



Senn Road Bridge MP 0.87 Scour Repair

Alternatives Analysis

Submitted to:

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Lewis County Public Works
57 W. Main, Chehalis, WA 98532

October 23, 2025

Prepared By:

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Project No. 21588.A00

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Executive Summary

The Senn Road MP 0.87 Bridge crossing Lucas Creek is located approximately 10 miles east of Chehalis, WA. It is a 60-foot long three-span concrete structure (built in 1966) supported by concrete piles. The bridge is currently classified as scour critical due to abutment / interior pier pile tip elevations within ten feet of the stream's thalweg. Scour repairs for the bridge are necessary to maintain vehicular access and protect public safety along Senn Road.

Stream hydraulic analysis for the site indicates that the calculated potential scour could extend below the bottom of the existing piling on the intermediate piers, therefore some type of scour mitigation is necessary. The site is in a FEMA mapped floodplain and any type of proposed repair must not increase the 100-year flood elevation, so it meets a no-rise condition.

It was noted that just upstream of the bridge, there was a slide that occurred along the roadway edge that is the bank of the stream. The slide was repaired with a reinforced soil slope around 2021.

Environmental studies were conducted at the site and six wetlands were identified within the project area as well as the stream classification and riparian areas defined. Environmental impacts due to the construction are expected to be able to be mitigated on-site. Environmental compliance through permits at the Federal, State and Local level will need to be obtained. Since the project is Federally Funded, NEPA compliance will be required. Both permanent and temporary ROW easements will be necessary for the project.

A Cultural Resource study was performed for the site and there were no archaeological finds or other cultural resources discovered within the project area. An inadvertent discovery plan is recommended to be in place prior to construction.

Four scour mitigation alternatives were studied:

- Alternative 1 – Bridge Replacement, approximate construction cost \$2.4 million
- Alternative 2 – Addition of drilled shafts, approximate construction cost \$1.5 million
- Alternative 3 – Rock Revetment, approximate construction cost \$750,000
- Alternative 4 – Revetment with rock and A-jacks, approximate construction cost \$1.08 million

Alternative 3 was recommended as the preferred alternative due to having the lowest cost, least impact to traffic, and the potential for plantings in various areas of the revetment.

Endorsement



10-23-2025

Douglas Sarkkinen

Otak Project Manager

Project Description

The Senn Road MP 0.87 Bridge crossing Lucas Creek is a 60-foot long three-span concrete structure (built in 1966) supported by concrete piles. This bridge is the sole access for Senn Road residents south of the bridge, therefore long-term closures of the roadway will not be allowed. The bridge is currently classified as scour critical due to abutment/interior pier pile tip elevations within ten feet of the stream's thalweg. Scour repairs for the bridge are necessary to maintain vehicular access and protect public safety along Senn Road. Preliminary scour countermeasure design has been completed, and this report documents those efforts as well as summarizing the selection of a preferred alternative. The construction will require in-water-work as well as potentially impact adjacent wetlands and riparian areas, which will require mitigation. Following completion of construction, a new Bridge Scour Evaluation is to be performed and documented on WSDOT Form 140-091, indicating the completed project satisfies WSBIS Code (NBI Code 113) to be rated 7 – Design Countermeasures Installed.

Hydraulic Analysis

To support the development of conceptual scour countermeasure alternatives, hydrologic analysis and hydraulic modeling of Lucas Creek at the Senn Road crossing were conducted. Design flows for Lucas Creek were determined using regression equations and the United States Geological Survey (USGS) Flood Q Ratio tool. The Flood Q Ratio tool was used to analyze gage data from a stream gauge in the vicinity of the crossing, however, the drainage area for the gauged stream was outside of the range for which the Flood Q Ratio tool is valid. Regression equations were determined to be the most applicable for the project. The resulting flows for the 2-, 10-, 25-, 50-, 100- and 500-year flood events are 414, 897, 1,180, 1,410, 1,650, and 2,240 cubic feet per second (cfs) respectively. More detailed discussion of the Hydrologic Model is included in Appendix C.

Hydraulic modeling was conducted using the flow rates described above, survey information, and supplemental LiDAR for the overbank areas. Modeling was conducted using the U.S. Bureau of Reclamation's SRH-2D hydraulic model through Aqueveo's Surface Water Modeling System (SMS) application. Preliminary analysis suggests that the proposed countermeasure design will not have a major impact on the hydraulics of the bridge, so the existing conditions model was used to inform initial scour countermeasure alternatives analysis and preliminary designs. A proposed conditions model will be prepared as part of future design phases for the preferred alternative. Scour calculations were performed within SMS, which utilizes FHWA Scour calculation methods documented in HEC 18: Evaluating Scour at Bridges. Abutment scour was evaluated using the existing bed material. Key hydraulic results from the modeling that will influence scour countermeasure design are provided below:

- 100-Year WSE – 357.6 feet
- 500-Year WSE – 358.2 feet
- 500 Year Velocity – 6.6 feet per second
- Pier Scour Depth – 5.4 feet
- Contraction Scour – 2.2 feet
- Abutment Scour (existing material) – 8.9 feet

Critical Areas

Otak biologists conducted field investigations on December 3 and 4, 2024. The study area included areas along both sides of Senn Road and Lucas Creek, upstream and downstream of Bridge No. 77. Areas immediately beyond the study area were also visually assessed to identify any wetlands and streams with buffers that could extend into the study area.

Six wetlands (Wetlands 1 – 6) were identified in the study area. Per the hydrogeomorphic (HGM) classification system, Wetlands 1, 2, and 6 are depressional wetlands and Wetlands 3, 4, and 5 are riverine wetlands. All six wetlands were rated as Category III wetlands per the Washington State Wetland Rating System for Western Washington – 2014 Update Version 2.0. All six wetlands have a standard buffer width of 75 feet per Lewis County Code (LCC) 17.38.270 (Required wetland buffers) based on category, habitat score, and impact intensity.

Three streams (Lucas Creek, Tributary 1, and Tributary 2) were identified in the study area. Lucas Creek is a Type S (Shoreline of the State) stream with an assigned buffer of 0 feet per the Lewis County Shoreline Master Program (Table 4-1, Section 4.04.02). Tributary 1 is located along the east side of Senn

Road and enters Lucas Creek east of Lewis County Bridge No. 77 from the south. Tributary 1 is a perennial Type F (Fish Habitat) stream with an assigned buffer of 100 feet per Table 17.38-6 in LCC 17.38.420 (Fish and Wildlife Habitat Conservation Areas – Designations). Tributary 2 is an intermittent Type Ns (Seasonal, Non-fish Habitat) stream located to the east of Lucas Creek. Tributary 2 enters Lucas Creek from the east through Wetland 3. Tributary 2 has an assigned buffer of 75 feet per Table 17.38-6 in LCC 17.38.420 (Fish and Wildlife Habitat Conservation Areas – Designations).

The project is located within the 100-year floodplain of Lucas Creek. The study area falls within Rural Conservancy Shoreline Environment Designation per the Lewis County Shoreline Master Program.

The full Critical Areas Report is included in Appendix D. Because construction will require in-water-work as well as potentially impact adjacent wetlands and riparian areas, mitigation will be required. The extent of the mitigation is not yet determined at this stage, but will more than likely be able to be accomplished on-site through stream enhancement measures, removal of non-native plants and providing additional plantings within the project area.

Cultural Resources

Cultural Resource Consultants, LLC completed a cultural resource assessment of the area near and adjacent to the proposed project. An APE (area of potential effect) was developed to estimate the extent of ground disturbance that will occur during construction of the proposed scour repair, including areas of bank and stream disturbance such as excavation along with adjacent areas that will be used for construction equipment and staging. The assessment was developed to document recorded and unrecorded archaeological sites, historic built environment resources, or other cultural resources at the project location.

In addition to background research, ten shovel probes were excavated on site to depths ranging from 3.7 feet to 5.3 feet, which is within the range of expected ground disturbance. Review of historic records gave no evidence of previous sensitive activities at this site and the field investigation did not identify any archaeological sites or other cultural resources. No additional cultural resources investigation is recommended at this time, and a finding of “no historic properties affected” is recommended. However, because the site is classified as a high risk area, it is recommended that an inadvertent discovery protocol be followed by staff on site if archaeological materials or human skeletal remains are discovered.

A copy of the Cultural Resources Report is included in Appendix E.

Scour Mitigation Alternatives

Four alternatives were developed to mitigate the bridge scour risk at this site. Preliminary drawings and construction cost estimates of each alternative are included in Appendices A and B respectively. Descriptions of each alternative are as follows:

Alternative 1 – Bridge Replacement

This alternative completely removes the existing bridge and replaces it with a single span bridge that is supported back on the banks at each end, away from the risk of potential stream scour. There would be no intermediate piers with this option. The new bridge structure would be 60 feet long and 30 feet wide (two 12 foot lanes and 4 foot shoulders) with concrete barriers on each side. Precast concrete girders with a concrete deck is the assumed superstructure and the substructure would consist of driven steel piling at each abutment with a concrete pile cap. Because Senn Rd is a dead end and the existing bridge is the only access to residences along the road, the new bridge would be constructed on a parallel

alignment to the existing bridge and the roadway shifted. This would allow the existing bridge to remain in service during construction and then be removed after the new bridge is complete. The removal of the existing bridge will require in-water-work, meaning temporary stream isolation and streambank restoration.

Construction costs for this alternative would be in the range of \$2.4 million.

