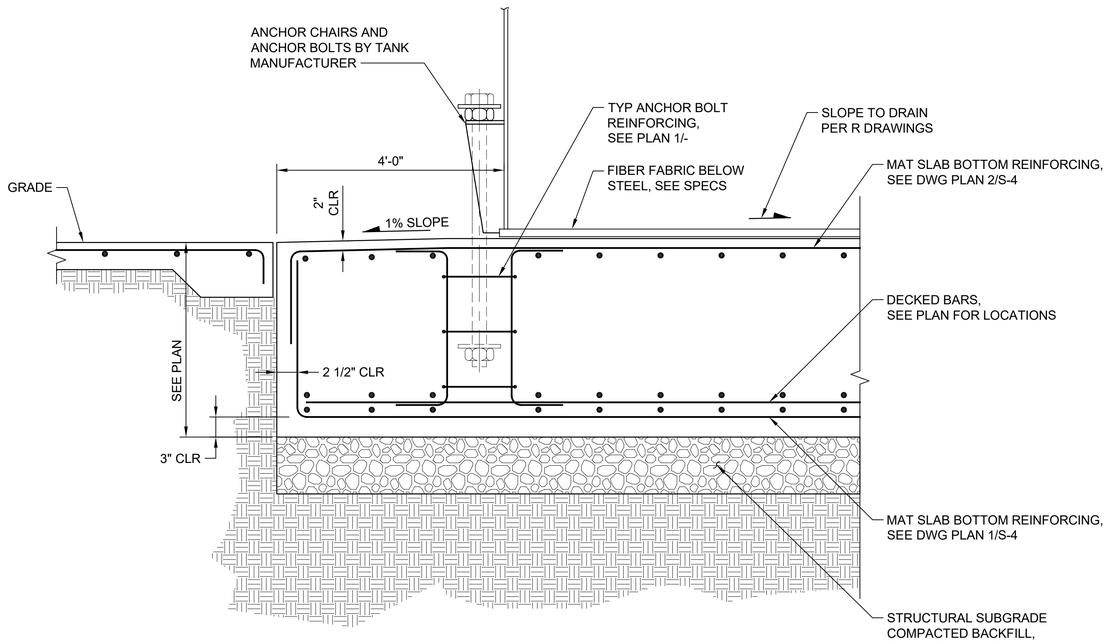


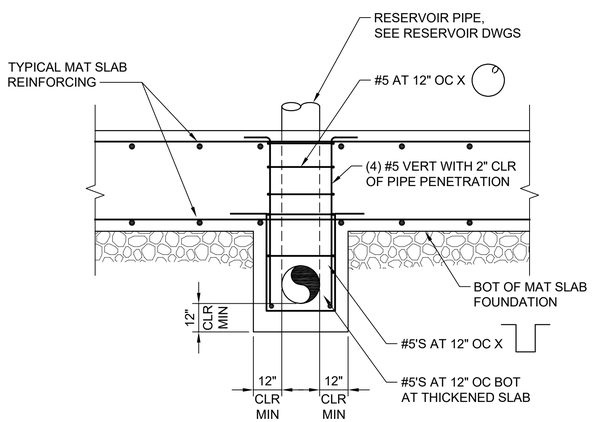
RESERVOIR FOUNDATION
SECTION A
SCALE: 3/4" = 1'-0" S-2

BAR SIZE	L_D	L_{DT}	L_{SB}	L_{SBT}	L_B
3	14	18	18	24	8
4	19	25	25	32	10
5	24	31	31	40	12
6	28	37	37	48	14
7	42	54	54	70	17
8	47	62	62	80	19
9	54	70	70	90	22
10	60	78	78	102	24
11	67	87	87	113	26

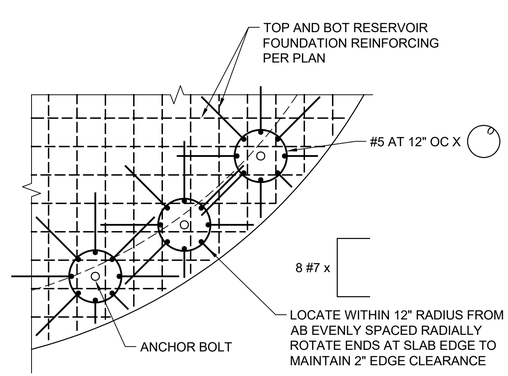
NOTES:

1. LENGTHS EXPRESSED IN INCHES.
2. LENGTHS APPLICABLE FOR f'c = 4000 psi, NORMAL WEIGHT CONCRETE ONLY, AND REINFORCEMENT WITH fy=60,000 PSI
3. L_D TENSION DEVELOPMENT LENGTH, BARS OTHER THAN TOP BARS
   L_{DT} TENSION DEVELOPMENT LENGTH, TOP BARS (SEE NOTE 4)
   L_{SB} CLASS B TENSION SPLICE, BAR SPACING
   L_{SBT} CLASS B TENSION SPLICE, TOP BARS (SEE NOTE 4)
   L_B COMPRESSION DEVELOPMENT LENGTH, BOTTOM BAR OR DOWEL
4. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.
5. FOR EPOXY COATED BARS, INCREASE ALL LENGTHS 50 PERCENT.
6. USE OF THIS CHART IS RESTRICTED TO BARS WITH CONCRETE COVER OF AT LEAST ONE BAR DIAMETER AND CLEAR SPACE BETWEEN BARS OF AT LEAST TWO BAR DIMENSIONS. FOR OTHER SITUATIONS, SPLICE LENGTHS SHALL BE INCREASED BY 50%, EXCEPT FOR L_B.

CONCRETE REINFORCING BAR LAP SLICE AND DEVELOPMENT LENGTHS
DETAIL 1
NTS TYP



REINFORCING AT PIPE PENETRATIONS AND BELOW SLAB
SECTION B
SCALE: 3/8" = 1'-0" S-2



TYPICAL ANCHOR BOLT REINFORCING
PLAN 1
SCALE: 3/8" = 1'-0" S-2

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BURN ROAD RESERVOIR
RESERVOIR FOUNDATION
SECTIONS AND DETAILS

KENNETH E. DAHL
STATE OF WASHINGTON
23044
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MDW
DRAWN	AWB
CHECKED	KED
SCALE	As Shown

WO# 100099341

WE–	965
DWG #	S-3
SHEET	27
OF	36

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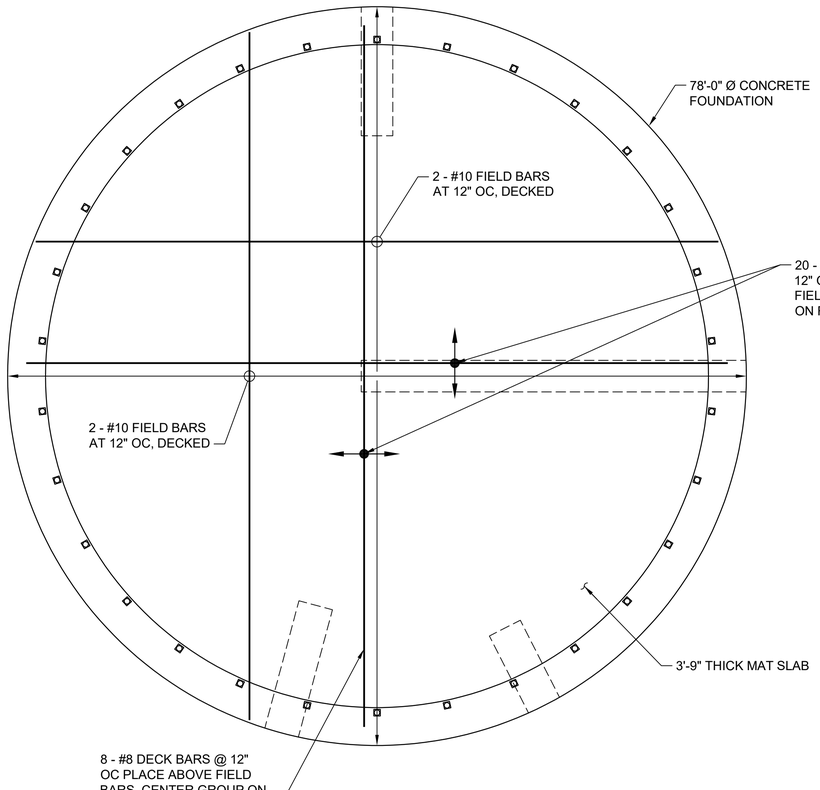
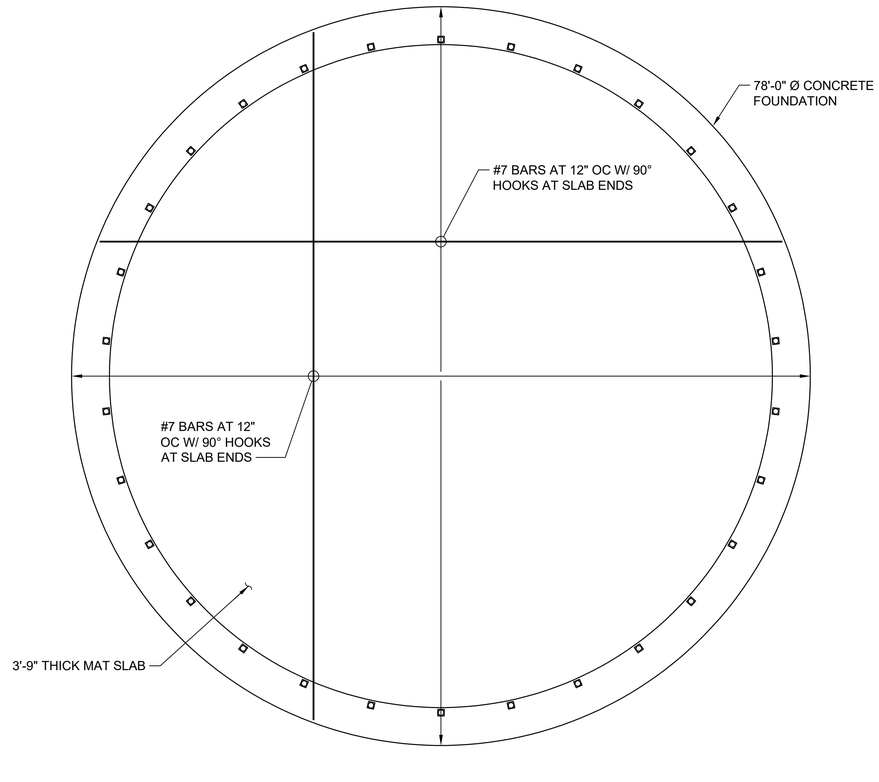


MAT SLAB
BOTTOM REINFORCING

PLAN 1

SCALE: 1/8" = 1'-0"



MAT SLAB
TOP REINFORCING

PLAN 2

SCALE: 1/8" = 1'-0"

HOOK END				
ALL GRADES (D) FINISHED BEND DIAMETER				
BAR SIZE	D	180° HOOKS		90° HOOKS
		E	J	A
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	24"
#14	18 1/4"	27"	21 3/4"	31"
#18	24"	36"	28 1/2"	41"

TABLE A						
MINIMUM TENSION EMBEDMENT LENGTHS, (Ldh) FOR STANDARD END HOOKS ON GRADE 60 BARS						
BAR SIZE	NORMAL WEIGHT CONCRETE, f'c (PSI)					
	3,000	4,000	5,000	6,000	7,000	8,000
#3	6"	6"	6"	6"	6"	6"
#4	8"	7"	7"	7"	7"	7"
#5	10"	9"	8"	7"	7"	7"
#6	12"	10"	9"	8"	8"	8"
#7	14"	12"	11"	10"	9"	9"
#8	16"	14"	12"	11"	10"	10"
#9	18"	15"	14"	13"	12"	11"
#10	20"	17"	15"	14"	14"	14"
#11	22"	19"	17"	16"	15"	15"
#14	37"	32"	29"	27"	25"	31"
#18	50"	43"	39"	35"	33"	35"

STANDARD HOOK & EMBEDMENT

DETAIL 3

NTS TYP

NOTES:

1. ABOVE VALUES VALID FOR ALL CASE IF" SIDE COVER GREATER THAN 2 1/2" END COVER GREATER THAN 2"
2. BAR DIMENSION REQUIRED TO MANUFACTURE HOOK.
3. FOR EPOXY COATED HOOKS, INCREASE THE ABOVE EMBEDMENT LENGTHS BY 20%.

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BURN ROAD RESERVOIR
SLAB REINFORCING PLANS AND TYPICAL DETAILS

KENNETH E. DAHL
STATE OF WASHINGTON
23044
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	MDW
DRAWN	AWB
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SCALE	As Shown

WO# 100099341

WE–	965
DWG #	S-4
SHEET	28
OF	36

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MOTORS AND POWER EQUIPMENT

- GROUND ROD IN GROUND ROD BOX
- TRANSFORMER
- MOTOR STARTER W/ DISCONNECT
- DISCONNECT SWITCH, NON FUSED (60A) INDICATES AMPERAGE RATING
- DISCONNECT SWITCH, FUSED 100=SWITCH RATING, 80=FUSE RATING
- UTILITY METERING
- MOTOR
- EXHAUST FAN
- PANELBOARD, SWITCHBOARD, MCC
- FUSE WITH AMPERE RATING
- PACKAGED POWER AND CONTROL PANEL
- UTILITY METERING
- GROUND
- SURGE PROTECTIVE DEVICE
- SURGE ARRESTER
- DISCONNECT OR SWITCH
- TRANSFORMER
- THERMAL MAGNETIC CIRCUIT BREAKER, RATING/NO. POLES MO = MAGNETIC ONLY
- THERMAL OVERLOAD RELAY
- ATS - AUTOMATIC TRANSFER SWITCH MTS - MANUAL TRANSFER SWITCH
- POWER CAPACITOR WITH KVAR RATING
- VFD = VARIABLE FREQUENCY DRIVE VSD = VARIABLE SPEED DRIVE SSS = SOLID STATE STARTER
- MOTOR - NUMBER "15" INDICATES HORSEPOWER
- MS OR M = MOTOR STARTER CONTACTOR C = CONTACTOR, BP = BYPASS CONTACTOR IC = ISOLATION CONTACTOR
- CURRENT TRANSFORMER , NUMBER "3" INDICATES NUMBER OF CTS
- PULL OUT SWITCH/PLUG-RECEPTACLE CONNECTION
- THERMOSTAT, HVAC
- THERMOSTAT AND PRESSURE TRANSMITTER, HVAC

ELEMENTARY WIRING DIAGRAM SYMBOLS

N.O. NORMALLY OPEN — N.O. NORMALLY CLOSED

- SWITCH
- PUSH BUTTON
- CONTACT
- FLOW SWITCH
- LEVEL SWITCH
- PRESSURE SWITCH
- TEMPERATURE SWITCH
- LIMIT SWITCH
- INSTRUMENT - FS = FLOW SWITCH, FT = FLOW XMTR, PS= PRESSURE SWITCH, PT = PRESSURE XMTR, ZS = LIMIT SWITCH, VS = VIBRATION SWITCH, VT = VIBRATION XMTR, MS = MOISTURE SWITCH, FE = FLOW ELEMENT, LE = LEVEL ELEMENT, TE = TEMP ELEMENT
- INSTRUMENT - LS = LEVEL SWITCH, TS = TEMPERATURE SWITCH,
- HEATER - HEAT TRACE
- KIRK KEY INTERLOCK

- HOA = HAND/OFF/AUTO SWITCH HOR = HAND/OFF/REMOTE SWITCH OCA = OPEN/CLOSE/AUTO SWITCH RO = RUN/OFF
- INDICATING LIGHT R=RED, G=GREEN, A=AMBER, B=BLUE, W=WHITE
- CONTROL RELAY / CONTACTOR
- TIME DELAY RELAY
- TWISTED SHIELDED PAIR (TSP)
- SOLENOID VALVE
- RTM = RUN TIME METER, AMP = AMP METER, CNT = COUNTER HMI = OPERATOR CONTROL INTERFACE (VFD OPERATOR & DISPLAY)
- SPEED POT
- BATTERY
- HORN
- BLOWN FUSE INDICATOR

INDICATING LIGHT:

A = AMBER G = GREEN W = WHITE
B = BLUE R = RED

SELECTOR SWITCH:

FOR = FORWARD/OFF/REVERSE
HOR = HAND/OFF/REMOTE
HOA = HAND/OFF/AUTO
RO = RUN/OFF
POT = POTENTIOMETER

RACEWAY SYMBOLS

- A-4: CONDUIT RUN 3/4"C, UNLESS OTHERWISE SHOWN 4-#12 FOR POWER CIRCUITS TO PANEL "A" CKT "4"
- C-XX: TAGGED CONDUIT RUN - SEE CONDUIT & WIRE SCHEDULE FOR DETAILS. P=POWER, C=CONTROL, S=SIGNAL
- D: UNTAGGED CONDUIT RUN - CONTRACTOR TO PROVIDE RACEWAY FOR CONTROL OR SIGNAL WIRING AS REQUIRED BY THE EQUIPMENT, IN ACCORDANCE TO THE WIRING DIAGRAMS, OR AS SPECIFIED. CONDUIT SIZE PER NEC; MINIMUM 3/4" "C" = (120V) #14 CONTROL WIRE, #12 POWER WIRE "S" = TSP SIGNAL WIRE "D" = DEVICENET CABLE CONNECTION "E" = ETHERNET CABLE CONNECTION (CAT-5) "F" = FIRE ALARM PANEL CONNECTION PROVIDE # OF WIRES AS REQUIRED.
- CONDUIT TURNED UP OR TOWARD
- RACEWAY TURNED DOWN
- CONDUIT CONCEALED
- CONDUIT EXPOSED
- CONDUIT JUNCTION BOX
- PB = PULL BOX, HH = HANDHOLE C=CONTROL, S=SIGNAL, P=POWER
- CONDUIT CAPPED
- CORD OR FLEXIBLE CONDUIT

WIRE DIAGRAMS, ONE-LINES, MISC

- EXISTING
- FUTURE
- PROPOSED WORK/EQUIPMENT
- CONDUCTORS NOT CONNECTED
- CONDUCTORS CONNECTED

REFERENCE SYMBOLS

- 100.1 / 1: CONDUIT
- L: LIGHTS
- FIT-111: EQUIPMENT TAG
- 1: CONSTRUCTION NOTE
- FN # : INSTRUMENT TYPE / FUNCTION; INSTRUMENT DESIGNATION; INSTRUMENT NUMBER

LIGHTING & RECEPTACLE SYMBOLS

LIGHTING FIXTURES

- LIGHTING FIXTURE
- STRIP LIGHTING FIXTURE
- WALL MOUNTED FIXTURE (SURFACE OR ARM)
- POLE ARM MOUNTED FIXTURE
- RECESSED LIGHT FIXTURE
- INFRARED FLOOD LIGHT FIXTURE
- EXIT LIGHT FIXTURE WALL MOUNTED
- REMOTE EXIT LIGHT FIXTURE
- OS: OCCUPANCY SENSOR CEILING MOUNTED

SWITCHES

$P3a

D	DIMMER	2	DOUBLE POLE
E	EXISTING SWITCH	3	THREE WAY
K	KEY OPERATED SWITCH	4	FOUR WAY
M	MOTOR RATED		
MC	MOMENTARY CONTACT, THREE POSITION	a	LOWER CASE = SWIITCH LEG
P	SWITCH WITH PILOT LIGHT		
R	REOSTATE - SPEED CONTROL		
T	TIMER		
WP	WEATHER PROOF		
XP	EXPLOSION PROOF		

- LS: MAGNETIC LIMIT SWITCH
- KS: KEY SWITCH

SPECIAL PURPOSE CONNECTIONS

- 2: SPECIAL PURPOSE EQUIPMENT CONNECTION
- 4: SPECIAL PURPOSE EQUIPMENT CONNECTION WALL MOUNTED

RECEPTACLE OUTLETS

- 2 GFCI: DUPLEX RECEPTACLE OUTLET WALL MOUNTED (NEMA 5-15R UNLESS OTHERWISE SPECIFIED)
- 6 WP: QUADRUPLE RECEPTACLE OUTLET WALL MOUNTED
- DUPLEX RECEPTACLE OUTLET CEILING MOUNTED
- SINGLE RECEPTACLE
- 4: SPECIAL PURPOSE RECEPTACLE OUTLET
- 6: SPECIAL PURPOSE RECEPTACLE OUTLET WALL MOUNTED
- DUPLEX DATA OUTLET (RJ45 STYLE)
- (X): SURFACE METAL RACEWAY WITH RECEPTACLE AT "X" OC

1, 2, 3, ETC ARE CIRCUIT NUMBERS OF PANEL BOARD TO WHICH OUTLET IS TO BE CONNECTED. REFER TO CIRCUIT SCHEDULE.

H HORIZONTAL
WP WEATHER PROOF
XP EXPLOSION PROOF
GFCI GROUND FAULT CIRCUIT INTERRUPTER

ABBREVIATIONS

A, AMP	AMPERE	MS	MOTOR STARTER
AC	AIR COMPRESSOR, ALTERNATING CURRENT	MTS	MANUAL TRANSFER SWITCH
AF	AMPERE FRAME	N	NEUTRAL
AFF	ABOVE FINISHED FLOOR	NC	NORMALLY CLOSED
AI	ANALOG INPUT POINT (PLC)	NEC	NATIONAL ELECTRICAL CODE
AIC	AMPERES INTERRUPTING CAPACITY	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
AIL	AMBER INDICATING LIGHT		
AL	ALARM	NF	NON FUSED
ALT	ALTERNATOR	N.O.	NORMALLY OPEN
AM	AMMETER		
AO	ANALOG OUTPUT POINT (PLC)	OI	OPERATOR INTERFACE
AS	AMPERE SWITCH	OIT	OPERATOR IN TROUBLE
AT	AMPERE TRIP	OL	OVERLOAD RELAY
ATS	AUTOMATIC TRANSFER SWITCH	OT	OVER TEMP
AWG	AMERICAN WIRE GAUGE		
		P	POWER
BAT	BATTERY	PB	PUSH BUTTON
BC	BATTERY CHARGER	PBC	PULLBOX (CONTROL)
BH	BLOCK HEATER	PBD	PULLBOX (DATA)
BIL	BLUE INDICATING LIGHT	PBL	PUSH BUTTON - LIGHTED
BKR	BREAKER	PBP	PULLBOX (POWER)
BP	BYPASS CONTRACTOR	PBS	PULLBOX (SIGNAL)
		PCP	POWER AND CONTROL PANEL
C	CONDUIT, CONTROL	PE	PHOTO ELECTRIC RELAY
CAP	CAPACITOR	PFR	PHASE FAILURE RELAY
CB	CIRCUIT BREAKER	PLC	PROGRAMMABLE LOGIC CONTROLLER
CKT	CIRCUIT	PMD	POWER MONITORING DEVICE
CNT	START COUNTER	PNL	PANEL
CP	CONTROL PANEL	POT	POTENTIOMETER
CPT	CONTROL POWER TRANSFORMER	PS	PRESSURE SWITCH, PUMP STATION
CR	CONTROL RELAY	PSE	PUGET SOUND ENERGY
CT	CURRENT TRANSFORMER	PT	POTENTIAL TRANSFORMER
CU	COPPER	PVC	POLYVINYL CHLORIDE (CONDUIT)
CV	CHECK VALVE		
		RCP	REMOTE CONTROL PANEL
DB	DIRECT BURIED	RIL	RED INDICATING LIGHT
DC	DIRECT CURRENT	RO	RUN - OFF
DEM	DEMAND	RTD	RESISTANCE TEMPERATURE DEVICE
DF	DEMAND FACTOR		
DI	AC DIGITAL INPUT POINT (PLC)	RTM	RUN TIME METER
DM	DIGITAL METER	RV	REDUCED VOLTAGE
DO	AC DIGITAL OUTPUT POINT (PLC)	RVAT	REDUCED VOLTAGE AUTO TRANSFORMER
DWG	DRAWING		
		S	STARTER
EDP	EMERGENCY DISTRIBUTION PANEL (ON GROUND FLOOR)	SA	SIGNAL SURGE ARRESTOR
		SCL	SEATTLE CITY LIGHT
EF	EXHAUST FAN	SE	SERVICE ENTRANCE
ENCL	ENCLOSURE	SPD	SURGE PROTECTIVE DEVICE
EX	EXISTING	SST	STAINLESS STEEL
		SSS	SOLID STATE STARTER
F	FUSED	SV	SOLENOID VALVE
FACP	FIRE ALARM CONTROL PANEL		
FS	FLOW SWITCH	T	THERMOSTAT
FT	FLOW TRANSMITTER	TC	TIME CLOCK
FVNR	FULL VOLTAGE NON-REVERSING	TDOD	TIME DELAY ON DE-ENERGIZATION
FU	FUSE	TDOE	TIME DELAY ON ENERGIZATION
FVR	FULL VOLTAGE REVERSING	TDR	TIME DELAY RELAY
		TEL	TELEPHONE
G, GND	GROUND	TNI	TELEPHONE NETWORK INTERFACE
GEN	GENERATOR	TS	TEMPERATURE SWITCH
GFI	GROUND FAULT INTERRUPTER	TSP	TWISTED SHIELDED PAIR
GFP	GROUND FAULT PROTECTOR	TST	TWISTED SHIELDED THREE WIRE
GIL	GREEN INDICATING LIGHT		
GRS	(GRC) GALVANIZED RIGID STEEL (CONDUIT)	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSER
		TYP	TYPICAL
H	HOT, HIGH, HAND	UH	UNIT HEATER
HH	HAND HOLE	UPS	UNINTERRUPTIBLE POWER SUPPLY
HID	HIGH INTENSITY DISCHARGE		
HMI	HUMAN MACHINE INTERFACE	V	VOLT
HOA	HAND OFF AUTO (SELECTOR SWITCH)	VS	VIBRATION SWITCH
HP	HORSEPOWER	VFD	VARIABLE FREQUENCY DRIVE
HS	HAND STATION (HOA SWITCH & POT)	VSD	VARIABLE SPEED DRIVE
HTR	HEATER		
		W	WATT
IC	ISOLATION CONTRACTOR	WHM	WATT HOUR METER
ISR	INTRINSICALLY SAFE RELAY	WIL	WHITE INDICATING LIGHT
KVA	KILO VOLT AMPS	WP	WEATHER PROOF
KVAR	KILO VOLT AMP REACTIVE		
KVARH	KILOVAR HOUR	XFMR	TRANSFORMER
KW	KILOWATT	XP	EXPLOSION PROOF
KWH	KILOWATT HOUR	XMTR	TRANSMITTER
		ZS	LIMIT SWITCH
L	LOW , LIGHT		
LC	LIGHTING CONTACTOR		
LCP	LOCAL CONTROL PANEL		
LE	LEVEL ELEMENT		
LS	LEVEL SWITCH		
LT	LEVEL TRANSMITTER		
LTG	LIGHTING		
M	METER, MOTOR		
MCC	MOTOR CONTROL CENTER		
MCP	MAIN CONTROL PANEL		
MFGR	MANUFACTURER		
MH	MANHOLE		
MO	MAGNETIC ONLY (CIRCUIT BREAKER)		
MOV	MOTOR OPERATED VALVE		

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No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
ELECTRICAL SYMBOLS AND LEGEND

JEFFREY S. GIBSON — STATE OF WASHINGTON — 23080 — REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	JSG
DRAWN	JJL
CHECKED	CGT
SCALE	
WO# 100099341	

WE— 965
DWG # E-1
SHEET 29
OF 37

NORTH

0 20 40

Scale in Feet

(15% REDUCED WETLAND BUFFER)

191.25'

PARCEL ID# 31063200101400
12710 150TH PL

PARCEL ID# 31063200101300
12820 150TH PL

PARCEL ID# 31063200101500
12705 150TH PL

PARCEL ID# 31063200101200
12807 150TH PL

PARCEL ID# 31063200101000
14930 BURN RD

PARCEL ID# 31063200100600
12918 150TH PL

FOUND 1/2" REBAR AND CAP LS# 12716

60' ACCESS & UTILITY ESMT AF# 7812130179

17+00

18+00

19+00

20+00

150TH ST NE

SPLIT RAIL FENCE

5' WOOD FENCE

6' CHAIN LINK FENCE

GRAVEL

GATE

DW

TWIN 15" & 10" FIR
21" HEMLOCK

12" FIR

EX BUILDING, PER DETAIL 1/E-8

EXISTING BUILDING

EX OVERHEAD POWER TO REMAIN

EX POWER POLE W/ XFMR AND GUY TO REMAIN

EX SERVICE LATERAL TO REMAIN

CONDUIT TRENCH, PER DETAIL 1/E-9

INLET FLOW VAULT, PER DETAIL 1/E-6

RESERVOIR #1
3.6 MG WELDED STEEL RESERVOIR

FUTURE RESERVOIR #2 (NOT IN CONTRACT)

C1 C2 C4 C5 C7 C8 C9 C10 C24 C25 C11 C12 C20 C21

C4B C8A C9C C20

C25

C4D C9D C13 C14 C15 C24A

ROW OF 6" ALDERS

ROW OF 10" ALDER

14' WIDE CONC APRON

2' WIDE GRAVEL DISPERSION TRENCH

WETLAND BUFFER

CATHODIC PROTECTION NEGATIVE CONNECTION

CONDUIT CHASE

RESERVOIR

LADDER

LIGHT FIXTURE

C5 C10 C11 C12

C1 C2 C4 C7 C8 C9 C20 C21 C24 C25

ELECTRICAL HANDHOLE, (1) PER DETAIL 5/E-8

OUTLET CHECK VALVE & FLOW METER VAULT, PER DETAIL 3/E-6

C4A

C9B

C4C C9A C20A C18

STORMWATER POND

OUTLET SEISMIC VALVE VAULT, PER DETAIL 2/E-6

FOUND 5/8" REBAR AND CAP G.R. CRANE LS# 7573

FOUND 5/8" REBAR AND CAP LS# 37554

FOUND 1 1/2" IRON PIPE

FOUND 3/8" REBAR NO CAP

5' WIRE FENCE

30" CEDAR

36" CEDAR

34" CEDAR

6" HEMLOCK

10" HEMLOCK

32" HEMLOCK

22" FIR

MAPLE CLUSTER

300' BPA

CONSTRUCTION NOTES:

(1) DRAIN HANDHOLE TO ADJACENT DRAIN MANHOLE. SEE CIVIL DRAWINGS.

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EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
ELECTRICAL SITE PLAN

JEFFREY S. GIBSON
STATE OF WASHINGTON
33080
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	JSG
DRAWN	JJL
CHECKED	CGT
SCALE	

WO# 100099341

WE–	965
DWG #	E-2
SHEET	30
OF	37

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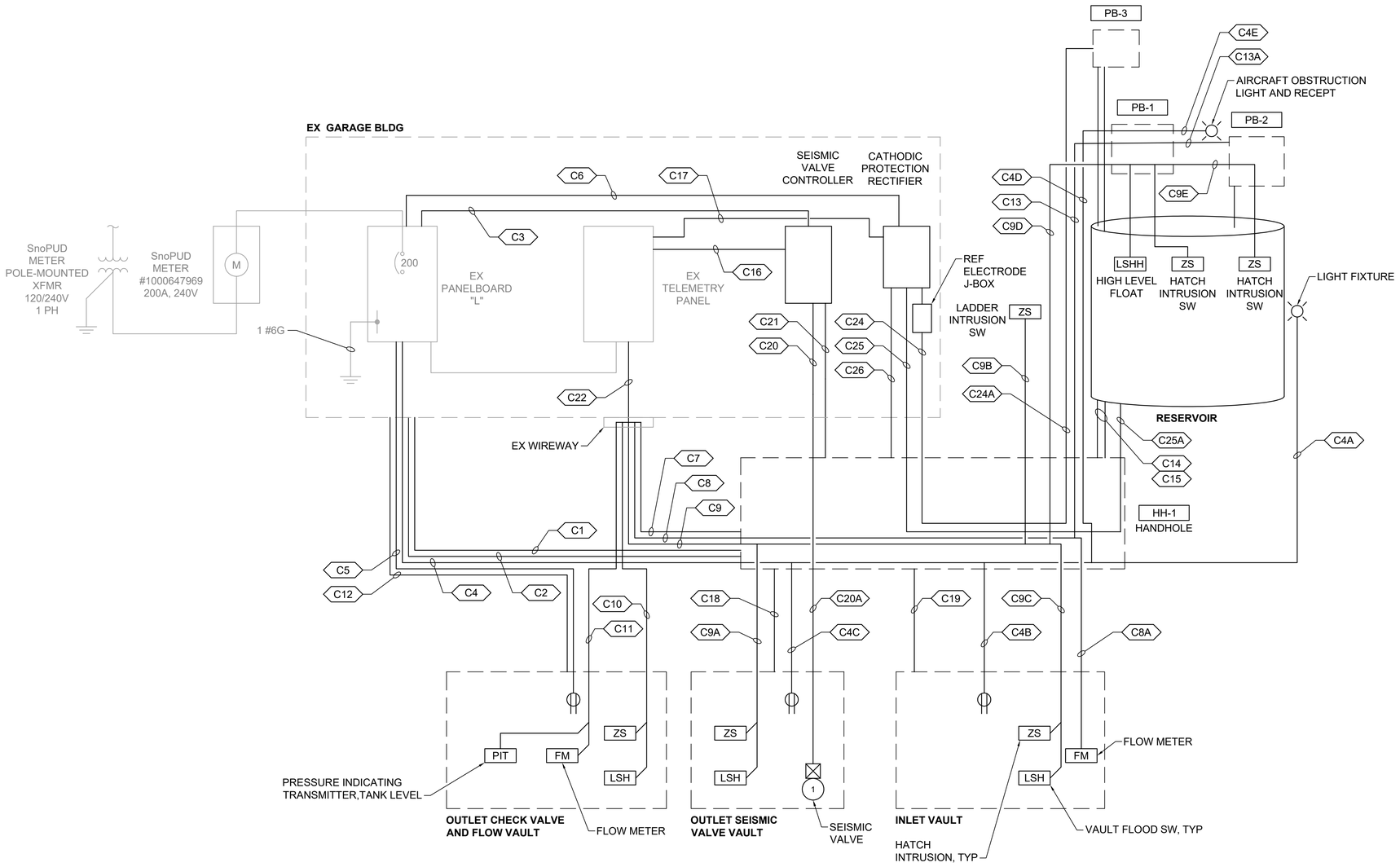
UNDERGROUND SERVICE

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resvd Filename: P23-10882_E-2 Plot date: May 21, 2025-05:22:30pm CAD User: abradley.
Xref Filename: | X23-10882_Ex Topo | X23-10882_Status | X23-10882_TB | X23-10882_Ex Prof | Talion | X23-10882_Ex Prop-RW | X23-10882_Prop Site | X23-10882_Prop Util | X23-10882_Ex Util | X23-10882_Ex Prop-Util | X23-10882_Prop Layout | Gibson | Rogers | Stevens | McCrosky | Wildhood | Gillespie | Dahl |



ONE-LINE DIAGRAM

DETAIL 1

NTS -

CONSTRUCTION NOTES:

1. PROVIDE NEW CIRCUIT BREAKER IN EXISTING PANELBOARD. MATCH RATINGS OF PANEL. SEE PANEL SCHEDULE DETAIL ON DWG E-5.

No.	DATE	REVISION	APPR.
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PUBLIC UTILITY DISTRICT NO. 1
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WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
ELECTRICAL ONE-LINE DIAGRAM

JEFFREY S. GIBSON
STATE OF WASHINGTON
33080
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	JSG
DRAWN	JJL
CHECKED	CGT
SCALE	N/A

WO# 100099341

WE–	965
DWG #	E-3
SHEET	31
OF	37

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UNDERGROUND SERVICE

EX PANELBOARD "L" SCHEDULE

POLE NO.	C.B. AMP	C.B. POLES	SERVICE	LOAD KVA TOTAL	TYPE	A	B	TYPE	TOTAL	SERVICE	C.B. AMP	C.B. POLES	POLE NO.
1	30	2	HEAT	1.5	N	1.5				GENERATOR	30	2	2
3							1.5						4
5	20	1	PLC CONTROL	0.5	C	0.86		R	0.36	WEST OUTLETS	20	1	6
7	20	1	OUTSIDE OUTLET	0.18	R		0.54	R	0.36	SOUTH OUTLETS	20	1	8
9	20	1	LIGHTS	0.9	L	1.26		R	0.36	NORTH OUTLETS	20	1	10
(1) 11	20	1	SEISMIC VALVE CONTROLLER	0.8	M		0.8			SPARE	20	1	12
(1) 13	20	1	RESERVOIR LIGHT	0.1	L	1.6		C	1.5	CATHODIC PROTECTION RECTIFIER	20	1	14 (1)
(1) 15	20	1	AIRCRAFT OB. LT/RECEPT	0.2	R		0.2			FUTURE TANK MIXER	20	1	16 (1)
(1) 17	20	1	VAULT RECEPTS	0.54	R	0.54							18
			CONNECTED LOAD PER PHASE			5.76	3.04						

LOAD SUMMARY	CONN KVA	DEMAND FACTOR	DEMAND KVA
TYPE "L": LIGHTING LOADS	1.00	125%	1.25
TYPE "C": CONTINUOUS LOADS	2.00	125%	2.50
TYPE "R": RECEPTACLES (FIRST 10KVA)	2.00	100%	2.00
TYPE "R": RECEPTACLES (OVER 10KVA)		50%	
TYPE "M": LARGEST MOTOR LOAD	0.80	125%	1.00
TYPE "M": OTHER MOTOR LOADS		100%	
TYPE "N": NON-CONTINUOUS LOADS	3.00	100%	3.00
TYPE "K" KITCHEN LOADS			
TYPE "S": SUB-FEED (INCLUDED IN LOADS ABOVE)			
TOTAL	8.80		9.75

VOLTS: 120/240V, 1PH, 3W
MAIN C.B.: 200 A
BUS: 200 A
POLES: 20
MOUNTING: SURFACE
AIC RATING 10,000
DEMAND AMPS 41

PANEL FEATURES

BRKR FEATURES

LUMINAIRE SCHEDULE

TAG	DESCRIPTION	MANUF/MODEL	VOLTAGE	LUMENS/CD	NOTES
A	EXTERIOR WALL PACK, LED 4000 K COLOR TEMP, PE CELL DARK BRONZE, ADJUSTABLE OUTPUT	LITHONIA # TWX2 LED ALO 40K MVOLT PE DDBXD	120	1450-6850	SET LUMENS TO 5250
B	AIRCRAFT OBSTRUCTION LIGHT, DUAL LED FIXTURES ON COMMON MOUNT, RED, SOLID ON, NIGHT VISION GOGGLE & NVIS COMPATIBLE, IP67 RATED, PHOTOCELL, ETL CERTIFIED L-810, FAA AC 150/5345-43J	FLIGHT LIGHT #FL-810LNV-R-AC-D-PM-P	120	32.5 CD	PROVIDE PHOTOCELL MOUNTING J-BOX AS REQURED

CONSTRUCTION NOTES:

(1) PROVIDE 20A, 1-POLE CIRCUIT BREAKER IN EXISTING PANELBOARD. PANEL IS EATON TYPE BR LOAD CENTER. BREAKERS SHALL BE EATON BR120, 10KAIC

CONDUIT SCHEDULE

PT #	CONDUIT SIZE	CONDUIT TYPE	WIRE/CABLE	FROM	TO	NOTES
C1	2"	PVC		EX GARAGE BUILDING	HH-1	SPARE
C2	2"	PVC		EX GARAGE BUILDING	HH-1	SPARE
C3	3/4"	RGS	2#12 & #12G	EX PANELBOARD	SEISMIC VALVE CONTROLLER	
C4	2"	PVC/RGS	4#10, 6#12 & #10G	EX PANELBOARD	HH-1	LIGHTS/RECEPT
C4A	1"	PVC/RGS	2#12 & #12 G	HH-1	EXTERIOR LIGHT A	ON TANK WALL
C4B	1"	PVC/RGS	2#12 & #12 G	HH-1	INLET VAULT	RECEPT
C4C	1"	PVC/RGS	2#12 & #12 G	HH-1	OUTLET SEISMIC VAULT	RECEPT
C4D	2"	PVC/RGS	4#10 & #10G	HH-1	PB-1	2 SPARE FOR FUTURE MIXER
C4E	3/4"	RGS	2#12 & #12 G	PB-1	AIRCRAFT OBS. LIGHT	LIGHT/RECEPT
C5	1"	PVC	2#12 & #12 G	EX PANELBOARD	OUTLET CHECK/FLOW VAULT	RECEPT
C6	3/4"	RGS	2#12 & #12 G	EX PANELBOARD	CATHODIC PROTECTION RECTIFIER	
C7	2"	PVC		EX TELEMETRY PANEL	HH-1	SPARE
C8	2"	PVC	1TSQ#16	EX TELEMETRY PANEL	HH-1	ANALOG CIRCUITS
C8A	1"	PVC	1TSQ#16	HH-1	INLET VAULT	INLET FLOW
C9	2"	PVC	18#14	EX TELEMETRY PANEL	HH-1	DIGITAL CIRCUITS
C9A	1"	PVC	4#14	HH-1	OUTLET SEISMIC VAULT	HATCH INTRUSION/VAULT FLOOD
C9B	3/4"	PVC/RGS	4#14	HH-1	LADDER INTRUSION SW	LADDER INTRUSION
C9C	1"	PVC/RGS	4#14	HH-1	INLET VAULT	HATCH INTRUSION/VAULT FLOOD
C9D	2"	PVC/RGS	6#14	HH-1	PB-1	HATCH INTRUSION/OVERFLOW
C9E	1"	RGS	2#14	PB-1	PB-2	
C10	1"	PVC	4#14	EX TELEMETRY PANEL	OUTLET CHECK/FLOW VAULT	HATCH INTRUSION/VAULT FLOOD
C11	1"	PVC	2TSQ#16	EX TELEMETRY PANEL	OUTLET CHECK/FLOW VAULT	OUTLET FLOW/TANK LEVEL
C12	1"	PVC		EX GARAGE BUILDING	OUTLET CHECK/FLOW VAULT	SPARE
C13	2"	PVC/RGS		HH-1	PB-1	SPARE
C13A	1"	RGS		PB-1	PB-2	SPARE
C14	2"	PVC/RGS		HH-1	TANK CONDUIT CHASE	SPARE
C15	2"	PVC/RGS		HH-1	TANK CONDUIT CHASE	SPARE
C16	3/4"	RGS	8#14	EX TELEMETRY PANEL	SEISMIC VALVE CONTROLLER	
C17	3/4"	RGS	4#14	EX TELEMETRY PANEL	CATHODIC PROTECTION RECTIFIER	
C18	1"	PVC		HH-1	OUTLET SEISMIC VAULT	SPARE
C19	1"	PVC		HH-1	INLET VAULT	SPARE
C20	2"	PVC	4#10 & #10G	SEISMIC VALVE CONTROLLER	HH-1	
C20A	1"	PVC	4#10 & #10G	HH-1	SEISMIC VALVE	
C21	2"	PVC		SEISMIC VALVE CONTROLLER	HH-1	SPARE
C22	3"	RGS	20#14 & 3TSQ#16	EX WIREWAY	EX TELEMETRY PANEL	
C23						NOT USED
C24	2"	PVC	BY DIV 13	CATHODIC PROT. RECTIFIER	HH-1	
C24A	2"	PVC/RGS	BY DIV 13	HH-1	PB-3	
C25	2"	PVC	BY DIV 13	CATHODIC PROT. RECTIFIER	HH-1	
C25A	2"	PVC/RGS	BY DIV 13	HH-1	RESERVOIR NEGATIVE CONNECTION	
C26	2"	PVC		CATHODIC PROT. RECTIFIER	HH-1	SPARE

NOTES:

(1) PROVIDE A SPARE JET LINE IN ALL CONDUITS FOR FUTURE.