Alternative 2 – Addition of 3'-0" Diameter Drilled Shafts

This alternative involves closing the bridge and installing a temporary detour bridge alongside to carry traffic. At each intermediate pier, the deck would be cored between the two outside piles to allow a new 3'-0" diameter drilled shaft to be installed, extending deep below the expected scour depth. It would require temporary casing and stream isolation to prevent material from entering into Lucas Creek. The drilled shafts would be extended up to the ground surface and then 2'-6" diameter concrete columns would be cast extending up from the drilled shaft to a new cross beam. The new cross beam would be approximately 4 feet square and would encapsulate the existing smaller cross beam that is monolithic with the bridge deck. After the new cross beams are cast and cured the existing piling would be cut off at least two feet below the mud line and removed, with the two columns remaining at each intermediate pier that would support the bridge. Afterwards the temporary detour bridge would be removed and the site restored to its original condition.

Construction costs for this alternative would be in the range of \$1.5 million

Alternative 3 – Rock Revetment

This alternative requires complete stream isolation by a temporary dam upstream and downstream, fish removal and putting the stream in a pipe for the duration of the stream work. After this is complete and the stream area is dry, excavation would occur to remove existing material under and along side the bridge to install large rock, either riprap or rock for scour protection that would extend across the channel. At the channel location the rock would be covered with at least 4 feet of streambed material. The side slopes of the rock under the bridge would be approximately 2:1. Upstream and downstream of the bridge, habitat enhancements would be provided by the addition of large woody debris and additional streambed gravels. New plantings along the edges of the stream and higher on the banks would occur to mitigate for impacts to riparian areas.

Construction costs for this alternative would be in the \$750,000 range.

Alternative 4 – Concrete Slope Protection (A-Jacks)

This alternative requires complete stream isolation by a temporary dam upstream and downstream, fish removal and putting the stream in a pipe for the duration of the stream work. After this is complete and the stream area is dry, excavation would occur to remove existing material under and along side the bridge to install revetment. On the side slopes, precast concrete A-jacks would be installed. This is a hard armor solution that is used for streambank stability, scour protection and energy dissipation. The A-jacks would extend down the channel, and the large rock, either riprap or rock for scour protection would extend across the channel. At the channel location the rock would be covered with at least 4 feet of streambed material. The side slopes of the rock under the bridge would be approximately 1:1.25. Upstream and downstream of the bridge, habitat enhancements would be provided by the addition of large woody debris and more streambed gravels. New plantings along the edges of the stream and higher on the banks would occur to mitigate for impacts to riparian areas.

Construction costs for this alternative would be in the \$1.08 million range.

Summary

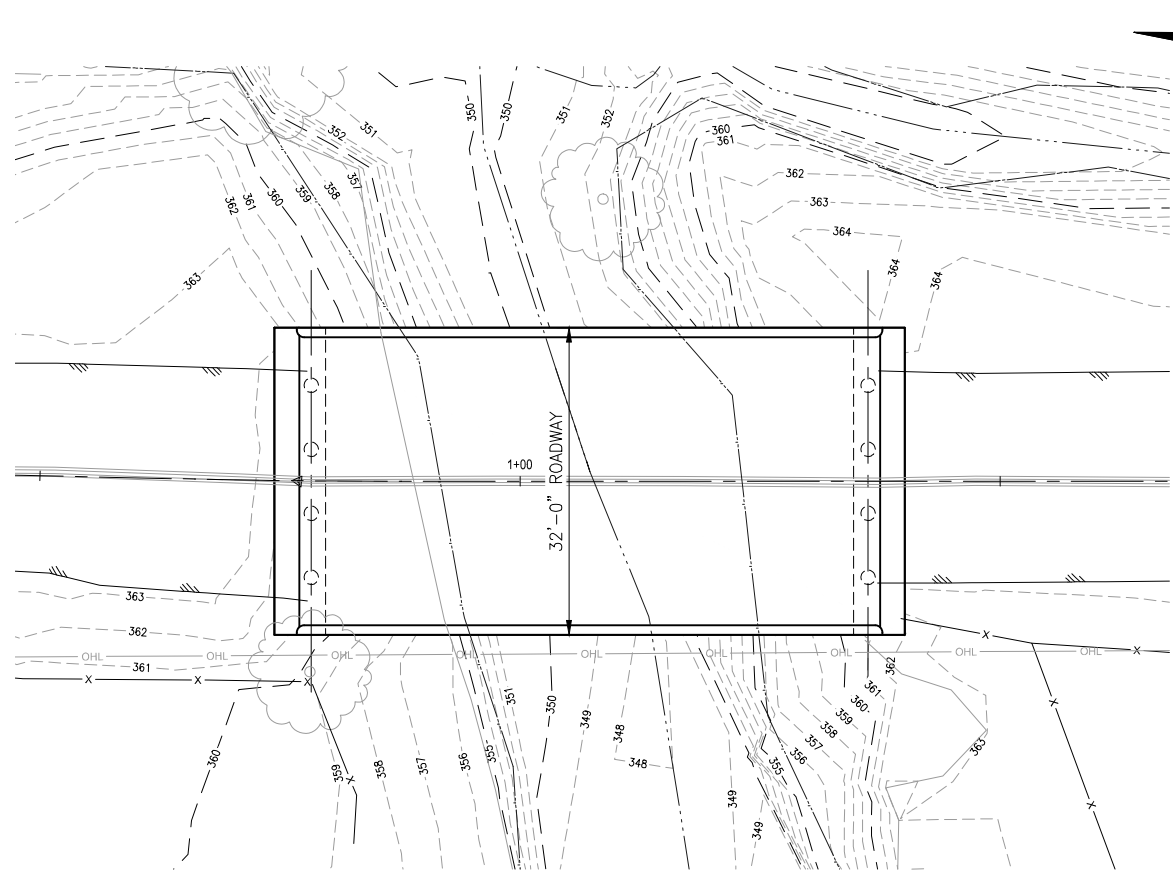
Of the four alternatives studied, Alternatives 3 and 4 appear to be the most beneficial for the project. Not only are they at the lower cost range, but they have the least impact to the traveling public. Minor road closures would be necessary when moving and staging equipment and materials, but otherwise the majority of the work can be accomplished while the bridge is open to traffic. Since Alternative 3 uses rock for revetment that will be exposed, it will more resemble the existing conditions and has the potential to have vegetation established within portions of it.

All four alternatives require in-water work, so initial environmental impacts and required mitigation would be expected to be similar. Alternative 1 would be the preferred environmental alternative as it removes the old bridge and intermediate piers as well as the riprap that has been installed previously. This alternative would allow the stream to be restored to its most natural condition, but it has the highest cost and is well beyond the funding limits for the project.

Based on the parameters reviewed and compared, it is recommended that Alternate 3 be selected as the preferred alternative and the project move forward based on this.

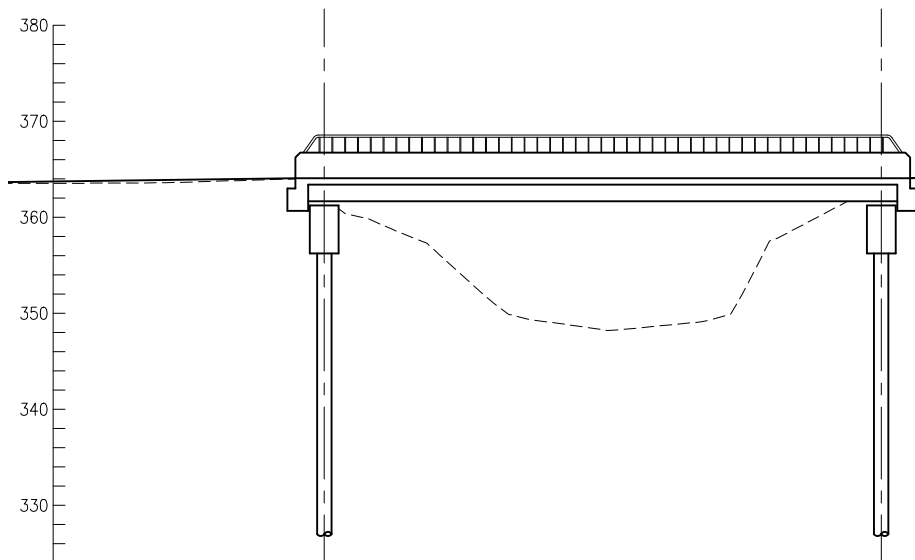
Appendix A

Drawings of Alternatives



PLAN

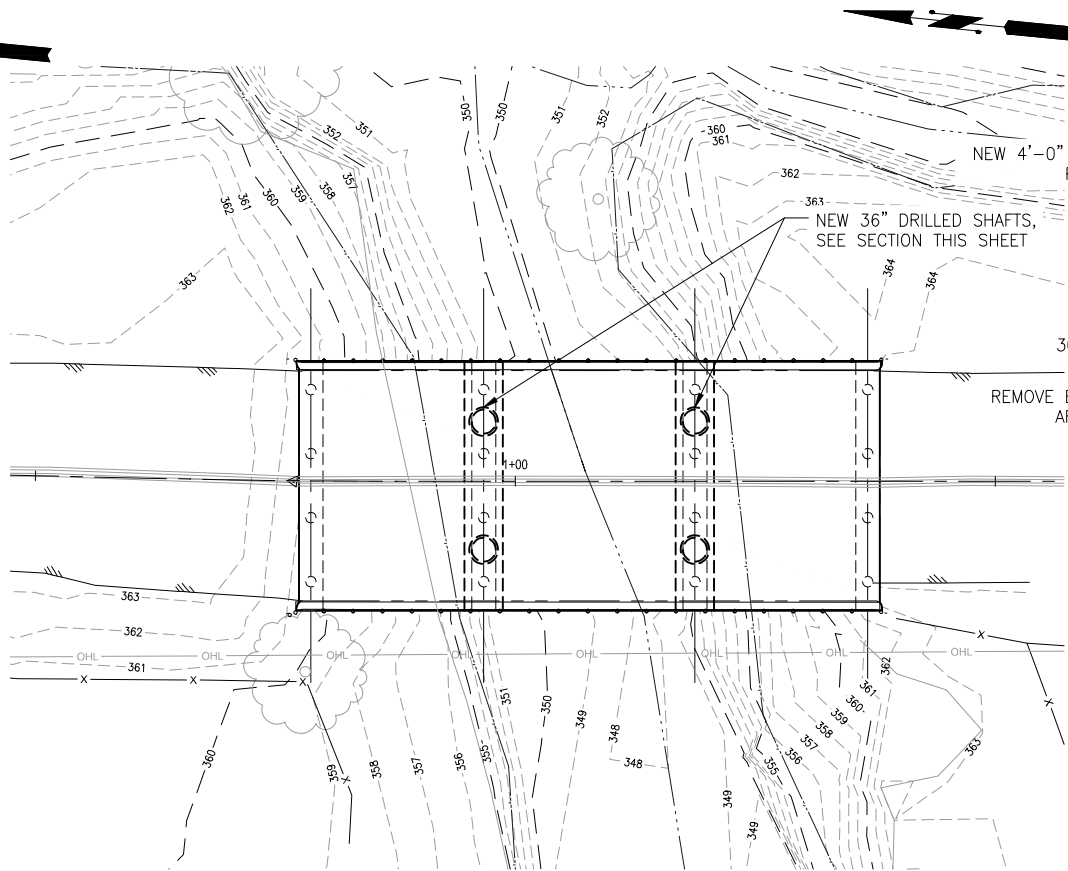
1" = 10'-0"



ELEVATION

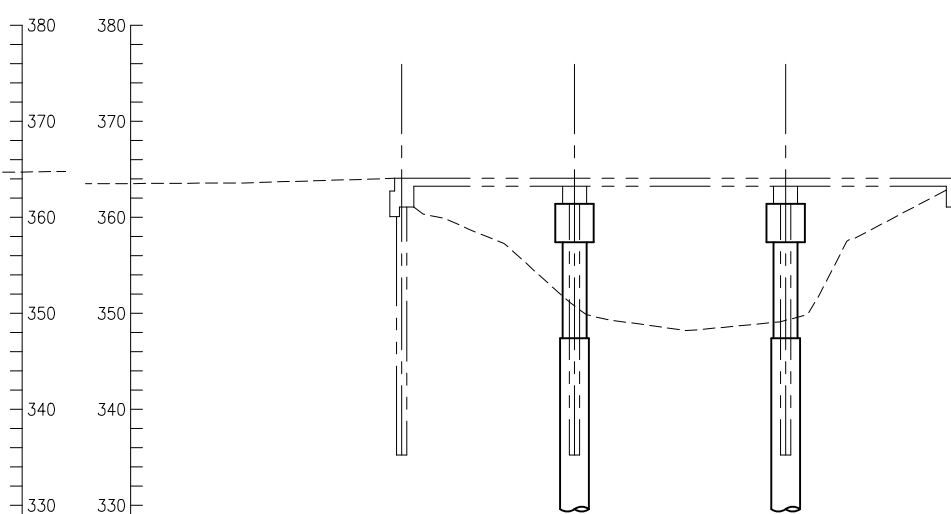
1" = 10'-0"

ALTERNATIVE 1 – NEW BRIDGE



PLAN

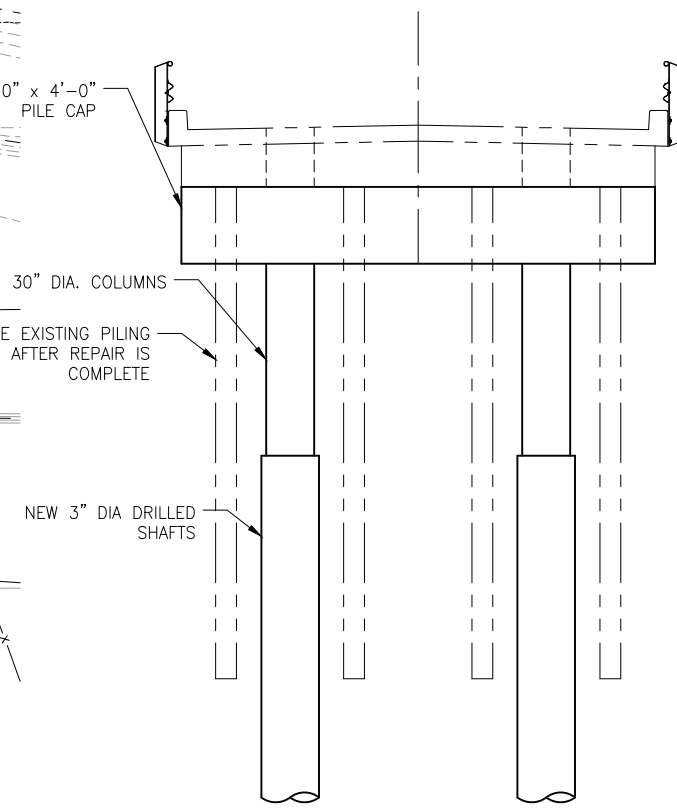
1" = 10'-0"



ELEVATION

1" = 10'-0"

ALTERNATIVE 2 – DRILLED SHAFTS



TYPICAL SECTION

1" = 5'-0"



57 W. MAIN ST.
CHEHALIS WA 98532
PHONE # (360) 740-1123
FAX # (360) 740-2719

DESIGNED BY : DLS
DRAWN BY : JMM
CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

SENN MP 0.87 BRIDGE
SCOUR REPAIR

ALTERNATIVES ANALYSIS
COUNTY ROAD PROJECT NO: 2159R

EXHIBIT A

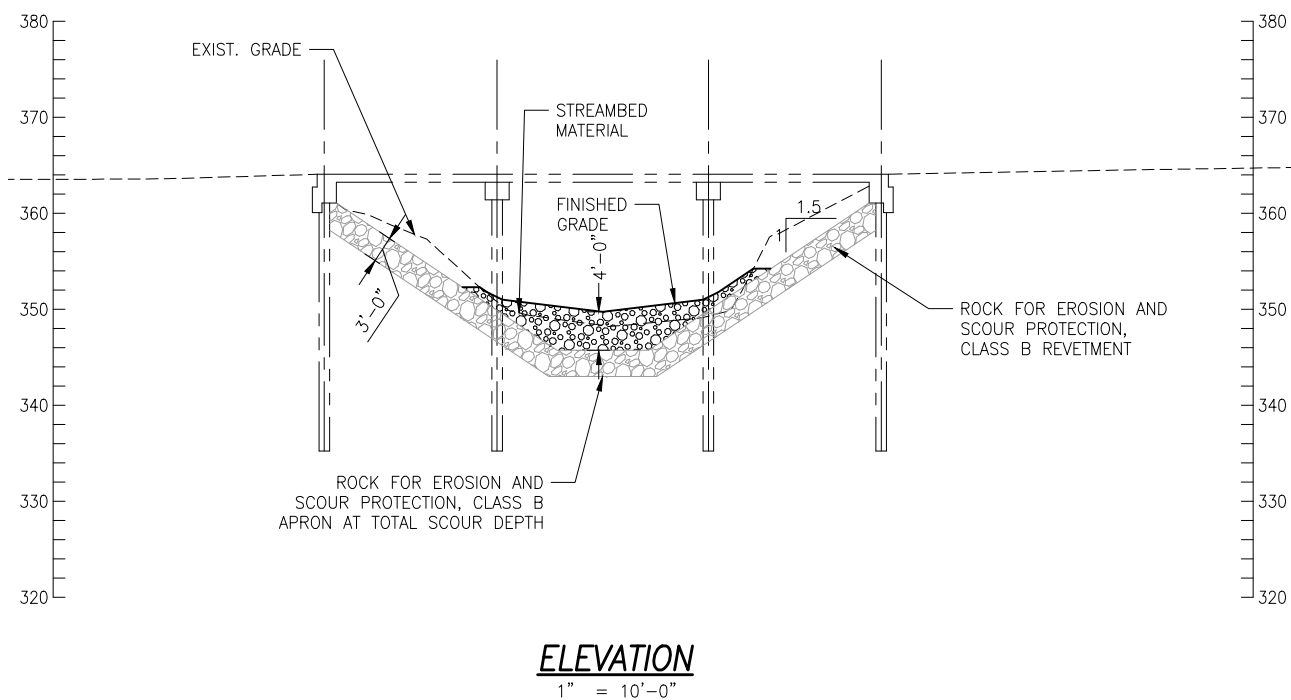
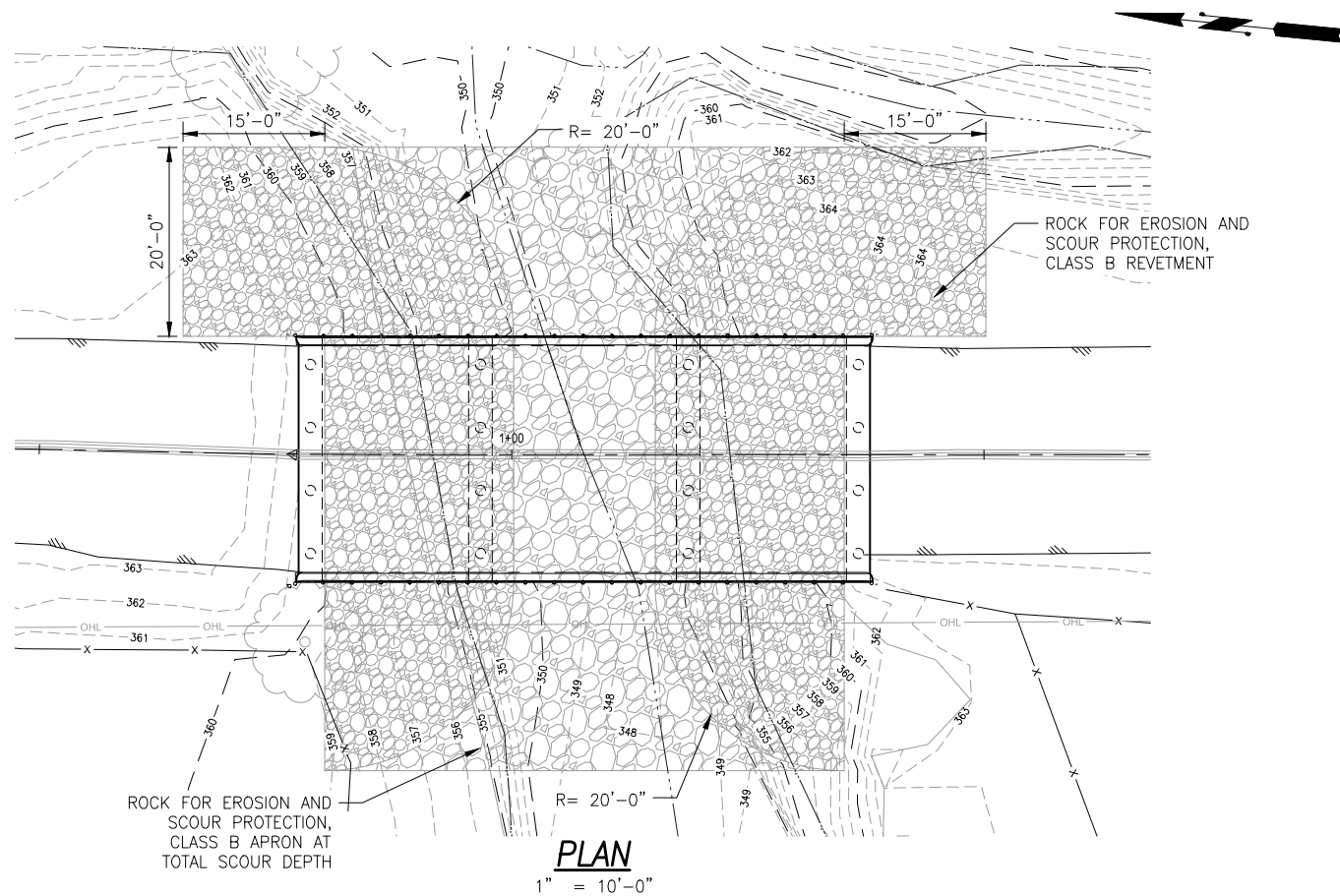
SHEET