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BURN ROAD RESERVOIR
ELECTRICAL SCHEDULE

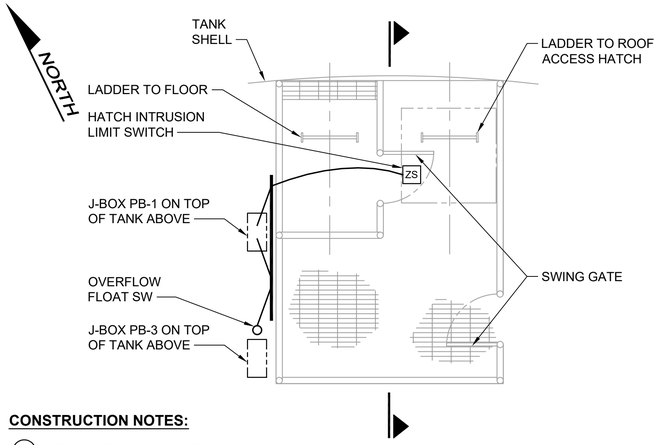
JEFFREY S. GIBSON
STATE OF WASHINGTON
33080
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	JSG
DRAWN	JJL
CHECKED	CGT
SCALE	

WO# 100099341

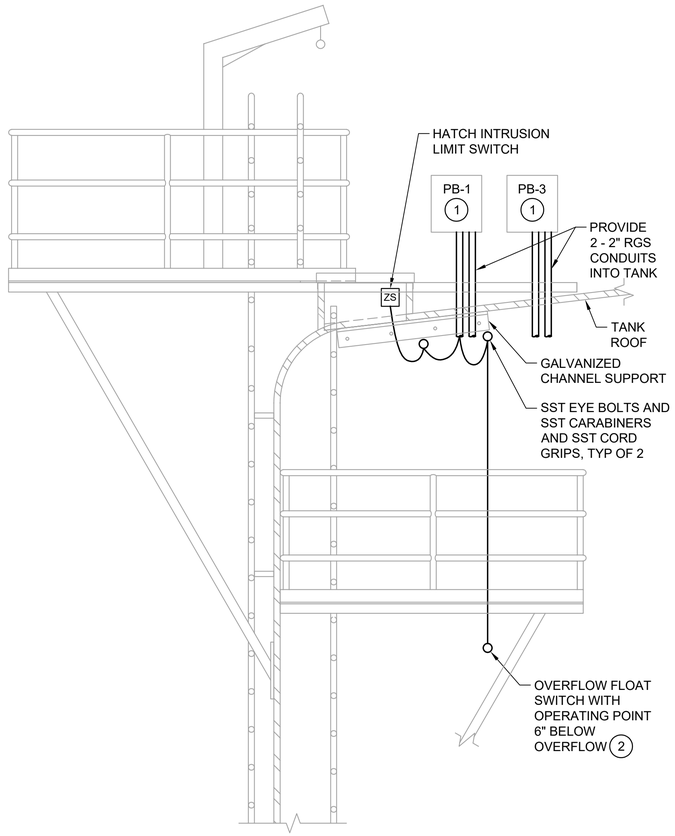
WE–	965
DWG #	E-4
SHEET	32
OF	37

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resvd. Filename: P23-10882_E-4 Plot date: May 21, 2025-05:30:10pm CAD User: abradley.
Xref Filename: | X23-10882_TB | X23-10882_Status | Tallch | Rogers | Stevens | Gibson | McCrosky | Widhood | Gillespie | Dahl |



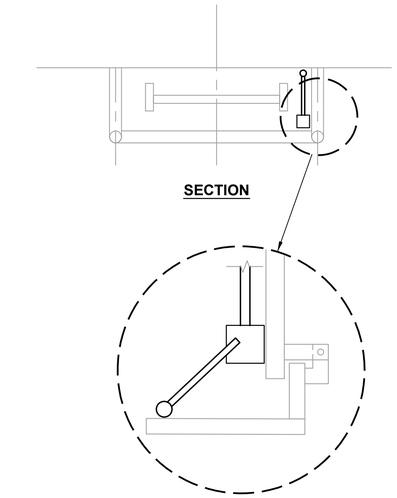
CONSTRUCTION NOTES:

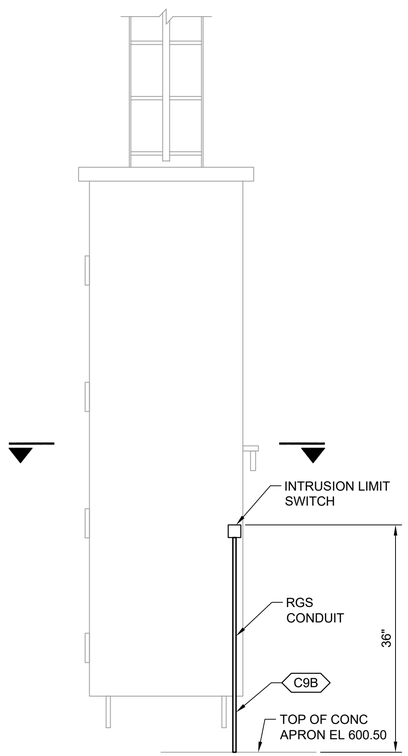
1. NOT ALL CONDUITS SHOWN. SEE DETAILS 2/E-8 AND 4/E-8.
2. OVERFLOW FLOAT. APPROVED FOR WATER DISTRIBUTION. WIRED N.C. FOR PLC NOTIFICATION OPENS THE CIRCUIT UPON HIGH WATER LEVEL.



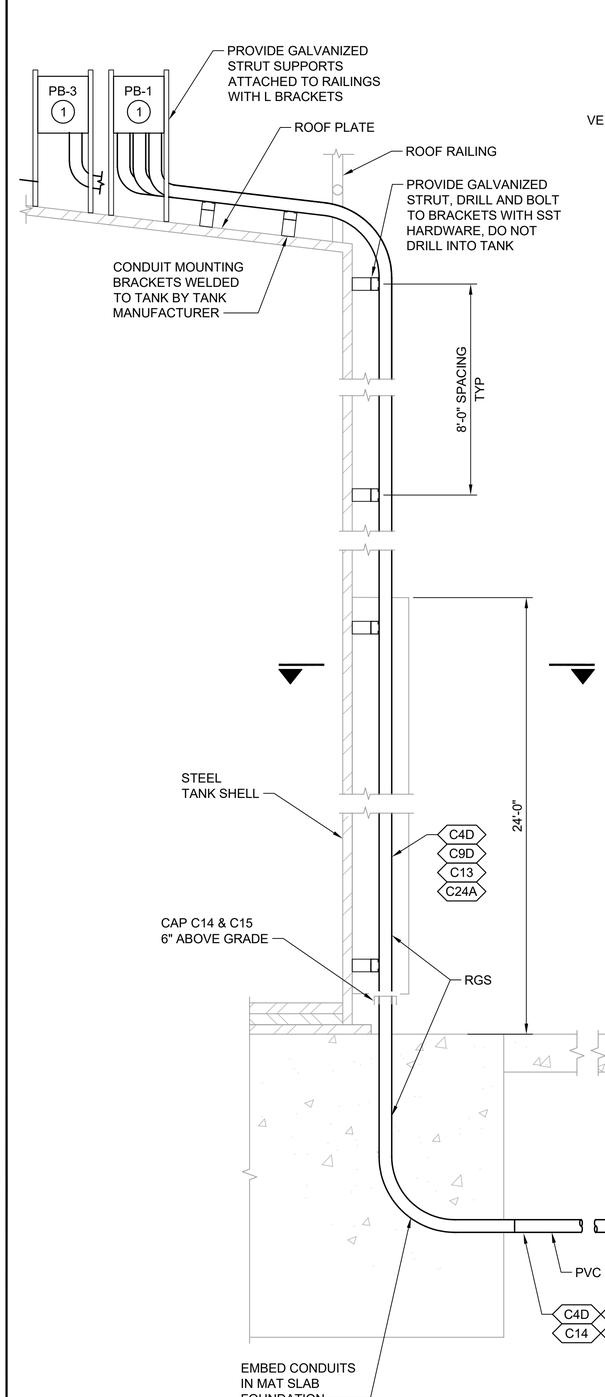
SECTION

INSIDE PLATFORM
DETAIL 1
NTS

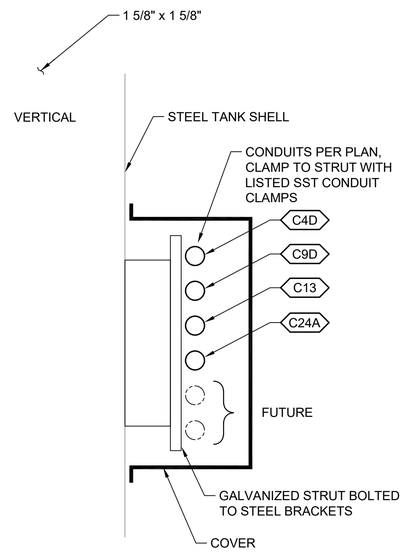




LADDER GUARD INTRUSION SWITCH
DETAIL 2
NTS E-7



CONDUIT CHASE
DETAIL 3
NTS E-7



SECTION

NOTE:

1. SEE STRUCTURAL DRAWINGS FOR CONDUIT SHROUD AND STRUT/ TANK ATTACHMENT DETAILS.

1. NOT ALL CONDUITS SHOWN. SEE DETAILS 2/E-8 AND 4/E-8.
2. OVERFLOW FLOAT. APPROVED FOR WATER DISTRIBUTION. WIRED N.C. FOR PLC NOTIFICATION OPENS THE CIRCUIT UPON HIGH WATER LEVEL.

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BURN ROAD RESERVOIR
ELECTRICAL DETAILS
1 OF 2

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33080
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
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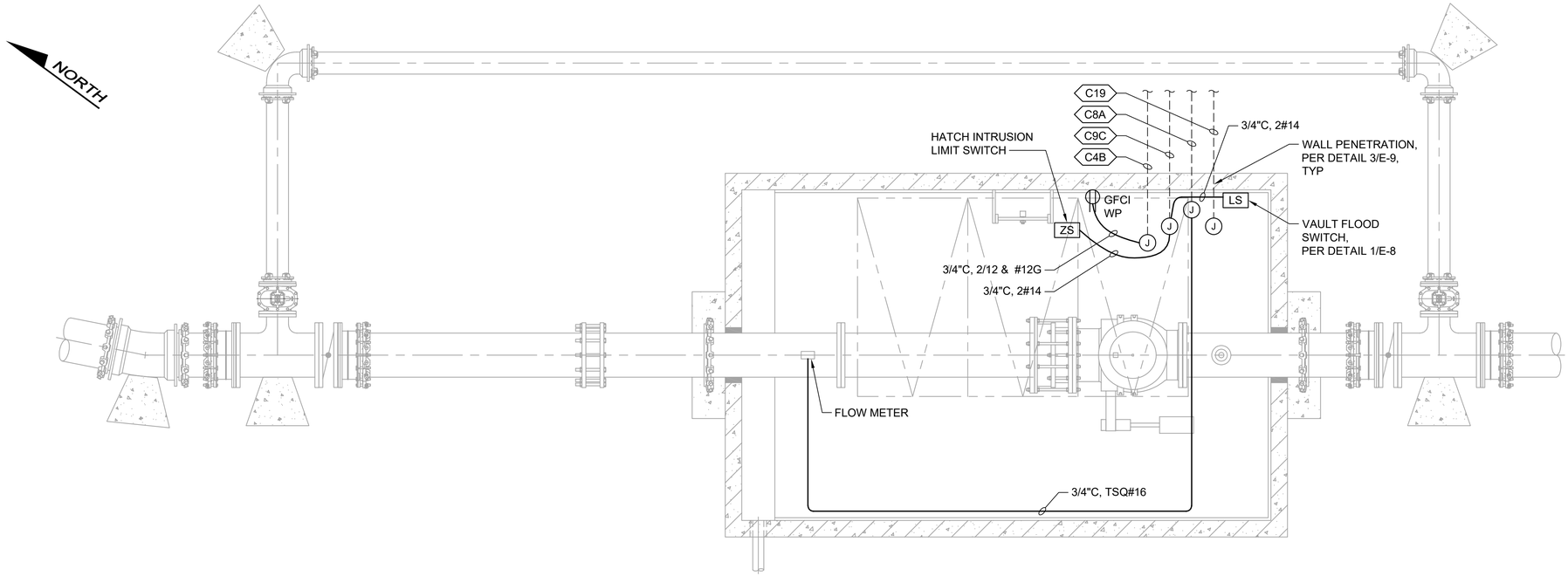


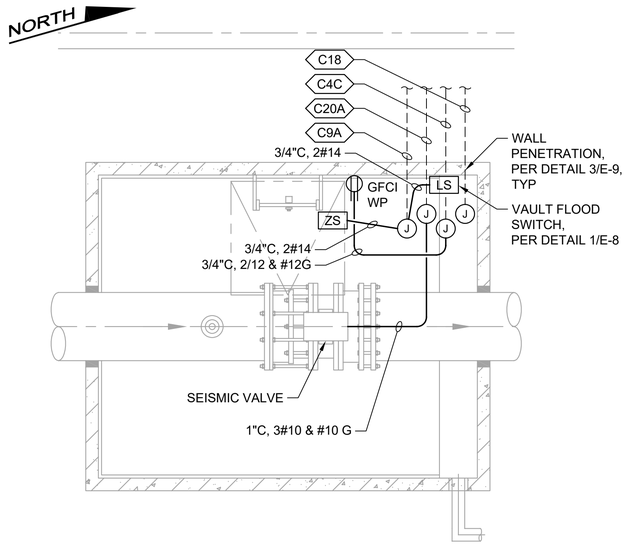
INLET VAULT ELECTRICAL

PLAN 1

SCALE: 1/2" = 1'-0" E-2

NOTES:

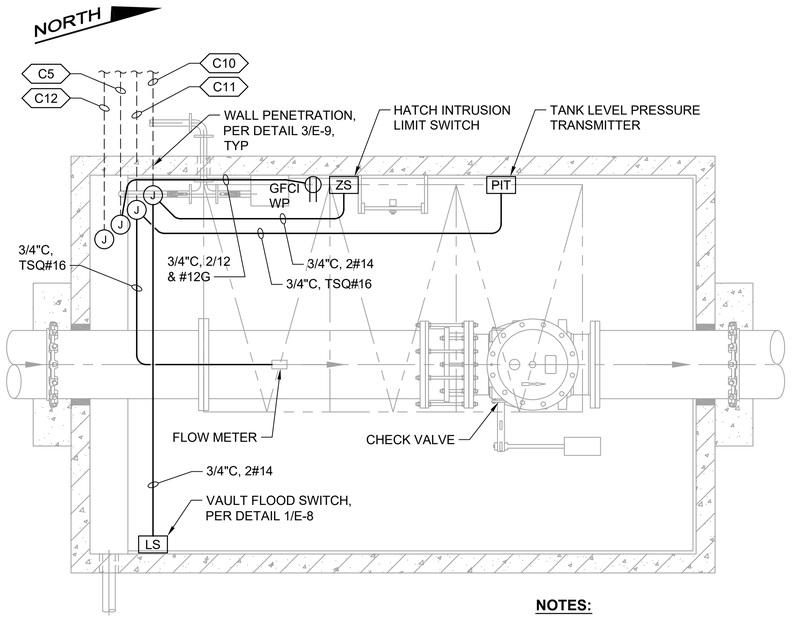
1. JUNCTION BOXES INSIDE VAULTS SHALL BE NEMA 4X, MINIMUM SIZE 6" x 6" x 4".



OUTLET SEISMIC VALVE VAULT ELECTRICAL

PLAN 2

SCALE: 1/2" = 1'-0"



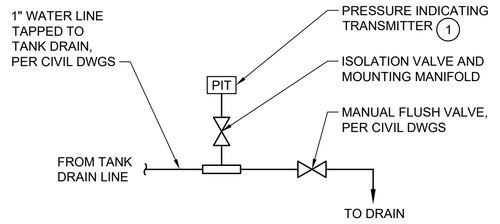
OUTLET CHECK VALVE AND FLOW ELECTRICAL

PLAN 3

SCALE: 1/2" = 1'-0"

NOTES:

1. JUNCTION BOXES INSIDE VAULTS SHALL BE NEMA 4X, MINIMUM SIZE 6" x 6" x 4".



CONSTRUCTION NOTES:

1. MEASURE ELEVATION OF TRANSDUCER RELATIVE TO TANK BOTTOM (EL 600.5). CALIBRATE TRANSDUCER ZERO OFFSET TO READ 0.00 WHEN WATER LEVEL IS AT BOTTOM OF TANK.

TANK LEVEL MONITORING SCHEMATIC DIAGRAM

DETAIL 4

N/A

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
3301 OLD HARTFORD ROAD, LAKE STEVENS
WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
ELECTRICAL DETAILS 2 OF 2

JEFFREY S. GIBSON — STATE OF WASHINGTON — 13080 — REGISTERED PROFESSIONAL ENGINEER

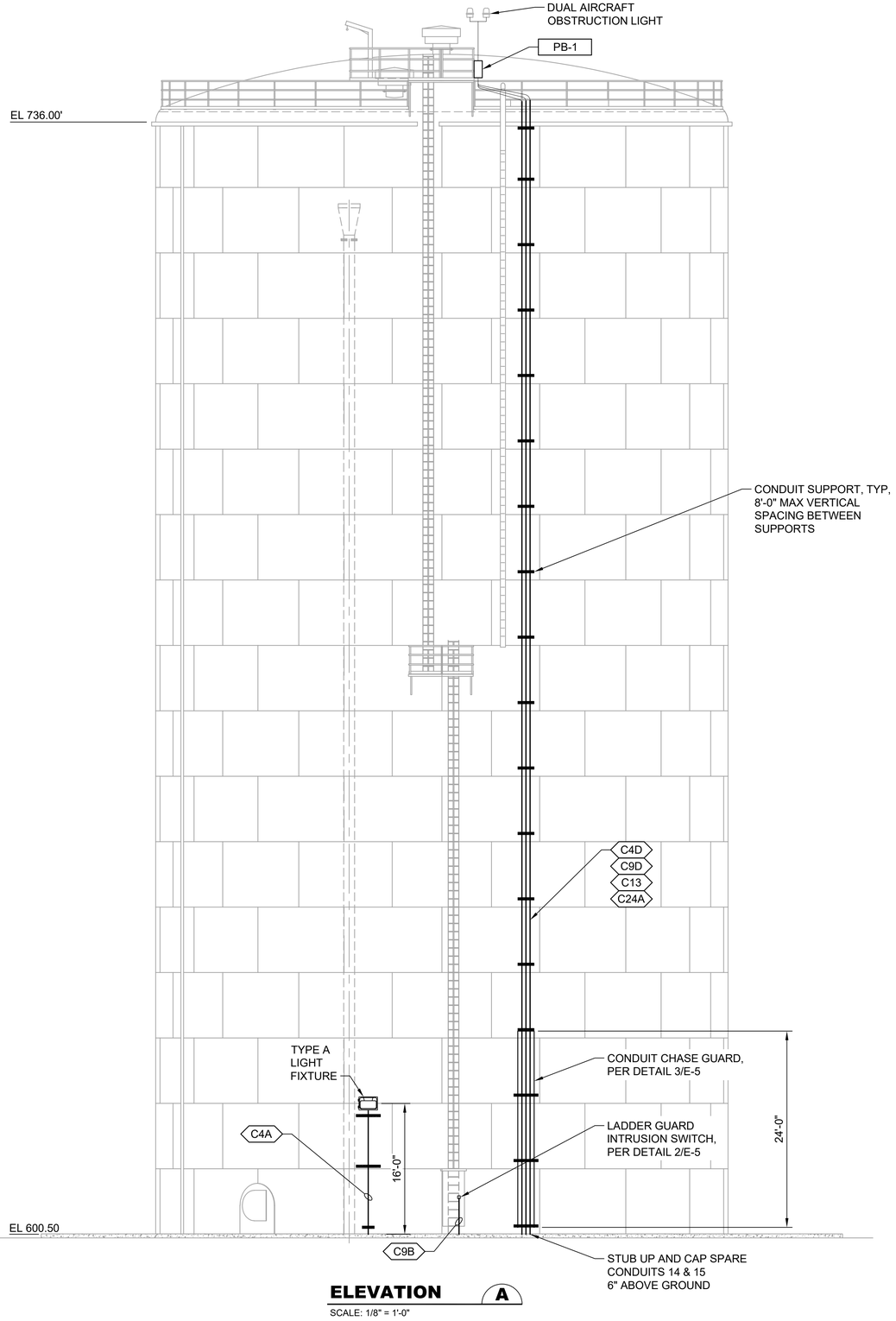
05/21/2025

DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

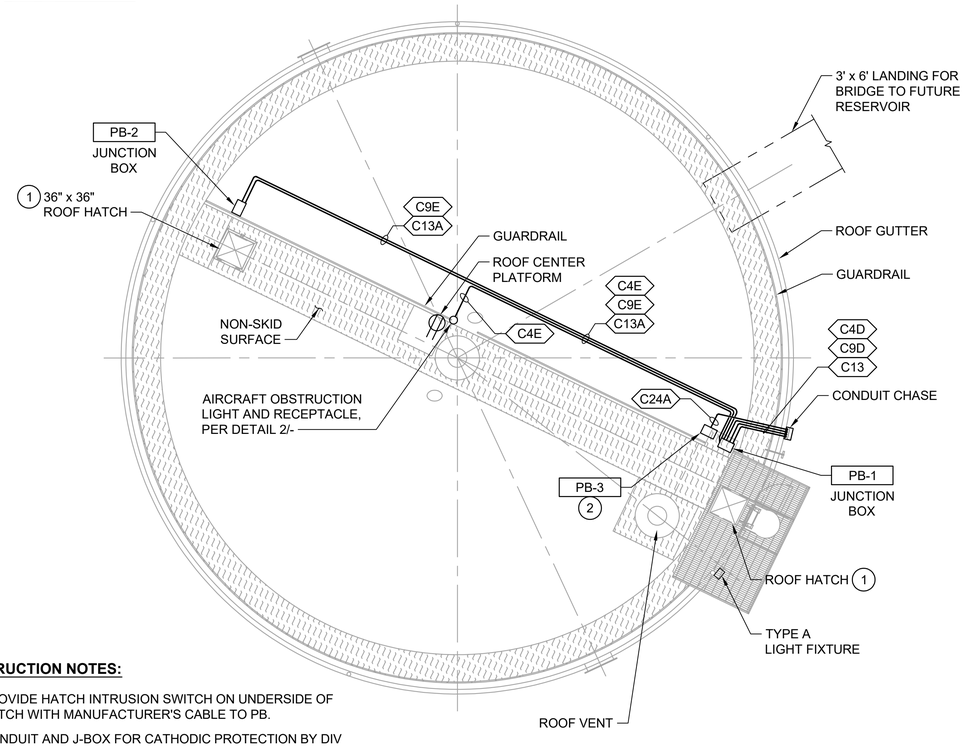
WE–	965
DWG #	E-6
SHEET	34
OF	37

811 **Call 48 Hours Before You Dig**
1-800-424-5555
UNDERGROUND SERVICE



ELEVATION A

SCALE: 1/8" = 1'-0"

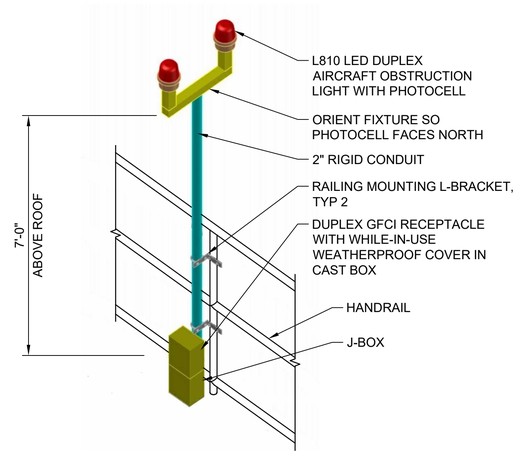


CONSTRUCTION NOTES:

1. PROVIDE HATCH INTRUSION SWITCH ON UNDERSIDE OF HATCH WITH MANUFACTURER'S CABLE TO PB.
2. CONDUIT AND J-BOX FOR CATHODIC PROTECTION BY DIV 16. ALL DC CONDUCTORS, LEADS, ANODES, REFERENCE ELECTRODES, SUPPORT SYSTEMS, AND ACCESS HANDHOLES FOR CATHODIC PROTECTION BY DIV. 13.

RESERVOIR ELECTRICAL ROOF PLAN 1

SCALE: 1/8" = 1'-0"



AIRCRAFT OBSTRUCTION LIGHT DETAIL 2

NTS

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

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WASHINGTON 98258 (425) 397-3000
MAILING ADDRESS: P.O. BOX 1107,
EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
RESERVOIR ELECTRICAL
ELEVATION AND ROOF PLAN

JEFFREY S. GIBSON
STATE OF WASHINGTON
33080
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

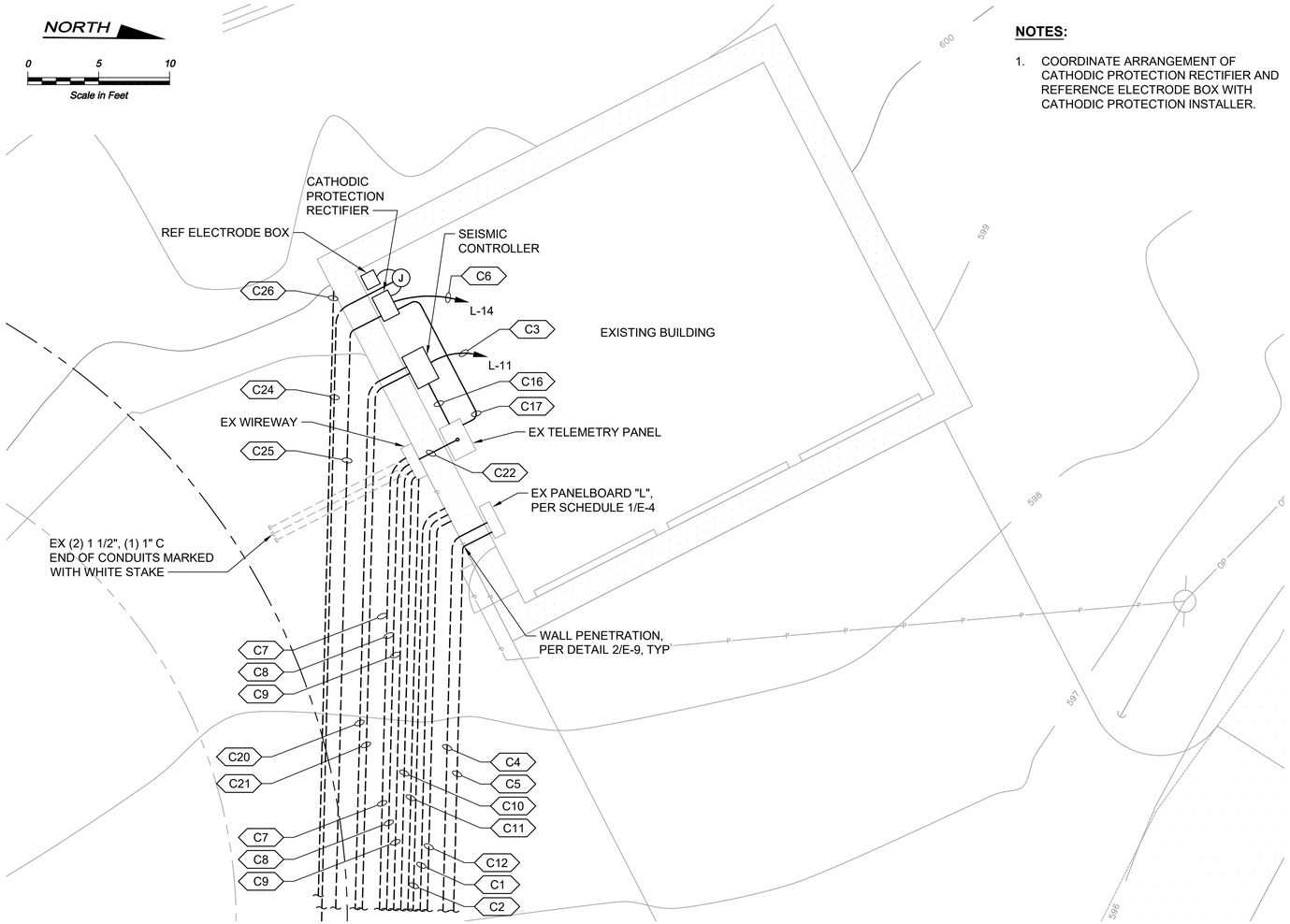
DATE	May 2025
DESIGNED	MTM
DRAWN	EDM
CHECKED	CGT
SCALE	AS SHOWN

WO# 100099341

WE–	965
DWG #	E-7
SHEET	35
OF	37

811
Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Resvd\ Filename: P23-10882_E-7 Plot date: May 21, 2025-05:27:31pm CAD User: abradley
Xref Filename: | X23-10882_TB | Tatich | Rogers | X23-10882_Status | Stevens | X23-10882_Prop Rsvr | Gibson | McCrosky | Wildhood | Gillespie | Dahl |



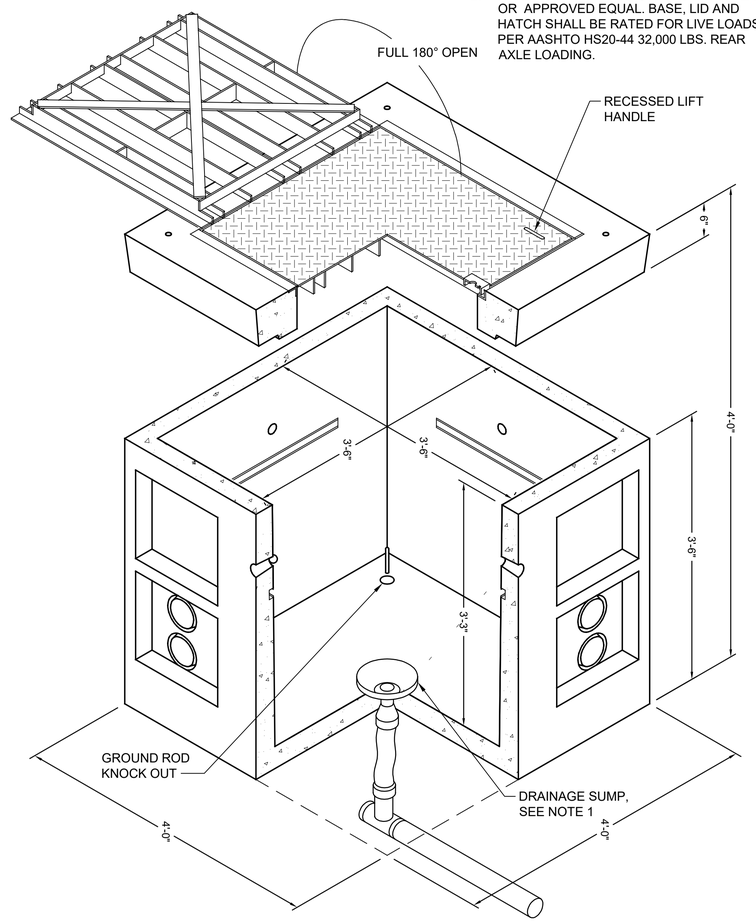
NOTES:

1. COORDINATE ARRANGEMENT OF CATHODIC PROTECTION RECTIFIER AND REFERENCE ELECTRODE BOX WITH CATHODIC PROTECTION INSTALLER.

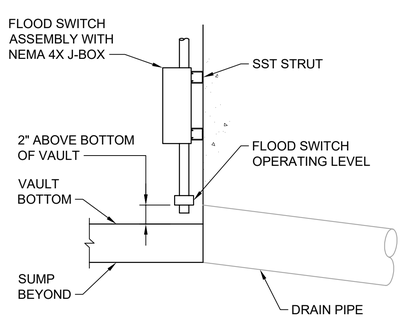
GARAGE BUILDING
PLAN 1
SCALE: 1" = 5'-0" -

NOTES:

1. SEE CIVIL DRAWINGS FOR DRAIN PIPE INFORMATION.
2. HANDHOLE SHALL BE OLDCASTLE 444-LA OR APPROVED EQUAL. BASE, LID AND HATCH SHALL BE RATED FOR LIVE LOADS PER AASHTO HS20-44 32,000 LBS. REAR AXLE LOADING.



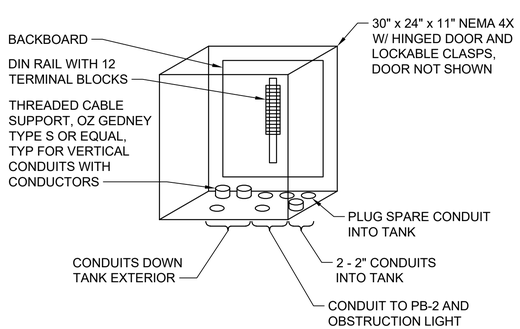
HANDHOLE
DETAIL 5
NTS -



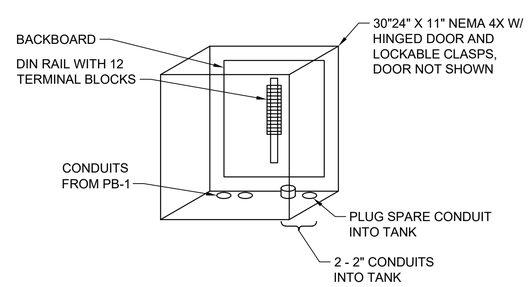
NOTES:

1. MOUNT FLOOD SWITCH ADJACENT TO, BUT NOT BLOCKING, DRAIN.

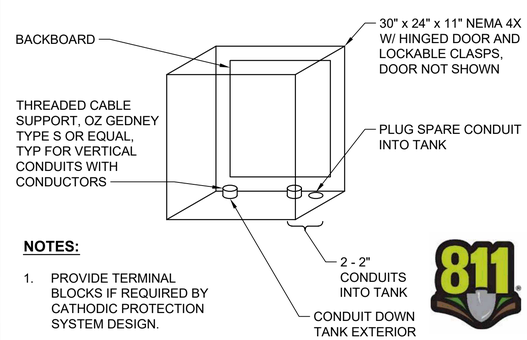
VAULT FLOOD SWITCH
DETAIL 1
NTS -



PB-1
DETAIL 2
NTS



PB-2
DETAIL 3
NTS



NOTES:

1. PROVIDE TERMINAL BLOCKS IF REQUIRED BY CATHODIC PROTECTION SYSTEM DESIGN.

PB-3
DETAIL 4
NTS

Call 48 Hours Before You Dig
1-800-424-5555
UNDERGROUND SERVICE

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

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WASHINGTON 98258 (425) 397-3000
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EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
GARAGE BUILDING PLAN AND ELECTRICAL DETAILS

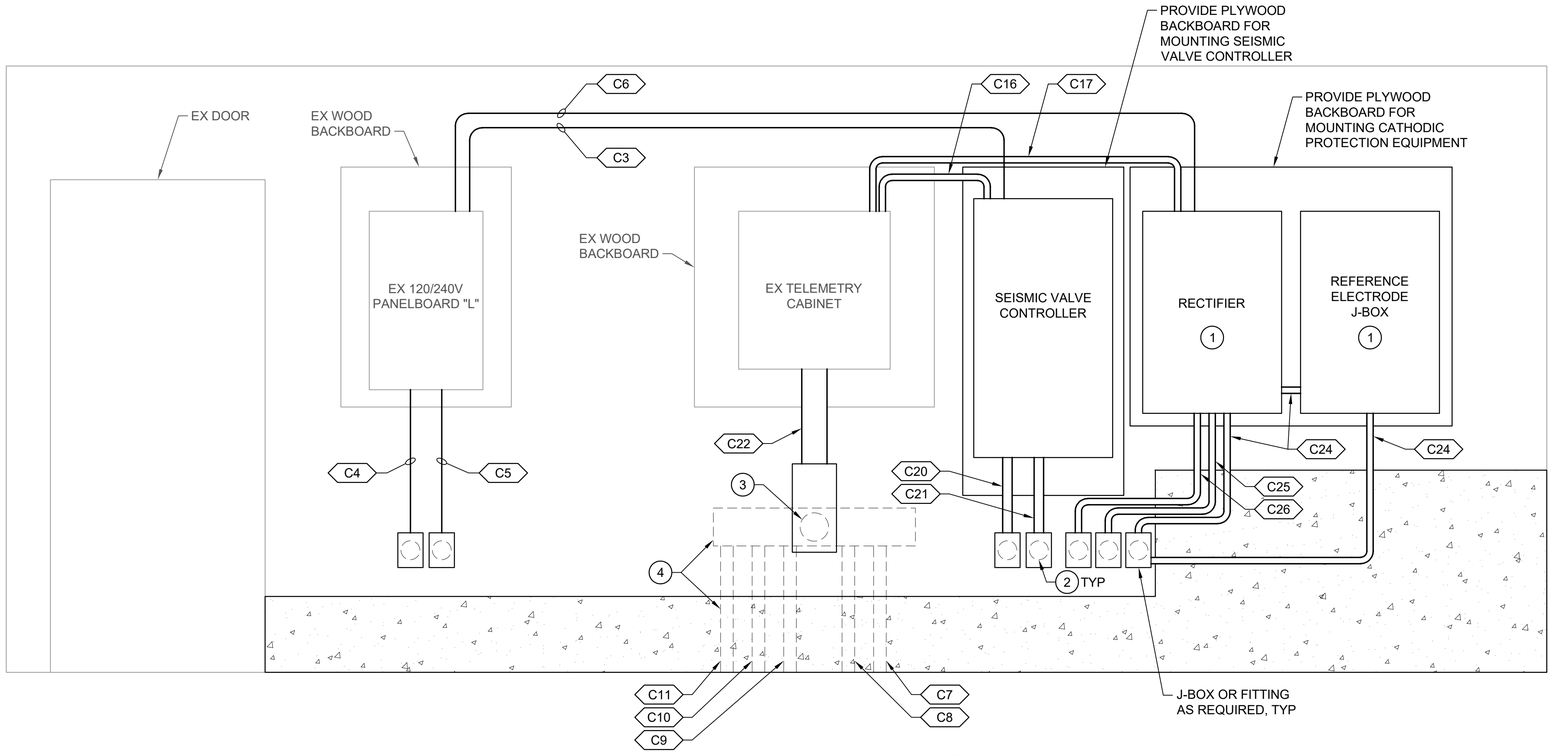
JEFFREY S. GIBSON, STATE OF WASHINGTON, 33080, REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	JSG
DRAWN	JJL
CHECKED	CGT
SCALE	

WO# 100099341

WE– 965
DWG # E-8
SHEET 36
OF 37

Path: S:\Cad\Snohomish PUD\23-10882 Burn Rd Rev\d Filename: P23-10882_E-8 Plot date: May 21, 2025-05:28:06pm CAD User: abradley
Xref Filename: | X23-10882_Ex Topo | X23-10882_Status | X23-10882_TB | X23-10882_Ex Prof | Talish | X23-10882_Ex Prop-RW | X23-10882_Prop Site | X23-10882_Prop Util | X23-10882_Dwg Layout | Gibson | Rogers | Stevens | McCrosky | Wildhood | Gillespie | Dahl |



ELEVATION A

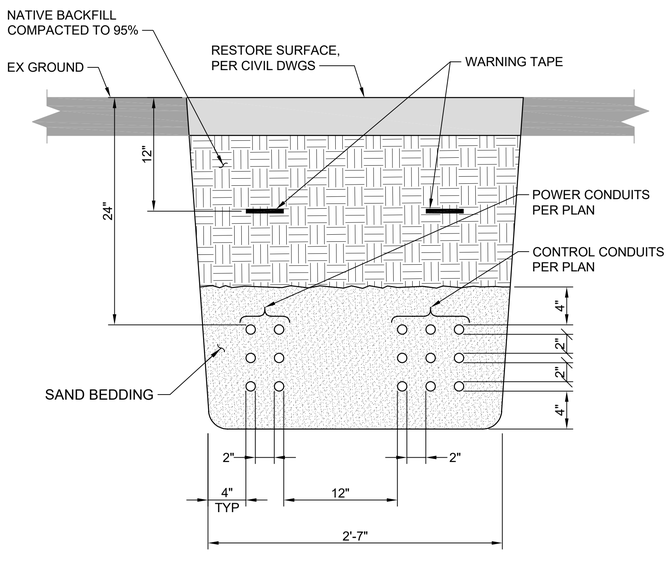
SCALE: 1" = 1'-0"

NOTES:

1. EXISTING CONDUITS NOT SHOWN.

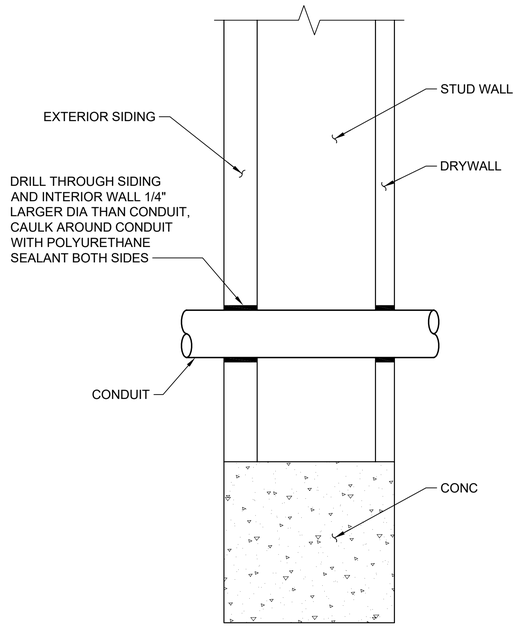
CONSTRUCTION NOTES:

1. CATHODIC PROTECTION EQUIPMENT CABINET(S) AS DESIGNED BY CATHODIC PROTECTION ENGINEER. ACTUAL EQUIPMENT SIZES AND ARRANGEMENT MAY VARY.
2. DRILL CONDUIT PENETRATIONS T THROUGH EXISTING WALL. CAULK AROUND CONDUITS WITH POLYURETHANE CONSTRUCTION SEALANT.
3. CONTRACTOR MAY UTILIZE EXISTING WALL PENETRATION OR REPLACE WITH NEW.
4. WIREWAY AND CONDUITS ON BUILDING EXTERIOR WALL.



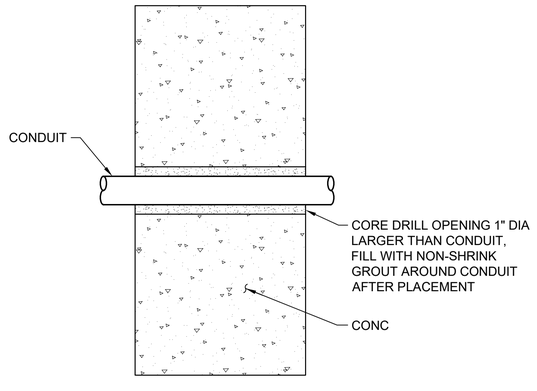
CONDUIT TRENCH DETAIL 1

SCALE: 1 1/2" = 1'-0" TYP



WALL PENETRATION - WOOD WALL DETAIL 2

NTS -



WALL PENETRATION - CONCRETE VAULT WALL DETAIL 3

NTS -

No.	DATE	REVISION	APPR.
	MAY 2025	ISSUED FOR PERMIT	

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WASHINGTON 98258 (425) 397-3000
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EVERETT, WASHINGTON 98206

BURN ROAD RESERVOIR
ELECTRICAL DETAILS

JEFFREY S. GIBSON
STATE OF WASHINGTON
33080
REGISTERED PROFESSIONAL ENGINEER
05/21/2025

DATE	May 2025
DESIGNED	JSG
DRAWN	AWB
CHECKED	CGT
SCALE	

WO# 100099341

WE–	965
DWG #	E-9
SHEET	37
OF	37

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APPENDIX A

SOILS INFORMATION

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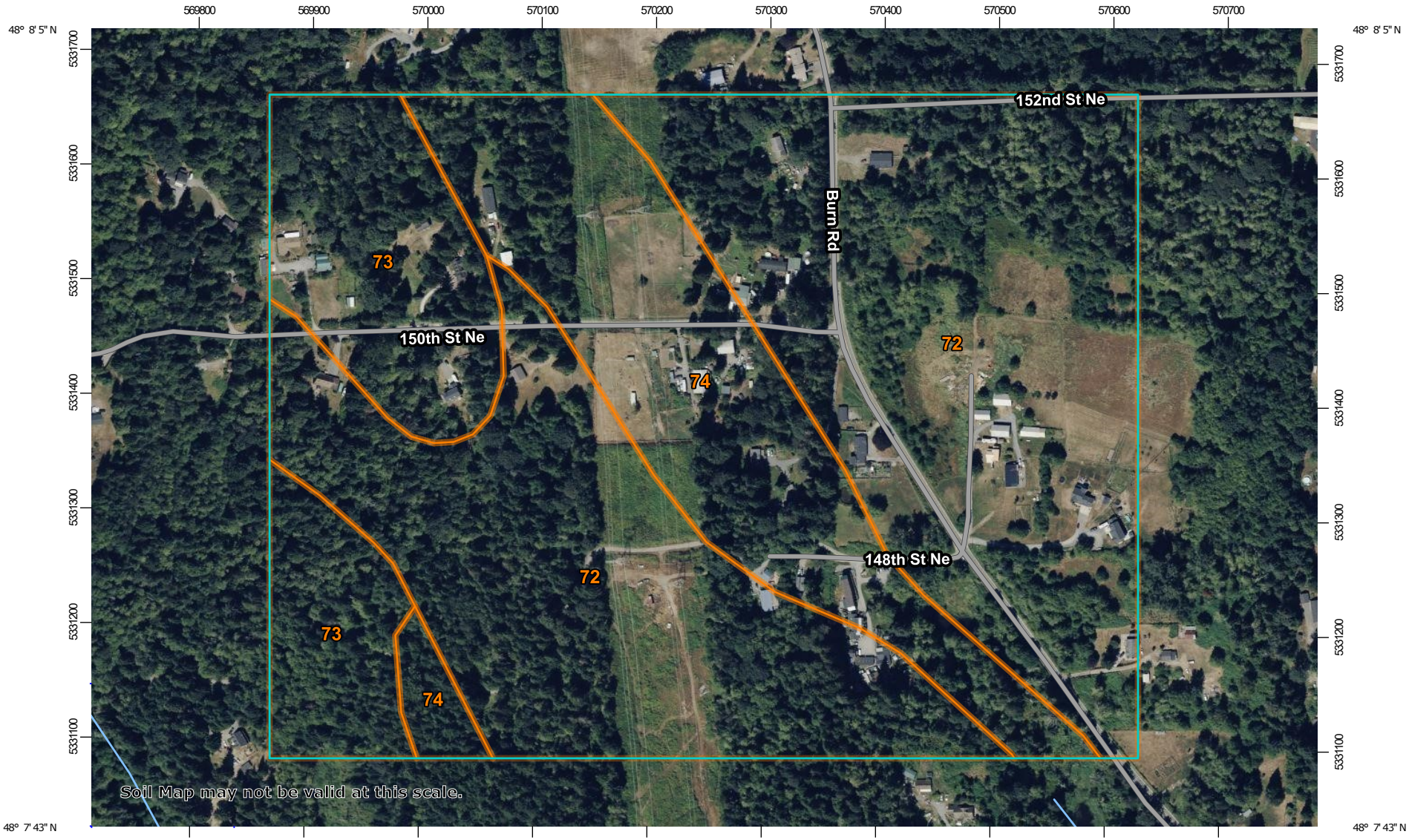
Soil Map—Snohomish County Area, Washington
(Burn Rd Reservoir Soils Map Survey)



Map Scale: 1:4,900 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Snohomish County Area, Washington
Survey Area Data: Version 25, Aug 29, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 14, 2022—Sep 1, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
72	Tokul gravelly medial loam, 0 to 8 percent slopes	68.6	62.9%
73	Tokul gravelly medial loam, 8 to 15 percent slopes	17.5	16.0%
74	Tokul gravelly medial loam, 15 to 30 percent slopes	23.1	21.1%
Totals for Area of Interest		**109.2**	**100.0%**

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APPENDIX B

GEOTECHNICAL REPORT

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GEOTECHNICAL ENGINEERING REPORT

Burn Road Reservoir
12820 - 150th Street Northeast
Arlington, Washington

Project No. 2630.01
21 May 2025

Prepared for:
Snohomish County PUD No.1

Prepared by:

ZipperGeo
Geoprofessional Consultants

ZipperGeo
Geoprofessional Consultants

Project No. 2630.01
21 May 2025

Snohomish County PUD No. 1
PO Box 1107
Everett, Washington 98206-1107

Attention: Ms. Max Selin, PE, Principal Engineer

Subject: Geotechnical Engineering Report
Burn Road Reservoir Project
12820 – 150th Street NE
Arlington, Washington 98223
PSC CW2236091

Dear Ms. Selin:

In accordance with your request and written authorization, Zipper Geo Associates, LLC (ZGA) has completed the subsurface exploration and geotechnical engineering evaluation for the proposed Burn Road Reservoir project. This report presents the findings of the subsurface exploration and geotechnical recommendations for the project. Notice to proceed was provided by the District on 9 August 2022 and our services have been provided in general accordance with our *Confirmation of Scope of Geotechnical Engineering Services and Fee Estimate* letter dated 17 August 2022. We appreciate the opportunity to be of service to you on this project. Please contact us if you have any questions concerning this report or if we may be of further assistance.

Respectfully submitted,
Zipper Geo Associates LLC

State of Washington
Engineering Geologist
1172
Licensed Geologist
DAVID C. WILLIAMS

ROBERT A. ROSS
STATE OF WASHINGTON
38384
REGISTERED
PROFESSIONAL ENGINEER

David C. Williams, LG, LEG — Signed 5.21.25
Principal Engineering Geologist

Robert A. Ross, PE — Signed 5.21.25
Managing Principal

Distribution: Addressee (1 pdf), BHC Consultants (1 pdf)

TABLE OF CONTENTS

GEOTECHNICAL ENGINEERING REPORT
PROPOSED BURN ROAD RESERVOIR
12820 – 150TH STREET NE
ARLINGTON, WASHINGTON

Project No. 2630.01
21 May 2025

INTRODUCTION

This report documents the subsurface conditions encountered at the site and our geotechnical engineering recommendations for the proposed project. The project description, site conditions, and our geotechnical conclusions and design recommendations are presented in the text of this report. Supporting data, including detailed exploration logs and field exploration procedures, as well as results of laboratory testing, are presented as appendices.

Our geotechnical engineering scope of services for the project included a site reconnaissance, subsurface evaluation, laboratory testing, and preparation of draft and final reports. The subsurface evaluation consisted of completing two geotechnical borings (B-1 and B-2) which extended to depths of approximately 20.5 to 30.5 feet, respectively, below existing grade near the proposed reservoir location.

Figure 1, the Site and Exploration Plan, presents the approximate location of our subsurface explorations. Appendix A contains a description of our field procedures and boring logs. Appendix B includes a description of the various laboratory testing procedures and the test results.

PROJECT DESCRIPTION

The proposed project entails the construction of a 3.6-million gallon water reservoir in the northern portion of the 5-acre parcel located at the address referenced above. We understand that the new reservoir will be of welded steel construction, incorporate a circular reinforced concrete foundation, and be 70 feet in diameter and about 135 feet tall. The reservoir is currently planned for construction about 130 feet southeast of an existing garage.

SITE CONDITIONS

The field exploration included a visual reconnaissance of surface conditions and advancing two borings (B-1 and B-2) to depths of approximately 25.5 feet and 30.5 feet, respectfully, on 15 September 2022. The surface and subsurface conditions are described below, while the exploration procedures and interpretive logs of the explorations are presented in Appendix A. Laboratory testing procedures are described in Appendix B, and the results are presented in Appendix B and selectively on the logs in Appendix A. The proposed site improvements and approximate exploration locations are shown on Figure 1, the Site and Exploration Plan.

Surface Conditions

The north portion of the parcel, which may be considered the project site, and adjoining 150th Street NE have somewhat undulating topography with ground surface elevations ranging from about 616 to 582 feet and an overall gentle slope downward from the southwest to the northeast. The site has been partially developed with a three-bay garage serviced by underground power. The site is landscaped with lawn and mature trees. We did not observe standing or flowing surface water on site or evidence of significant surface water erosion during our site visits.

Geologic Conditions

The *Geologic Map of the Lake Stevens Quadrangle, Snohomish County, Washington* (USGS Map MF 1742, 1985) indicates that the site is underlain by Vashon lodgement till, a glacially consolidated soil that will be well-suited for support of the reservoir. The till is also characterized by a relatively low infiltration rate, a characteristic that is not particularly favorable from the stormwater infiltration perspective.

Both borings B-1 and B-2 disclosed glacial till soils below a shallow surficial horizon of loose silty sand with trace gravel, as well as roots that extended to about 6 inches below grade. Weathered glacial till, consisting of medium dense, moist, gravelly silty sand was observed to approximately 5 feet below grade at the boring B-1 location and dense to very dense unweathered till extended to the boring's 20.5-foot termination depth. Boring B-1 disclosed dense to very dense glacial till immediately below the shallow 6-inch deep loose silty sand horizon to the boring's 30.5-foot termination depth.

Groundwater

Groundwater was not observed while advancing borings B-1 and B-2, and soil moisture contents were generally low. However, during the wetter time of year is not uncommon for groundwater to be perched within isolated sandy horizons within glacial till. A perched condition may also develop seasonally at the interface between weathered and unweathered glacial till and at the interface between fill material and underlying less permeable native soils. It should be noted that groundwater conditions and soil moisture contents are expected to vary with seasonal changes in precipitation, site utilization, and other on- and off-site factors. Therefore, groundwater levels during construction or at other times in the life of the facility may vary from the conditions we observed. The probability of seasonal perched water should be considered when developing the design and construction plans for the project.

Summary of Laboratory Testing

Laboratory testing was completed on select soil samples obtained from the borings. Laboratory testing included moisture content and grain size analysis. The results of moisture content testing are presented on the test pit logs. Results of grain size testing are provided in Appendix B.

The moisture content of the native soils ranged from approximately 5 to 12 percent and averaged about 9 percent, a value that we estimate is within about 2 percent of the optimum moisture content as defined by ASTM D 1557 (modified Proctor). The fines content of the two samples of native soils we tested ranged

from about 40 to 41 percent. This high fines (the soil fraction passing the US No. 200 sieve) content indicates that the native soils should be considered moisture-sensitive from the grading perspective.

CONCLUSIONS AND RECOMMENDATIONS

General Considerations

We reviewed draft plans prepared by BHC Consultants dated May 2025 prior to preparation of this final report. In our opinion, the proposed site improvements of constructing the new water reservoir and underground piping, as well as completing limited grading, appear feasible from the geotechnical perspective utilizing conventional ringwall or circular mat foundations. Given the compressive loading that will be imposed by the reservoir and water, we recommend removing the less dense weathered glacial till such that the reservoir bears upon the denser unweathered till, or well-compacted coarse granular structural fill or Controlled Density Fill (CDF) placed above unweathered glacial till. Our conclusions and recommendations are presented below.

Regulated Geologically Hazardous Areas

Chapter 30.62B.140 of the Snohomish County Code (SCC) identifies and regulates areas that are naturally susceptible to geologic events such as landslides, seismic activity, and severe erosion. Based on our review of the Snohomish County Planning and Development Services (PDS) map (https://gismaps.snoco.org) and our site observations, it is our opinion that the site does not meet the criteria for landslide, seismic, or severe erosion hazard areas as defined by the SCC. Consequently, development of the site for purposes of constructing a new water reservoir will not be encumbered with setbacks or buffers related to regulated geologically hazardous areas.

A 33 percent or steeper slope lies approximately 120 feet west of the proposed reservoir construction. However, based on our explorations and observations, the site is underlain by low permeability glacial till to at least 28 feet bgs and therefore, does not meet the criteria for a 30.91L.040 Landslide hazard area.

According to the Snohomish PDS map, no liquefiable soils are in the site's immediate vicinity, a condition confirmed by the glacially consolidated soils disclosed by the borings.

The USDA Soil Survey of Snohomish County states that the site-characteristic Tokul gravelly medial soils at (15 to 25 percent slopes) pose a moderate erosion hazard. The steepest slope segment planned to be graded, which is a bit east of the planned reservoir location, has only about 10 feet of relief and an inclination of about 18 percent; slope gradients are typically much lower.

According to the maps published by the USGS, the Darrington Devil's Fault trace is located more than 20 miles to the north and traces of the Southern Whidbey Island Fault Zone lie about 18 miles to the southwest. Consequently, the risk of ground rupture associated with a design seismic event adversely affecting the site is remote, in our opinion. Provided that design of the proposed reservoir is undertaken

in a manner consistent with applicable sections of applicable codes relative to seismic design, the site does not present particular constraints toward development in comparison to nearby properties.

Seismic Considerations

Based on site location and soil conditions, the values provided below are recommended for seismic design. The values provided below are derived from the USGS US Seismic Design Maps Web Application based on data from the USGS hazard data available in 2008.

IBC Seismic Design Parameters**:** 2021 IBC Seismic Design parameters are summarized in the table below.

Criteria	Factor
2021 International Building Code (IBC) [1] Site Class	C [2]
S_s Spectral Acceleration for a Short Period	1.026g
S_1 Spectral Acceleration for a 1-Second Period	0.366g
F_a Site Coefficient for a Short Period	1.2
F_v Site Coefficient for a 1-Second Period	1.5
S_{MS} Maximum considered spectral response acceleration for a Short Period	1.231g
S_{M1} Maximum considered spectral response acceleration for a 1-Second Period	0.548g
S_{DS} Five-percent damped design spectral response acceleration for a Short Period	0.821g
S_{D1} Five-percent damped design spectral response acceleration for a 1-Second Period	0.366g

1. In general accordance with ASCE 7-16
2. The 2021 International Building Code, and by reference ASCE 7-16, considers a site soil profile determination extending a depth of 100 feet for seismic site classification. The current authorized scope did not include the required 100-foot soil profile determination. The borings advanced as part of our evaluation extended to a maximum depth of approximately 31-1/2 feet and this seismic site class definition considers that dense to very dense soils as noted on the published geologic mapping exist below the maximum depth of the subsurface exploration. Additional exploration to greater depths could be considered to confirm the conditions below the current depth of exploration, if necessary.

Site Preparation

Erosion Control Measures: Preparation for site grading and construction should begin with procedures intended to drain any ponded water that may be present and to control surface water runoff. Attempting to grade the site without adequate drainage control measures will reduce the amount of on-site soil effectively available for use as structural fill for utility trenches or backfilling around the reservoir

foundation, increase the amount of select import fill material required, and ultimately increase the cost of the earthwork and foundation construction phases of the project.

The glacial till soils have a relatively low permeability which presents the potential for standing water to develop. The particular locations of surface water management features would best be determined during construction. We recommend that the contractor anticipate the need for surface water control during the wetter times of the year.

Temporary Drainage: Stripping, excavation, grading, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and provide proper control of erosion. The site soils have a high fines (soil particles finer than the US No. 200 sieve) content and are highly susceptible to disturbance and erosion when wet. The site should be graded to prevent water from ponding in construction areas and/or flowing into and/or over excavations. Exposed grades should be crowned, sloped, and smooth-drum rolled at the end of each day to facilitate drainage if inclement weather is forecasted. Accumulated water must be removed from subgrades and work areas immediately and prior to performing further work in the area. Equipment access may be limited and the amount of soil rendered unfit for use as structural fill may be greatly increased if drainage efforts are not accomplished in a timely manner. Successful drainage of saturated zones due to accumulations of surface water would be relatively slow due to the fines content of the soils. Instead, aeration, chemical treatment, or removal and replacement may be necessary.

Weathered Till Removal: Considering that the ground surface elevation of the proposed reservoir is about elevation 600 feet, and based upon conditions observed at the locations of borings B-1 and B-2, we anticipate that site preparation will require excavating approximately 4 to 5 feet (approximately elevation 595 to 596 feet) in order to remove the weathered glacial till from below the foundation and floor. Please note that the actual required excavation depth to reach the dense to very dense glacial till may vary from the depth range mentioned here depending upon variation in subsurface conditions. We recommend that the excavation be carried down to a consistent elevation below the reservoir footprint in order to have consistent bearing conditions.

Subgrade Protection:
The glacial till will be susceptible to disturbance by equipment travel and foot traffic, presenting the potential for accumulations of loose soil to develop, particularly under wet weather or wet site conditions. Therefore, we recommend protecting the glacial till subgrade once the foundation excavation is completed. We recommend placing a minimum three (3) inch thickness of CDF with a compressive strength of 200 psi or crushed surfacing base course compacted with a large self-propelled vibratory compactor to protect the subgrade.

Freezing Conditions: If earthwork takes place during freezing conditions, all exposed subgrades should be allowed to thaw and then be compacted prior to placing subsequent lifts of structural fill. Alternatively, the frozen material could be stripped from the subgrade to expose unfrozen soil prior to placing

subsequent lifts of fill or foundation components. The frozen soil should not be reused as structural fill until allowed to thaw and adjusted to the proper moisture content, which may not be possible during the typical wetter months of late fall to mid to late spring.

Structural Fill Materials and Placement

All fill material placed as backfill around the reservoir foundation or in backfilled utility trenches should be placed in accordance with the recommendations herein for structural fill. Prior to the placement of structural fill, all surfaces to receive fill should be prepared as previously recommended in the Site Preparation section of this report. Structural fill subgrades should consist of non-organic soil surfaces that are firm and non-yielding. All structural fill should be free of organic material, debris, or other deleterious material. Individual particle size should generally be less than six (6) inches in diameter

Laboratory Testing: Representative samples of on-site and imported soils to be used as structural fill should be submitted for laboratory testing at least four days in advance of its intended use in order to complete the necessary Proctor tests.

Structural fill should be placed in lifts no greater than ten (10) inches in loose thickness and each lift should be mechanically compacted to at least 95 percent of the modified Proctor maximum dry density as determined by the ASTM D 1557 test procedure. We recommend that a ZGA representative be present during grading so that an adequate number of density tests may be conducted as structural fill placement occurs. In this way, the adequacy of the earthwork may be evaluated as it proceeds. In the case of utility trench filling in municipal rights-of-way, the backfill should be placed and compacted in accordance with current Snohomish County codes and standards. Our recommendations for soil compaction as a function of location are summarized below.

RECOMMENDED SOIL COMPACTION LEVELS	
Location	**Minimum Percent Compaction***
General fill embankments and on-site utility trenches outside the reservoir foundation	95
All backfilled trenches below the reservoir	95
Upper one (1) foot below permanent vehicle access areas	95
Trench backfill in public rights-of-way	95
* *ASTM D 1557 Modified Proctor Maximum Dry Density*	

The suitability of soils for structural fill use depends primarily on the gradation and moisture content of the soil when it is placed. As the amount of fines (that soil fraction passing the U.S. No. 200 sieve) increases, soil becomes increasingly sensitive to small changes in moisture content and adequate compaction becomes more difficult, or impossible, to achieve. Generally, soils containing more than about five (5) percent fines by weight (based on that soil fraction passing the U.S. No. 4 sieve) cannot be

compacted to a firm, non-yielding condition when the moisture content is more than a few percent from optimum. The optimum moisture content is that which yields the greatest soil density under a given compactive effort.

At the time of the subsurface evaluation, the shallow glacial till soil likely within the depth range of construction phase excavations had moisture contents that we interpreted to be within about 2 percent of the anticipated optimum moisture content relative to the till's possible use as structural fill. However, soil moisture conditions should be expected to change throughout the year. Soils with a fines content (that soil fraction passing the U.S. No. 200 sieve) greater than about five (5) percent will be sensitive to changes in moisture content relative to their use as structural fill. Selective drying of over-optimum moisture soils may be achieved by scarifying or windrowing surficial materials during dry weather. Soils that are dry of optimum may be moistened through the application of water and thorough blending to facilitate a uniform moisture distribution prior to compaction.

Re-use of Site Soils as Structural Fill: It is our opinion that the native glacial till will be adequate for use as structural fill borrow for general applications outside the reservoir's footprint, provided that the moisture content be adequately maintained. The till has a relatively high fines content, and it will not be feasible to use this material as structural fill during wet weather or wet site conditions.

Imported Structural Fill: In the event that inclement weather or wet site conditions prevent the use of on-site soil or non-select material as structural fill, we recommend that a "clean," free-draining pit-run sand and gravel or crushed rock be used. Such materials should generally contain less than five (5) percent fines, based on that soil fraction passing the ¾-inch sieve, and not contain discrete particles greater than 3 inches in diameter. CDF would be a feasible alternative to compacted structural fill and is most commonly used to backfill confined areas such as utility trenches. It should be noted that the placement of structural fill is, in many cases, weather-dependent. Delays due to inclement weather are common, even when using select granular fill. We recommend that the site grading and subsurface utility work be scheduled for the drier months, if at all possible.

We recommend limiting structural fill placed below the reservoir footprint to material meeting the criteria for crushed surfacing, base course gradation, as described in WSDOT Specification 9-03.9(3). We do not recommend using on-site soils or imported bank run sand and gravel as fill below the reservoir. As described subsequently in the Reservoir Foundation Recommendations section, CDF may be used as fill below the reservoir as an alternative to crushed surfacing base course.

Soil Stockpiling: If soils are stockpiled on site, and wet weather is anticipated, the stockpile should be protected with plastic sheeting that is securely anchored. If on-site soils become unusable, it may become necessary to import clean, granular soils to complete wet weather site work.

Utility Trenching and Backfilling

We recommend that utility trenching conform to all applicable federal, state, and local regulations, such as OSHA and WISHA, for open excavations. Trench excavation safety guidelines are presented in WAC Chapter 296-155 and WISHA RCW Chapter 49.17. In order to maintain the function of any existing utilities, we recommend that temporary excavations not encroach upon the bearing splay of existing utilities. Likewise, utility excavations should not encroach upon the bearing splay of footings or floor slabs. The bearing splay of structures and utilities should be considered to begin about three (3) feet away from the widest point of the pipe or foundation and extend downward at a 1H:1V slope. If, due to space constraints, an open excavation cannot be completed without encroaching on a utility, we recommend shoring the new utility excavation with a slip box or other suitable means that provide for protection of workers and that maintain excavation sidewall integrity to the depth of the excavation.

Utility Subgrade Preparation: We recommend that all utility subgrades be firm and unyielding and free of all soils that are loose, disturbed, or pumping. Such soils should be removed and replaced with compacted structural fill or crushed rock foundation material.

Trench Backfill: After a firm subgrade has been established, we recommend that a minimum of three (3) inches of bedding material be placed in the trench bottom. Under dry trench conditions, pipe bedding material should conform to Section 9-03.12 (3) of the WSDOT Standard Specifications. Under wet trench conditions, the fines content of the bedding should not exceed five (5) percent based on that fraction passing the U.S. No. 4 sieve. We further recommend that all bedding material extend at least four (4) inches above utilities that require protection during subsequent trench backfilling.

All trenches should be wide enough to allow for compaction around the haunches of the pipe. Otherwise, materials such as clean 5/8-inch crushed rock or pea gravel could be used to eliminate the required compaction around the pipe, with the exception of trenches that are located below the reservoir foundation. We recommend compacting all bedding below, around, and above piping located below the reservoir foundation to at least 95 percent of the modified Proctor maximum dry density.

Backfilling the remainder of the trenches could be completed with on-site soils if they can be compacted to the minimum levels recommended in Table 1. Wet soils excavated from the trenches could only be used as backfill by reducing the moisture content to within a few percent of optimum.

Temporary and Permanent Slopes

Temporary excavation slope stability is a function of many factors, including:

- The presence and abundance of groundwater;
- The type and density of the various soil strata;
- The depth of cut;

- Surcharge loadings adjacent to the excavation; and

- The length of time the excavation remains open.

As the cut is deepened, or as the length of time an excavation is open, the likelihood of bank failure increases; therefore, maintenance of safe slopes and worker safety should remain the responsibility of the contractor, who is present at the site, able to observe changes in the soil conditions, and monitor the performance of the excavation.

It is exceedingly difficult under the variable circumstances to pre-establish a safe and "maintenance-free" temporary cut slope angle. Therefore, it should be the responsibility of the contractor to maintain safe temporary slope configurations since the contractor is continuously at the job site, able to observe the nature and condition of the cut slopes, and able to monitor the subsurface materials and groundwater conditions encountered. It may be necessary to drape temporary slopes with plastic or to otherwise protect the slopes from the elements and minimize sloughing and erosion. We do not recommend vertical slopes or cuts deeper than four (4) feet if worker access is necessary. The cuts should be adequately sloped or supported to prevent injury to personnel from local sloughing and spalling. The excavation should conform to applicable Federal, State, and Local regulations.

Based upon our review of WAC 296-155-650 -155, Part N *Excavation, Trenching, and Shoring*, we have interpreted that the existing shallow weathered till soils meet the Type C definition. The dense to very dense glacial till meets the Type A classification. The contractor should be prepared to adequately shore or slope all excavations.

Reservoir Foundation Recommendations

When our initial draft report was prepared in late 2022, we indicated our understanding that the new reservoir will be of welded steel construction and employ either a ringwall foundation or concrete slab foundation. The load imposed by the water alone was expected to be approximately 8,000 pounds per square foot (psf). The current draft plans indicate that the reservoir will employ a circular reinforced concrete mat foundation and that the loading resultant from the water under full-height conditions will be about 8,455 psf; these conditions are consistent with the originals considered when we prepared our initial draft report. Our original foundation design recommendations, which follow below, are appropriate for the reservoir conditions described in the draft May 2025 plans provided for our review.

In our opinion, the undisturbed native, dense to very dense unweathered glacial till is adequate for support of the reservoir. As described previously, we recommend constructing the foundation such that it bears upon the undisturbed, at least dense, native unweathered glacial till, or CDF with a minimum of 200 psi compressive strength or imported crushed rock structural fill compacted with a large self-propelled vibratory compactor to at least 95 percent density per ASTM D 1557. The CDF or structural fill should be placed above undisturbed dense to very dense glacial till.

Ringwall Foundation Allowable Bearing Pressure: The ringwall foundation allowable bearing pressure used for design will vary depending upon the foundation bearing width and depth below the adjacent exterior grade. We recommend considering the maximum allowable bearing pressures described in the table below for the ringwall foundation alternative. A one-third increase of these bearing pressures may be used for short-term wind or seismic loading. We can provide additional recommendations for foundation configurations not listed in the table below if necessary.

Reservoir Foundation Recommendations		
Perimeter Foundation Width (feet)	**Foundation Subgrade Depth (feet)**	**Allowable Bearing Capacity (lbs/ft^2)**
3	5	10,000
4	5	12,000
5	5	13,000
3	4	9,000
4	4	10,000
5	4	11,000

Circular Slab Mat Foundation Recommendations: We recommend considering an allowable bearing pressure of 18,000 lbs/ft^2 for a circular mat foundation. This assumes a foundation slab depth of about 5 feet (expected depth to dense to very dense glacial till) and this value incorporates a factor of safety of about 2.

Lateral Resistance: We recommend using an allowable base friction value of 0.35; a factor of safety of approximately 1.5 has been applied to this value. We recommend considering a maximum allowable passive resistance (triangular distribution) of 250 pcf. This value incorporates a factor of safety of approximately 2 and assumes that the backfill placed around the foundation has been compacted to at least 95 percent of the maximum dry density. The uppermost 18 inches of foundation embedment should be neglected when calculating passive resistance.

Estimated Settlement: We estimate that total settlement of either reservoir foundation alternative will be less than one inch provided that the foundation and floor are supported by either the undisturbed native dense to very dense unweathered glacial till, or CDF or compacted crushed surfacing base course fill placed above the dense to very dense till as described previously. Foundation settlement will occur elastically as the loads are applied. We estimate that differential settlement may approach half of the total settlement.

Foundation Subgrade Protection: Under no circumstances should the reservoir foundation or floor be cast atop loose or soft soils, slough, debris, or surfaces bearing standing water. We recommend that a ZGA representative observe the condition of the foundation subgrade prior to placement of the protective

CDF recommended previously in order to verify that the bearing soils are undisturbed and that conditions are consistent with the recommendations contained within this report.

Reservoir Floor Subgrade Preparation Recommendations

Our previous recommendations regarding removal of loose to medium dense soils down to at least dense unweathered glacial till below the reservoir footprint are applicable to preparation of the reservoir floor subgrade for the ringwall foundation alternative. We recommend supporting the floor on either CDF with a 200 psi compressive strength or crushed surfacing base course compacted to at least 95 percent density per ASTM D 1557.

Stormwater Drainage Considerations

Our authorized scope of services did not include a detailed evaluation of the geotechnical feasibility of stormwater infiltration. As previously described, the explorations completed for this evaluation disclosed weathered and unweathered glacial till soils with a high fines content. Based on these conditions we anticipate that a shallow perched groundwater condition may develop during the wetter time of year. Stormwater infiltration into unweathered glacial till is typically not considered feasible because of the soil's low permeability, although infiltration into the less dense weathered horizon, albeit at low rates, is feasible in some situations. However, the probable lack of 3 to 5 feet of vertical separation between a typical infiltration feature and a likely seasonal perched groundwater condition would appear to preclude conventional infiltration per the conditions described in the *Snohomish County Drainage Manual*. Consequently, it would appear that stormwater dispersion above a vegetated flow path would be a more viable alternative from the geotechnical perspective.

The draft plans available for our review indicate that our original recommendations for final site grades sloping away from the new reservoir and other drainage-sensitive areas have been incorporated into the design. Most of the stormwater originating from impervious surfaces described will be conveyed to a dispersion trench feature to be constructed on the south side of the reservoir. The trench is at least 90 feet away from the nearest slope, and this slope has an inclination of only 13 percent. The flow path between the trench and the slope is well-vegetated, and the conditions are consistent with those suitable for dispersion as described in the *Snohomish County Drainage Manual*.

Erosion Control

We recommend that the project employ the following construction phase erosion control elements:

- Clear identification of clearing limits;
- Protecting exposed soil surfaces that will be subject to vehicle traffic with crushed rock, crushed recycled concrete, or pit run sand and gravel;
- Covering soil stockpiles with anchored plastic sheeting;

- Protecting graded surfaces outside the reservoir footprint with straw if they are exposed for more than two days during wet weather;

- Installing a siltation control fence or anchored straw or coir wattle on the downslope side of the are disturbed during construction.

We recommend that final erosion control measures include seeding exposed soil surface with a County-approved grass seed mix. The use of straw mulch above the seed will help to reduce erosion until the grass becomes established and may also speed germination.

General Comments

ZGA should be retained to review the final design plans and specifications so comments can be made regarding the interpretation and implementation of our geotechnical recommendations in the design and specifications. ZGA also should be retained to provide observation and testing services during grading, excavation, foundation constructions, and other earth-related construction phases of the project.