1
OF
2

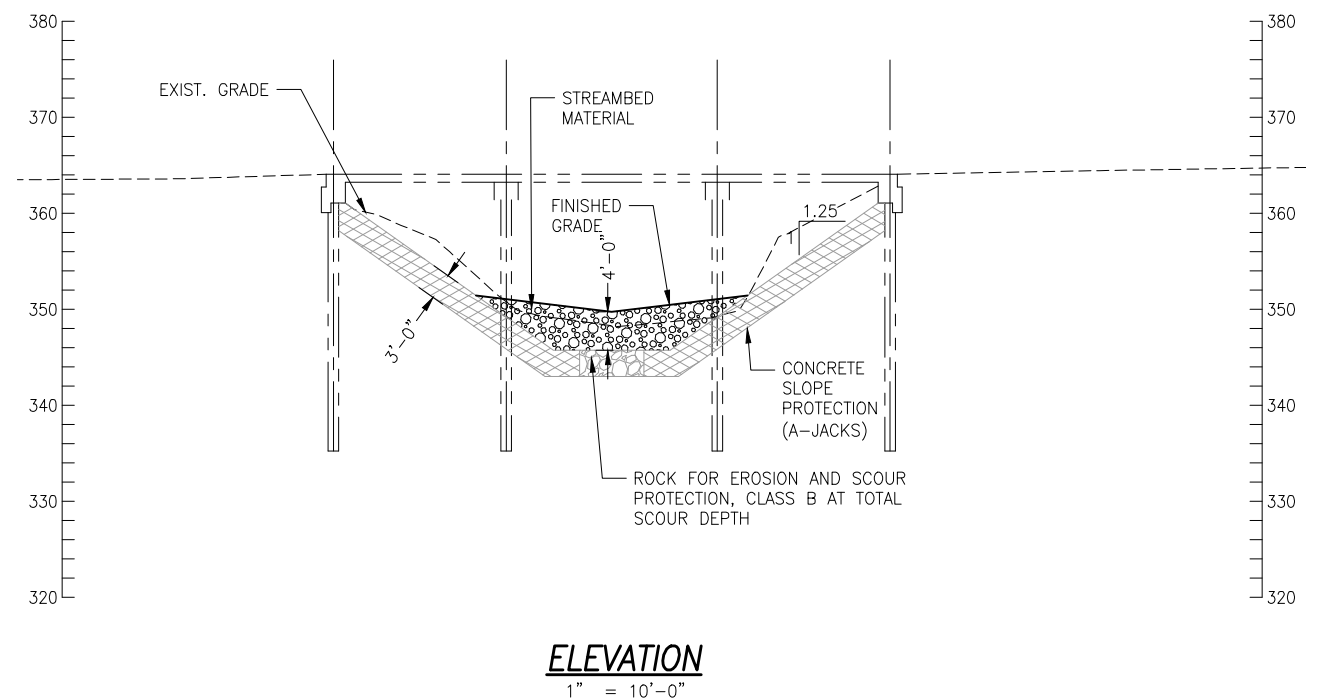
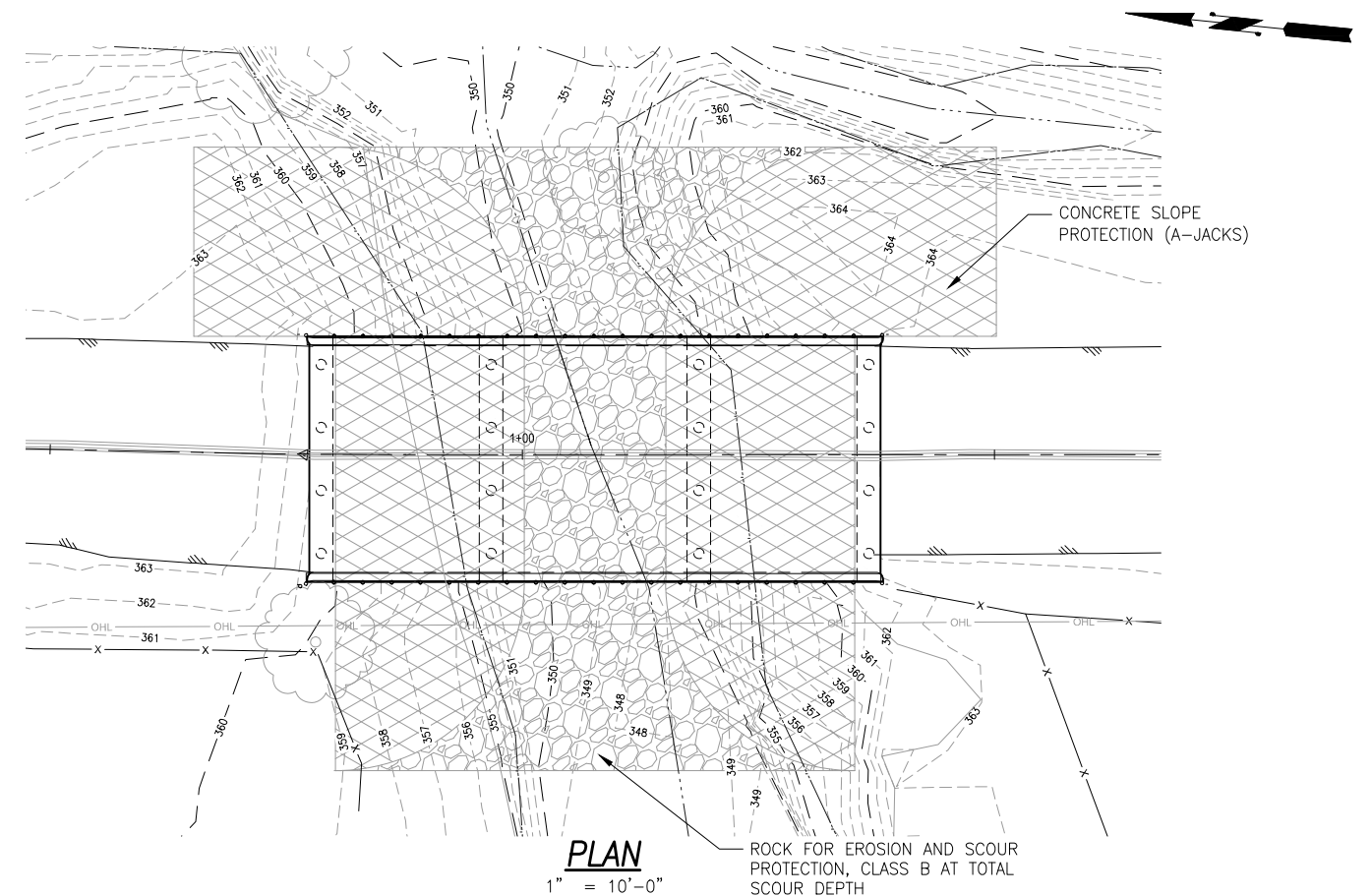


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ALTERNATIVE 3 – ROCK REVETMENT



ALTERNATIVE 4 – CONCRETE SLOPE PROTECTION (A-JACKS)



57 W. MAIN ST.
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PHONE # (360) 740-1123
FAX # (360) 740-2719

DESIGNED BY : DLS
DRAWN BY : JMM
CHECKED BY :
DATE :

NO.	DATE	REVISION	BY	APP.