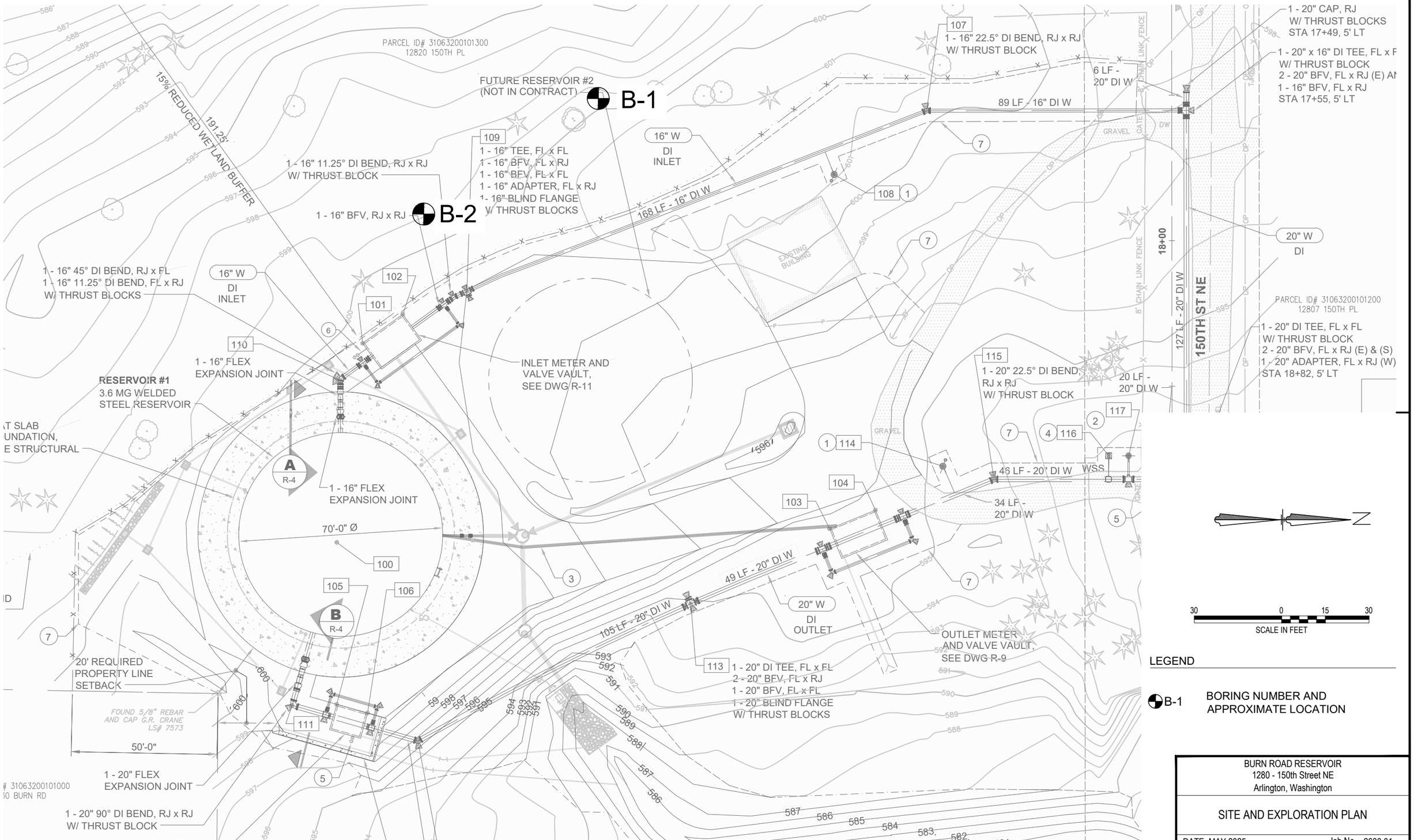
The analysis and recommendations presented in this report are based upon the data obtained from the explorations performed at the indicated locations and from other information discussed in this report. This report does not reflect potential variation in subsurface conditions across the site or due to the modifying effects of weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials, or conditions. If the District is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of the District for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless ZGA reviews the changes and either verifies or modifies the conclusions of this report in writing.

CLOSURE

We appreciate the opportunity to be of service to you and would be pleased to discuss the contents of this report or other aspects of the project with you at your convenience.



LEGEND

B-1 BORING NUMBER AND APPROXIMATE LOCATION

REFERENCE: BURN ROAD RESERVOIR, RESERVOIR SITE WATER PLAN, SNOHOMISH COUNTY PUD, SHEET 8, DATED MAY 2025.

BURN ROAD RESERVOIR
1280 - 150th Street NE
Arlington, Washington

SITE AND EXPLORATION PLAN

DATE: MAY 2025 Job No. 2630.01

Zipper Geo Associates, LLC
19019 36th Ave. W.,Suite E
Lynnwood, WA

FIGURE 1
SHT.1 of 1

APPENDIX A
FIELD EXPLORATION PROCEDURES AND LOGS

FIELD EXPLORATION PROCEDURES AND LOGS

Our field exploration program for this project included completing a visual reconnaissance of the site and advancing two borings (B-1 and B-2). The approximate exploration locations are presented on Figure 1, the Site and Exploration Plan. Exploration locations were determined in the field using steel and fiberglass tapes by measuring distances from existing site features shown on the *Existing Conditions Topographical Survey*, Sheet 2 of 4, dated 15 September 2022, prepared by David Evans and Associates, Inc. The ground surface elevation at each exploration location was interpolated from the referenced plan. As such, the exploration locations and elevations should be considered accurate to the degree implied by the measurement methods. The following sections describe our procedures associated with the explorations. Descriptive logs of the explorations are enclosed in this appendix.

Boring Procedures

The borings were advanced using a track-mounted drill rig operated by an independent drilling company (Boretec1) working under subcontract to ZGA. The borings were advanced using hollow stem auger drilling methods. An engineering geologist from our firm continuously observed the borings, logged the subsurface conditions encountered, and obtained representative soil samples. All samples were stored in moisture-tight containers and transported to our laboratory for further evaluation and testing. Samples were generally obtained by means of the Standard Penetration Test at 2.5-foot to 5-foot intervals throughout the drilling operation.

The Standard Penetration Test (ASTM D 1586) procedure consists of driving a standard 2-inch outside diameter steel split spoon sampler 18 inches into the soil with a 140-pound hammer free falling 30 inches. The number of blows required to drive the sampler through each 6-inch interval is recorded, and the total number of blows struck during the final 12 inches is recorded as the Standard Penetration Resistance, or "blow count" (N value). If a total of 50 blows are struck within any 6-inch interval, the driving is stopped and the blow count is recorded as 50 blows for the actual penetration distance. The resulting Standard Penetration Resistance values indicate the relative density of granular soils and the relative consistency of cohesive soils.

The enclosed boring logs describe the vertical sequence of soils and materials encountered in each boring, based primarily upon our field classifications. Where a soil contact was observed to be gradational, our logs indicate the average contact depth. Where a soil type changed between sample intervals, we inferred the contact depth. Our logs also graphically indicate the blow count, sample type, sample number, and approximate depth of each soil sample obtained from the boring. If groundwater was encountered in a borehole, the approximate groundwater depth and date of observation are depicted on the log.

Boring Location:	See Figure 1, Site and Exploration Plan	Drilling Company:	Boretec 1	Bore Hole Dia.:	8-inch
Top Elevation:	Apprroximately 599 feet	Drilling Method:	Hollow Stem Auger	Hammer Type:	Cathead
Date Drilled:	9/15/2022	Drill Rig:	EC 95 Track Drill	Logged by:	BGF

B-1

Depth (ft)	SOIL DESCRIPTION	Sample Number	SAMPLES Recovery (In.)	Groundwater	PENETRATION RESISTANCE (blows/foot)	Blow Counts	Testing
	The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.				▲ Standard Penetration Test; △ Hammer Weight and Drop: ____ (0, 20, 40, 60)		
0	1 - 2 inches of well manicured grass over loose, moist, brown, silty SAND, some fine roots, trace gravel	S-1A	18			7	
	Dense, moist, light brown, gravelly silty SAND/gravelly sandy SILT (Glacial Till)	S-1	18			41	MC
5		S-2	18			34	GSA
	Grades to very dense	S-3	18			74	MC
10		S-4	18			50-5"	MC
	Hard drilling						
15	Very dense, moist, gray, silty SAND, some gravel (Glacial Till)	S-5	6			50-5"	MC
20		S-6	6			50-4"	MC
	Very hard drilling						
25							

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit ⊣○⊢ Liquid Limit

Natural Water Content

Burn Road 276 Reservoir
12820 150th Street NE
Arlington, WA

Date: October 2022 Project No.: 2630.01

ZipperGeo
Geoprofessional Consultants
19019 36th Ave. W, Suite E
Lynnwood, WA

BORING LOG: B-1

Boring Location:	See Figure 1, Site and Exploration Plan	Drilling Company:	Boretec 1	Bore Hole Dia.:	8-inch
Top Elevation:	Apprroximately 599 feet	Drilling Method:	Hollow Stem Auger	Hammer Type:	Cathead
Date Drilled:	9/15/2022	Drill Rig:	EC 95 Track Drill	Logged by:	BGF

B-1

Depth (ft)	SOIL DESCRIPTION	Sample Number / SAMPLES / Recovery (In.)	Groundwater	PENETRATION RESISTANCE (blows/foot)	Blow Counts	Testing
	The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.			▲ Standard Penetration Test △ Hammer Weight and Drop:		
25	Very dense, moist, gray, silty SAND, trace gravel	S-7 6		0 20 40 60	50-4"	
	Boring completed at approximately 25.5 feet. Groundwater was not encountered ATD.					
30						
35						
40						
45						
50						

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

- ◇ % Fines (<0.075 mm)
- ○ % Water (Moisture) Content
- Plastic Limit — ○ — Liquid Limit
- Natural Water Content

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

Burn Road 276 Reservoir
12820 150th Street NE
Arlington, WA

Date: October 2022 Project No.: 2630.01

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Geoprofessional Consultants
19019 36th Ave. W, Suite E
Lynnwood, WA

BORING LOG: B-1

Boring Location:	See Figure 1, Site and Exploration Plan	Drilling Company:	Boretec 1	Bore Hole Dia.:	8-inch
Top Elevation:	Apprroximately 599 feet	Drilling Method:	Hollow Stem Auger	Hammer Type:	Cathead
Date Drilled:	9/15/2022	Drill Rig:	EC 95 Track Drill	Logged by:	BGF

B-2

Depth (ft)	SOIL DESCRIPTION	Sample Number	SAMPLES Recovery (In.)	Groundwater	PENETRATION RESISTANCE (blows/foot)	Blow Counts	Testing
	The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.				▲ Standard Penetration Test; △ Hammer Weight and Drop: ____ (0 – 20 – 40 – 60)		
0	1 - 2 inches of well manicured grass over loose, moist, brown, silty SAND, some fine roots, trace gravel	S-1A	18			7	
	Medium dense, moist, brown, gravelly silty SAND (Weathered Glacial Till)	S-1	18			28	GSA
5	Dense, moist, light brown, silty SAND, with gravel (Glacial Till)	S-2	18			32	MC
	Grades to very dense	S-3	10			50-3"	MC
10	Grades to light brown to gray	S-4	10			50-4"	MC
	Very hard drilling						
15	Very dense, moist, gray, silty SAND, trace gravel (Glacial Till)	S-5	6			50-5"	MC
20		S-6	6			50-5"	MC
	Boring completed at approximately 20.5 feet. Groundwater was not encountered ATD.						
25							

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

- ◇ % Fines (<0.075 mm)
- ○ % Water (Moisture) Content
- Plastic Limit ⊣○⊢ Liquid Limit
- Natural Water Content

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

Burn Road 276 Reservoir
12820 150th Street NE
Arlington, WA

Date: October 2022 Project No.: 2630.01

ZipperGeo
Geoprofessional Consultants
19019 36th Ave. W, Suite E
Lynnwood, WA

BORING LOG: B-2

APPENDIX B
LABORATORY TESTING PROCEDURES AND RESULTS

LABORATORY PROCEDURES AND RESULTS

A series of laboratory tests were performed during the course of this study to evaluate the index and geotechnical engineering properties of the subsurface soils. Descriptions of the types of tests performed are given below.

Visual Classification

Samples recovered from the exploration locations were visually classified in the field during the exploration program. Representative portions of the samples were carefully packaged in moisture tight containers and transported to our laboratory where the field classifications were verified or modified as required. Visual classification was generally done in accordance with ASTM D 2488. Visual soil classification includes evaluation of color, relative moisture content, soil type based upon grain size, and accessory soil types included in the sample. Soil classifications are presented on the exploration logs in Appendix A.

Moisture Content Determinations

Moisture content determinations were performed on representative samples obtained from the explorations in order to aid in identification and correlation of soil types. The determinations were made in general accordance with the test procedures described in ASTM D 2216. The results are shown on the exploration logs in Appendix A.

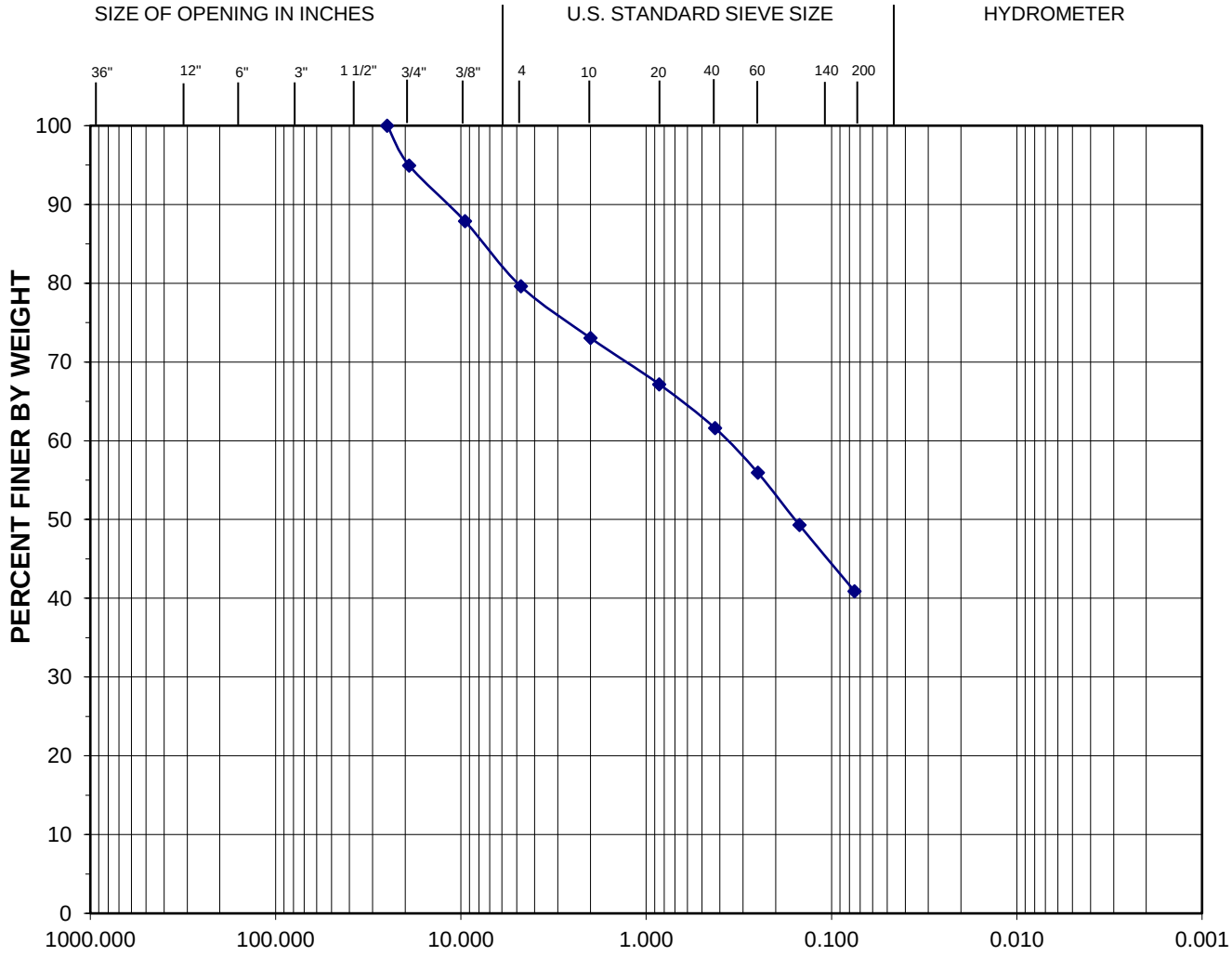
Grain Size Analysis

A grain size analysis indicates the range in diameter of soil particles included in a particular sample. Grain size analyses were performed on representative samples in general accordance with ASTM D 6913. The results of the grain size determinations for the samples were used in classification of the soils, and are presented in this appendix.

GRAIN SIZE ANALYSIS

Test Results Summary

ASTM D6913



		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
BOULDERS	COBBLES	GRAVEL		SAND			FINE GRAINED	

Comments:

Exploration	Sample	Depth (feet)	Moisture (%)	Fines (%)	Description
B-1	S-2	5	9.2	40.9	Gravelly sandy SILT

Zipper Geo Associates, LLC Geotechnical and Environmental Consultants	PROJECT NO: 2630.01 DATE OF TESTING: 9/26/2022	PROJECT NAME: Burn Road 726 Resevoir

Boring Location:	See Figure 1, Site and Exploration Plan	Drilling Company:	Boretec 1	Bore Hole Dia.:	8-inch
Top Elevation:	Apprroximately 598 feet	Drilling Method:	Hollow Stem Auger	Hammer Type:	Cathead
Date Drilled:	9/15/2022	Drill Rig:	EC 95 Track Drill	Logged by:	BGF

B-2

Depth (ft)	SOIL DESCRIPTION	Sample Number	SAMPLES Recovery (In.)	Groundwater	PENETRATION RESISTANCE (blows/foot)	Blow Counts	Testing
	The stratification lines represent the approximate boundaries between soil types. The transition may be gradual. Refer to report text and appendices for additional information.				▲ Standard Penetration Test; △ Hammer Weight and Drop: ____ (0, 20, 40, 60)		
0	1 - 2 inches of well manicured grass over loose, moist, brown, silty SAND, some fine roots, trace gravel	S-1A	18			7	
	Medium dense, moist, brown, gravelly silty SAND (Weathered Glacial Till)	S-1	18			28	GSA
5	Dense, moist, light brown, silty SAND, with gravel (Glacial Till)	S-2	18			32	MC
	Grades to very dense	S-3	10			50-3"	MC
10	Grades to light brown to gray	S-4	10			50-4"	MC
	Very hard drilling						
15	Very dense, moist, gray, silty SAND, trace gravel (Glacial Till)	S-5	6			50-5"	MC
20		S-6	6			50-5"	MC
	Boring completed at approximately 20.5 feet. Groundwater was not encountered ATD.						
25							

SAMPLE LEGEND

- 2-inch O.D. split spoon sample
- 3-inch I.D. Shelby tube sample

GROUNDWATER LEGEND

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing
- Groundwater level at time of drilling (ATD) or on date of measurement. 11/2/12

◇ % Fines (<0.075 mm)

○ % Water (Moisture) Content

Plastic Limit ⊣○⊢ Liquid Limit

Natural Water Content

TESTING KEY

GSA = Grain Size Analysis

200W = 200 Wash Analysis

Consol. = Consolidation Test

Att. = Atterberg Limits

Burn Road 276 Reservoir
12820 150th Street NE
Arlington, WA

Date: October 2022 Project No.: 2630.01

ZipperGeo
Geoprofessional Consultants
19019 36th Ave. W, Suite E
Lynnwood, WA

BORING LOG: B-2

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APPENDIX C

CRITICAL AREA REPORT

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CRITICAL AREA
TECHNICAL MEMORANDUM

FOR

BURN ROAD RESERVOIR
12820 150TH STREET NE
SNOHOMISH, WA

Wetland Resources, Inc. Project #22229

Prepared By
Wetland Resources, Inc.
9505 19th Avenue SE, Suite 106
Everett, WA 98208
(425) 337-3174

Prepared For
PUD No. 1 of Snohomish County
Attn: Max Selin
PO Box 1102, MS O2
Everett, Washington 98206-1107

July 29, 2023

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APPENDICES

1.0 INTRODUCTION

Wetland Resources, Inc. (*WRI*) conducted a site visit on August 31, 2022 to determine critical areas on and within the vicinity of the project area located at 12820 1505th Street NE. The 5.3 acre subject parcel (Parcel #31063200101300) is located to the east of Burn Rd south of Arlington, within unincorporated Snohomish County. Wetland resources also observed off-site features within an approximate 500 foot radius from the proposed project

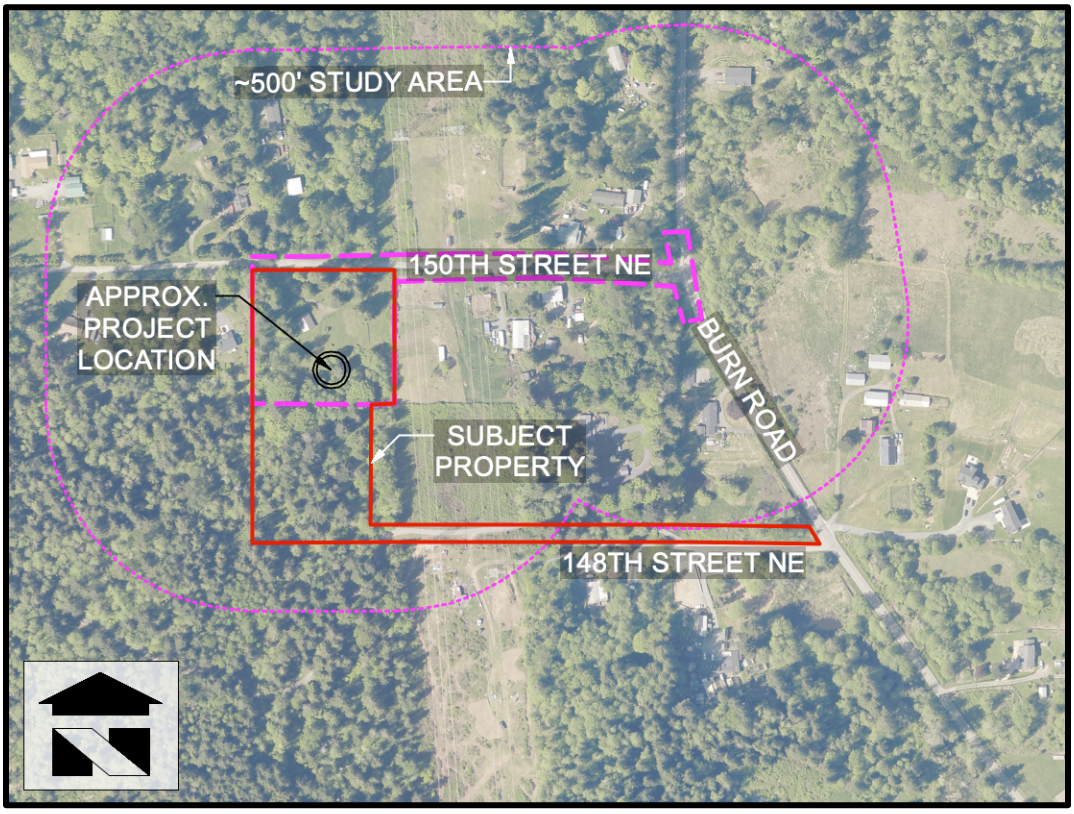


Figure 1 – Aerial View of the Subject Property. Not to scale.

1.1 SITE DESCRIPTION

The study area is limited to Snohomish County parcel 31063200101300 and the right of way east of the property along 150th Street NE, and within the right of way of a portion of Burn Road. The subject parcel is currently developed with a 1-story structure within the northern portion and is surrounded by maintained lawn. The southern portion of the subject parcel consists of a dense native forest dominated by a canopy of western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), red alder (*Alnus rubra*), and black cottonwood (*Populus balsamifera*), with an understory of salmonberry (*Rubus spectabilis*), red huckleberry (*Vaccinium parvifolium*), vine maple (*Acer circinatum*), sword fern (*Polystichum munitum*), dull Oregon grape (*Mahonia nervosa*), salal (*Gaultheria shallon*), and pacific trailing blackberry (*Rubus ursinus*).

Critical Area Name	HGM Rating Class	Functions Score	Habitat Score	Critical Area Classification	Buffer
Wetland A	Depressional	21	High (8)	II	225’
Wetland B	Depressional	22	Moderate (7)	II	110’
Wetland C	Depressional	23	High(9)	I	225’
Wetland D	Depressional	21	Moderate (7)	II	110’
Stream A	Riverine	N/A	N/A	Ns	50’
Stream B	Riverine	N/A	N/A	Ns	50’

Four wetlands (Wetlands A-D) and two streams were identified within 500 feet of the approximate project location. Per Snohomish County Code (SCC) 30.62A.230 wetlands were evaluated under the Washington State Wetland Rating System for Western Washington (Hruby 2014) and streams were classified per the Washington Administrative Code (WAC 222-16-030). Wetland and stream buffers are determined per SCC 30.62A.320(1)(a).

2.0 CRITICAL AREAS DELINEATION REPORT

2.1 WETLANDS AND FWHCAS

The proposed project occurs in the vicinity of a fish and wildlife habitat conservation area (FWHCA), and its associated buffer. SCC 30.62A.140 requires that applicants submit a critical area report for all development activities or actions that require a permit that contain or are affected by a critical area or buffer. This report meets the minimum requirements for critical area reports as defined in SCC 30.62A.140(1)-(13).

2.2 LIMIT OF STUDY

The proposed project occurs within the northern portion of Snohomish County parcel 31063200101300 and along 150th Street NE. Lack of legal access beyond the right of way prevents Wetland Resources, Inc. (WRI) staff from performing routine wetland and stream determinations in surrounding areas. Wetland and stream boundaries depicted outside of the subject parcels are based on visual observation from the edge of legal access, publicly available resources, fine-scale elevation contours, and using best professional judgment.

2.3 RELEVANT CRITICAL AREA SITE PLANS (CASP)

Wetlands B-D as well as Streams A and B are located off-site; therefore, WRI could not conduct a routine investigation. Due to lack of legal access the shape, location, and buffer for off-site features will be consistant with previously recorded Critical Area Site Plans (CASPs).

Table 1 CASP summary table. Location of referenced CASPs shown below in figure 2

Ref. No.	CASP No.	Tax ID	Year Recorded	Significance
1	200411300697	31063200101400	2004	This CASP is adjacent to the subject property to the west. Wetland A is shown expanding from 150th Street NE to the south beyond the limit of study with a buffer of approximately 50 feet. The boundary of Wetland A is consistent with this CASP, however its buffer has been updated to current regulations.
2	9607310539	32310610070000	1996	This CASP is located northwest of the intersection of Burn Road and 150th Street NE. Wetland B is depicted as having a different shape than what was determined by WRI.
3	201909050184	31063300301800, 31063300300400	2019	This CASP is located south of the project area, south of the intersection of Burn Road and 148th Street NE. One wetland (Wetland D) and one stream (Stream B) are depicted. None of the buffers projected from these features land within the vicinity of the project area.
4	201606010661	31063300202100	2016	This CASP is located across Burn Road to the southeast of the project area. Two wetlands are shown on site however none of the 110 foot buffers project within the vicinity of the project area.

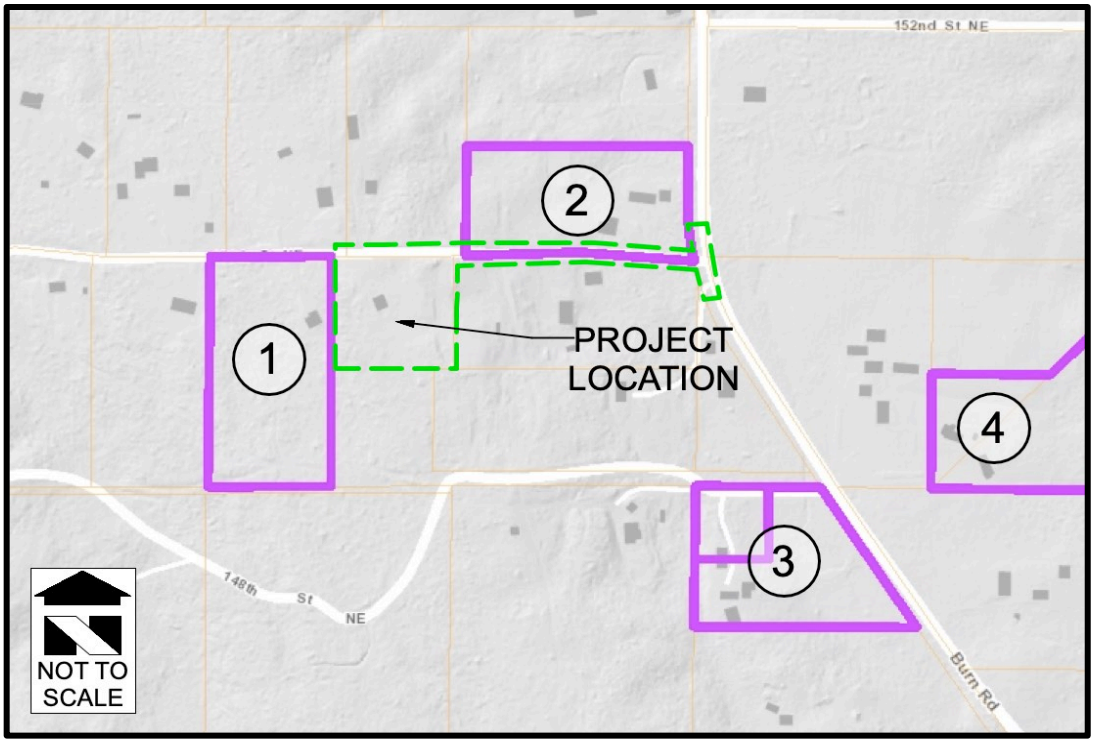


Figure 2 Locations of referenced CASPs within vicinity of proposed project area.

2.4 REVIEW OF EXISTING INFORMATION

Prior to conducting the site investigation, public resource information was reviewed to gather background information on the subject property and the surrounding area in regards to wetlands, streams, and other critical areas. These sources included the following:

- USDA/Natural Resources Conservation Service (NRCS) Web Soil Survey: The Web Soil Survey indicates that the subject property is underlain by Tokul gravelly medial loam, 0 to 8 percent slopes (72) within the majority of the property. A small portion of the northwestern property corner is mapped as the same soil unit with 8-15 percent slopes (73). A small portion of the northeast corner of the property and the center of the panhandle is mapped as the same unit with 15-30 percent slopes (74). Tokul is not listed as a hydric soil.
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory: The NWI maps a riverine (R4SBC) feature crossing the eastern portion of the property's panhandle near the intersection of Burn Road and 148th Street. This feature originates approximately 600 feet to the north, flows under Burn Road, then across the panhandle under 148th Street before draining into a ponded feature (PUBHh) approximately 120feet south of 148th Street. The stream continues south adjacent to Burn Road before ultimately draining into the South Fork Stillaguamish River approximately 3.5 miles downstream from the subject property. The next closest feature is a tributary to Little Pilchuck Creek flowing northwest to southeast, approximately 1,000 feet to the southwest of the property corner at its closest point.
- Washington Department of Natural Resources (WA DNR) Forest Practices Application Mapping Tool: This resource documents the same features depicted by NWI. The stream that

flows across the panhandle is mapped as a non-fish bearing stream. There is a mapped fish-passage break approximately 1,300 feet downstream from the property boundary where this feature becomes a Type F stream. The entire property is mapped as being within the Lower South Fork Stillaguamish River subbasin of the Stillaguamish watershed, Water Inventory Resources Area (WRIA) 5.

- Snohomish County Planning and Development (PDS) Map Portal: The PDS Map Portal shows the same stream feature shown by NWI and FPAMT in approximately the same location. This feature is mapped by the county as non-fish habitat and is seasonal. This resource maps a series of modeled wetlands along its banks near the property. However, these are derived from contour data and is not indicative of actual wetland conditions.

- WDFW Priority Habitat and Species (PHS) Interactive Map: This resource does not map any features on the subject property. The stream to the east is mapped as starting 450 feet to the southeast of the property boundary. The parcel is mapped as being in a township containing vester bat (*Myotis yumanensis*).
- Washington Department of Fish and Wildlife (WDFW) SalmonScape Interactive Mapping System: The SalmonScape interactive map displays the stream crossing the panhandle under the Hydrography tab but is not mapped by WDFW as containing salmonids.

3.0 CRITICAL AREAS DELINEATION REPORT

3.1 WETLAND DELINEATION METHODOLOGY

Wetland conditions were identified using the methodologies described in the *Corps of Engineers Wetlands Delineation Manual* (*Final Report*; January 1987), except where superseded by the *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (*Version 2.0*, referred to as 2010 Regional Supplement). Our findings are consistent with these manuals. The following criteria descriptions were used in the wetland boundary determination:

1.) Examination of the site for hydrophytic vegetation (species present and percent cover);

2.) Examination of the site for hydric soils;

3.) Determining the presence of wetland hydrology

3.1.1 Hydrophytic Vegetation Criteria

The manuals define hydrophytic vegetation as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. One of the most common indicators for hydrophytic vegetation is when more than 50 percent of a plant community consists of species rated "Facultative" and wetter on lists of plant species that occur in wetlands.

3.1.2 Soils Criteria and Mapped Description

The manuals define hydric soils as those that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Field indicators are used for determining whether a given soil meets the definition for hydric soils.

The soils underlying the site are mapped in the Soil Survey of Snohomish County Area Washington as Tokul gravelly medial loam. Soils sampled on-site appear to match the description for these soils.

3.1.3 Hydrology Criteria

The 2010 Regional Supplement defines wetland hydrology as "areas that are inundated (flooded or ponded) or the water table is less than or equal to 12 inches below the soil surface for 14 or more consecutive days during the growing season at a minimum frequency of 5 years in 10." During the early growing season, wetland hydrology determinations are made based on physical observation of surface water, a high water table, or saturation in the upper 12 inches. Outside of the early growing season, wetland hydrology determinations are made based on physical evidence of recent inundation or saturation (i.e. water marks, surface soil cracks, water-stained leaves).

3.2 Stream Delineation Methodology

The ordinary high water mark (OHWM) of streams was determined using the methodology described in the Washington State Department of Ecology document *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson et. al. 2016). Streams are classified according to the water typing system provided in the Washington Administrative Code (WAC), section 222-16-031, SCC 30.91S.640, and SCC 30.62A.230. Lack of legal access prevented WRI from determining the OHWM of Stream A, therefore its boundary was determined using CASPs, publicly available resources, fine-scale contours, and best professional judgement.

3.3 Critical Area Boundary Determination Findings

Four wetlands (Wetlands A-D) and two streams (Stream A and B) were identified within approximately 500 feet from the proposed project area.

3.3.1 Wetland A

Jurisdiction: Snohomish County
HGM Class: Depressional
Cowardin Classification: Palustrine, Forested, Saturated only + Seasonally Flooded (PFOE)
Snohomish County Classification: Category II
Buffer Requirement: 225 feet

Wetland A is a large depressional wetland that extends onto the southwestern subject property corner. This wetland drains north into a culvert under 150th Street NE, acting as a headwater wetland to Stream A.

Figure 3 On-site portion of Wetland A.

Vegetation within the on-site portion of this wetland consists of a canopy dominated by Western red cedar (*Thuja plicata*; FAC), black cottonwood (*Populus balsamifera*; FAC), and red alder (*Alnus rubra*; FAC), with an understory of hardhack (*Spirea douglasii*; FACW), salmonberry (*Rubus spectabilis*; FAC), Himalayan blackberry (*Rubus armeniacus*; FAC), ladyfern (*Athyrium filix-femina*; FACW), and skunk cabbage (*Lysichiton americanus*; OBL), with occasional hummocks vegetated by red huckleberry (*Vaccinium parvifolium*; FACU), sword fern (*polystichum munitum*; FACU), and pacific trailing berry (*Rubus ursinus*; FACU).

Soils within the surface layer of the on-site portion of Wetland A are typically black (10YR 2/1) loam to a depth of approximately three inches below the surface. From three inches to approximately eight inches below the surface, soils are primarily black (10YR 2/1) clay loam with portions of very dark gray (10YR 3/1) clay loam appearing. From eight to 10 inches below the surface, soils are solely very dark gray (10YR 3/1) clay loam. From approximately 10 to 18 inches below the surface, soils vary from very dark gray (10YR 3/1) to dark gray (4/1) clay loam with approximately 15 percent of dark yellowish-brown (10YR 3/6) redoximorphic concentrations. Soil saturation was observed starting at approximately six inches below the surface during the August 2022 inspection.

Wetland A received a total of 21 points for functions with a high (8) habitat score. Wetland A is a Category II wetland with a standard buffer of 225 feet measured horizontally from its delineated boundary.

3.3.2 Wetland B

Jurisdiction: Snohomish County
HGM Class: Depressional
Cowardin Classification: Palustrine, Forested, Saturated only + Seasonally Flooded (PFOE)
Snohomish County Classification: Category II
Buffer Requirement: 110 feet

Wetland B is a depressional wetland located northwest of the intersection of 150th Street NE and Burn Road. This feature is located entirely outside of the subject property.

Vegetation observed from the legal right of way consists of a canopy dominated by black cottonwood (*Populus balsamifera*; FAC), Western red cedar (*Thuja plicata*; FAC), and Sitka spruce (*Picea sitchensis*; FAC), with an understory of Sitka willow (*Salix sitchensis*; FAC), vine maple (*Acer circinatum*; FAC), salmonberry (*Rubus spectabilis*; FAC), Himalayan blackberry (*Rubus armeniacus*; FAC), twinberry (*Lonicera involucrata*; FAC), lady fern (*Athyrium filix-femina*; FACW), field horsetail (*Equisetum arvense*; FAC), and reed canarygrass (*Phalaris arundinacea*; FACW).

Lack of legal access prohibited WRI from collecting soil and hydrology data. The location of this wetland is consistent with CASP 9607310539. Wetland B received a total of 22 points for functions with a moderate (7) habitat score. Wetland B requires a standard buffer of 110 feet measured horizontally from its determined boundary.

Wetland B received a total of 22 points for functions with a moderate (7) habitat score. Wetland B is a Category II wetland with a standard buffer of 110 feet measured horizontally from its determined boundary.

3.3.3 Wetland C

Jurisdiction: Snohomish County
HGM Class: Depressional
Cowardin Classification: Palustrine, Forested, Saturated only + Seasonally Flooded (PFOE)
Snohomish County Classification: Category I
Buffer Requirement: 225 feet

Wetland C is a large depressional wetland located along the eastern side of Burn Road. This feature is located entirely outside of the subject property. No CASPS depict this feature, therefore its boundary was estimated from field observations, aerial imagery, high-precision topographic contours, and best professional judgement. This wetland acts as a headwater wetland to Stream B.

Vegetation observed from the legal right of way consists of a canopy dominated by black cottonwood (*Populus balsamifera*; FAC) and red alder (*Alnus rubra*; FAC), with an understory of Pacific willow (*Salix lasiandra*; FAC), salmonberry (*Rubus spectabilis*; FAC), Himalayan blackberry (*Rubus armeniacus*; FAC), ladyfern (*Athyrium filix-femina*; FACW), field horsetail (*Equisetum arvense*; FAC), common rush (*Juncus effusus*; FACW), slough sedge (*Carex obnupta*; OBL), and reed canarygrass (*Phalaris arundinacea*; FACW).

Lack of legal access prohibited WRI from collecting soil and hydrology data. Wetland C received a total of 23 points for functions with a high (9) habitat score. Wetland C is a Category I wetland with a standard buffer of 225 feet measured horizontally from its determined boundary.