SENN MP 0.87 BRIDGE
SCOUR REPAIR

ALTERNATIVES ANALYSIS
COUNTY ROAD PROJECT NO: 2159R
EXHIBIT B

SHEET
2
OF
2



Appendix B

Preliminary Cost Estimates

LEWIS COUNTY
Sargent Rd MP 1.33 Bridge Scour
Engineers Estimate of Probable Construction Cost
Alternate 1- Bridge Replacement



Estimate date: 10/22/2025
 Prepared by: Otak

Estimate Notes and assumptions

Unit costs for items derived from prior bid tabulations, WSDOT unit costs, and professional experience.

Note: Estimate does not include costs for property acquisition (if needed) or utility impacts

LEWIS COUNTY Senn Rd MP 0.87 Bridge Scour Repair

BID ITEM NUMBER	SPEC. SECTION	BID ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	1-09	MOBILIZATION	L.S.	1	\$ 224,532.00	\$ 224,532.00
2	1-04	MINOR CHANGE	FORCE ACCOUNT	1	\$ 22,000.00	\$ 22,000.00
3	1-05	CONSTRUCTION SURVEYING	L.S.	1	\$ 7,500.00	\$ 7,500.00
4	1-07	SPCC PLAN	L.S.	1	\$ 3,500.00	\$ 3,500.00
5	1-10	PROJECT TEMPORARY TRAFFIC CONTROL	L.S.	1	\$ 20,000.00	\$ 20,000.00
6	1-10	CONSTRUCTION SIGNS CLASS A	S.F.	171	\$ 30.00	\$ 5,130.00
7	2-01	CLEARING AND GRUBBING	ACRE	0.2	\$ 40,000.00	\$ 8,000.00
8	2-02	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L.S.	1	\$ 11,000.00	\$ 11,000.00
9	2-03	CHANNEL EXCAVATION INCL. HAUL	C.Y.	810	\$ 62.00	\$ 50,220.00
10	2-12	CONSTRUCTION GEOTEXTILE FOR SEPARATION	S.Y.	60	\$ 25.00	\$ 1,500.00
11	6-02	REMOVE EXISTING BRIDGE	L.S.	1	\$ 150,000.00	\$ 150,000.00
5	6-02	TEMPORARY DETOUR BRIDGE AND ROADWAY	L.S.	1	\$ 350,000.00	\$ 350,000.00
5	3-02	ROADWAY RECONSTRUCTION	L.S.	1	\$ 120,000.00	\$ 120,000.00
5	6-02	STRUCTURE EXCAVATION INCL HAUL	L.S.	1	\$ 20,000.00	\$ 20,000.00
5	6-02	4 FOOT DIAMETER DRILLED SHAFT	L.F.	140	\$ 1,600.00	\$ 224,000.00
5	6-02	CONCRETE CLASS 4000	C.Y.	60	\$ 1,600.00	\$ 96,000.00
5	6-02	STEEL REINFORCING BAR	LB	15000	\$ 4.00	\$ 60,000.00
5	6-02	SUPERSTRUCTURE 'SENN RD BRIDGE'	L.S.	1	\$ 390,000.00	\$ 390,000.00
5	6-02	CONCRETE BARRIER	L.F.	120	\$ 600.00	\$ 72,000.00
5	6-02	BP RAIL	L.F.	120	\$ 150.00	\$ 18,000.00
5	6-02	TYPE 31 GUARDRAIL	L.F.	200	\$ 125.00	\$ 25,000.00
12	8-01	HIGH VISIBILITY SILT FENCE	L.F.	280	\$ 8.00	\$ 2,240.00
13	8-01	HIGH VISIBILITY FENCE	L.F.	400	\$ 8.00	\$ 3,200.00
14	8-01	STABILIZED CONSTRUCTION ENTRANCE	S.Y.	75	\$ 85.00	\$ 6,375.00
15	8-01	EROSION CONTROL AND WATER POLLUTION PREVENTION	L.S.	1	\$ 5,000.00	\$ 5,000.00
16	8-02	TOPSOIL TYPE B	C.Y.	290	\$ 75.00	\$ 21,750.00
17	8-15	ROCK FOR EROSION AND SCOUR PROTECTION CLASS B	TON	300	\$ 100.00	\$ 30,000.00
18	8-15	FILTER BLANKET	TON	190	\$ 75.00	\$ 14,250.00
19	8-31	TEMPORARY STREAM DIVERSION (SENN RD BRIDGE SCOUR)	L.S.	1	\$ 50,000.00	\$ 50,000.00
20	SP	LANDSCAPE RESTORATION	L.S.	1	\$ 39,125.00	\$ 39,125.00
21	SP	WOODY MATERIAL-LOG WITH ROOTWAD (EA)	EA.	7	\$ 2,800.00	\$ 19,600.00
23	SP	COIR SLOPE PROTECTION	S.Y.	160	\$ 80.00	\$ 12,800.00
24	SP	STREAMBED COBBLES 10 IN.	TON	120	\$ 118.00	\$ 14,160.00
25	SP	STREAMBED SEDIMENT	TON	150	\$ 85.00	\$ 12,750.00
26	SP	STREAMBED SAND	TON	100	\$ 80.00	\$ 8,000.00
						\$ -
SUB -TOTAL						\$2,117,632.00
15% CONTINGENCY						\$317,644.80
TOTAL						\$2,435,276.80

LEWIS COUNTY
Sargent Rd MP 1.33 Bridge Scour
Engineers Estimate of Probable Construction Cost
Alternate 2 - Adding drilled shafts



Estimate date: 10/22/2025
 Prepared by: Otak

Estimate Notes and assumptions

Unit costs for items derived from prior bid tabulations, WSDOT unit costs, and professional experience.

Note: Estimate does not include costs for property acquisition (if needed) or utility impacts

LEWIS COUNTY Senn Rd MP 0.87 Bridge Scour Repair

BID ITEM NUMBER	SPEC. SECTION	BID ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	1-09	MOBILIZATION	L.S.	1	\$ 142,032.00	\$ 142,032.00
2	1-04	MINOR CHANGE	FORCE ACCOUNT	1	\$ 22,000.00	\$ 22,000.00
3	1-05	CONSTRUCTION SURVEYING	L.S.	1	\$ 7,500.00	\$ 7,500.00
4	1-07	SPCC PLAN	L.S.	1	\$ 3,500.00	\$ 3,500.00
5	1-10	PROJECT TEMPORARY TRAFFIC CONTROL	L.S.	1	\$ 10,000.00	\$ 10,000.00
6	1-10	CONSTRUCTION SIGNS CLASS A	S.F.	171	\$ 30.00	\$ 5,130.00
7	2-01	CLEARING AND GRUBBING	ACRE	0.2	\$ 40,000.00	\$ 8,000.00
8	2-02	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L.S.	1	\$ 11,000.00	\$ 11,000.00
9	2-03	CHANNEL EXCAVATION INCL. HAUL	C.Y.	810	\$ 62.00	\$ 50,220.00
10	2-12	CONSTRUCTION GEOTEXTILE FOR SEPARATION	S.Y.	60	\$ 25.00	\$ 1,500.00
11	6-02	REMOVE EXIST PILING	L.S.	1	\$ 15,000.00	\$ 15,000.00
5	6-02	TEMPORARY DETOUR BRIDGE AND ROADWAY	L.S.	1	\$ 350,000.00	\$ 350,000.00
5	6-02	STRUCTURE EXCAVATION INCL HAUL	L.S.	1	\$ 20,000.00	\$ 20,000.00
5	6-02	3 FOOT DIAMETER DRILLED SHAFT	L.F.	100	\$ 3,100.00	\$ 310,000.00
5	6-02	CONCRETE CLASS 4000	C.Y.	60	\$ 2,500.00	\$ 150,000.00
5	6-02	STEEL REINFORCING BAR	LB	10000	\$ 4.00	\$ 40,000.00
12	8-01	HIGH VISIBILITY SILT FENCE	L.F.	280	\$ 8.00	\$ 2,240.00
13	8-01	HIGH VISIBILITY FENCE	L.F.	400	\$ 8.00	\$ 3,200.00
14	8-01	STABILIZED CONSTRUCTION ENTRANCE	S.Y.	75	\$ 85.00	\$ 6,375.00
15	8-01	EROSION CONTROL AND WATER POLLUTION PREVENTION	L.S.	1	\$ 5,000.00	\$ 5,000.00
16	8-02	TOPSOIL TYPE B	C.Y.	190	\$ 75.00	\$ 14,250.00
17	8-15	ROCK FOR EROSION AND SCOUR PROTECTION CLASS B	TON	300	\$ 100.00	\$ 30,000.00
18	8-15	FILTER BLANKET	TON	190	\$ 75.00	\$ 14,250.00
19	8-31	TEMPORARY STREAM DIVERSION (SENN RD BRIDGE SCOUR)	L.S.	1	\$ 30,000.00	\$ 30,000.00
20	SP	LANDSCAPE RESTORATION	L.S.	1	\$ 29,125.00	\$ 29,125.00
21	SP	WOODY MATERIAL-LOG WITH ROOTWAD (EA)	EA.	7	\$ 2,800.00	\$ 19,600.00
23	SP	COIR SLOPE PROTECTION	S.Y.	160	\$ 80.00	\$ 12,800.00
24	SP	STREAMBED COBBLES 10 IN.	TON	120	\$ 118.00	\$ 14,160.00
25	SP	STREAMBED SEDIMENT	TON	150	\$ 85.00	\$ 12,750.00
26	SP	STREAMBED SAND	TON	100	\$ 80.00	\$ 8,000.00
						\$ -

SUB -TOTAL **\$1,347,632.00**
15% CONTINGENCY **\$202,144.80**
TOTAL **\$1,549,776.80**

LEWIS COUNTY
Sargent Rd MP 1.33 Bridge Scour
Engineers Estimate of Probable Construction Cost
Alternate 3 - Rock Revetment



Estimate date: 10/22/2025
 Prepared by: Otak

Estimate Notes and assumptions

Unit costs for items derived from prior bid tabulations, WSDOT unit costs, and professional experience.

Note: Estimate does not include costs for property acquisition (if needed) or utility impacts

LEWIS COUNTY Senn Rd MP 0.87 Bridge Scour Repair

BID ITEM NUMBER	SPEC. SECTION	BID ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	1-09	MOBILIZATION	L.S.	1	\$ 67,104.00	\$ 67,104.00
2	1-04	MINOR CHANGE	FORCE ACCOUNT	1	\$ 22,000.00	\$ 22,000.00
3	1-05	CONSTRUCTION SURVEYING	L.S.	1	\$ 7,500.00	\$ 7,500.00
4	1-07	SPCC PLAN	L.S.	1	\$ 3,500.00	\$ 3,500.00
5	1-10	PROJECT TEMPORARY TRAFFIC CONTROL	L.S.	1	\$ 10,000.00	\$ 10,000.00
6	1-10	CONSTRUCTION SIGNS CLASS A	S.F.	171	\$ 30.00	\$ 5,130.00
7	2-01	CLEARING AND GRUBBING	ACRE	0.2	\$ 40,000.00	\$ 8,000.00
8	2-02	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L.S.	1	\$ 11,000.00	\$ 11,000.00
9	2-03	CHANNEL EXCAVATION INCL. HAUL	C.Y.	810	\$ 62.00	\$ 50,220.00
10	2-12	CONSTRUCTION GEOTEXTILE FOR SEPARATION	S.Y.	60	\$ 25.00	\$ 1,500.00
12	8-01	HIGH VISIBILITY SILT FENCE	L.F.	280	\$ 8.00	\$ 2,240.00
13	8-01	HIGH VISIBILITY FENCE	L.F.	400	\$ 8.00	\$ 3,200.00
14	8-01	STABILIZED CONSTRUCTION ENTRANCE	S.Y.	75	\$ 85.00	\$ 6,375.00
15	8-01	EROSION CONTROL AND WATER POLLUTION PREVENTION	L.S.	1	\$ 6,000.00	\$ 6,000.00
16	8-02	TOPSOIL TYPE B	C.Y.	290	\$ 75.00	\$ 21,750.00
17	8-15	ROCK FOR EROSION AND SCOUR PROTECTION CLASS B	TON	1400	\$ 95.00	\$ 133,000.00
18	8-15	FILTER BLANKET	TON	190	\$ 75.00	\$ 14,250.00
19	8-31	TEMPORARY STREAM DIVERSION (SENN RD BRIDGE SCOUR)	L.S.	1	\$ 55,000.00	\$ 55,000.00
20	SP	LANDSCAPE RESTORATION	L.S.	1	\$ 39,125.00	\$ 39,125.00
22	SP	WOODY MATERIAL-TOP TREE (EA)	EA.	1	\$ 1,800.00	\$ 1,800.00
23	SP	COIR SLOPE PROTECTION	S.Y.	160	\$ 80.00	\$ 12,800.00
24	SP	STREAMBED COBBLES 10 IN.	TON	1170	\$ 118.00	\$ 138,060.00
25	SP	STREAMBED SEDIMENT	TON	150	\$ 85.00	\$ 12,750.00
26	SP	STREAMBED SAND	TON	200	\$ 80.00	\$ 16,000.00
						\$ -
SUB - TOTAL						\$648,304.00
CONTINGENCY 15%						\$97,245.60
TOTAL						\$745,549.60

LEWIS COUNTY
Sargent Rd MP 1.33 Bridge Scour
Engineers Estimate of Probable Construction Cost
Alternate 4 - Concrete Slope Protection (A-Jacks)



Estimate date: 10/22/2025
 Prepared by: Otak

Estimate Notes and assumptions

Unit costs for items derived from prior bid tabulations, WSDOT unit costs, and professional experience.

Note: Estimate does not include costs for property acquisition (if needed) or utility impacts

LEWIS COUNTY Senn Rd MP 0.87 Bridge Scour Repair

BID ITEM NUMBER	SPEC. SECTION	BID ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	1-09	MOBILIZATION	L.S.	1	\$ 98,304.00	\$ 98,304.00
2	1-04	MINOR CHANGE	FORCE ACCOUNT	1	\$ 22,000.00	\$ 22,000.00
3	1-05	CONSTRUCTION SURVEYING	L.S.	1	\$ 7,500.00	\$ 7,500.00
4	1-07	SPCC PLAN	L.S.	1	\$ 3,500.00	\$ 3,500.00
5	1-10	PROJECT TEMPORARY TRAFFIC CONTROL	L.S.	1	\$ 10,000.00	\$ 10,000.00
6	1-10	CONSTRUCTION SIGNS CLASS A	S.F.	171	\$ 30.00	\$ 5,130.00
7	2-01	CLEARING AND GRUBBING	ACRE	0.2	\$ 40,000.00	\$ 8,000.00
8	2-02	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L.S.	1	\$ 11,000.00	\$ 11,000.00
9	2-03	CHANNEL EXCAVATION INCL. HAUL	C.Y.	810	\$ 62.00	\$ 50,220.00
10	2-12	CONSTRUCTION GEOTEXTILE FOR SEPARATION	S.Y.	60	\$ 25.00	\$ 1,500.00
12	8-01	HIGH VISIBILITY SILT FENCE	L.F.	280	\$ 8.00	\$ 2,240.00
13	8-01	HIGH VISIBILITY FENCE	L.F.	400	\$ 8.00	\$ 3,200.00
14	8-01	STABILIZED CONSTRUCTION ENTRANCE	S.Y.	75	\$ 85.00	\$ 6,375.00
15	8-01	EROSION CONTROL AND WATER POLLUTION PREVENTION	L.S.	1	\$ 5,000.00	\$ 5,000.00
16	8-02	TOPSOIL TYPE B	C.Y.	290	\$ 75.00	\$ 21,750.00
17	8-15	ROCK FOR EROSION AND SCOUR PROTECTION CLASS B	TON	300	\$ 100.00	\$ 30,000.00
17	8-15	CONCRETE SLOPE PROTECTION (A-JACKS)	S.Y.	410	\$ 900.00	\$ 369,000.00
18	8-15	FILTER BLANKET	TON	190	\$ 75.00	\$ 14,250.00
19	8-31	TEMPORARY STREAM DIVERSION (SENN RD BRIDGE SCOUR)	L.S.	1	\$ 50,000.00	\$ 50,000.00
20	SP	LANDSCAPE RESTORATION	L.S.	1	\$ 39,125.00	\$ 39,125.00
22	SP	WOODY MATERIAL-TOP TREE (EA)	EA.	1	\$ 1,800.00	\$ 1,800.00
23	SP	COIR SLOPE PROTECTION	S.Y.	160	\$ 80.00	\$ 12,800.00
24	SP	STREAMBED COBBLES 10 IN.	TON	1170	\$ 118.00	\$ 138,060.00
25	SP	STREAMBED SEDIMENT	TON	150	\$ 85.00	\$ 12,750.00
26	SP	STREAMBED SAND	TON	200	\$ 80.00	\$ 16,000.00
						\$ -

SUB-TOTAL **\$939,504.00**
CONTINGENCY 15% **\$140,925.60**
TOTAL **\$1,080,429.60**

Appendix C

Draft Hydraulics Report



Osborn Consulting
1317 Commercial Street, Suite 201
Bellingham, Washington 98225
360.354.9989

TECHNICAL MEMORANDUM

Date: October 14, 2025

Project: Lewis County Senn MP 0.87 Scour Mitigation
To: Doug Sarkkinen, PE, Project Manager | Otak

From: Isaac Fournier, PE | Osborn Consulting
Henry Moen, EIT | Osborn Consulting

cc:
Subject: DRAFT Senn Hydraulic and Hydrology Report

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INTRODUCTION

Lewis County (County) is planning scour mitigation at Senn Road Bridge (MP 0.87), to bring the structure's current National Bridge Inspection (NBI) Code 113 Rating 3 – Scour Critical, up to 7 – Design Countermeasures Installed. Osborn Consulting, Inc. (Osborn) performed hydrologic, hydraulic, and scour analyses of the existing conditions, and developed two concept level countermeasure designs for the Senn Road Bridge crossing. Project location and vicinity are shown below in Figure 1.



Figure 1: Project Vicinity Map (Lewis County GIS Web Map)

SECTION 1 HYDROLOGIC ANALYSIS

A hydrologic analysis of Lucas Creek at the Senn Road crossing was conducted to inform hydraulic modeling efforts. Three methods were used to generate and analyze hydrologic conditions at this site: a flood frequency analysis performed by Northwest Hydraulic Consultants (NHC) as part of a previous project, a USGS Flood Q regression analysis and a Flood Q ratio analysis were both performed by Osborn as part of the project.

The flood frequency analysis used nearby Gage #12024400 (NF Newaukum River Abv Bear Creek NR Forest, WA) data as a basis to calculate the statistical properties of the gaged river hydrology and then apply that data to the Lucas Creek basin using the drainage area ratio method. This resulted in a 500-year flow event of 4,579 cfs and a 2-year flow event of 828 cfs.

The USGS Flood Q regression analysis requires the basin drainage area, the annual precipitation and the region in Washington State as input parameters to estimate the hydrology. The drainage basin and annual precipitation was determined using the USGS Streamstats application (USGS 2019). The report generated by StreamStats, including the regression equation flows, is provided in Appendix A. Lucas Creek is in Regression Region 4 Washington and has a drainage area of 13.1 square miles and an annual precipitation of 56.5 inches. Based on these parameters, the 500-year flow event was estimated to be 2,240 cfs and the 2-year flow event as 414 cfs. A printout of the Flood Q regression and ratio tool is shown in Appendix B.