3.3.4 Wetland D

Jurisdiction: Snohomish County
HGM Class: Depressional
Cowardin Classification: Palustrine, Forested, Saturated only + Seasonally Flooded (PFOE)
Snohomish County Classification: Category II
Buffer Requirement: 110 feet

Wetland D is a depressional wetland located northwest of the intersection of the 148th Street NE and Burn Road. The boundary this wetland is consistent with the work of WRI from a recent nearby project (18-152167-000-00-LDA).

Vegetation observed form the legal right-of-way consists of a canopy of black cottonwood (*Populus balsamifera*; FAC), and red alder (*Alnus rubra*; FAC), with an understory of Sitka willow (*Salix sitchensis*; FAC), pacific willow (*Salix lasiandra*; FACW), salmonberry (*Rubus spectabilis*; FAC), Himalayan blackberry (*Rubus armeniacus*; FAC), hardhack (*Spirea douglasii*; FACW), and reed canarygrass (*Phalaris arundinacea*; FACW).

Lack of legal access prohibited WRI from collecting soil and hydrology data. Wetland D received a total of 21 points for functions with a moderate (7) habitat score. Wetland D is a Category II wetland with a standard buffer of 110 feet measured horizontally from its determined boundary.

3.3.5 Non-Wetland Areas Determination

Areas described as non-wetland are typically dominated by a canopy western hemlock (*Tsuga heterophylla*; FACU), Douglas fir (*Pseudotsuga menziesii*; FACU), western red cedar (*Thuja plicata;* FAC), and red alder (*Alnus rubra*; FAC), with an understory of vine maple (*Acer circinatum;* FAC), salmonberry (Rubus spectabilis; FAC), red huckleberry (*Vaccinium parvifolium*; FACU), salal (*Gaultheria shallon*; FACU), sword fern (*Polystichum munitum*; FACU), and pacific trailing blackberry (*Rubus ursinus*; FACU).

Soils in non-wetland areas vary but are typically dark brown (10YR 3/3) sandy loam with portions of dark yellowish-brown (10YR 4/6) sandy loam from the surface to a depth of approximately 14 inches. From 14 inches to 18 inches below the surface, soils are dark grayish brown (10YR 4/2) clay loam with approximately two percent of dark yellowish-brown redoximorphic concentrations. Soils in non-wetland areas were moist in some areas, however lacked hydrology indicators during the August 2023 inspection.

Due to the lack of facultative species, hydric soils, or hydrology indicators; areas described as non-wetland do not meet criteria for wetland conditions.

Figure 4 Maintained portion of property described as non-wetland.

Figure 5 Forested on-site area described as non-wetland.

3.3.6 Stream A

Jurisdiction: Snohomish County
Cowardin Classification: Riverine, Upper Perennial, Streamed, Cobble-Gravel
Snohomish County Classification: Type Ns
Buffer Requirement: 50 feet

Stream A originates on the north side of 150th Street NE at the drainage of Wetland A. This feature continues off-site to the north before turning east under Jordan Trails road, ultimately draining into the South Fork Stillaguamish River. Multiple resources map a fish type break from F to Ns near Jordan Trails Road; therefore, the portion of Stream A within the study area is Type Ns and requires a standard buffer of 50 feet measured horizontally from its determined boundary.

3.3.7 Stream B

Jurisdiction: Snohomish County
Cowardin Classification: Riverine, Upper Perennial, Streamed, Cobble-Gravel
Snohomish County Classification: Type Ns
Buffer Requirement: 50 feet

Stream B originates in the center of Wetland C and flows south before crossing to the west side under burn road near the intersection at 148th Street NE. This feature continues south and ultimately drains into the South Fork Stillaguamish River. CASP no. 201909050184 as well as multiple publicly available resources map this stream as being seasonal non-fish bearing. Therefore, Stream B is classified as a Type Ns Stream and requires a standard buffer of 50 feet from its determined boundary.

4.0 PROJECT DESCRIPTION, IMPACTS, AND BUFFER MITIGATION PLAN

PUD No. 1 of Snohomish County, hereby named "the applicant", is proposing to construct a new water reservoir. To achieve this, the applicant proposes to reduce the standard buffer of Wetland A by 15 percent by installing split-rail fencing along the proposed buffer per SCC 30.62A.320(1)(f)(ii). By reducing the buffer of Wetland A from 225 feet to 191.25 feet, no permanent disturbance to buffer area is proposed.

4.1 PERMANENT FENCING AND CAPA SIGNAGE

As part of the proposed buffer reduction described above, the applicant proposes to install permanent fencing between the buffer edge and development. Type 1 Critical Area Protection Area (CAPA) signs will be affixed to the fence. The location of the fencing and signage is depicted on the Critical Area Study Map in Appendix C. A signage and fencing detail is provided below.

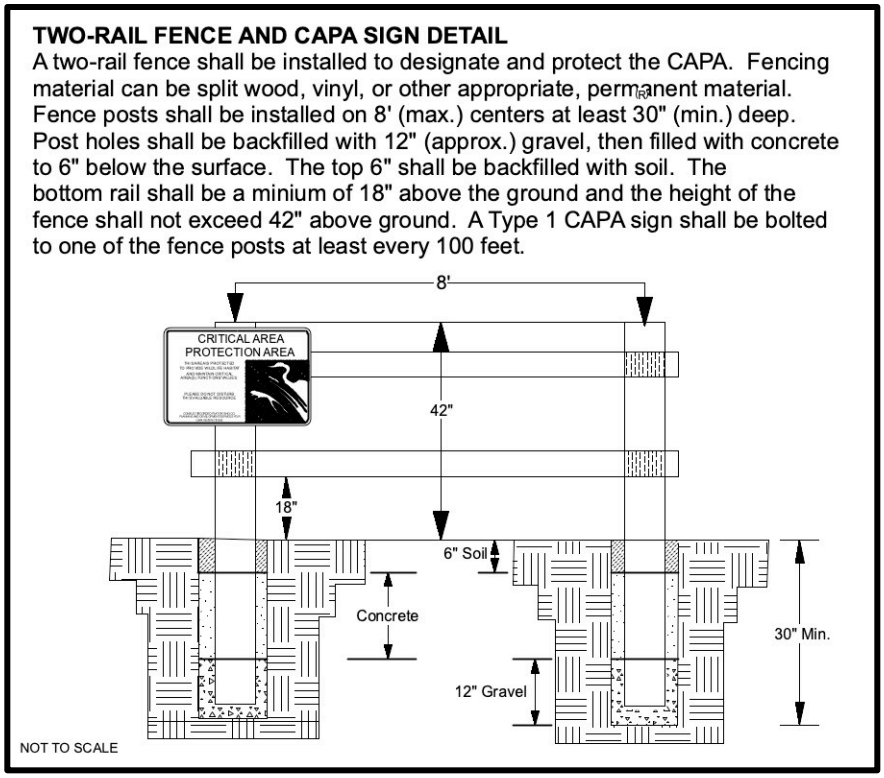


Figure 6 – CAPA sign and fencing detail

4.2 TEMPORARY IMPACTS AND BUFFER RESTORATION

Any temporarily disturbed areas in buffer area are expected to be composed of maintained lawn and shall be reseeded to the recommended grass seed mixture below, or similar approved mixture. The county shall approve any change in species or concentration. Fertilizer shall only be used if absolutely necessary due to potential runoff into adjacent waters. If deemed absolutely necessary by the consulting biologist and/or the county, an appropriate fertilizer will be recommended for the particular situation.

Table 2 - Native Grass Seed Buffer Mix

COMMON NAME	LATIN NAME	LBS/1,000 S.F.
Tall fescue	*Festuca arundinacea*	0.4
Colonial bentgrass	*Agrostis tenuis*	0.4
Annual ryegrass	*Lolium multiflorum*	0.5
Red clover	*Trifolium repens*	0.2

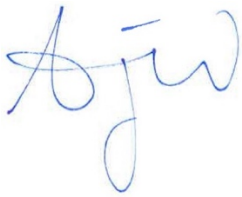
5.0 USE OF THIS REPORT

This Critical Area Technical Memorandum is supplied to PUD No. 1 of Snohomish County as a means of determining the presence of on-site and nearby critical areas, as required by Snohomish County. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

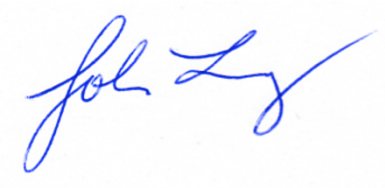
The laws applicable to critical areas are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

This report conforms to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.



Alex Wachter
Associate Ecologist



John Laufenberg, PWS
Principal Ecologist

6.0 REFERENCES

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APPENDIX A

USACE WETLAND DETERMINATION DATA FORMS

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

Project/Site: #22229 Burn Rd Reservoir City/County: Snohomish County Sampling Date: 8/31/22

Applicant/Owner: PUD No. 1 of SnoCo State: WA Sampling Point: S1

Investigator(s): AW,EC Section, Township, Range: Sec 32, Twp 31N, Rge 06E, W.M.

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): None Slope (%): ~2%

Subregion (LRR): LRR A Lat: 48.13116 Long: -122.05843 Datum: NAD83

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes 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:

WRA - In near WRA 5

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m^2)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	40	Y	FAC
2. Thuja plicata	10	N	FAC
3. Alnus rubra	5	N	FAC
4. **Tsuga heterophylla / *Pseudotsuga menziesii	5/5	N	FACU
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m^2)			
1. Rubus spectabilis	30	Y	FAC
2. *Vaccinium parvifolium	10	Y	FACU
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 1m^2)			
1. Athyrium felix-femina	80	Y	FAC
2. *Gaultheria shallon	30	N	FACU
3. Phalaris arundinacea	25	N	FACW
4. Lysichiton americanus	15	N	OBL
5. *Rubus ursinus	10	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	160	= Total Cover	
Woody Vine Stratum (Plot size: 3m^2)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

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

**Tsuga heterophylla and Pseudotsuga menziesii are rooted out of Wetland A, however provide canopy coverage.
*Vaccinium parvifolium, Gaultheria shallon, and Rubus ursinus are rooted on stumps/hummocks.

SOIL

Sampling Point: S1

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
0-3	10YR 2/1						Loam	
3-8	10YR 2/1	80						
	10YR 3/1	20					Clay loam	
8-10	10YR 3/1						Clay loam	
10-15	10YR 3/1	85	10YR 3/6	15	C	M	Clay loam	
15-18	10YR 4/1	80	10YR 3/6	15	C	M	Clay loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 6"

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

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

Project/Site: #22229 Burn Rd Reservoir City/County: Snohomish County Sampling Date: 8/31/22

Applicant/Owner: PUD No. 1 of SnoCo State: WA Sampling Point: S2

Investigator(s): AW,EC Section, Township, Range: Sec 32, Twp 31N, Rge 06E, W.M.

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

Subregion (LRR): LRR A Lat: 48.13119 Long: -122.05840 Datum: NAD83

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes 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:

WRA - Out near WRA 5

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m^2)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	60	Y	FAC
2. Tsuga heterophylla	10	N	FACU
3. Thuja plicata	5	N	FAC
4.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m^2)			
1. Rubus spectabilis	80	Y	FAC
2.			
3.			
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 1m^2)			
1. Polystichum munitum	20	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20	= Total Cover	
Woody Vine Stratum (Plot size: 3m^2)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

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

SOIL

Sampling Point: S2

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
0-14	10YR 3/3	80					Sandy loam	
	10YR 4/6	20					Sandy loam	
14-18	10YR 4/2	97	10YR 4/6	3	C	M	Clay loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ☐ No ☑

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

Remarks:

Soil moist at 14 inches below surface.

APPENDIX B

DEPARTMENT OF ECOLOGY (2014)
WETLAND RATING FORMS AND FIGURES

Wetland name or number **A**

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 8/31/22

Rated by AW Trained by Ecology? ✔ Yes ___No Date of training 6/22

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, SnoCo

OVERALL WETLAND CATEGORY II (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

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H [M] L	H [M] L	H [M] L	
Landscape Potential	H [M] L	H [M] L	[H] M L	
Value	[H] M L	H [M] L	[H] M L	**TOTAL**
Score Based on Ratings	**7**	**6**	**8**	**21**

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

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I II**
Interdunal	**I II III IV**
None of the above	✔

Wetland name or number **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	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 4.3, D 5.3	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	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	4

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	**5**
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* ☑ Area seasonally ponded is > 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	**4**
Total for D 1 Add the points in the boxes above	**11**

Rating of Site Potential If score is: ___ **12-16 = H** ✔ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 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	**1**
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ 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** ✔ **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]	**0**
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	**3**

Rating of Value If score is: ✔ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

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

5

Total for D 4 — Add the points in the boxes above — **10**

Rating of Site Potential If score is: ___ **12-16 = H** ✔ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland 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** ✔ **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

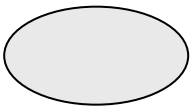
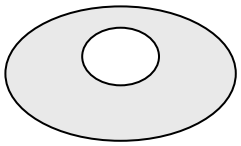
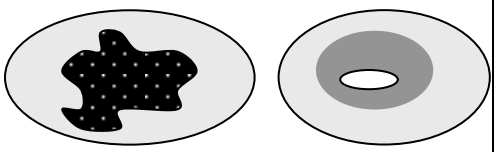
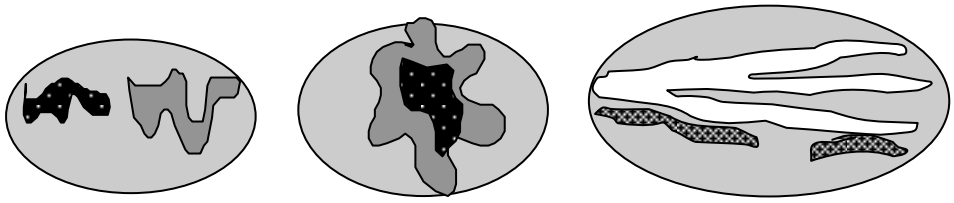
1

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** ✔ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **A**

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	**1**
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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	**2**
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*  [**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*)	**3**
Total for H 1 Add the points in the boxes above	**7**

Rating of Site Potential If score is: ___ **15-18 = H** ✔ **7-14 = M** ___ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 34 **+** [(% moderate and low intensity land uses)/2] 15 **=** 50 % 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	**3**
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 40 **+** [(% moderate and low intensity land uses)/2] 23 **=** 62 % ☑ 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	**3**
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	**0**
Total for H 2 Add the points in the boxes above	**6**

Rating of Landscape Potential If score is: ✔ **4-6 = H** ___ **1-3 = M** ___ **< 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: ✔ **2 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **A**

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.

Wetland name or number **A**

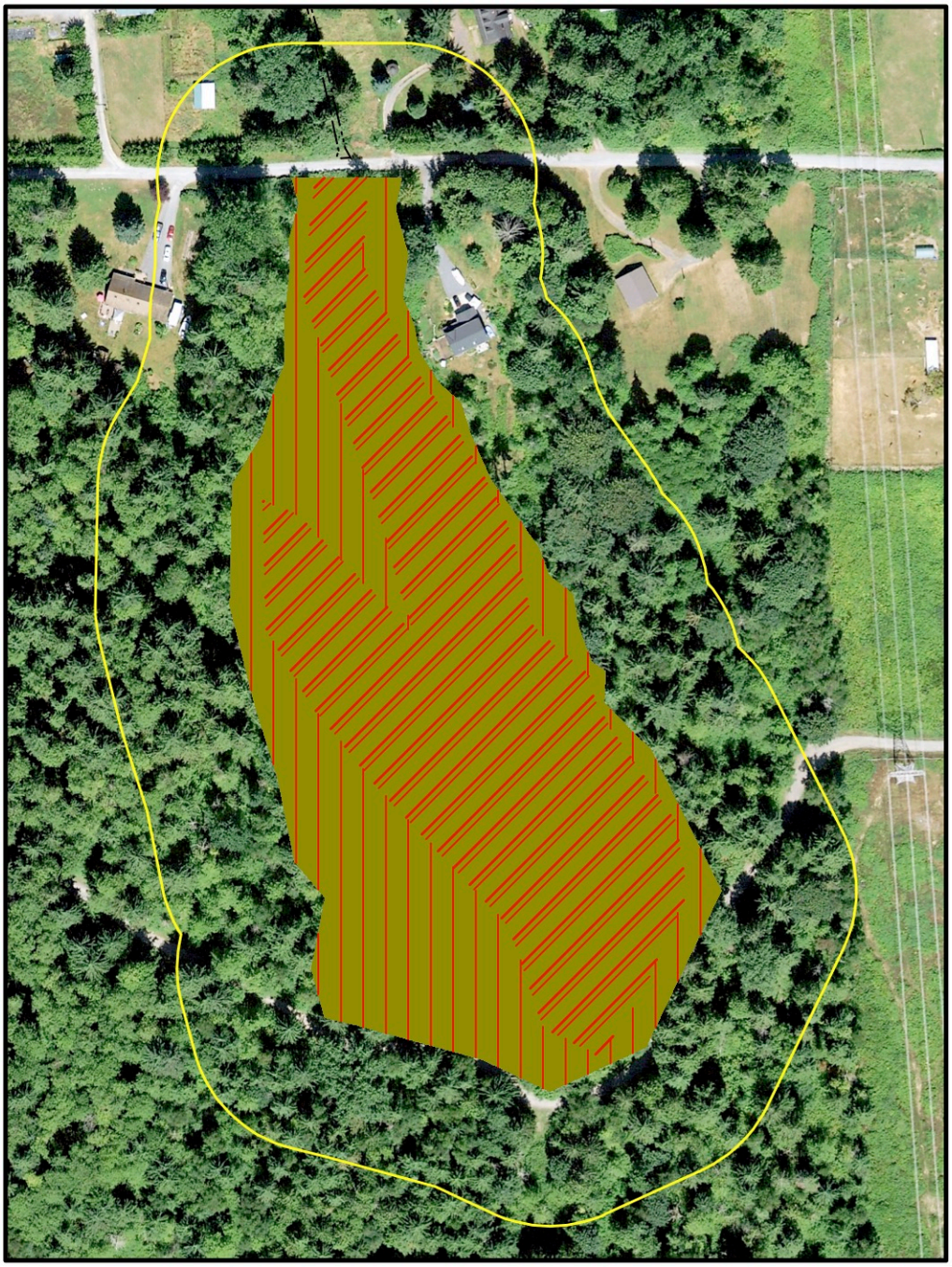
CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of 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**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes **– Go to SC 2.2** No **– Go to SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes **– Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

Wetland name or number **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**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon** 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**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula: Lands west of SR 103 ☐ Grayland-Westport: Lands west of SR 105 ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** 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**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	**N/A**

PUD - BURN RD RESERVOIR
WETLAND RATING FIGURE 1- WETLAND A



LEGEND

- FORESTED VEGETATION
- SATURATED ONLY
- SEASONALLY FLOODED
- INTERMITTENT STREAM
- 150' FROM WL BOUNDARY

Scale 1" = 200'

0 100 200 300 400

Wetland Resources, Inc.
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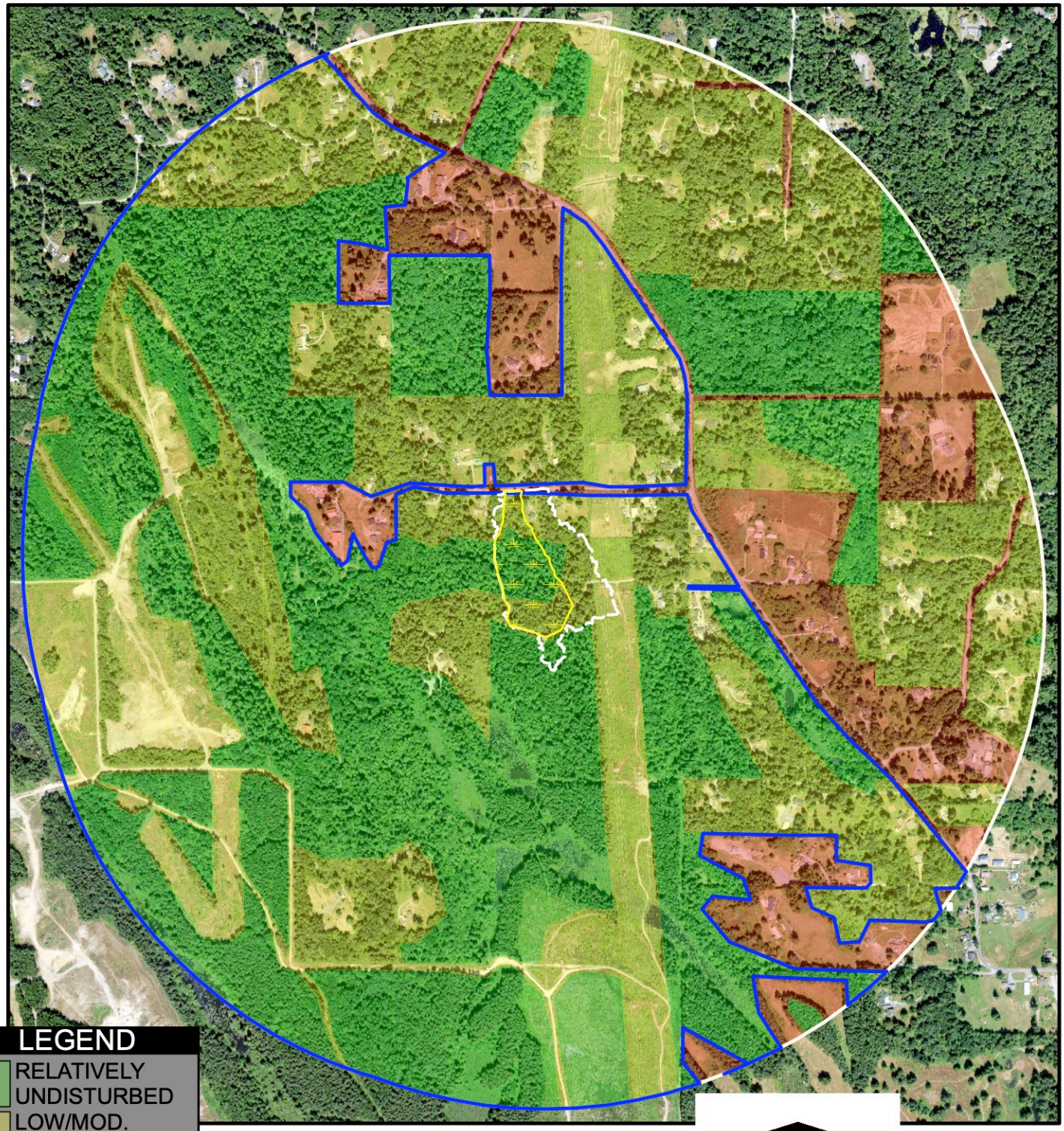
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND RATING
Wetland A

Figure A-1
WRI Job # 22229
Rated by: AW

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 2- WETLAND A



LEGEND

- RELATIVELY UNDISTURBED
- LOW/MOD. INTENSITY
- HIGH INTENSITY
- ACCESSIBLE HABITAT
- WETLAND
- 1 KM FROM WETLAND
- CONTRIBUTING BASIN

CONTRIBUTING BASIN AREA RELATIVE TO WETLAND UNIT IS 2:1

Scale 1" = 1,000'

0 1,000 2,000

Wetland Resources, Inc.

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WETLAND RATING

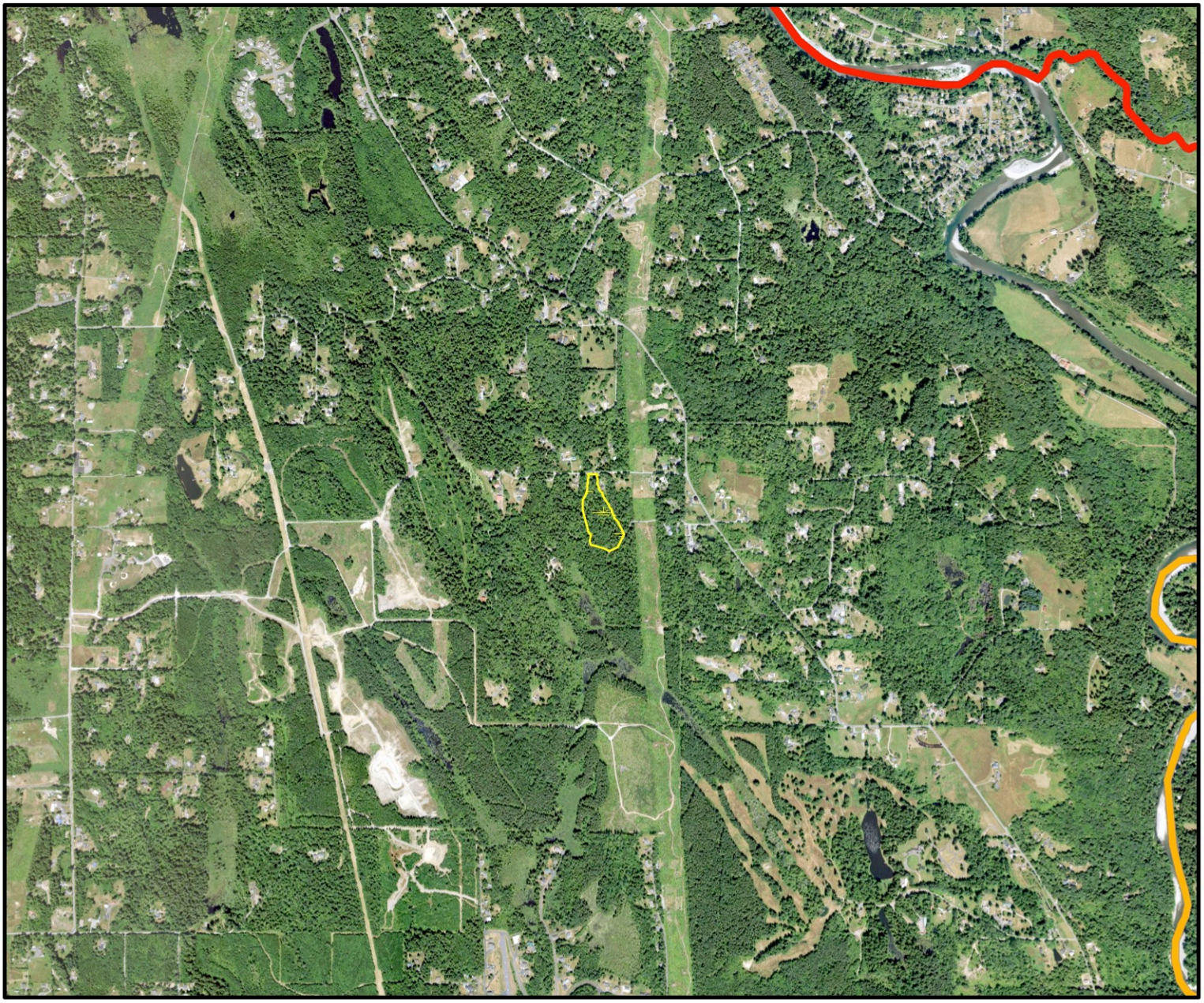
Wetland A

Figure A-2

WRI Job # 22229

Rated by: AW

PUD - BURN RD RESERVOIR
WETLAND RATING FIGURE 3- WETLAND A



LEGEND

WETLAND

AQUATIC RESOURCES ON THE 303(d) LIST

Scale 1" = 2,000'

0 2,000 4,000

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
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WETLAND RATING
Wetland A

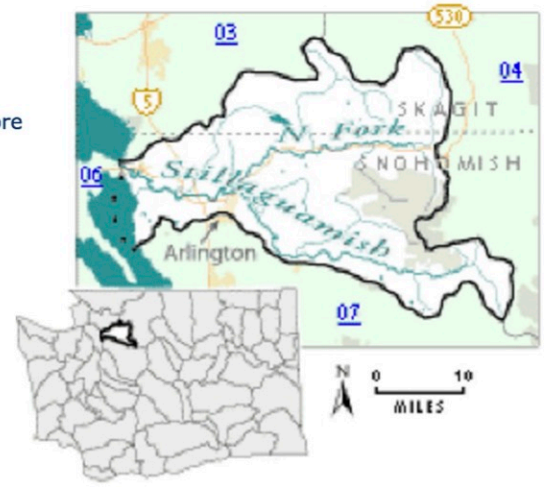
Figure A-3
WRI Job # 22229
Rated by: AW

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 4- WETLAND A

WRIA 5: Stillaguamish

The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.



Counties

- Skagit
- Snohomish

Waterbody Name	Pollutant(s)	Status**	TMDL Lead
Old Stillaguamish Channel	Dissolved Oxygen	On hold	Ralph Svrjcek 425-649-7165
Stillaguamish River	Arsenic Dissolved Oxygen Fecal Coliform Mercury pH Temperature	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7165

** ***Status*** *will be listed as one of the following: Approved by EPA, Under Development or Implementation*

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WETLAND RATING
Wetland A

Figure A-4
WRI Job # 22229
Rated by: AW

Wetland name or number **B**

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland B Date of site visit: 8/31/22

Rated by AW Trained by Ecology? ✔ Yes ___No Date of training 6/22

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, SnoCo

OVERALL WETLAND CATEGORY **II** (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

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H [M] L	H [M] L	H M [L]	
Landscape Potential	[H] M L	[H] M L	[H] M L	
Value	[H] M L	H [M] L	[H] M L	**TOTAL**
Score Based on Ratings	**8**	**7**	**7**	**22**

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

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I II**
Interdunal	**I II III IV**
None of the above	✔

Wetland name or number **B**

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 4.3, D 5.3	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	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	4

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 **B**

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 **B**

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 **B**

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	**3**
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	**4**
Total for D 1 Add the points in the boxes above	**9**

Rating of Site Potential If score is: ___ **12-16 = H** ☑ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? [Yes = 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	**1**
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 [No = 0]	**0**
Total for D 2 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 or 4 = H** ___ **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]	**0**
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	**3**

Rating of Value If score is: ☑ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **B**

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

5

Total for D 4 — Add the points in the boxes above — **10**

Rating of Site Potential If score is: ___ **12-16 = H** ✔ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland 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	**1**
Total for D 5	Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ✔ **3 = H** ___ **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

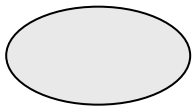
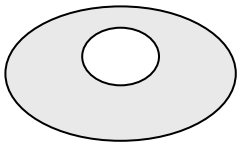
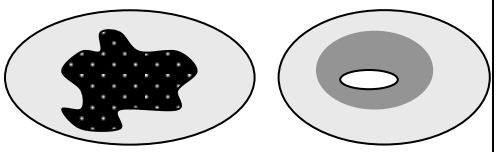
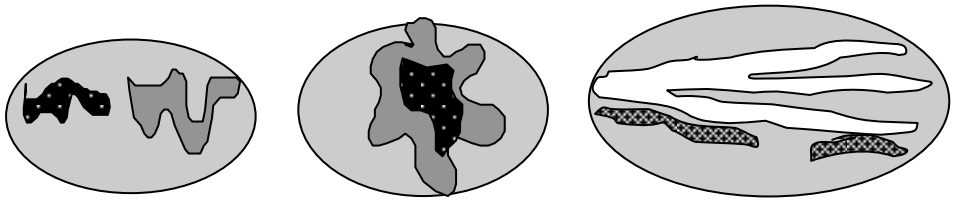
1

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** ✔ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **B**

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	**1**
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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	**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 **B**

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*)	**2**
Total for H 1 Add the points in the boxes above	**5**

Rating of Site Potential If score is: ___**15-18 = H** ___**7-14 = M** ✔ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 22 **+** [(% moderate and low intensity land uses)/2] 11 **=** 33 % 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	**2**
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 37 **+** [(% moderate and low intensity land uses)/2] 23 **=** 60 % ☑ 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	**3**
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	**0**
Total for H 2 Add the points in the boxes above	**5**

Rating of Landscape Potential If score is: ✔ **4-6 = H** ___**1-3 = M** ___**< 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: ✔ **2 = H** ___**1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number **B**

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.

Wetland name or number **B**

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

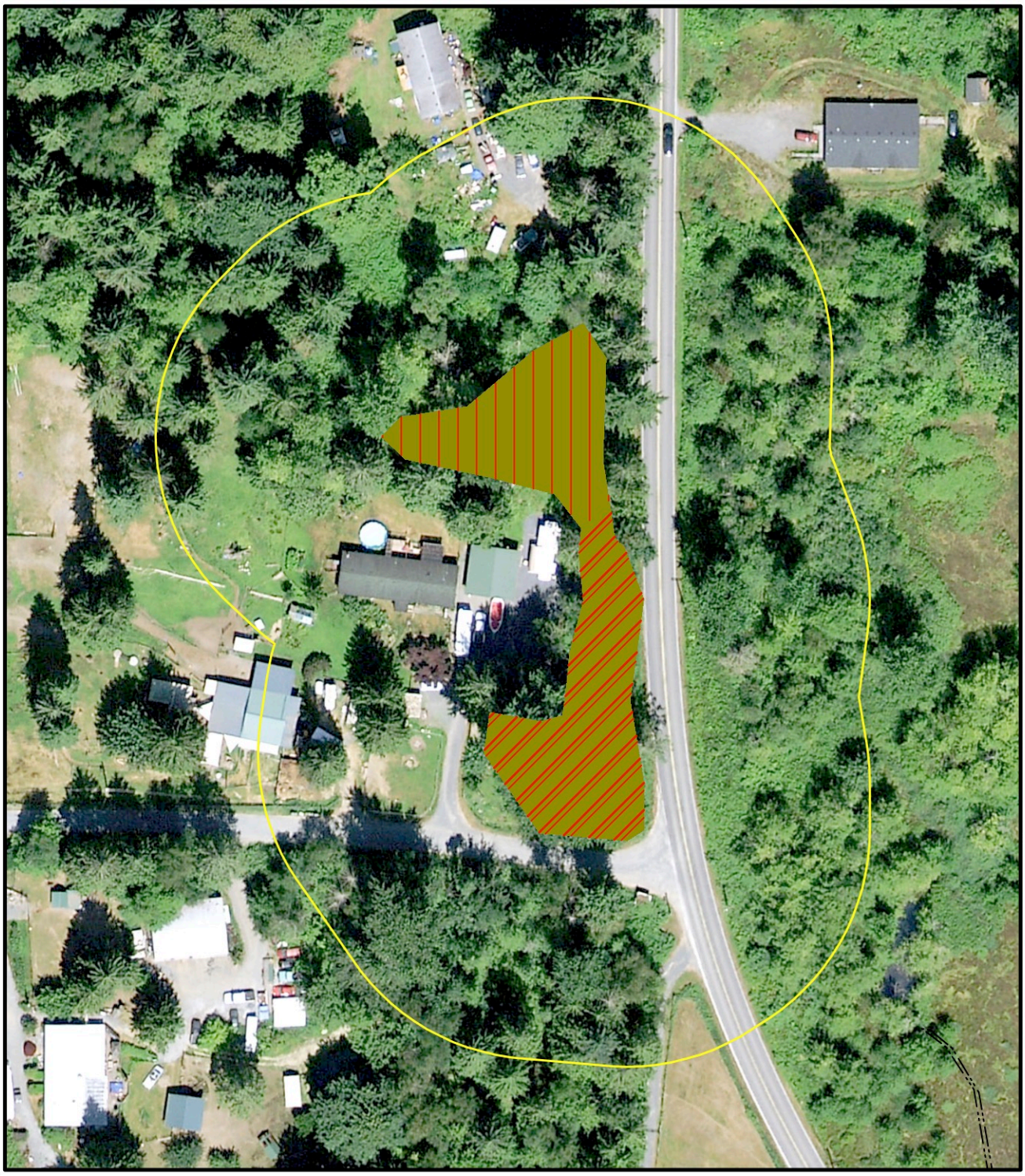
Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of 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**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes **– Go to SC 2.2** No **– Go to SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes **– Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

Wetland name or number **B**

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** ☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon** 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**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula: Lands west of SR 103 ☐ Grayland-Westport: Lands west of SR 105 ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** 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**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	**N/A**

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 1- WETLAND B



LEGEND

- FORESTED VEGETATION
- SATURATED ONLY
- SEASONALLY FLOODED
- 150' FROM WL BOUNDARY

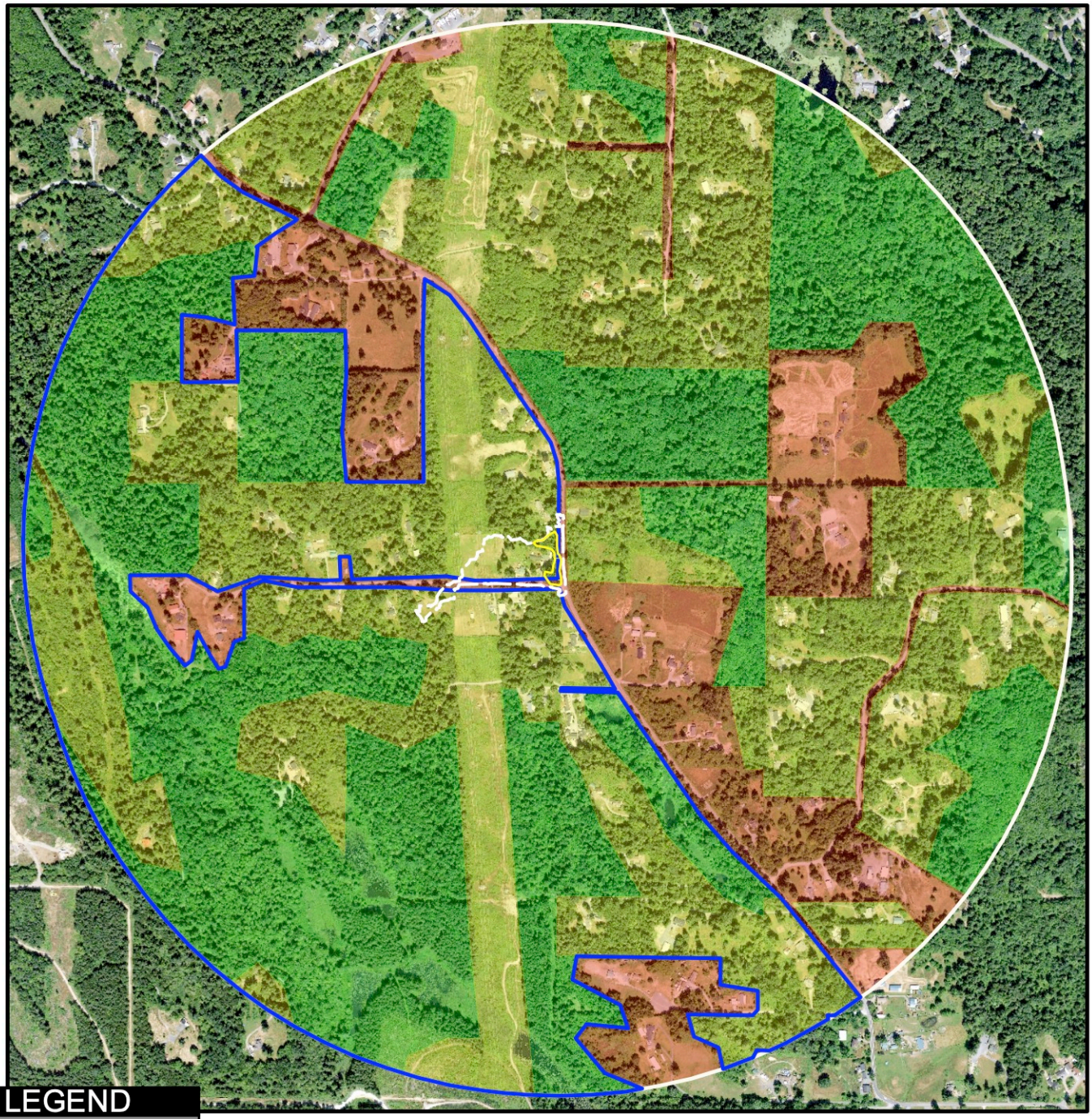
Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND RATING
Wetland B

Figure B-1
WRI Job # 22229
Rated by: AW

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 2- WETLAND B



LEGEND

- RELATIVELY UNDISTURBED
- LOW/MOD. INTENSITY
- HIGH INTENSITY
- ACCESSIBLE HABITAT
- WETLAND
- 1 KM FROM WETLAND
- CONTRIBUTING BASIN

CONTRIBUTING BASIN AREA RELATIVE TO WETLAND UNIT IS 9:1

Scale 1" = 1,000'

0 1,000 2,000

Wetland Resources, Inc.

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

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Phone: (425) 337-3174

Fax: (425) 337-3045

Email: mailbox@wetlandresources.com

WETLAND RATING

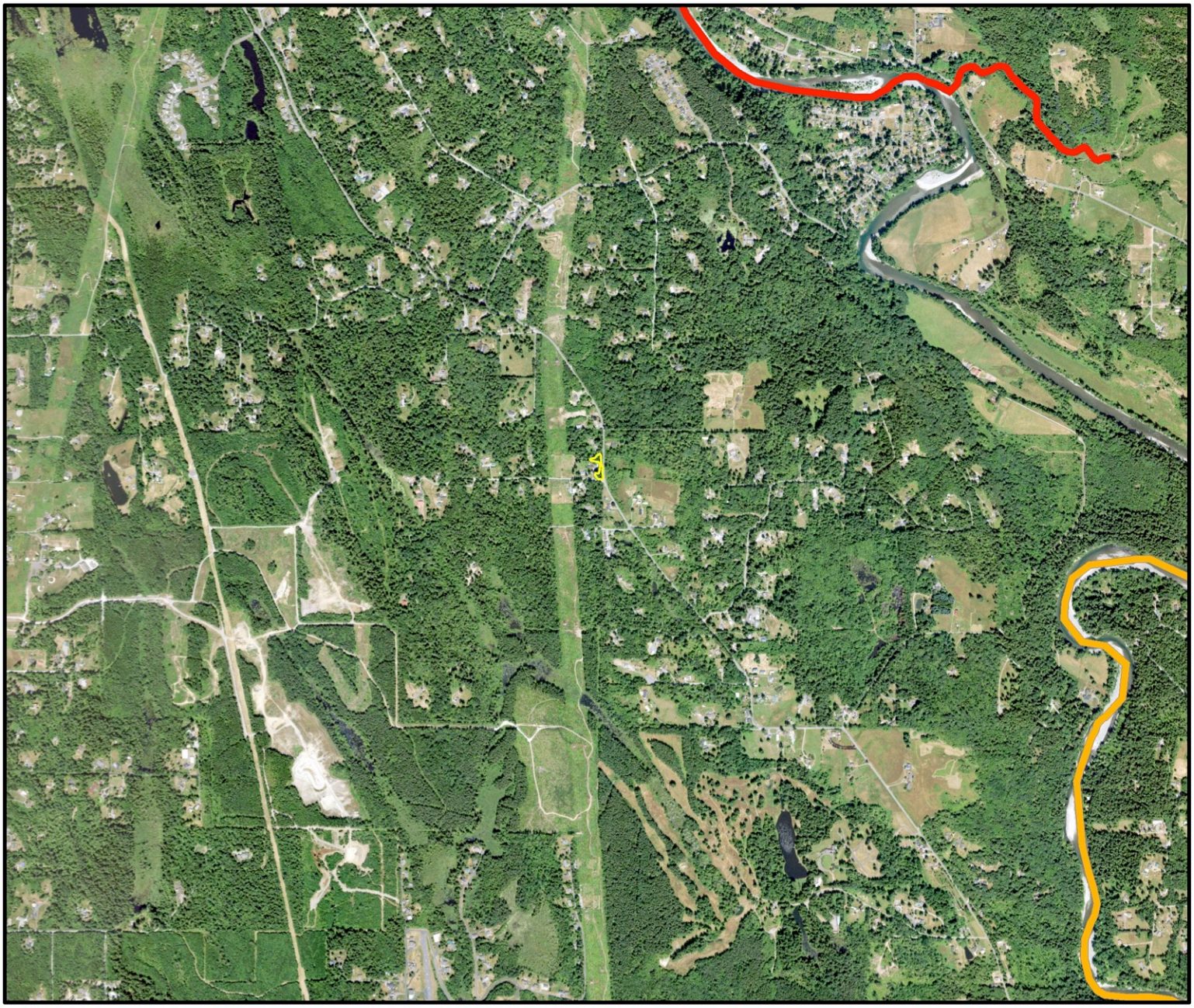
Wetland B

Figure B-2

WRI Job # 22229

Rated by: AW

PUD - BURN RD RESERVOIR
WETLAND RATING FIGURE 3- WETLAND B



LEGEND

WETLAND

AQUATIC RESOURCES ON THE 303(d) LIST

Scale 1" = 2,000'

0 2,000 4,000

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND RATING
Wetland B

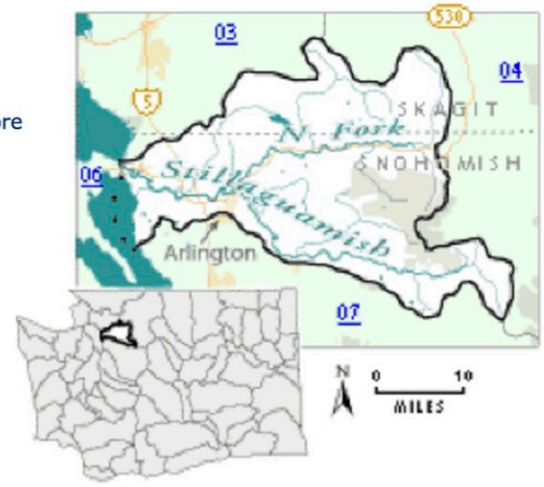
Figure B-3
WRI Job # 22229
Rated by: AW

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 4- WETLAND B

WRIA 5: Stillaguamish

The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.



Counties

- Skagit
- Snohomish

Waterbody Name	Pollutant(s)	Status**	TMDL Lead
Old Stillaguamish Channel	Dissolved Oxygen	On hold	Ralph Svrjcek 425-649-7165
Stillaguamish River	Arsenic Dissolved Oxygen Fecal Coliform Mercury pH Temperature	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7165

** ***Status*** *will be listed as one of the following: Approved by EPA, Under Development or Implementation*

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND RATING
Wetland B

Figure B-4
WRI Job # 22229
Rated by: AW

Wetland name or number C

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland C Date of site visit: 8/31/22

Rated by AW Trained by Ecology? ✔ Yes ___No Date of training 6/22

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, SnoCo

OVERALL WETLAND CATEGORY I (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

_____ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H [M] L	H [M] L	[H] M L	
Landscape Potential	[H] M L	H [M] L	[H] M L	
Value	[H] M L	H [M] L	[H] M L	**TOTAL**
Score Based on Ratings	**8**	**6**	**9**	**23**

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

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	✔

Wetland name or number C

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 4.3, D 5.3	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	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	4

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 **C**

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 **C**

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 **C**

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	**5**
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* ☑ Area seasonally ponded is > 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	**4**
Total for D 1 — Add the points in the boxes above	**11**

Rating of Site Potential If score is: ___ **12-16 = H** ☑ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? [Yes = 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	**1**
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 [No = 0]	**0**
Total for D 2 — Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ☑ **3 or 4 = H** ___ **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]	**0**
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	**3**

Rating of Value If score is: ☑ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **C**

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

5

Total for D 4 — Add the points in the boxes above — **10**

Rating of Site Potential If score is: ___ **12-16 = H** ✔ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland 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** ✔ **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

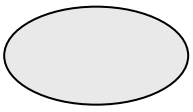
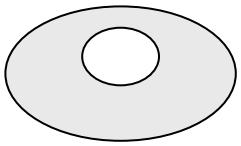
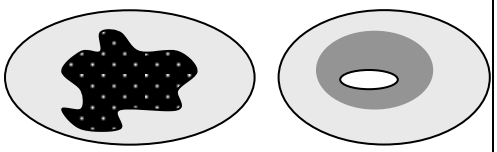
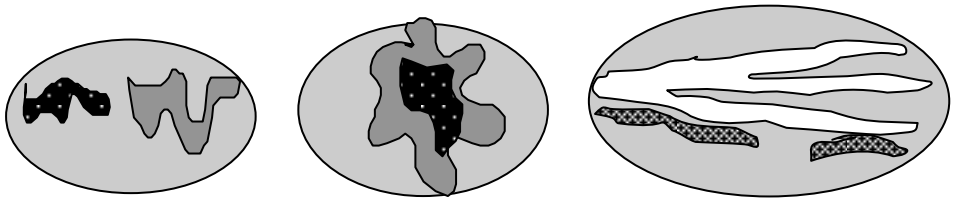
1

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** ✔ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **C**

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	**4**
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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**	**2**
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species.* ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle*** If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0	**2**
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3points 	**3**

Wetland name or number **C**

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*)	**4**
Total for H 1 Add the points in the boxes above	**15**

Rating of Site Potential If score is: ✔ **15-18 = H** ___ **7-14 = M** ___ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 13 **+** [(% moderate and low intensity land uses)/2] 9 **=** 22 % 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	**2**
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 38 **+** [(% moderate and low intensity land uses)/2] 22 **=** 60 % ☑ 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	**3**
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	**0**
Total for H 2 Add the points in the boxes above	**5**

Rating of Landscape Potential If score is: ✔ **4-6 = H** ___ **1-3 = M** ___ **< 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: ✔ **2 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number C

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.

Wetland name or number **C**

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of 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**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes **–** Go to **SC 2.2** No **–** Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes **– Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

Wetland name or number **C**

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

Yes **= Category I** | No **= Not a forested wetland for this section** — **Cat. I**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

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

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* — **Cat. I**

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). — **Cat. II**

☐ 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 — **Cat I**

☐ 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)? — **Cat. II**

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** — **Cat. III**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

Yes = **Category III** | No = **Category IV** — **Cat. IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form — **N/A**

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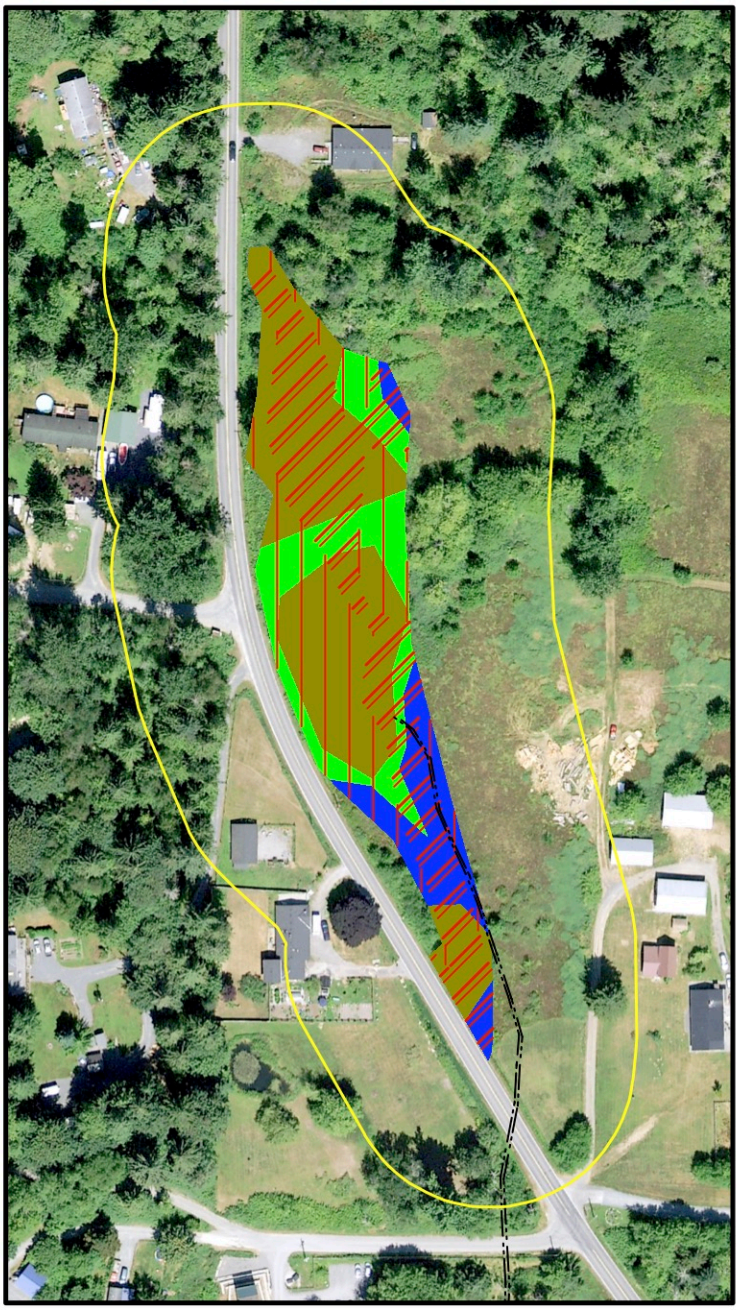
PUD - BURN RD RESERVOIR
WETLAND RATING FIGURE 1- WETLAND C



LEGEND

- SCRUB-SHRUB
- EMERGENT VEGETATION
- FORESTED VEGETATION
- SATURATED ONLY
- SEASONALLY FLOODED
- 150' FROM WL BOUNDARY
- INTERMITTENT STREAM

Scale 1" = 200'

0 100 200 300 400

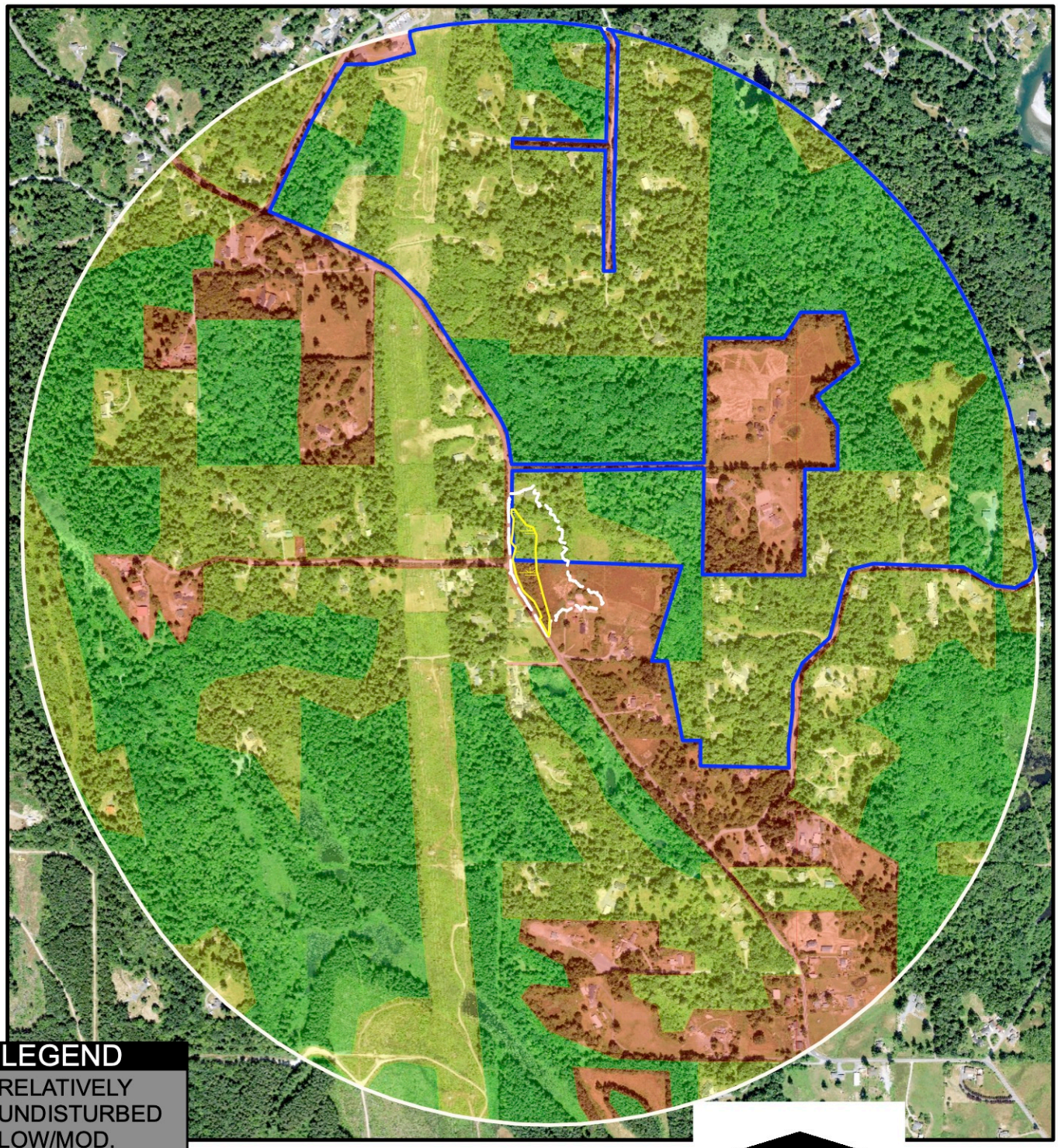
Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND RATING
Wetland C

Figure C-1
WRI Job # 22229
Rated by: AW

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 2- WETLAND C



LEGEND

- RELATIVELY UNDISTURBED
- LOW/MOD. INTENSITY
- HIGH INTENSITY
- ACCESSIBLE HABITAT
- WETLAND
- 1 KM FROM WETLAND
- CONTRIBUTING BASIN

CONTRIBUTING BASIN AREA RELATIVE TO WETLAND UNIT IS 3:1

Scale 1" = 1,000'

0 1,000 2,000

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WETLAND RATING

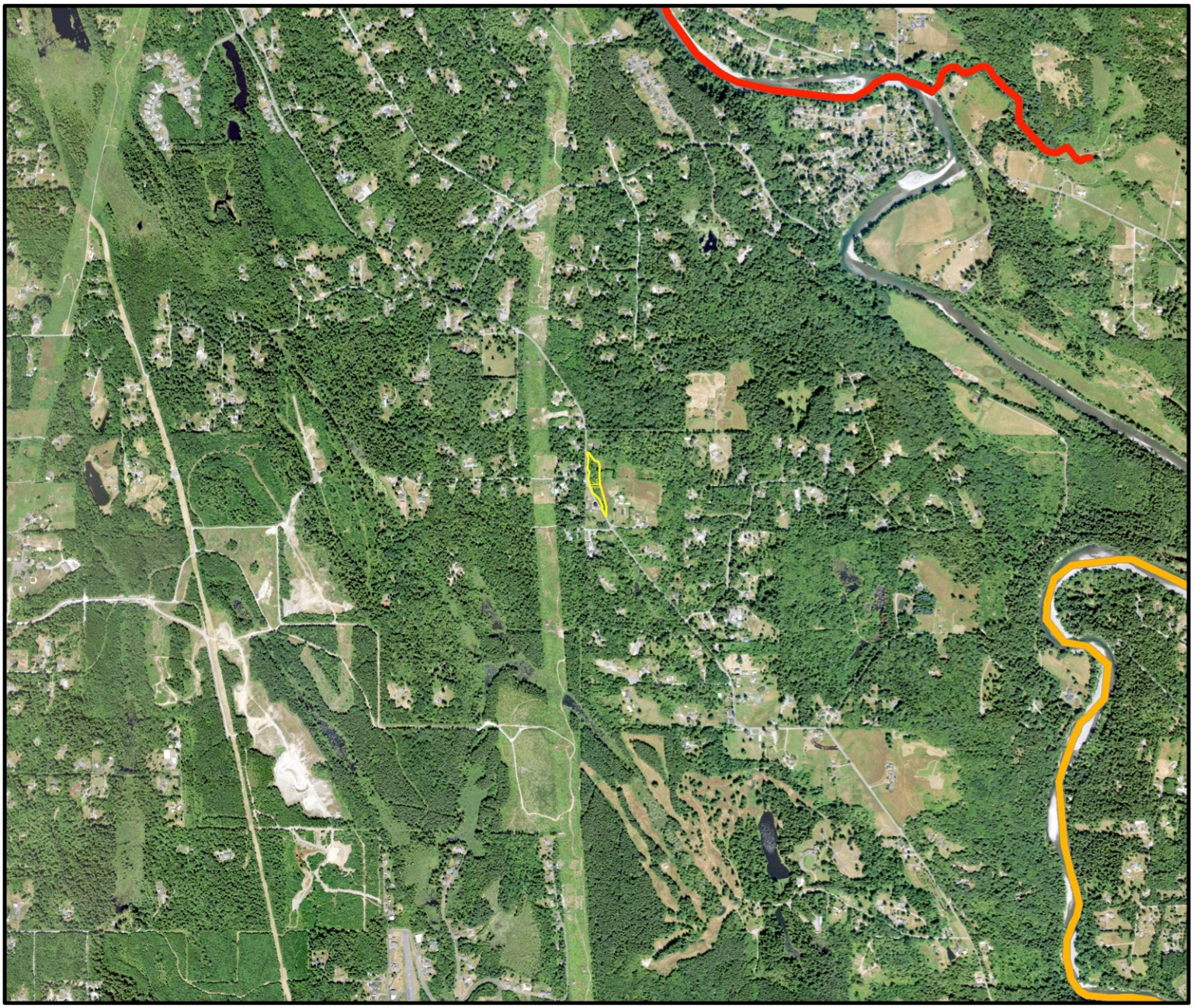
Wetland C

Figure C-2

WRI Job # 22229

Rated by: AW

PUD - BURN RD RESERVOIR
WETLAND RATING FIGURE 3- WETLAND C



LEGEND

WETLAND

AQUATIC RESOURCES ON THE 303(d) LIST

Scale 1" = 2,000'

0 2,000 4,000

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WETLAND RATING
Wetland C

Figure C-3
WRI Job # 22229
Rated by: AW

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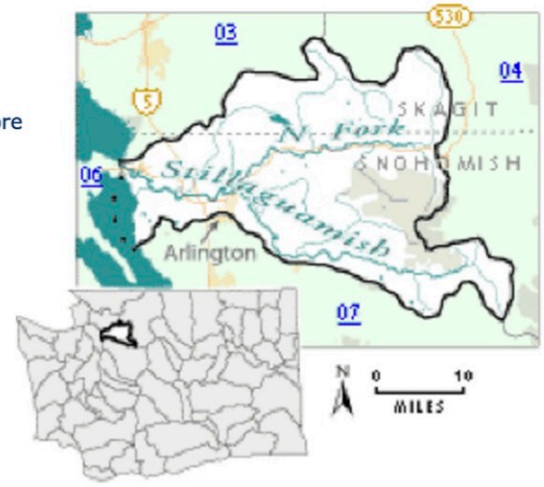
WETLAND RATING FIGURE 4- WETLAND C

WRIA 5: Stillaguamish

The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.



Counties

- Skagit
- Snohomish

Waterbody Name	Pollutant(s)	Status**	TMDL Lead
Old Stillaguamish Channel	Dissolved Oxygen	On hold	Ralph Svrjcek 425-649-7165
Stillaguamish River	Arsenic Dissolved Oxygen Fecal Coliform Mercury pH Temperature	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7165

** ***Status*** *will be listed as one of the following: Approved by EPA, Under Development or Implementation*

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WETLAND RATING
Wetland C

Figure C-4
WRI Job # 22229
Rated by: AW

Wetland name or number **D**

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland D Date of site visit: 8/31/22

Rated by AW Trained by Ecology? ✔ Yes ___No Date of training 6/22

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, SnoCo

OVERALL WETLAND CATEGORY **II** (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

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality			Hydrologic			Habitat			
	Circle the appropriate ratings									
Site Potential	H	M	[L]	H	[M]	L	H	M	[L]	
Landscape Potential	[H]	M	L	[H]	M	L	[H]	M	L	
Value	[H]	M	L	H	[M]	L	[H]	M	L	**TOTAL**
Score Based on Ratings	**7**			**7**			**7**			**21**

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

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	✔

Wetland name or number **D**

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	B1
Hydroperiods	D 1.4, H 1.2	B1
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	B1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	B1
Map of the contributing basin	D 4.3, D 5.3	B2
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	B2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	B3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	B4

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 **D**

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 **D**

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 **D**

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	**1**
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	**3**

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** ✔ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? [Yes = 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	**1**
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 [No = 0]	**0**
Total for D 2 Add the points in the boxes above	**3**

Rating of Landscape Potential If score is: ✔ **3 or 4 = H** ___ **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]	**0**
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]	**0**
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	**2**

Rating of Value If score is: ✔ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **D**

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

3

Total for D 4 — Add the points in the boxes above — **8**

Rating of Site Potential If score is: ___ **12-16 = H** ✔ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland 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 — **1**

Total for D 5 — Add the points in the boxes above — **3**

Rating of Landscape Potential If score is: ✔ **3 = H** ___ **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

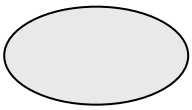
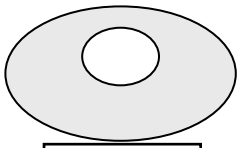
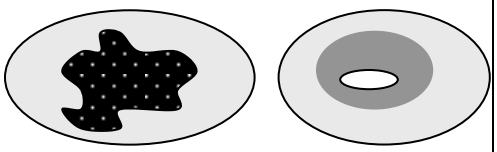
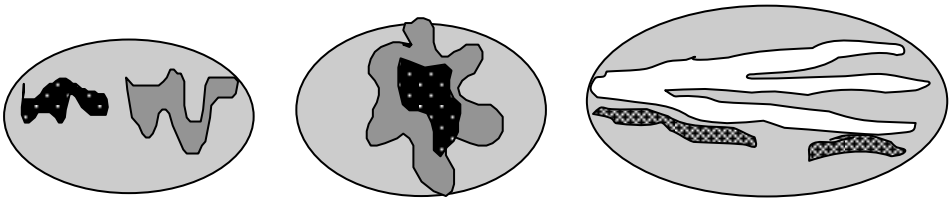
1

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** ✔ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **D**

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	**1**
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 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	**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 	**1**

Wetland name or number **D**

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*)	**2**
Total for H 1 Add the points in the boxes above	**6**

Rating of Site Potential If score is: ___ **15-18 = H** ___ **7-14 = M** ✔ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 24 **+** [(% moderate and low intensity land uses)/2] 12 **=** 36 % 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	**3**
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 38 **+** [(% moderate and low intensity land uses)/2] 21 **=** 59 % ☑ 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	**3**
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	**0**
Total for H 2 Add the points in the boxes above	**6**

Rating of Landscape Potential If score is: ✔ **4-6 = H** ___ **1-3 = M** ___ **< 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: ✔ **2 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number **D**

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.

Wetland name or number **D**

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

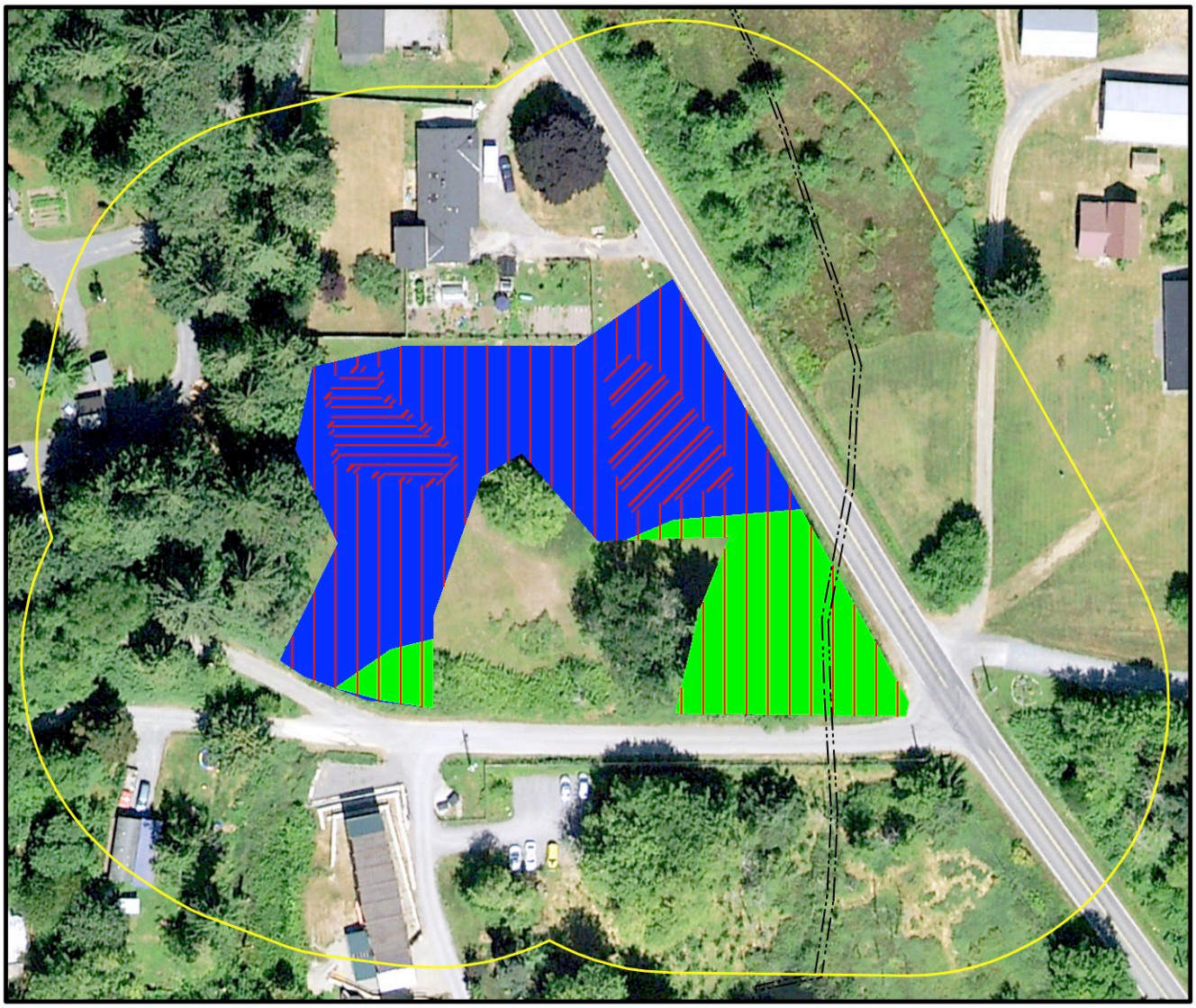
Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of 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**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes **– Go to SC 2.2** No **– Go to SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes **= Category I** No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes **– Contact WNHP/WDNR and go to SC 2.4** No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes **= Category I** No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No **= Is not a bog**	**Cat. I**

Wetland name or number **D**

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** ☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon** 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**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula: Lands west of SR 103 ☐ Grayland-Westport: Lands west of SR 105 ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** 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**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	**N/A**

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 1- WETLAND D



LEGEND

- SCRUB-SHRUB
- EMERGENT VEGETATION
- SATURATED ONLY
- SEASONALLY FLOODED
- PERMANENTLY FLOODED
- INTERMITTENT STREAM
- 150' FROM WL BOUNDARY

Wetland Resources, Inc.

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E. Suite 106 Everett, Washington 98208

Phone: (425) 337-3174

Fax: (425) 337-3045

Email: mailbox@wetlandresources.com

WETLAND RATING

Wetland D

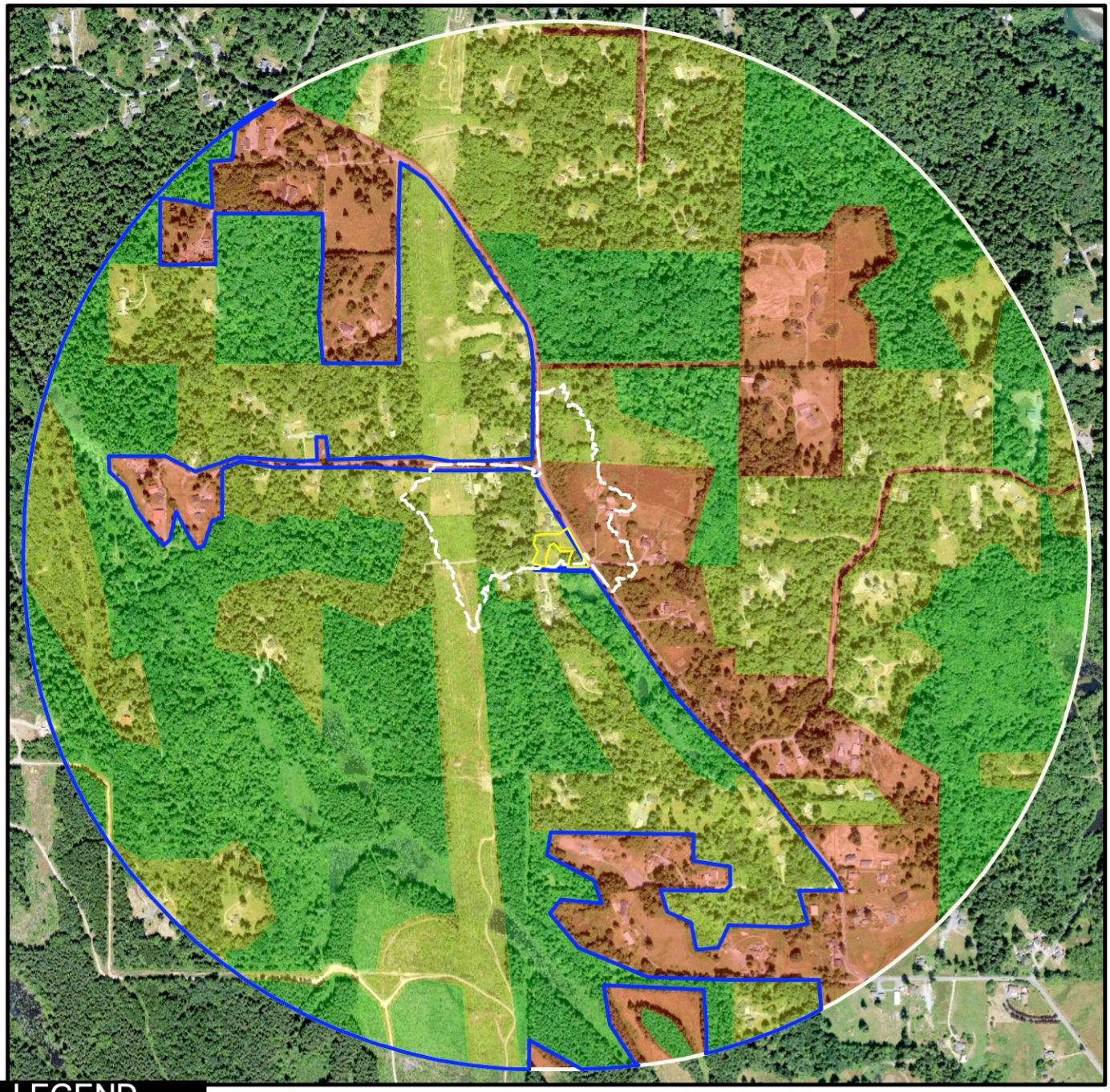
Figure D-1

WRI Job # 22229

Rated by: AW

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 2- WETLAND D



LEGEND

- RELATIVELY UNDISTURBED
- LOW/MOD. INTENSITY
- HIGH INTENSITY
- ACCESSIBLE HABITAT
- WETLAND
- 1 KM FROM WETLAND
- CONTRIBUTING BASIN

CONTRIBUTING BASIN AREA RELATIVE TO WETLAND UNIT IS 23:1

Scale 1" = 1,000'

0 1,000 2,000

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WETLAND RATING

Wetland D

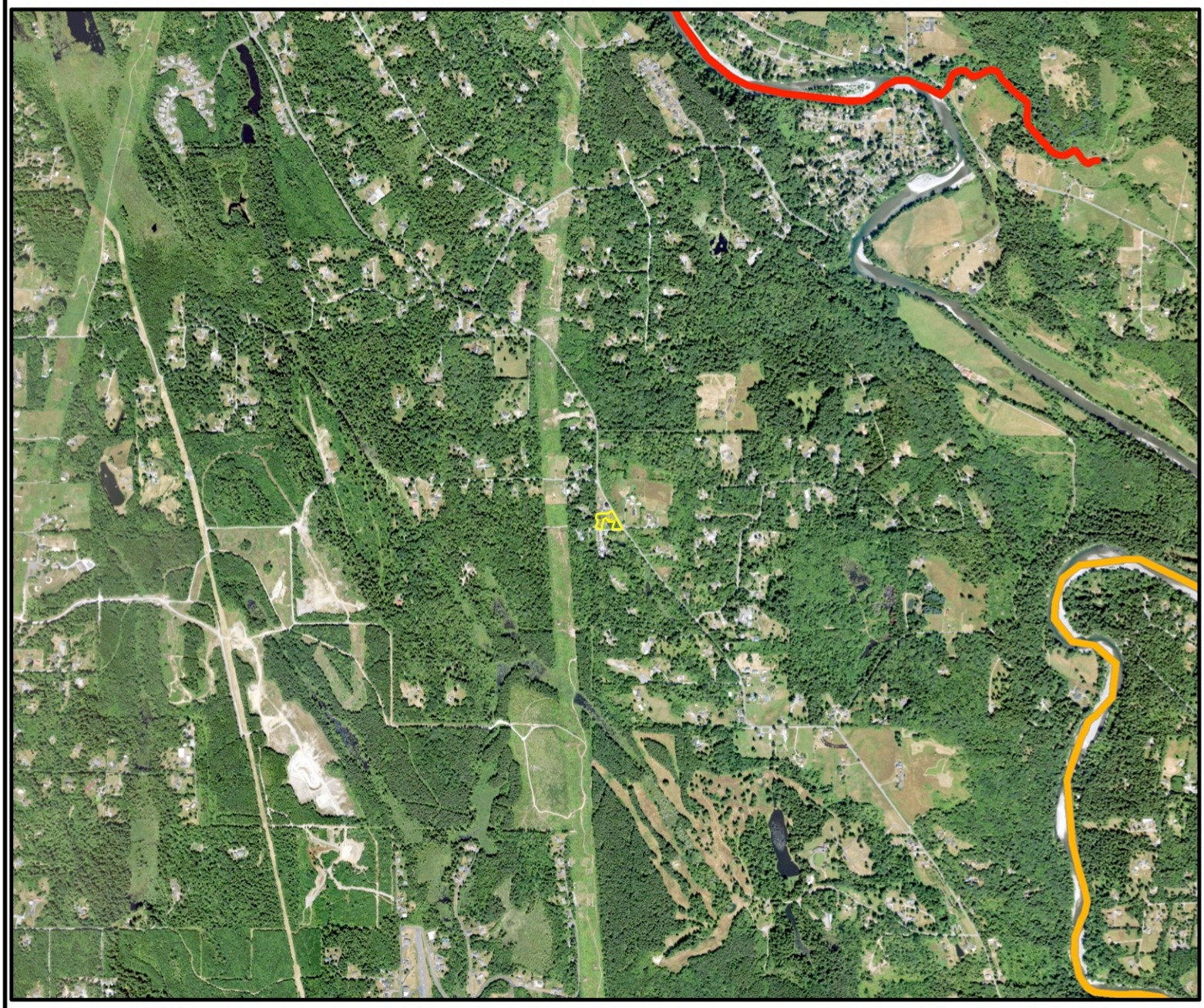
Figure D-2

WRI Job # 22229

Rated by: AW

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 3- WETLAND D



LEGEND

WETLAND

AQUATIC RESOURCES ON THE 303(d) LIST

Scale 1" = 2,000'

0 2,000 4,000

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WETLAND RATING

Wetland D

Figure D-3

WRI Job # 22229

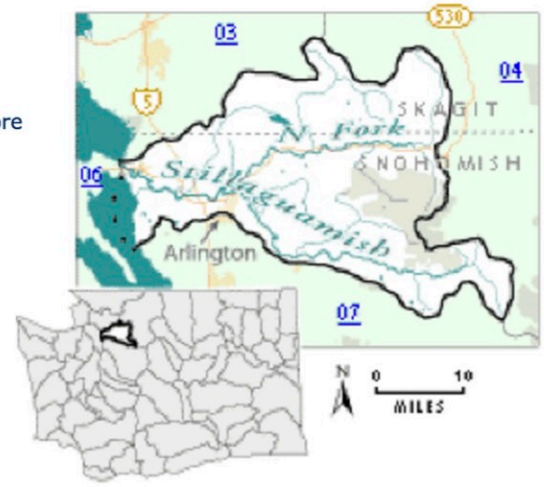
Rated by: AW

PUD - BURN RD RESERVOIR

WETLAND RATING FIGURE 4- WETLAND D

WRIA 5: Stillaguamish

The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.