The USGS Flood Q ratio tool uses the same data as the Flood Q regression tool but compares the basin to a selected gage on a nearby river. Gage #12024400 North Fork Newaukum River Abv Bear Creek NR Forest, WA was selected as it is the closest and most similar in size to the Lucas Creek Basin. The Flood Q ratio tool analysis resulted in a 500-year flow event of 2,000 cfs and a 2-year flow event of 374 cfs. A printout of the Flood Q regression and ratio tool is shown in Appendix B.

From these analysis methods the Flood Q regression hydrology was selected for the hydraulic model. The Flood Q ratio tool requires that the basin area being analyzed is within 50% of the size of the gaged basin for the weighted hydrology to be valid. The gage station basin area is 29.7 square miles, and the Lucas Creek basin area is only 45% of that area. The results of the flood frequency analysis were not considered following hydraulic modeling as the 2-year flow exceeded the field observed bankfull width by approximately 10 feet, suggesting the flows are overly conservative. The estimated flood discharges for Lucas Creek at the Senn Road crossing that were used for subsequent hydraulic modeling are summarized below in Table 1.

Table 1. Peak Flows for Lucas Creek at the Senn Road Bridge Crossing

Gage #, Analysis Tool	Flow Frequency Return Period					
	2-Year (cfs)	10-Year (cfs)	25-Year (cfs)	50-Year (cfs)	100-Year (cfs)	500-Year (cfs)
#12024400 Flood Q Regression Tool	414	897	1,180	1,410	1,650	2,240

Notes:

cfs = cubic feet per second

SECTION 2 HYDRAULIC ANALYSIS

Hydraulic analysis of the existing conditions of the Senn Road Bridge crossing was performed using the United State Bureau of Reclamation's SRH-2D Version 3.3.1 computer program, a two-dimensional hydraulic and sediment transport numerical model (USBR, 2020). Pre- and post- processing for this model was included using the Surface-water Modeling System (SMS) version 13.3.16 (Aquaveo, 2025). Results from the hydraulic modeling were used in coordination with the FHWA Hydraulic Toolbox software version 5.4, specifically the Bridge Scour Analysis calculator (FWHA 2024). Scour calculations are discussed in Section 3.

The existing conditions scenario was analyzed using SRH-2D simulations. The alternative design concepts are not anticipated to significantly impact the channel hydraulics and thus are not independently modeled at this stage. Scour countermeasure design concepts have been developed using the results from the existing conditions hydraulic model. A proposed conditions model for the selected alternative will be prepared at a later design stage.

Model configuration including mesh qualities, roughness coefficients, and boundary conditions are discussed in the subsequent section.

2.1 Model Setup

Channel geometry data in the existing model was developed from topographic survey provided by Otak which extended 300 feet upstream and 300 feet downstream of the Senn Road bridge. Supplemental topographic information sourced from the SWWA Foothills 2017 dataset on the Washington LiDAR Portal (USGS 2017) was merged with the survey. The existing conditions mesh extends from approximately 300 feet upstream to approximately 300 feet downstream of the crossing. The channel bed, banks, and thalweg were modeled using patch-type (quadrilateral) elements to capture the more singular-directional flow. Areas outside of the channel were modeled using paving-type (triangular) elements. The existing bridge abutments and piers were modeled as holes in the mesh. There are two groups of four cylindrical piers: one group on either side of the channel. The existing model mesh is shown in Figure 2.

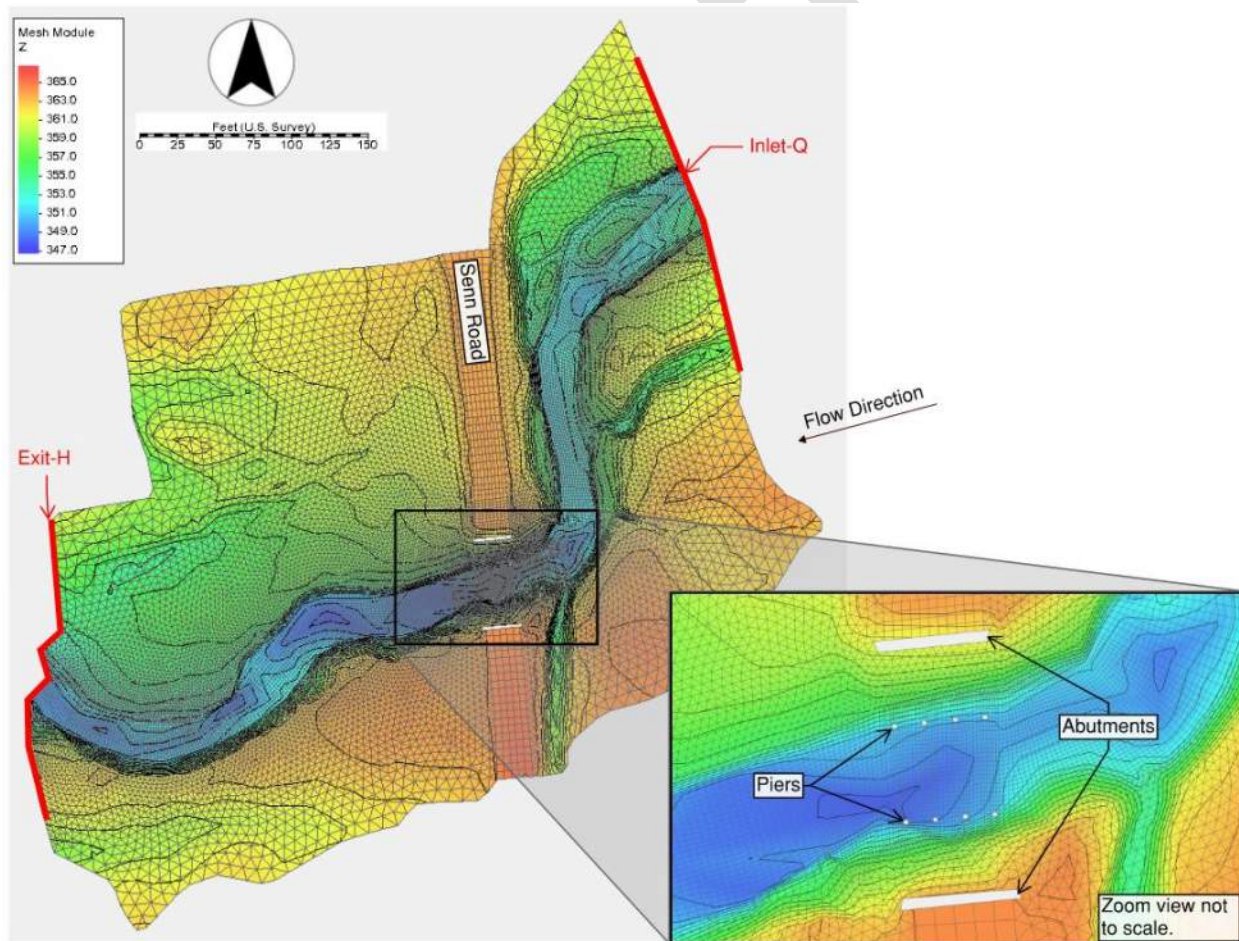


Figure 2: Existing conditions mesh and boundary conditions

Boundary condition coverages were created for each simulation that was included in the model. Inflow boundary conditions used the Inlet-Q (subcritical flow) type with a constant discharge and conveyance distribution at the inlet. Discharge values varied by design flow event. The 2-year, 10-year, 25-year, 50-year, 100-year, and 500-year flow events were included in the model simulations (see Table 1 for flood discharge values). Outflow boundary conditions used the Exit-H (subcritical outflow) type with an exit

water surface elevation that was generated from a normal depth rating curve. The rating curve was populated using the following inputs: Manning's $n = 0.04$, slope = 0.007 feet/foot, and flows ranging from 0 cfs to 4580 cfs.

Hydraulic roughness within each model simulation is defined by Manning's n values. Material coverages, which define the spatial distribution of roughness values, were delineated for the existing conditions model. The channel roughness coefficient was evaluated using the quasi-quantitative method (Arcement and Schneider 1989) in the Stream Channel Flow Resistance Coefficient Computation Tool (NSAEC 2018). Other material coverages including vegetated overbank, asphalt roadway, and agricultural land were assigned Manning's n roughness coefficients estimated from Chow's *Open-Channel Hydraulics* (Chow 1959). Manning's n values are listed in Table 2.

Table 2. Roughness Coefficients

Material	Manning's n
Existing Channel	0.04
Vegetated Overbank	0.08
Asphalt Roadway	0.02
Agricultural Land	0.045

2.2 Model Results

Hydraulic results for average channel water surface elevation (WSE), maximum channel depth, average channel velocity, and average channel shear stress were analyzed at representative cross section locations. Results were analyzed at seven cross section locations along the existing alignment: three downstream (DS), one spanning the bridge, and three upstream (US). Cross section locations are shown below on Figure 3, and results are summarized in Table 3.