Counties

- Skagit
- Snohomish

Waterbody Name	Pollutant(s)	Status**	TMDL Lead
Old Stillaguamish Channel	Dissolved Oxygen	On hold	Ralph Svrjcek 425-649-7165
Stillaguamish River	Arsenic Dissolved Oxygen Fecal Coliform Mercury pH Temperature	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7165

** ***Status*** *will be listed as one of the following: Approved by EPA, Under Development or Implementation*

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Email: mailbox@wetlandresources.com

WETLAND RATING
Wetland D

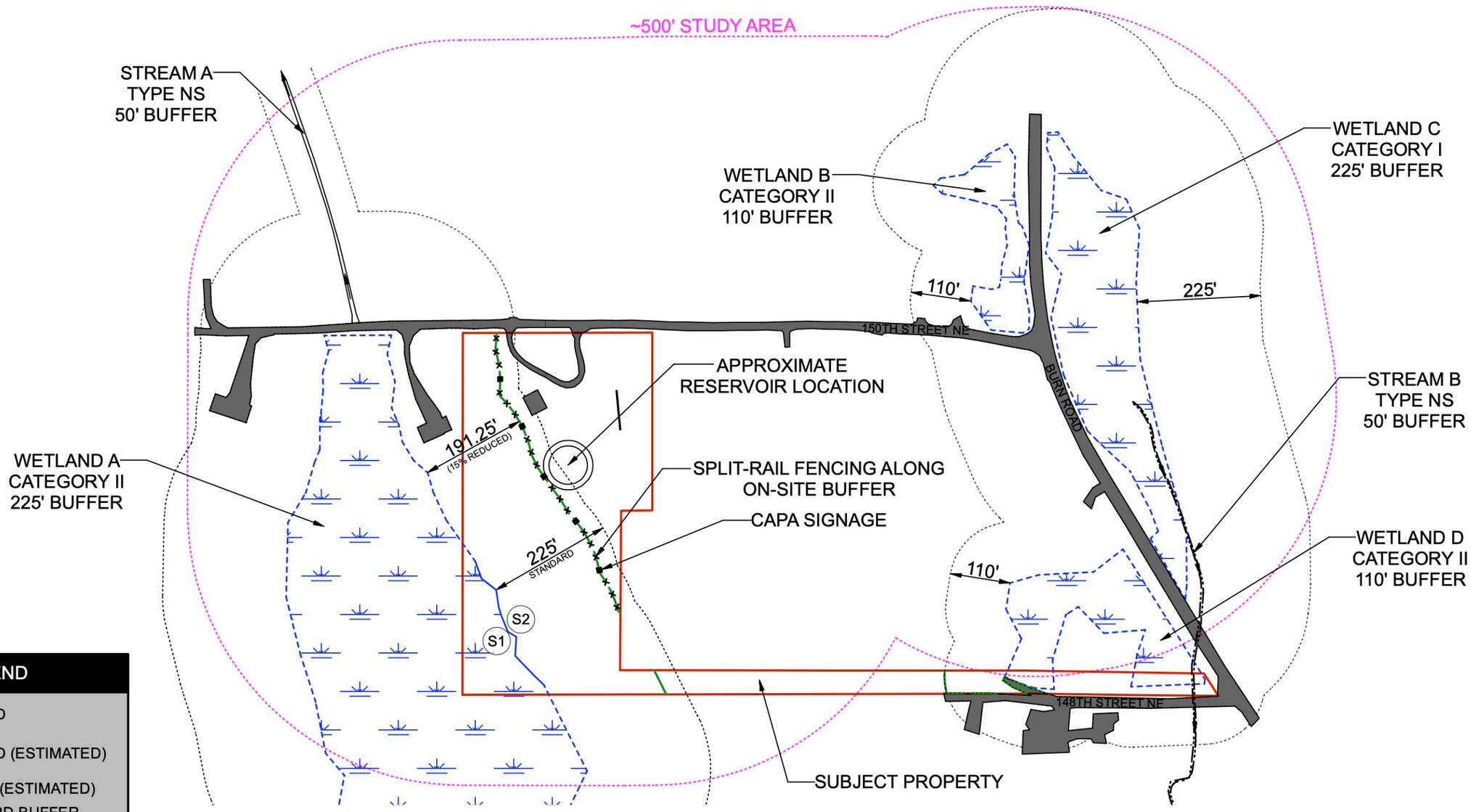
Figure D-4
WRI Job # 22229
Rated by: AW

APPENDIX C

CRITICAL AREA STUDY MAP

CRITICAL AREA STUDY MAP
BURN ROAD RESERVIOR

PORTION OF SECTION 32, TOWNSHIP 31N, RANGE 6E, W.M.



LEGEND

- WETLAND
- WETLAND (ESTIMATED)
- STREAM (ESTIMATED)
- STANDARD BUFFER
- EXISTING IMPERVIOUS
- PROPOSED BUFFER
- SPLIT-RAIL FENCING
- CAPA SIGNAGE
- S1 DATA SITES (S1-S2)

Scale 1" = 200'

0 100 200 300 400

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Email: mailbox@wetlandresources.com

CRITICAL AREA STUDY MAP
BURN ROAD RESERVOIR
SNOHOMISH COUNTY, WA

PUD No. 1 of Snohomish County
Attn: Max Selin
PO Box 1107, MS O2
Everett, WA 98206-1107

Sheet 1/1
WRI #: 22229
Drawn by: AW
Date: 07/31/2023

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APPENDIX D

STORMWATER CALCULATIONS

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APPENDIX D - STORMWATER CALCULATIONS

TABLE OF CONTENTS:

Biofiltration Swale Calculations

Burn Road Reserviour - Evaluate Size of Proposed Bioswale, Bottom Width = 2 ft

Calculated by: Taylor Russell
Checked by: C. Talich
3/7/2025

King County Surface Water Design Manual Biofiltration Swale Sizing Calculations

Water Quality Design Flow Rate (Q_{wq})	P-1	0.0381 ft3/s	from WWHM2012 On-Line BMP Water Quality Flow Rate
Longitudinal Slope (s)	P-2	0.025 ft/ft	min. 0.015 / max. 0.025
Select Vegetation Cover	P-3	Grass	

Final Dimensions		
Length	100.00	ft
Bottom Width	2.00	ft
Top Width	8.00	ft
Depth	1.00	ft
Side Slope	3	:1

***Guidance for Bypassing Off-line Facilities*:**

Most bioswales are currently designed to be on-line facilities. However, an off-line design is possible. Bioswales designed in an off-line mode should not engage a bypass until the flow rate exceeds the modified off-line water quality design flow rate.

2021 Surface Water Design Manual

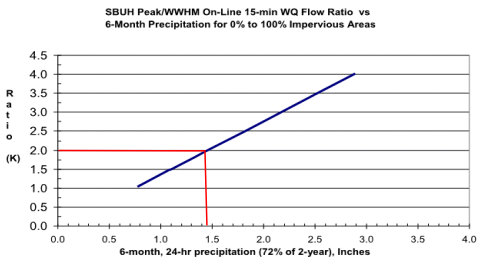
6-42

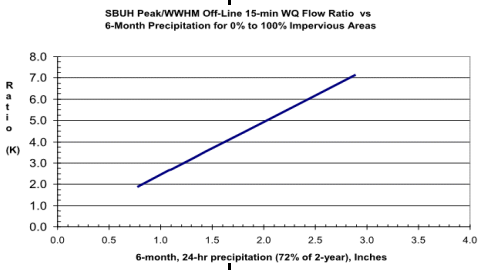
6.3.1 BASIC BIOSWALES — *METHODS OF ANALYSIS*

If the bioswale is located downstream of an onsite detention facility, the swale design flow shall be the 2-year release rate from the detention facility.

Design Steps (D)

Design Flow Depth (y)	D-1	0.33 ft	2" mowed frequently, 4" mowed infrequently
Mannings n Value (n)	D-2	0.24	0.2-0.3, 0.24 if mowed infrequently
Select swale shape	D-3	Trapezoidal	
Side Slope (Z)		3 :1	
Bottom With of Trapezoid (b)	D-4(a)	2.00 ft	-1.00
$Q_{wq} = 1.49AR^{0.67}s^{0.5}/n$			
Cross Sectional Area (A_{trap}) = $by+Zy^2$	D-4(b))	1	Combine Manning's equation with Area and Hydraulic Radius equations.
Hydraulic Radius (R_{trap}) = $(by+Zy^2)/(b+2y\sqrt{Z^2+1})$		0.243416	
$Q_{wq,trap} = 1.49(by+Zy^2)((by+Zy^2)/(b+2y\sqrt{Z^2+1}))^{0.67}s^{0.5}/n$		0.38 cfs	
$Q_{wq\ (WWHM)}$ - $Q_{wq\ (calc)}$ =	D-4(c)	0.00 cfs	Solve for "b" by setting this cell to 0 and changing variable cells for "b".
Top Width of Trapezoid (T)	D-5(d)	4.00 ft	
$A_{trap} = by+Zy^2$	D-5	1.00 ft2	
Flow Velocity at Water Quality Flow Rate (V_{wq}) = kQ/A	D-6(a)	0.08 ft/s	
Determine 6-month, 24-hr precipitation (72% of 2-yr)	D-6(b)	1.44 in	2" from 2 year Western Washington Isopluvial
Ratio of peak volumetric flow rate to Q_{wq} (k)	D-6(c)	2	From table below





Swale Length (L)	D-7(a)	41.15 ft	Minimum length of 100 feet.
Hydraulic Residence Time (t)	D-7(b)	9 min	t=9 minutes for biofiltration swales without continuous inflow.

Stability Check (SC)

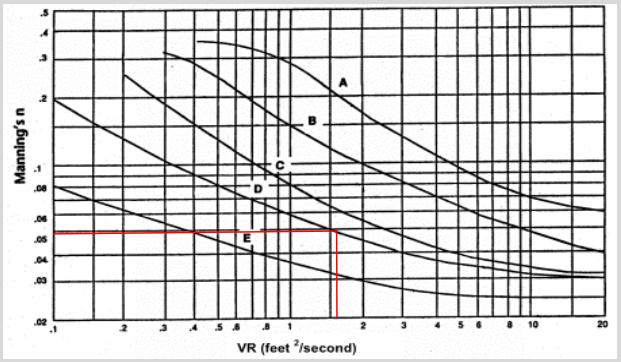
100-Year Flow (15-min time step) (Q_{100})	SC-1	**0.28 cfs**	**0.28 < 3 fps**
Estimate Vegetation Cover (Good or Fair)	SC-2	Fair	
Estimate Degree of Retardance	SC-3(a)	D	
Velocity (V_{max})	SC-3(b)	3 ft/s	

Table 9.4.2
Guide for Selecting Degree of Retardance [a]

Coverage	Average Grass Height (inches)	Degree of Retardance
Good	<2	E. Very Low
	2-6	D. Low
	6-10	C. Moderate
	11-24	B. High
	>30	A. Very High
Fair	<2	E. Very Low
	2-6	D. Low
	6-10	D. Low
	11-24	C. Moderate
	>30	B. High

See Chow (1959).. In addition, Chow recommended selection of retardance C for a grass-legume mixture 6-8 inches high and D for a mixture 4-5 inches high. No retardance recommendations have appeared for emergent wetland species. Therefore, judgment must be used. Since these species generally grow less densely than grasses, using a "fair" coverage would be a reasonable approach.

High Flow Manning's n (n)	SC-4	0.049	Minimum for poor veg. cover and low height is 0.033, typically start at 0.04.
$VR_{approximate}$	SC-5	1.6 ft^2/s	From table below



Compute Hydraulic Radius (R)	SC-6	0.53 ft	Use VR to compute R, assume a Vmax.
$VR_{computed} = 1.49R^{1.67}s^{0.5}/n$	SC-7	1.68 ft^2/s	
Compare VR	SC-8	Repeat Steps SC-4 through SC-8	
Velocity ($V_{computed}$)	SC-9(a)	3.16 ft/s	
	SC-9(b)	Check Vmax	
Stability Area ($A_{stability}$)	SC-10	0.09 ft2	
Stability Check	SC-11	Proceed	
Flow Depth at Stable Flow (y_{stable}) = -b+-(√b^2-4Z(-A))/2Z	SC-12	0.04 ft	It is a quadratic equation, generating two results.
		-0.71 ft	
Total Channel Depth (y_{total})	SC-13(a)	1.00 ft	Add 0.5 feet of freeboard to maximum of SC-12 and D-1. Rounded up the value.
Total Top Width (T_{total})	SC-13(b)	8 ft	
Hydraulic Radius (R) = (by+Zy^2)/(b+2y(Z^2+1)0.5)	SC-14	0.60 ft	
Flow at Greatest Resistance (Q_{resist}) = $1.49AR^{0.67}s^{0.5}/n$	SC-15(a)	3.42 cfs	> 0.28 cfs, therefore Ok
	SC-15(b)	Complete	

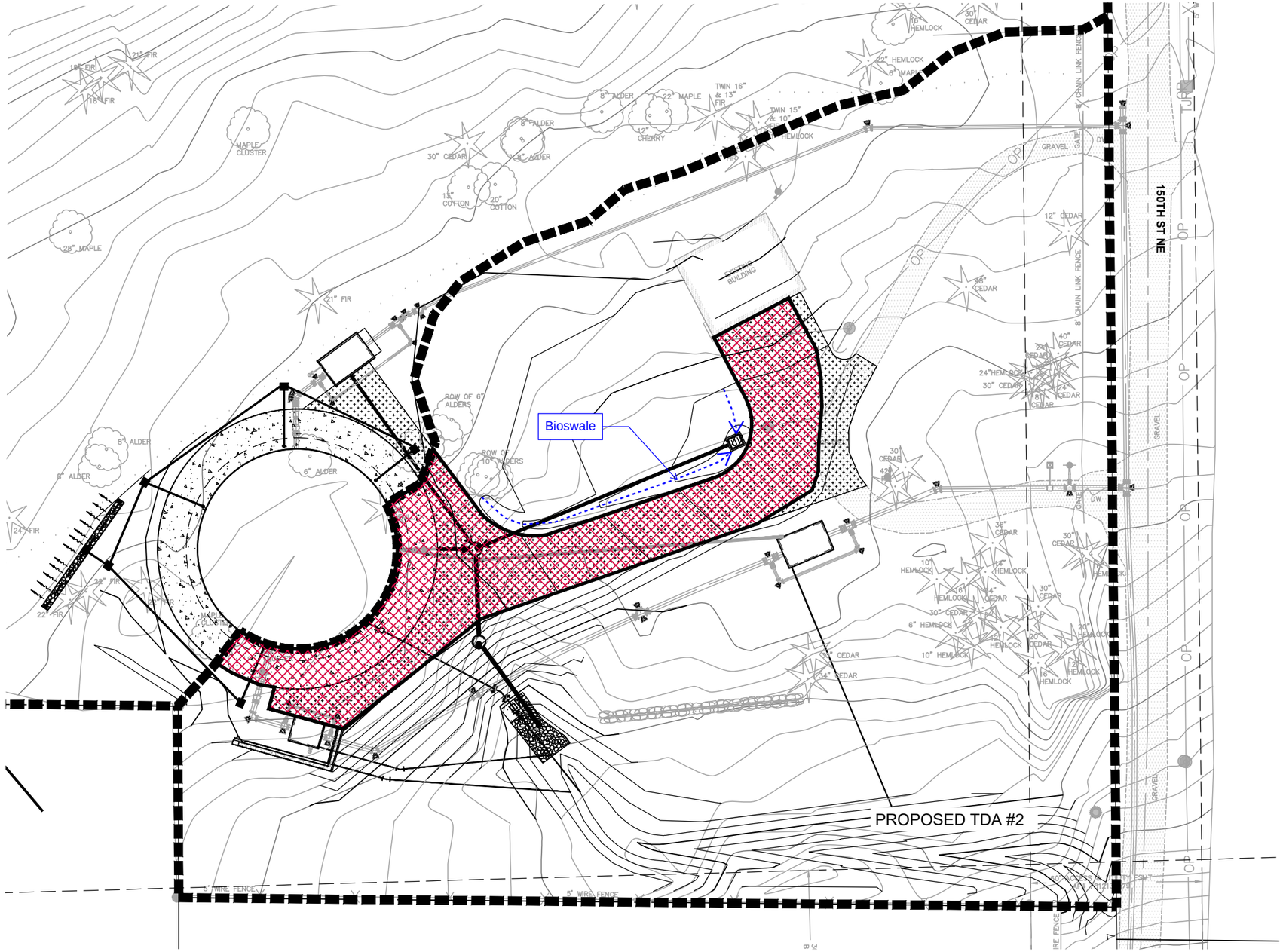
NORTH

0 40 80

Scale in Feet

LEGEND

PGHS DRAINING TO THE BIOSWALE



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Xref Filename: | X23-10882_TB | Talich | Rogers | Stevens | Gibson | McCrosky | Wildhood | X23-10882_Status | X23-10882_Ex Topo | X23-10882_Prop Grad | X23-10882_Prop Site | X23-10882_Prop Util | X23-10882_Ex Prof | X23-10882_Ex Prop-RW | Gillespie | Dahl | X23-10882_Prop Grad |

bhc CONSULTANTS

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO. 1

Pollution Generating Hard Surface Draining to Boiswale

Stormwater Report

May 2025

EXHIBIT

1

WWHM2012

PROJECT REPORT

General Model Information

WWHM2012 Project Name: Burn Road Res Biofiltration Swale
Site Name:
Site Address:
City:
Report Date: 5/22/2025
Gage: Everett
Data Start: 1948/10/01
Data End: 2009/09/30
Timestep: 15 Minute
Precip Scale: 1.400
Version Date: 2024/06/28
Version: 4.3.1

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.167
Pervious Total	0.167
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.167

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 1	POC 1	

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.167
Impervious Total	0.167
Basin Total	0.167

Element Flow Componants:

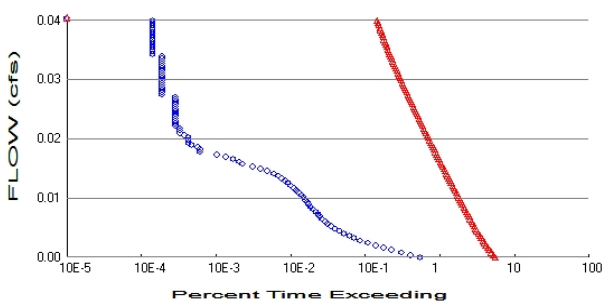
Surface	Interflow	Groundwater
Componant Flows To:		
POC 1	POC 1	

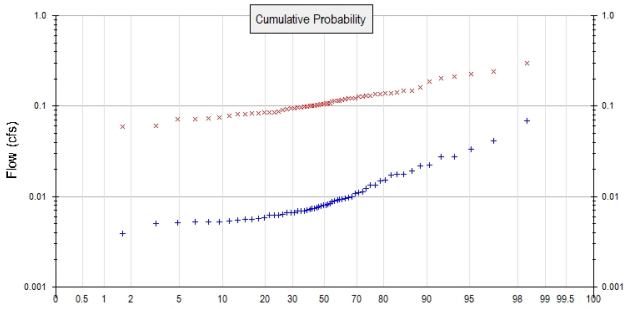
Routing Elements
Predeveloped Routing

Mitigated Routing

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.167
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0
Total Impervious Area: 0.167

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.008746
5 year	0.015035
10 year	0.020682
25 year	0.02988
50 year	0.038496
100 year	0.048868

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.10699
5 year	0.144134
10 year	0.171205
25 year	0.208338
50 year	0.238199
100 year	0.270007

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.013	0.116
1950	0.011	0.120
1951	0.008	0.138
1952	0.007	0.103
1953	0.008	0.128
1954	0.034	0.161
1955	0.011	0.135
1956	0.008	0.058
1957	0.012	0.093
1958	0.028	0.240

1959	0.008	0.096
1960	0.009	0.099
1961	0.068	0.302
1962	0.009	0.123
1963	0.017	0.129
1964	0.011	0.072
1965	0.006	0.097
1966	0.004	0.097
1967	0.007	0.204
1968	0.009	0.107
1969	0.041	0.213
1970	0.005	0.085
1971	0.010	0.114
1972	0.008	0.148
1973	0.006	0.121
1974	0.017	0.146
1975	0.008	0.117
1976	0.006	0.082
1977	0.005	0.084
1978	0.005	0.061
1979	0.022	0.131
1980	0.009	0.102
1981	0.006	0.084
1982	0.008	0.087
1983	0.015	0.113
1984	0.007	0.105
1985	0.010	0.143
1986	0.022	0.137
1987	0.010	0.123
1988	0.007	0.102
1989	0.007	0.099
1990	0.007	0.082
1991	0.007	0.107
1992	0.006	0.100
1993	0.006	0.077
1994	0.005	0.094
1995	0.007	0.074
1996	0.013	0.129
1997	0.027	0.114
1998	0.007	0.137
1999	0.006	0.060
2000	0.005	0.228
2001	0.002	0.073
2002	0.007	0.071
2003	0.005	0.101
2004	0.009	0.187
2005	0.006	0.085
2006	0.019	0.108
2007	0.015	0.106
2008	0.018	0.090
2009	0.005	0.085

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0683	0.3016
2	0.0410	0.2399
3	0.0335	0.2278

4	0.0275	0.2127
5	0.0275	0.2040
6	0.0220	0.1870
7	0.0216	0.1612
8	0.0191	0.1477
9	0.0177	0.1465
10	0.0175	0.1432
11	0.0172	0.1376
12	0.0151	0.1375
13	0.0150	0.1368
14	0.0134	0.1350
15	0.0132	0.1309
16	0.0122	0.1293
17	0.0114	0.1288
18	0.0109	0.1278
19	0.0108	0.1235
20	0.0098	0.1230
21	0.0096	0.1210
22	0.0096	0.1197
23	0.0094	0.1166
24	0.0092	0.1158
25	0.0091	0.1136
26	0.0089	0.1136
27	0.0088	0.1130
28	0.0083	0.1081
29	0.0082	0.1072
30	0.0080	0.1067
31	0.0080	0.1058
32	0.0079	0.1049
33	0.0077	0.1025
34	0.0075	0.1020
35	0.0073	0.1019
36	0.0073	0.1011
37	0.0073	0.0999
38	0.0071	0.0993
39	0.0069	0.0991
40	0.0069	0.0971
41	0.0069	0.0966
42	0.0067	0.0956
43	0.0067	0.0944
44	0.0066	0.0926
45	0.0064	0.0899
46	0.0063	0.0875
47	0.0062	0.0855
48	0.0062	0.0850
49	0.0059	0.0848
50	0.0057	0.0840
51	0.0056	0.0840
52	0.0056	0.0823
53	0.0054	0.0820
54	0.0054	0.0775
55	0.0053	0.0743
56	0.0052	0.0730
57	0.0052	0.0720
58	0.0052	0.0714
59	0.0051	0.0611
60	0.0039	0.0595
61	0.0023	0.0576

Duration Flows

The Duration Matching Failed

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0044	11460	117788	1027	Fail
0.0047	8553	110858	1296	Fail
0.0051	6423	104185	1622	Fail
0.0054	4787	98068	2048	Fail
0.0058	3713	92849	2500	Fail
0.0061	2911	88314	3033	Fail
0.0064	2306	83994	3642	Fail
0.0068	1829	80122	4380	Fail
0.0071	1504	76593	5092	Fail
0.0075	1298	73214	5640	Fail
0.0078	1098	70048	6379	Fail
0.0082	953	67118	7042	Fail
0.0085	829	64338	7760	Fail
0.0089	737	61728	8375	Fail
0.0092	666	59119	8876	Fail
0.0095	614	56744	9241	Fail
0.0099	562	54477	9693	Fail
0.0102	523	52274	9995	Fail
0.0106	493	50200	10182	Fail
0.0109	463	48317	10435	Fail
0.0113	427	46435	10874	Fail
0.0116	392	44574	11370	Fail
0.0120	368	42778	11624	Fail
0.0123	353	41109	11645	Fail
0.0126	336	39569	11776	Fail
0.0130	316	38136	12068	Fail
0.0133	297	36682	12350	Fail
0.0137	271	35313	13030	Fail
0.0140	252	33923	13461	Fail
0.0144	234	32725	13985	Fail
0.0147	214	31484	14712	Fail
0.0151	196	30308	15463	Fail
0.0154	177	29217	16506	Fail
0.0157	161	28126	17469	Fail
0.0161	147	27057	18406	Fail
0.0164	127	26073	20529	Fail
0.0168	102	25110	24617	Fail
0.0171	83	24169	29119	Fail
0.0175	65	23250	35769	Fail
0.0178	48	22330	46520	Fail
0.0182	43	21539	50090	Fail
0.0185	36	20694	57483	Fail
0.0188	29	19975	68879	Fail
0.0192	22	19265	87568	Fail
0.0195	13	18595	143038	Fail
0.0199	13	17943	138023	Fail
0.0202	12	17289	144075	Fail
0.0206	10	16690	166900	Fail
0.0209	9	16108	178977	Fail
0.0213	9	15492	172133	Fail
0.0216	9	14944	166044	Fail
0.0220	8	14384	179800	Fail
0.0223	7	13868	198114	Fail
0.0226	7	13387	191242	Fail

0.0230	7	12953	185042	Fail
0.0233	6	12472	207866	Fail
0.0237	6	12059	200983	Fail
0.0240	6	11659	194316	Fail
0.0244	6	11236	187266	Fail
0.0247	6	10870	181166	Fail
0.0251	6	10474	174566	Fail
0.0254	6	10102	168366	Fail
0.0257	6	9740	162333	Fail
0.0261	6	9450	157500	Fail
0.0264	6	9118	151966	Fail
0.0268	6	8810	146833	Fail
0.0271	6	8491	141516	Fail
0.0275	6	8188	136466	Fail
0.0278	4	7925	198125	Fail
0.0282	4	7651	191275	Fail
0.0285	4	7379	184475	Fail
0.0288	4	7165	179125	Fail
0.0292	4	6936	173400	Fail
0.0295	4	6699	167475	Fail
0.0299	4	6496	162400	Fail
0.0302	4	6273	156825	Fail
0.0306	4	6055	151375	Fail
0.0309	4	5871	146775	Fail
0.0313	4	5672	141800	Fail
0.0316	4	5486	137150	Fail
0.0319	4	5298	132450	Fail
0.0323	4	5125	128125	Fail
0.0326	4	4960	124000	Fail
0.0330	4	4810	120250	Fail
0.0333	4	4658	116450	Fail
0.0337	3	4537	151233	Fail
0.0340	3	4421	147366	Fail
0.0344	3	4280	142666	Fail
0.0347	3	4158	138600	Fail
0.0350	3	4042	134733	Fail
0.0354	3	3927	130900	Fail
0.0357	3	3822	127400	Fail
0.0361	3	3720	124000	Fail
0.0364	3	3628	120933	Fail
0.0368	3	3523	117433	Fail
0.0371	3	3444	114800	Fail
0.0375	3	3345	111500	Fail
0.0378	3	3251	108366	Fail
0.0382	3	3159	105300	Fail
0.0385	3	3063	102100	Fail

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

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

Model Default Modifications

Total of 0 changes have been made.

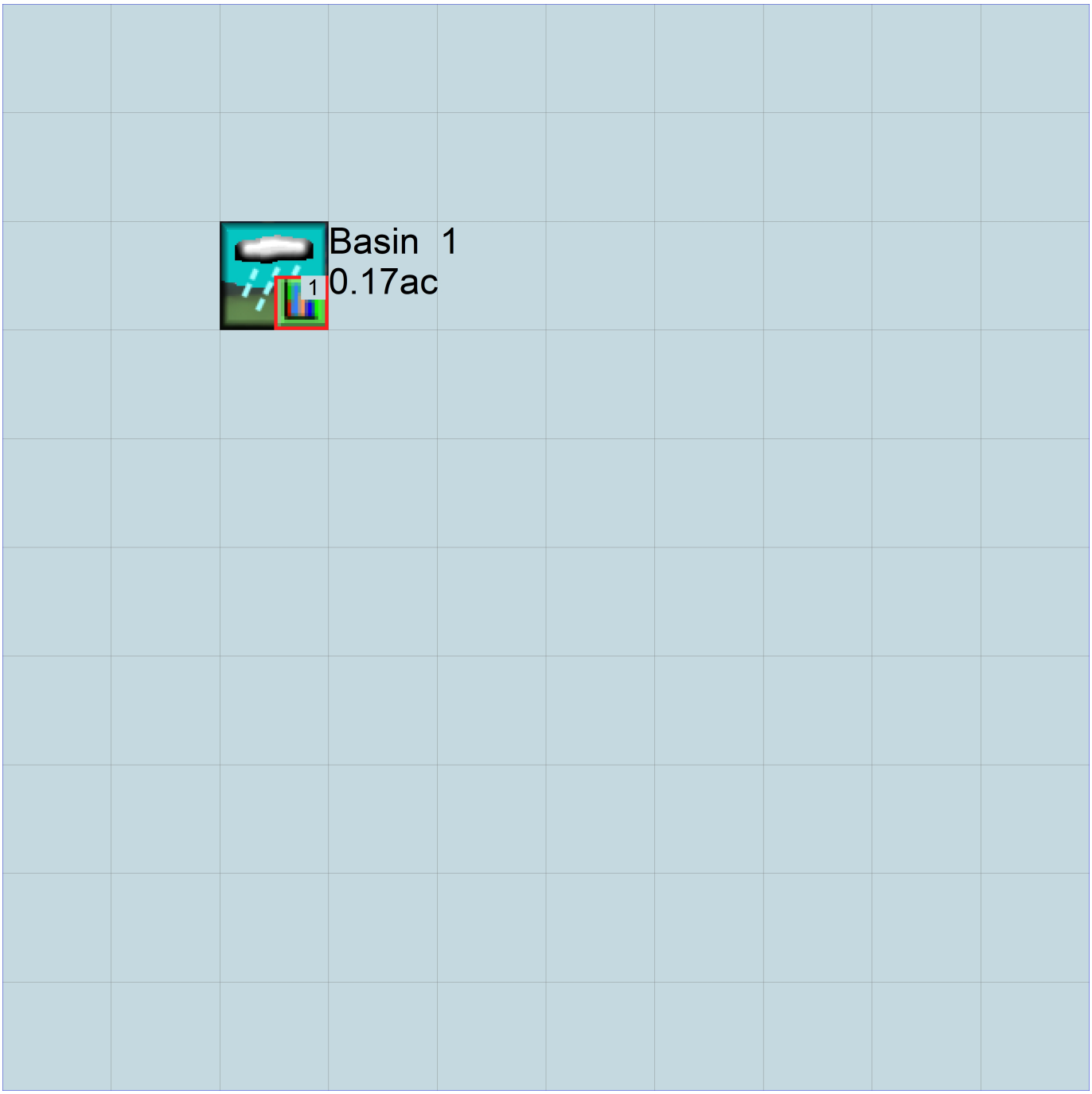
PERLND Changes

No PERLND changes have been made.

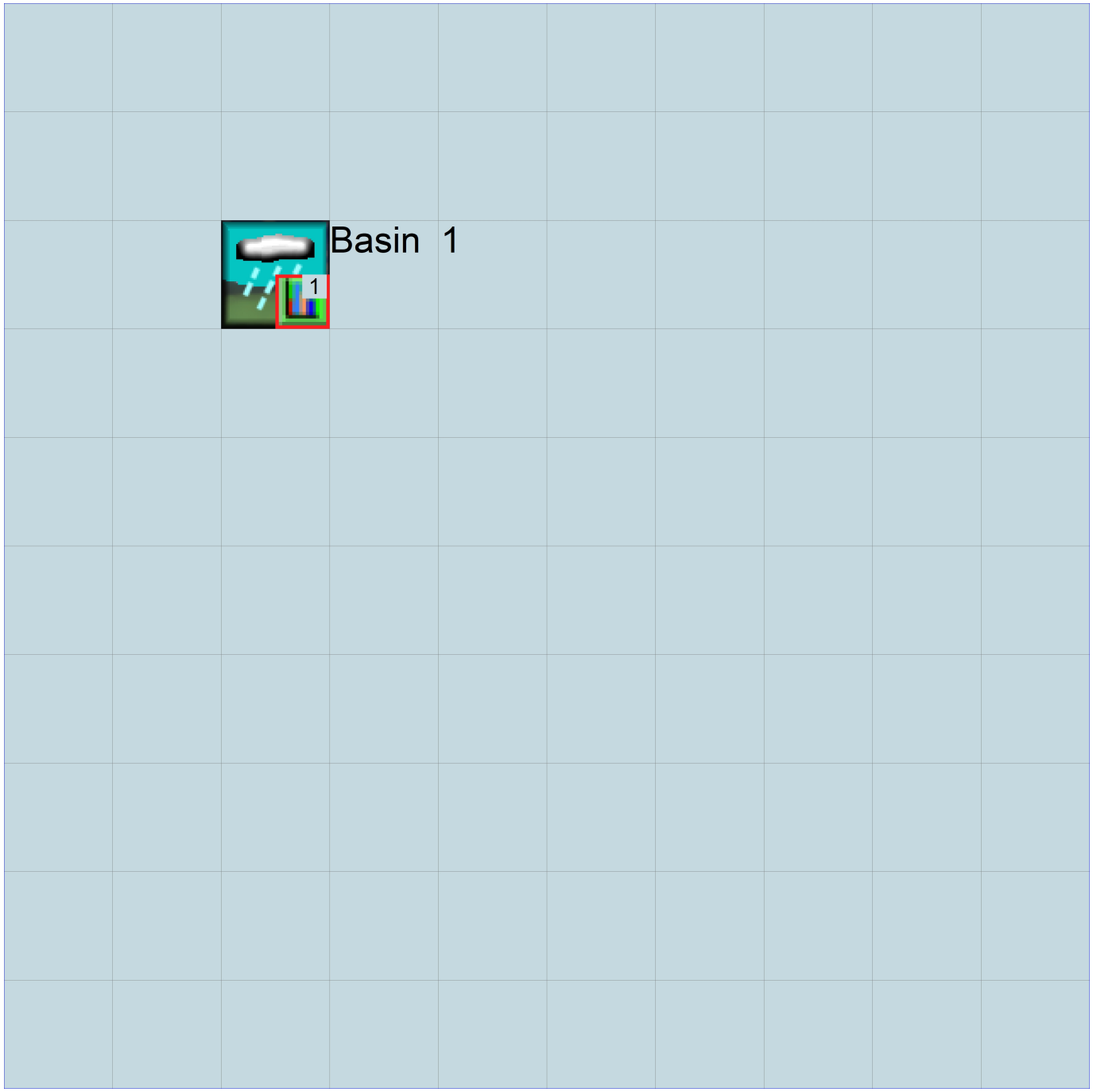
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Burn Road Res Biofiltration Swale.wdm
MESSU       25   PreBurn Road Res Biofiltration Swale.MES
            27   PreBurn Road Res Biofiltration Swale.L61
            28   PreBurn Road Res Biofiltration Swale.L62
            30   POCBurn Road Res Biofiltration Swale1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                       0.167     COPY   501     12
PERLND  10                       0.167     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.4            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.4            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Burn Road Res Biofiltration Swale.wdm
MESSU       25   MitBurn Road Res Biofiltration Swale.MES
            27   MitBurn Road Res Biofiltration Swale.L61
            28   MitBurn Road Res Biofiltration Swale.L62
            30   POCBurn Road Res Biofiltration Swale1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      IMPLND       1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
```

```
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                            ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL     *********
    1         0    0    4    0    0    4    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1               0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND
```

```
SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
IMPLND   1                       0.167     COPY   501     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.4            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.4            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

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WWHM2012

PROJECT REPORT

General Model Information

WWHM2012 Project Name: Burn Road Res TDA#1 Developed Site
Site Name:
Site Address:
City:

Report Date:	5/22/2025
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	Hourly
Precip Scale:	1.400
Version Date:	2024/06/28
Version:	4.3.1

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Forest, Flat	0.83
C, Lawn, Flat	0.74
Pervious Total	1.57

Impervious Land Use	acre
ROADS FLAT	0.06
ROOF TOPS FLAT	0.03
Impervious Total	0.09
Basin Total	1.66

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 1	POC 1	

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Forest, Flat	0.33
C, Pasture, Flat	0.57
C, Lawn, Flat	0.48
Pervious Total	1.38

Impervious Land Use	acre
ROADS FLAT	0.21
ROOF TOPS FLAT	0.03
SIDEWALKS FLAT	0.04
Impervious Total	0.28
Basin Total	1.66

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

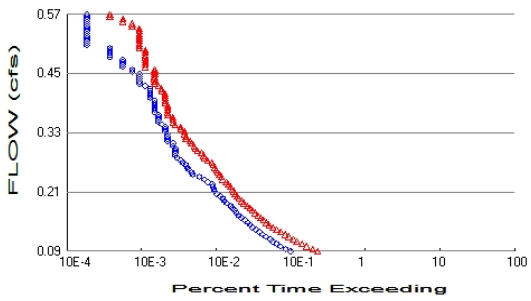
POC 1	POC 1

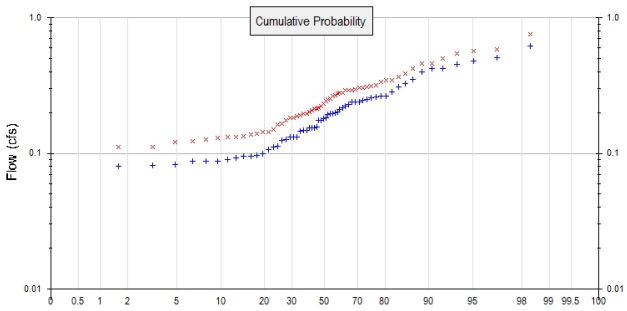
Routing Elements
Predeveloped Routing

Mitigated Routing

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.57
Total Impervious Area: 0.09

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.38
Total Impervious Area: 0.28

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.174853
5 year	0.279045
10 year	0.359988
25 year	0.476089
50 year	0.572827
100 year	0.678531

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.230613
5 year	0.346509
10 year	0.43258
25 year	0.551843
50 year	0.648326
100 year	0.751377

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.176	0.222
1950	0.350	0.420
1951	0.089	0.150
1952	0.155	0.196
1953	0.223	0.279
1954	0.309	0.364
1955	0.283	0.335
1956	0.113	0.139
1957	0.260	0.306
1958	0.506	0.584

1959	0.132	0.189
1960	0.176	0.216
1961	0.617	0.755
1962	0.265	0.310
1963	0.425	0.502
1964	0.126	0.165
1965	0.083	0.112
1966	0.097	0.144
1967	0.181	0.345
1968	0.210	0.291
1969	0.482	0.565
1970	0.111	0.163
1971	0.238	0.296
1972	0.451	0.547
1973	0.182	0.249
1974	0.195	0.270
1975	0.197	0.253
1976	0.145	0.203
1977	0.093	0.130
1978	0.100	0.139
1979	0.397	0.462
1980	0.107	0.144
1981	0.148	0.183
1982	0.132	0.175
1983	0.194	0.241
1984	0.155	0.214
1985	0.217	0.263
1986	0.327	0.390
1987	0.240	0.312
1988	0.124	0.190
1989	0.240	0.293
1990	0.087	0.132
1991	0.095	0.135
1992	0.148	0.195
1993	0.132	0.182
1994	0.080	0.105
1995	0.095	0.133
1996	0.198	0.233
1997	0.423	0.463
1998	0.249	0.317
1999	0.087	0.122
2000	0.203	0.282
2001	0.062	0.111
2002	0.087	0.123
2003	0.081	0.126
2004	0.264	0.344
2005	0.156	0.213
2006	0.230	0.276
2007	0.256	0.306
2008	0.247	0.291
2009	0.154	0.207

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.6166	0.7551
2	0.5055	0.5840
3	0.4817	0.5647

4	0.4506	0.5469
5	0.4251	0.5020
6	0.4234	0.4627
7	0.3968	0.4622
8	0.3497	0.4203
9	0.3273	0.3905
10	0.3088	0.3644
11	0.2828	0.3447
12	0.2650	0.3441
13	0.2639	0.3352
14	0.2595	0.3167
15	0.2564	0.3121
16	0.2490	0.3099
17	0.2468	0.3064
18	0.2402	0.3061
19	0.2397	0.2957
20	0.2382	0.2926
21	0.2303	0.2914
22	0.2231	0.2911
23	0.2167	0.2817
24	0.2098	0.2787
25	0.2028	0.2762
26	0.1979	0.2699
27	0.1973	0.2627
28	0.1954	0.2529
29	0.1935	0.2487
30	0.1820	0.2415
31	0.1812	0.2325
32	0.1765	0.2217
33	0.1765	0.2156
34	0.1564	0.2142
35	0.1549	0.2128
36	0.1546	0.2067
37	0.1535	0.2028
38	0.1483	0.1960
39	0.1475	0.1955
40	0.1452	0.1904
41	0.1322	0.1892
42	0.1316	0.1832
43	0.1316	0.1817
44	0.1262	0.1751
45	0.1243	0.1651
46	0.1133	0.1626
47	0.1113	0.1498
48	0.1065	0.1442
49	0.1000	0.1437
50	0.0966	0.1389
51	0.0955	0.1386
52	0.0952	0.1347
53	0.0930	0.1326
54	0.0893	0.1316
55	0.0873	0.1301
56	0.0872	0.1265
57	0.0869	0.1230
58	0.0825	0.1220
59	0.0810	0.1119
60	0.0797	0.1109
61	0.0619	0.1052

Duration Flows

The Duration Matching Failed

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0874	534	1232	230	Fail
0.0923	453	1057	233	Fail
0.0972	388	876	225	Fail
0.1021	345	751	217	Fail
0.1070	303	645	212	Fail
0.1119	284	577	203	Fail
0.1168	250	505	202	Fail
0.1217	223	449	201	Fail
0.1267	201	394	196	Fail
0.1316	182	346	190	Fail
0.1365	165	308	186	Fail
0.1414	155	274	176	Fail
0.1463	144	254	176	Fail
0.1512	129	231	179	Fail
0.1561	116	210	181	Fail
0.1610	107	195	182	Fail
0.1659	100	178	178	Fail
0.1708	95	164	172	Fail
0.1757	89	152	170	Fail
0.1806	84	139	165	Fail
0.1855	74	127	171	Fail
0.1904	70	118	168	Fail
0.1953	66	108	163	Fail
0.2002	60	102	170	Fail
0.2051	55	96	174	Fail
0.2100	51	93	182	Fail
0.2149	50	88	176	Fail
0.2198	48	83	172	Fail
0.2247	47	77	163	Fail
0.2296	41	73	178	Fail
0.2345	37	66	178	Fail
0.2394	32	63	196	Fail
0.2443	26	59	226	Fail
0.2492	25	56	224	Fail
0.2541	23	54	234	Fail
0.2590	22	51	231	Fail
0.2639	21	49	233	Fail
0.2688	19	47	247	Fail
0.2737	18	41	227	Fail
0.2786	16	38	237	Fail
0.2835	15	36	240	Fail
0.2885	15	34	226	Fail
0.2934	15	30	200	Fail
0.2983	15	28	186	Fail
0.3032	14	27	192	Fail
0.3081	14	25	178	Fail
0.3130	12	24	200	Fail
0.3179	12	21	175	Fail
0.3228	12	21	175	Fail
0.3277	12	20	166	Fail
0.3326	11	20	181	Fail
0.3375	11	18	163	Fail
0.3424	11	18	163	Fail
0.3473	10	15	150	Fail

0.3522	9	14	155	Fail
0.3571	9	14	155	Fail
0.3620	9	14	155	Fail
0.3669	9	12	133	Fail
0.3718	8	12	150	Fail
0.3767	8	12	150	Fail
0.3816	8	12	150	Fail
0.3865	8	12	150	Fail
0.3914	8	11	137	Fail
0.3963	8	11	137	Fail
0.4012	7	11	157	Fail
0.4061	7	11	157	Fail
0.4110	7	11	157	Fail
0.4159	7	10	142	Fail
0.4208	7	10	142	Fail
0.4257	6	9	150	Fail
0.4306	5	8	160	Fail
0.4355	5	8	160	Fail
0.4404	5	8	160	Fail
0.4453	5	8	160	Fail
0.4503	5	8	160	Fail
0.4552	4	8	200	Fail
0.4601	4	8	200	Fail
0.4650	3	6	200	Fail
0.4699	3	6	200	Fail
0.4748	3	6	200	Fail
0.4797	3	6	200	Fail
0.4846	2	6	300	Fail
0.4895	2	6	300	Fail
0.4944	2	6	300	Fail
0.4993	2	6	300	Fail
0.5042	2	5	250	Fail
0.5091	1	5	500	Fail
0.5140	1	5	500	Fail
0.5189	1	5	500	Fail
0.5238	1	5	500	Fail
0.5287	1	5	500	Fail
0.5336	1	5	500	Fail
0.5385	1	5	500	Fail
0.5434	1	5	500	Fail
0.5483	1	4	400	Fail
0.5532	1	4	400	Fail
0.5581	1	3	300	Fail
0.5630	1	3	300	Fail
0.5679	1	2	200	Fail
0.5728	1	2	200	Fail

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

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

Model Default Modifications

Total of 0 changes have been made.

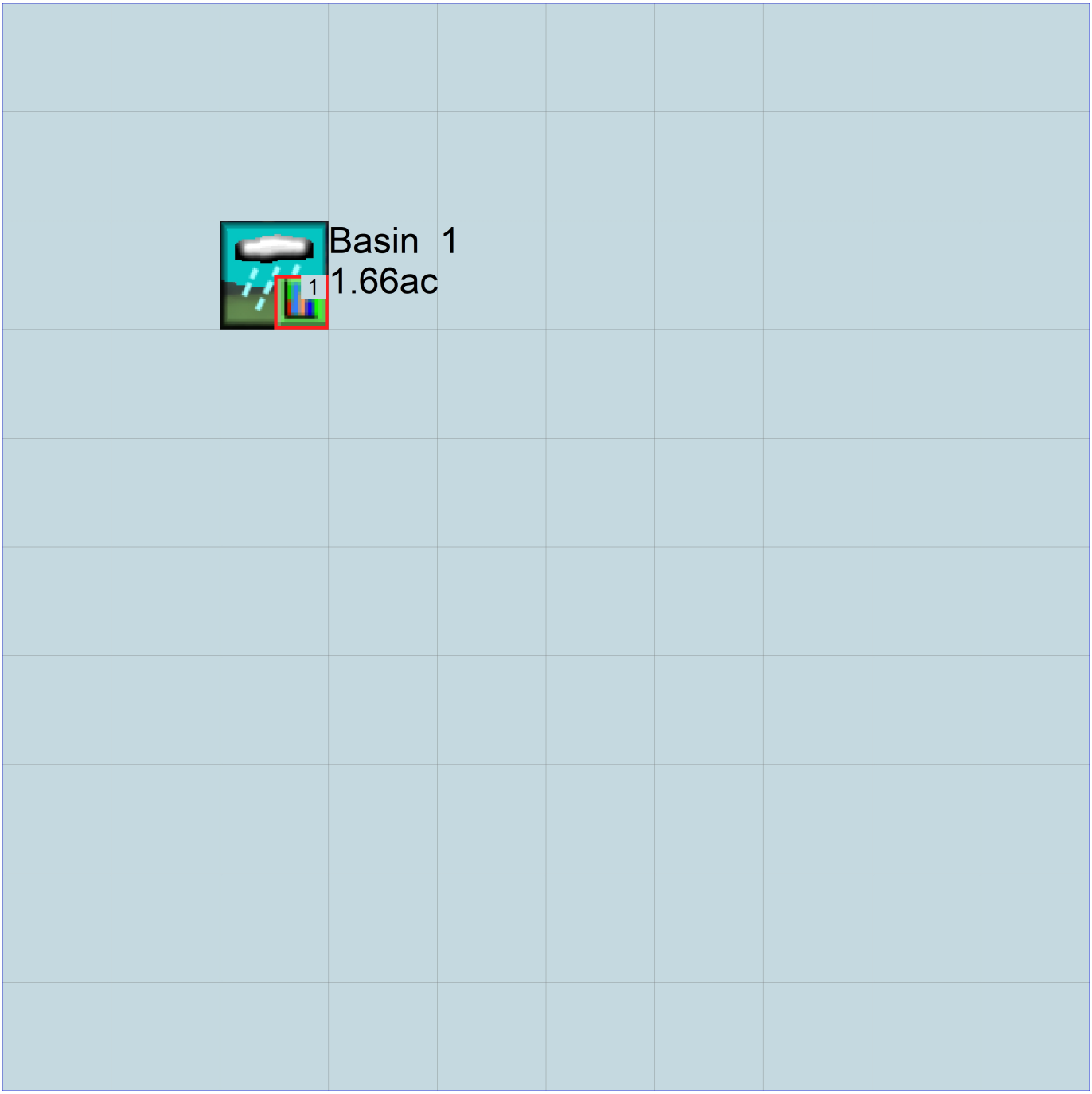
PERLND Changes

No PERLND changes have been made.

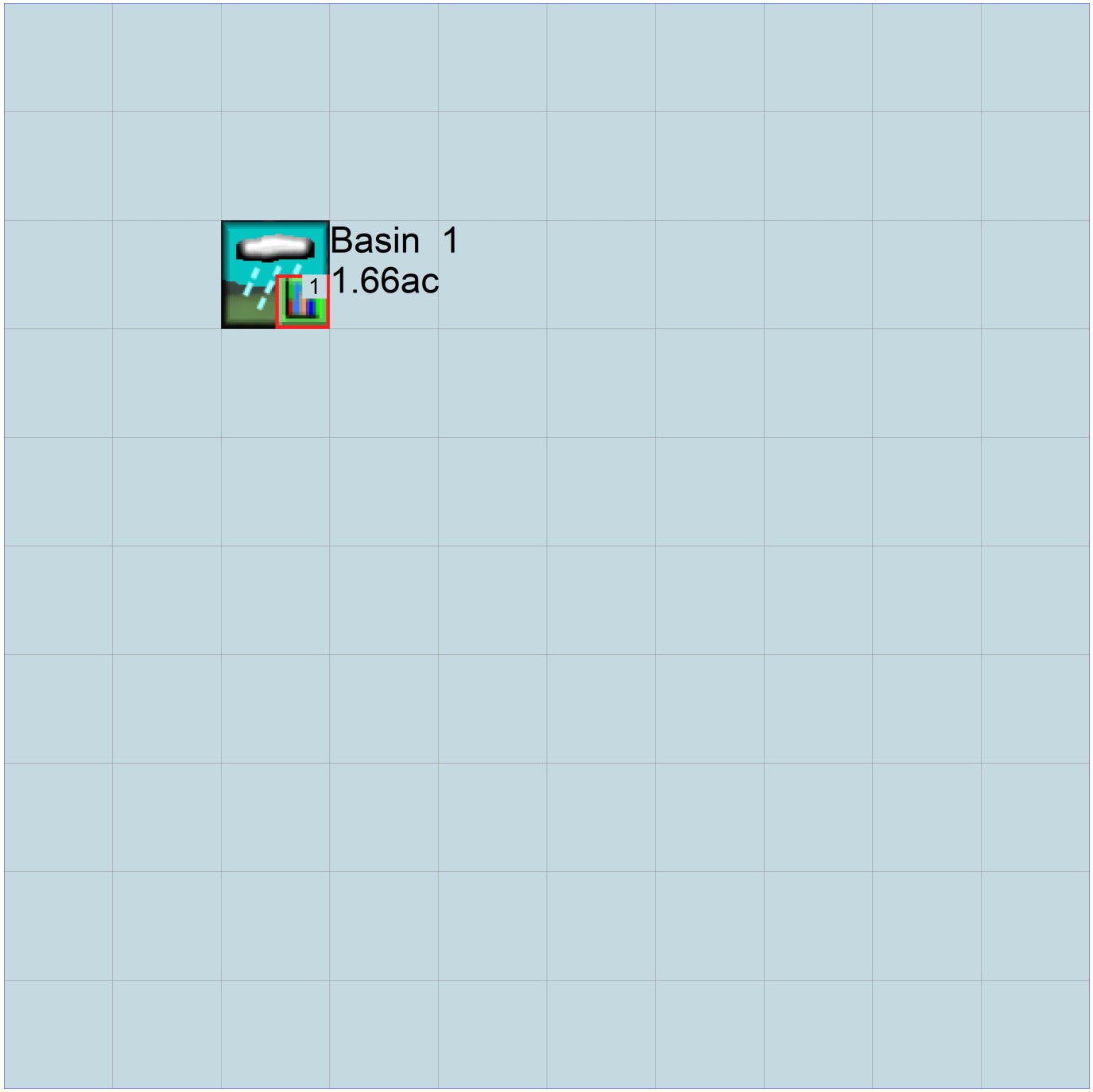
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Burn Road Res TDA#1 Developed Site.wdm
MESSU       25   PreBurn Road Res TDA#1 Developed Site.MES
            27   PreBurn Road Res TDA#1 Developed Site.L61
            28   PreBurn Road Res TDA#1 Developed Site.L62
            30   POCBurn Road Res TDA#1 Developed Site1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:60
      PERLND      10
      PERLND      16
      IMPLND       1
      IMPLND       4
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                      in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
   16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
```

```
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10              0         0         2         2         0         0         0
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10            0.2       0.5      0.35         6       0.5       0.7
   16            0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10              0         0         0         0       2.5         1         0
   16              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                  in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    4    1    9
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
```

```
    1         0    0    0    0    0
    4         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
    4            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    4              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                        0.83     COPY   501     12
PERLND  10                        0.83     COPY   501     13
PERLND  16                        0.74     COPY   501     12
PERLND  16                        0.74     COPY   501     13
IMPLND   1                        0.06     COPY   501     15
IMPLND   4                        0.03     COPY   501     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO
```

```
  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.4       SUM  PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.4       SUM  IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Burn Road Res TDA#1 Developed Site.wdm
MESSU       25   MitBurn Road Res TDA#1 Developed Site.MES
            27   MitBurn Road Res TDA#1 Developed Site.L61
            28   MitBurn Road Res TDA#1 Developed Site.L62
            30   POCBurn Road Res TDA#1 Developed Site1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:60
      PERLND      10
      PERLND      13
      PERLND      16
      IMPLND       1
      IMPLND       4
      IMPLND       8
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
   13     C, Pasture, Flat        1    1    1    1   27    0
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
   13         0    0    1    0    0    0    0    0    0    0    0    0
```

```
 16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
   13         0    0    0    0    0    0    0    0    0    0    0
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
   13              0       4.5      0.06       400      0.05       0.5     0.996
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10              0         0         2         2         0         0         0
   13              0         0         2         2         0         0         0
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10          0.2       0.5      0.35         6       0.5       0.7
   13         0.15       0.4       0.3         6       0.5       0.4
   16          0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
   10              0         0         0         0       2.5          1         0
   13              0         0         0         0       2.5          1         0
   16              0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
    8      SIDEWALKS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
    8         0    0    1    0    0    0
```

```
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    4    1    9
    4         0    0    4    0    0    0    1    9
    8         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
    4         0    0    0    0    0
    8         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
    4            400      0.01       0.1       0.1
    8            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    4              0         0
    8              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
    8              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                      0.33     COPY   501     12
PERLND  10                      0.33     COPY   501     13
PERLND  13                      0.57     COPY   501     12
PERLND  13                      0.57     COPY   501     13
PERLND  16                      0.48     COPY   501     12
PERLND  16                      0.48     COPY   501     13
IMPLND   1                      0.21     COPY   501     15
IMPLND   4                      0.03     COPY   501     15
IMPLND   8                      0.04     COPY   501     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
```

```
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                      in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                     ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *     *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50      ***
  <------><--------><--------><--------><--------><--------><-------->      ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                        ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.4       SUM  PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.4       SUM  IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
```

```
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

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APPENDIX E

OPERATION AND MAINTENANCE (O&M) MANUAL

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Table V-A.6: Maintenance Standards - Debris Barriers (e.g., Trash Racks)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier cleared to design flow capacity.
Metal	Damaged/ Missing Bars.	Bars are bent out of shape more than 3 inches. Bars are missing or entire barrier missing. Bars are loose and rust is causing 50% deterioration to any part of barrier.	Bars in place with no bends more than 3/4 inch. Bars in place according to design. Barrier replaced or repaired to design standards.
	Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe	Barrier firmly attached to pipe

Table V-A.7: Maintenance Standards - Energy Dissipators

Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
External:			
Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Rock pad replaced to design standards.
	Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
Dispersion Trench	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/flushed so that it matches design.
	Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench redesigned or rebuilt to standards.
	Perforations Plugged.	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Perforated pipe cleaned or replaced.
	Water Flows Out Top of "Distributor" Catch Basin.	Maintenance person observes or receives credible report of water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.	Facility rebuilt or redesigned to standards.
	Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.	No danger of landslides.
Internal:			
Manhole/Chamber	Worn or Damaged Post, Baffles, Side of Chamber	Structure dissipating flow deteriorates to 1/2 of original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Structure replaced to design standards.
	Other Defects	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins

Table V-A.8: Maintenance Standards - Typical Biofiltration Swale

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits on grass treatment area of the bio-swale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
	Standing Water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet biofiltration swale.
	Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire swale width.	Level the spreader and clean so that flows are spread evenly over entire swale width.

Table V-A.8: Maintenance Standards - Typical Biofiltration Swale (continued)

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
	Constant Baseflow	When small quantities of water continually flow through the swale, even when it has been dry for weeks, and an eroded, muddy channel has formed in the swale bottom.	Add a low-flow pea-gravel drain the length of the swale or by-pass the baseflow around the swale.
	Poor Vegetation Coverage	When grass is sparse or bare or eroded patches occur in more than 10% of the swale bottom.	Determine why grass growth is poor and correct that condition. Re-plant with plugs of grass from the upper slope: plant in the swale bottom at 8-inch intervals. Or re-seed into loosened, fertile soil.
	Vegetation	When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over.	Mow vegetation or remove nuisance vegetation so that flow not impeded. Grass should be mowed to a height of 3 to 4 inches. Remove grass clippings.
	Excessive Shading	Grass growth is poor because sunlight does not reach swale.	If possible, trim back over-hanging limbs and remove brushy vegetation on adjacent slopes.
	Inlet/Outlet	Inlet/outlet areas clogged with sediment and/or debris.	Remove material so that there is no clogging or blockage in the inlet and outlet area.
	Trash and Debris Accumulation	Trash and debris accumulated in the bio-swale.	Remove trash and debris from bioswale.
	Erosion/Scouring	Eroded or scoured swale bottom due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. If bare areas are large, generally greater than 12 inches wide, the swale should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident, or take plugs of grass from the upper slope and plant in the swale bottom at 8-inch intervals.

Table V-A.9: Maintenance Standards - Wet Biofiltration Swale

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Sediment Accumulation	Sediment depth exceeds 2-inches in 10% of the swale treatment area.	Remove sediment deposits in treatment area.
	Water Depth	Water not retained to a depth of about 4 inches during the wet season.	Build up or repair outlet berm so that water is retained in the wet swale.
	Wetland Vegetation	Vegetation becomes sparse and does not provide adequate filtration, OR vegetation is crowded out by very dense clumps of cattail, which do not allow water to flow through the clumps.	Determine cause of lack of vigor of vegetation and correct. Replant as needed. For excessive cattail growth, cut cattail shoots back and compost off-site. Note: normally wetland vegetation does not need to be harvested unless die-back is causing oxygen depletion in downstream waters.
	Inlet/Outlet	Inlet/outlet area clogged with sediment and/or debris.	Remove clogging or blockage in the inlet and outlet areas.
	Trash and Debris Accumulation	See Table V-A.1: Maintenance Standards - Detention Ponds	Remove trash and debris from wet swale.
	Erosion/Scouring	Swale has eroded or scoured due to flow channelization, or higher flows.	Check design flows to assure swale is large enough to handle flows. By-pass excess flows or enlarge swale. Replant eroded areas with fibrous-rooted plants such as Juncus effusus (soft rush) in wet areas or snowberry (Symphoricarpos albus) in dryer areas.

Table V-A.5: Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe. Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No Trash or debris located immediately in front of catch basin or on grate opening. No trash or debris in the catch basin. Inlet and outlet pipes free of trash or debris. No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin). Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Top slab is free of holes and cracks. Frame is sitting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regrouted and secure at basin wall.
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pollution	See Table V-A.1: Maintenance Standards - Detention Ponds	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Cover/grate is in place, meets design standards, and is secured
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place, meets the design standards, and is installed and aligned with the flow path.

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APPENDIX F

DOWNSTREAM ANALYSIS

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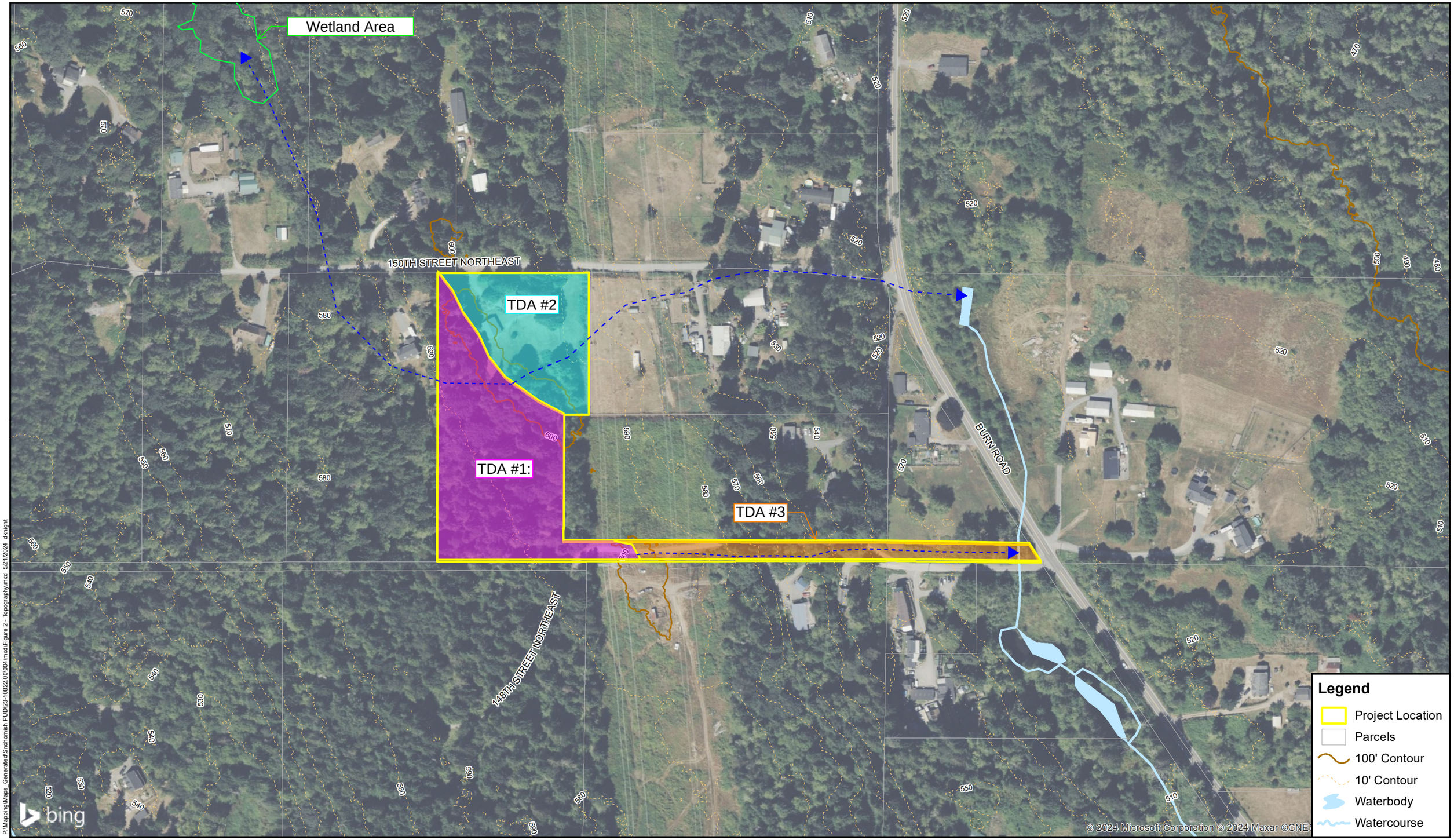


P:\Mapping\Maps_Generated\Snohomish PUD\23-10822.00\004\mxd\Figure 2 - Topography.mxd 5/21/2024 dknight

GIS Base Data: Snohomish County, Contours generated from LiDAR

Snohomish County base data 2024
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC., assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

N

0 200 400 Feet

Downstream Analysis

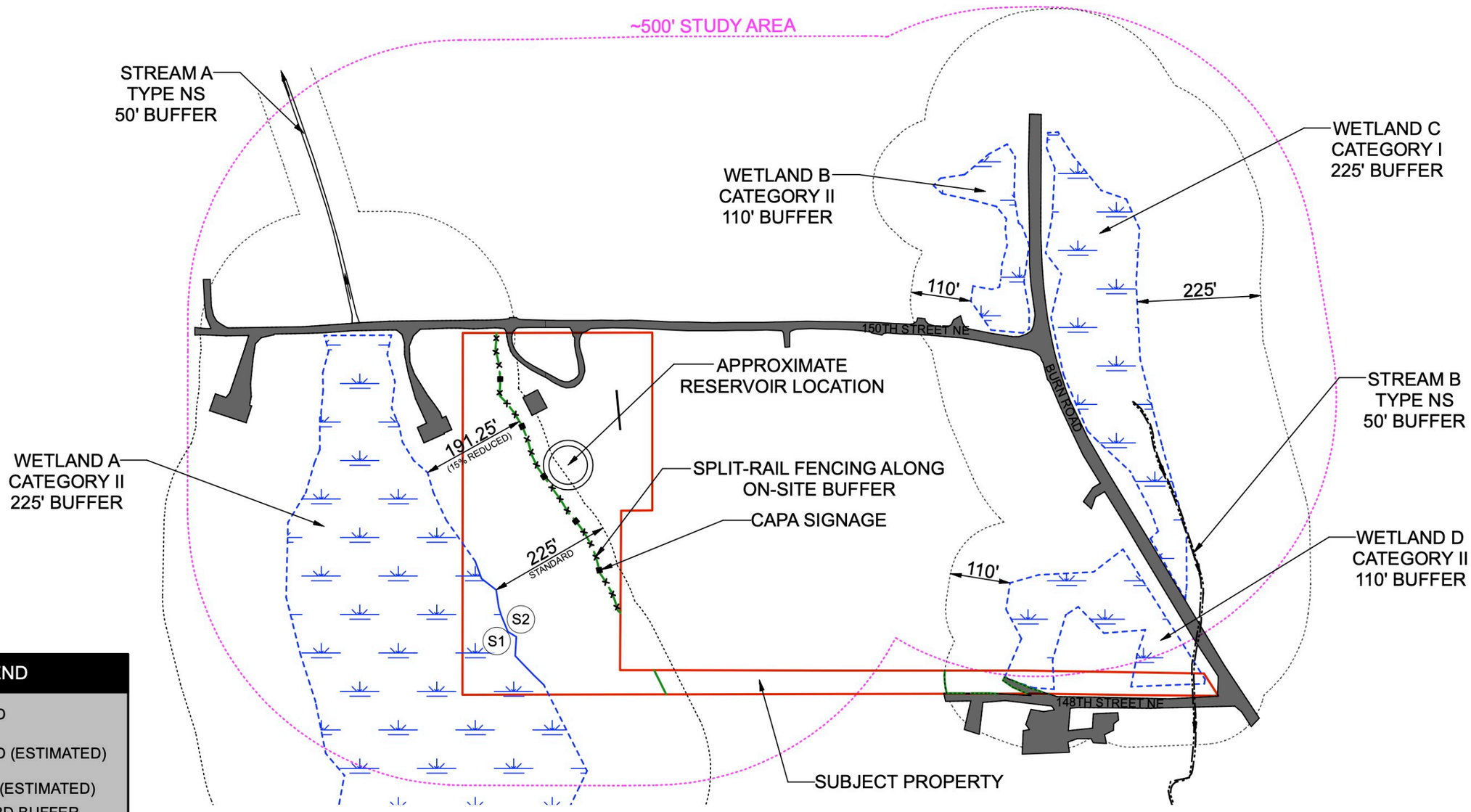
Site Topography & Threshold Discharge Areas

Burn Road 726 Zone Reservoir
Snohomish County PUD No. 1
May 2025

Figure **1**

CRITICAL AREA STUDY MAP
BURN ROAD RESERVIOR

PORTION OF SECTION 32, TOWNSHIP 31N, RANGE 6E, W.M.



LEGEND

- WETLAND
- WETLAND (ESTIMATED)
- STREAM (ESTIMATED)
- STANDARD BUFFER
- EXISTING IMPERVIOUS
- PROPOSED BUFFER
- SPLIT-RAIL FENCING
- CAPA SIGNAGE
- S1 DATA SITES (S1-S2)

Scale 1" = 200'

0 100 200 300 400

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

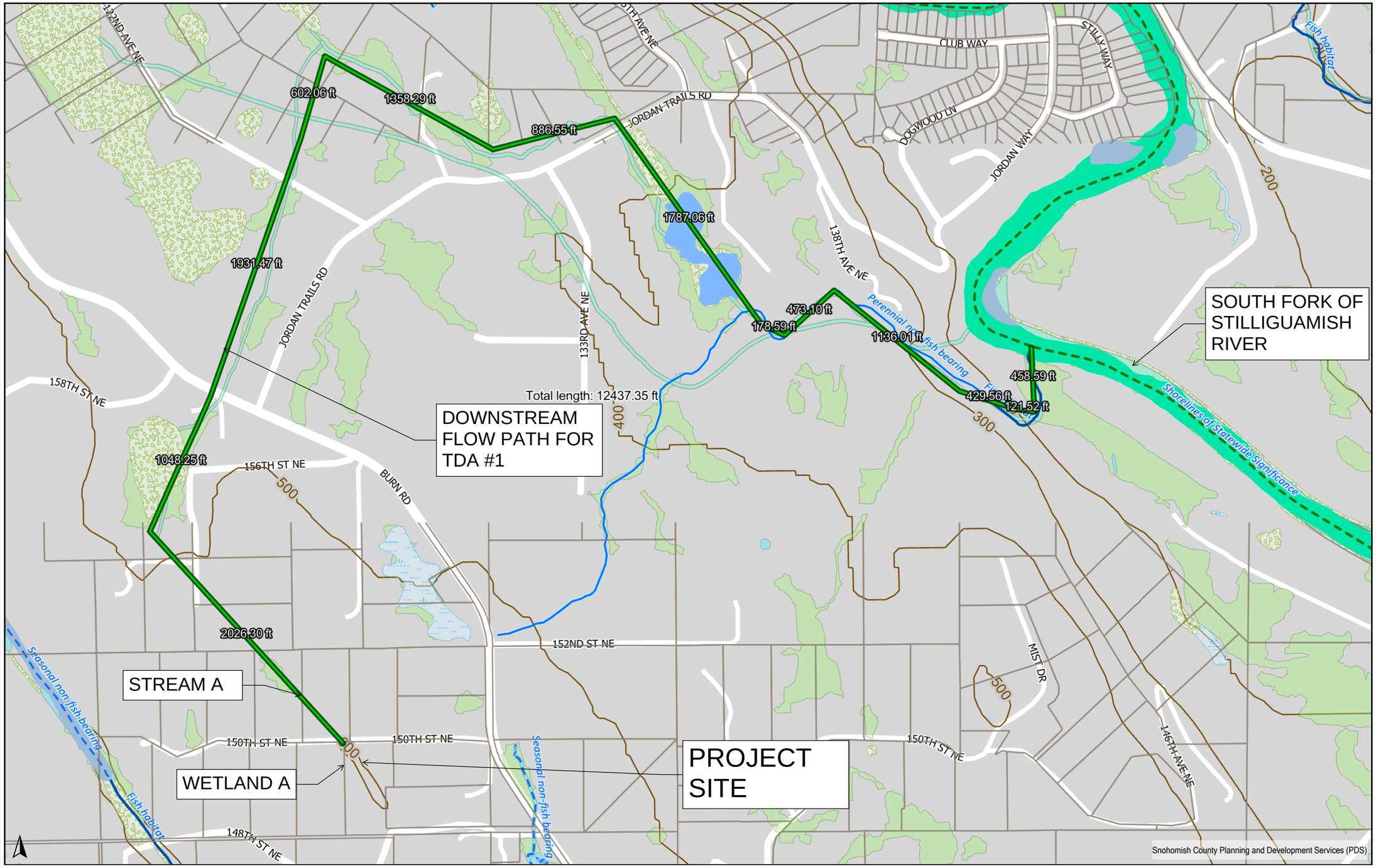
CRITICAL AREA STUDY MAP
BURN ROAD RESERVOIR
SNOHOMISH COUNTY, WA

PUD No. 1 of Snohomish County
Attn: Max Selin
PO Box 1107, MS O2
Everett, WA 98206-1107

Sheet 1/1
WRI #: 22229
Drawn by: AW
Date: 07/31/2023

Downstream Analysis - TDA #1

Map Generated On: 05/22/25



Legend

Cadastral
- Parcels

Critical Areas
- Hydrology
  - Shorelines of the State
  - Shorelines of Statewide Significance
  - Fish habitat
  - Perennial non-fish bearing
  - Seasonal non-fish bearing
  - Unknown
  - N/A
  - Shorelines of the State
  - Shorelines of Statewide Significance
  - Fish habitat
  - Perennial non-fish bearing
  - Seasonal non-fish bearing
  - Unknown
  - N/A
- Wetlands and Hydric Soils
  - Estuarine and Marine Deepwater
  - Estuarine and Marine Wetland
  - Freshwater Emergent Wetland
  - Freshwater Forested/Shrub Wetland
  - Freshwater Pond
  - Lake
  - Riverine

Topography
- Contours

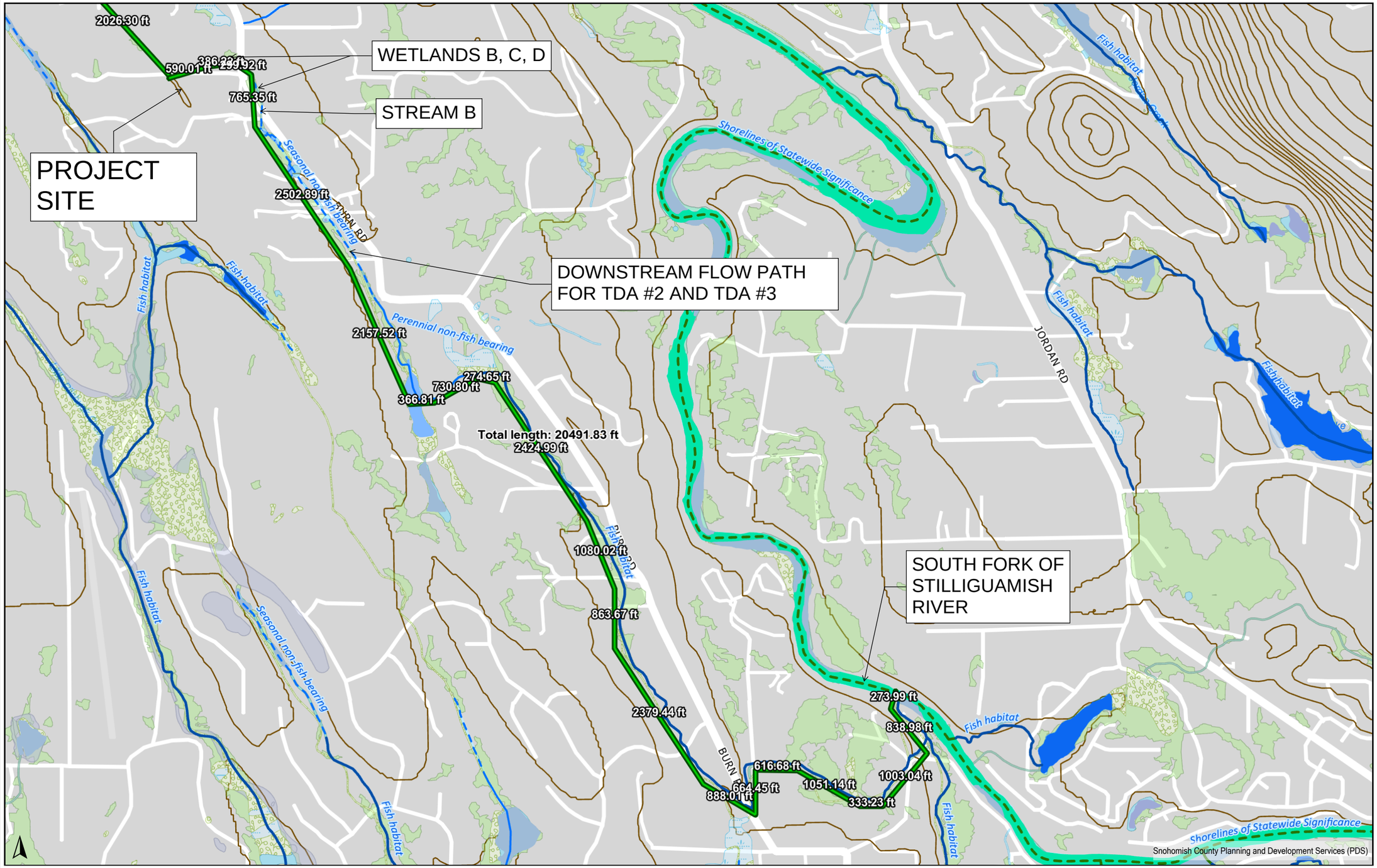
0 500 1000 ft

Scale 1 : 12049

Notes

Downstream Analysis - TDA #2

Map Generated On: 05/22/25



Legend

- Critical Areas
  - Hydrology
    - Shorelines of the State
    - Shorelines of Statewide Significance
    - Fish habitat
    - Perennial non-fish bearing
    - Seasonal non-fish bearing
    - Unknown
    - N/A
    - Shorelines of the State
    - Shorelines of Statewide Significance
    - Fish habitat
    - Perennial non-fish bearing
    - Seasonal non-fish bearing
    - Unknown
    - N/A
  - Wetlands and Hydric Soils
    - Estuarine and Marine Deepwater
    - Estuarine and Marine Wetland
    - Freshwater Emergent Wetland
    - Freshwater Forested/Shrub Wetland
    - Freshwater Pond
    - Lake
    - Riverine
- Topography
  - Contours

0 1000 2000 ft

Scale 1 : 25000

Notes