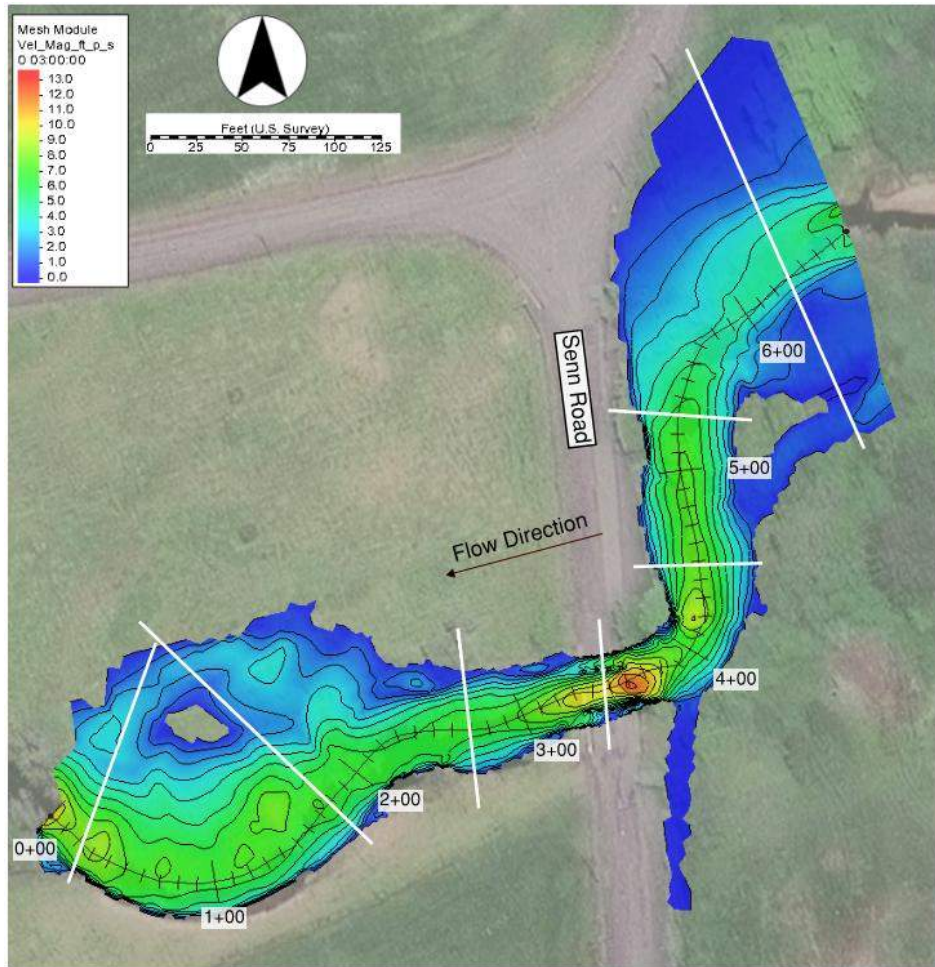


Figure 3: 100-year velocity dataset with locations of cross sections

Table 3. Hydraulic Model Results

Hydraulic Parameter	Cross Section	2-Year	100-Year	500-Year
Average WSE (ft)	DS 0+23	352.7	356.3	357.4
	DS 1+78	354.1	357.3	357.9
	DS 2+70	354.3	357.7	358.3
	Structure 3+47	354.3	357.4	357.8
	US 4+48	354.8	359.7	361.2
	US 5+31	355.6	360.3	361.9
	US 6+30	356.1	360.8	362.2
Max Depth (ft)	DS 0+23	3.7	7.3	8.4
	DS 1+78	3.4	6.6	7.2
	DS 2+70	5.5	9.0	9.6
	Structure 3+47	6.0	9.3	9.7
	US 4+48	3.3	8.2	9.7
	US 5+31	4.3	9.0	10.5

Hydraulic Parameter	Cross Section	2-Year	100-Year	500-Year
	US 6+30	4.5	9.1	10.5
Average Velocity (ft/s)	DS 0+23	5.8	7.7	7.5
	DS 1+78	4.1	6.1	6.7
	DS 2+70	2.7	5.9	7.3
	Structure 3+47	2.9	6.6	8.3
	US 4+48	6.0	6.9	7.2
	US 5+31	4.4	5.9	5.7
	US 6+30	3.6	3.8	4.3
Average Shear (lb/SF)	DS 0+23	1.1	1.5	1.3
	DS 1+78	0.6	1.0	1.1
	DS 2+70	0.2	0.8	1.2
	Structure 3+47	0.3	1.4	2.2
	US 4+48	1.2	1.2	1.2
	US 5+31	0.6	0.8	0.7
	US 6+30	0.5	0.4	0.4

2.3 100-Year Water Surface Elevation Comparison

This project is within FEMA Zone A Special Flood Hazard Area. A no rise analysis is required for design to assist with alternative selection process.

Preliminary modeling was conducted for the Rock Revetment alternative (Alternative 3) and the Revetment Using A-jacks alternative (Alternative 4). The existing conditions model was modified to reflect these two alternative conditions. Average WSEs from the alternative modeling are listed and compared to existing conditions average WSEs in Table 4. The alternatives do not result in an overall increase in the 100-year WSE exceeding one foot. These model results are based on preliminary design and will be refined when an alternative is selected and design progresses.

Table 4. 100-Year Average WSE Comparison

Cross Section STA	Existing WSE	Alternative 3		Alternative 4	
		WSE	Difference ^a	WSE	Difference ^a
DS 0+23	356.3	356.3	0.0	356.3	0.0
DS 1+78	357.3	357.3	0.0	357.3	0.0
DS 2+70	357.7	357.6	-0.1	357.6	-0.1
Structure 3+47	357.4	357.6	0.2	357.7	0.3
US 4+48	359.7	359.4	-0.3	359.4	-0.3
US 5+31	360.3	360.2	-0.1	360.2	-0.2
US 6+30	360.8	360.7	-0.1	360.7	-0.1

a) Difference calculated as Alternative WSE minus Existing WSE.

SECTION 3 SCOUR ANALYSIS

3.1 Scour Results

Hydraulic model results were exported from the bridge scour coverage in SMS to the Hydraulic Toolbox Bridge Scour Calculator. Placement of the bridge scour coverage arcs are shown in Figure 4. Contraction, pier, and abutment scour were evaluated for existing conditions. All modeled flood events were evaluated to identify which flow produced the greatest amount of scour. Long-term degradation potential was evaluated separately.

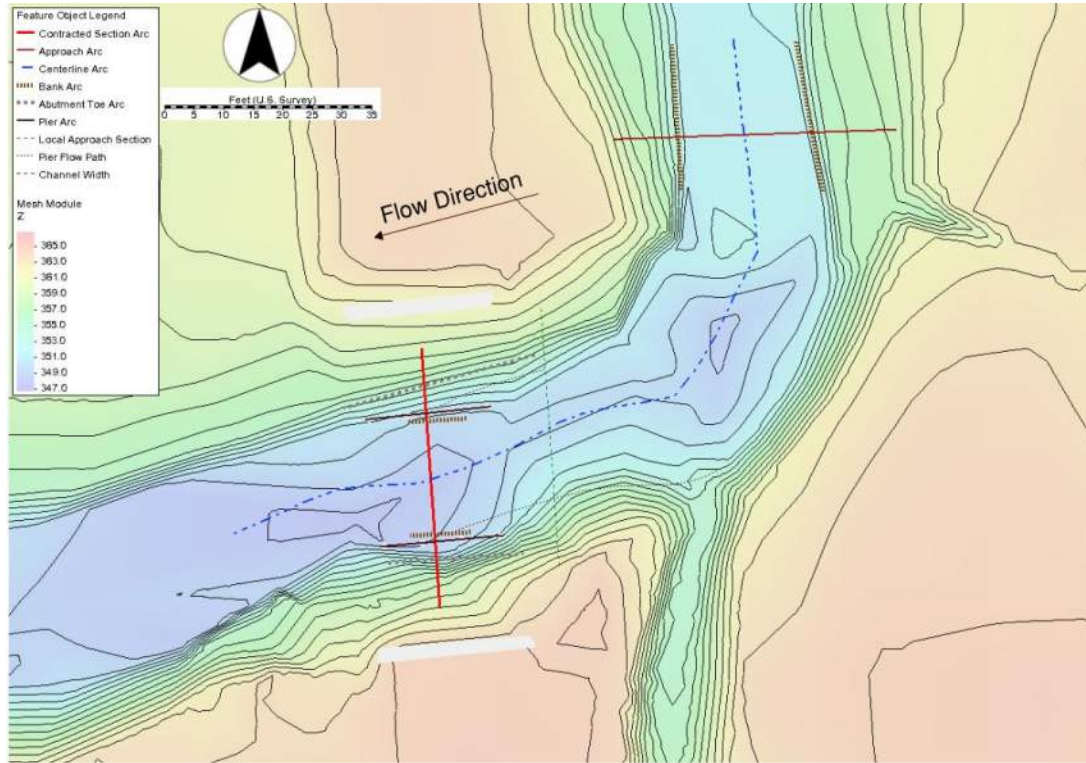


Figure 4: Bridge scour coverage arcs

Maximum contraction, pier, and abutment scour depths are expected to occur at the 500-year flow event, with values of 0.3 feet, 5.4, and 7.4 feet, respectively. All scour depths calculated in the Hydraulic Toolbox are summarized in Table 5.

Table 5. Hydraulic Toolbox Scour Summary

Flood Frequency	Scour Type				
	Contraction (feet)	Pier #1 (feet)	Pier #2 (feet)	Abutment Existing Material ⁽¹⁾ (feet)	Abutment Class B Rock ⁽¹⁾ (feet)
500-Year	0.3⁽²⁾	5.4	5.4	7.4	0.0
100-Year	0.0	5.0	5.0	4.8	0.0
50-Year	0.0	4.1	4.3	3.8	0.0
25-Year	0.0	3.7	3.8	2.7	0.0
10-Year	0.0	3.4	3.2	1.4	0.0
2-Year	0.0	3.8	3.8	0.0	0.0

- (1) Abutment scour depths are the same for left and right abutment.
- (2) Bold values indicate maximum scour depth for each type of scour.

Long-term degradation potential is considered low at the Senn Road crossing due to the relatively flat slope of the stream. The channel gradient is generally consistent based on the LiDAR elevation data with an equilibrium slope of 0.4 percent measured over approximately one mile of the stream. Additionally, hard till material was observed in the streambed downstream of the crossing which is relatively resistant to degradation. Cross section data shown in Figure 6 from the years 1990, 1997, 2019, and 2021 shows some channel adjustments of approximately 1.3 feet over the period of 30 years.

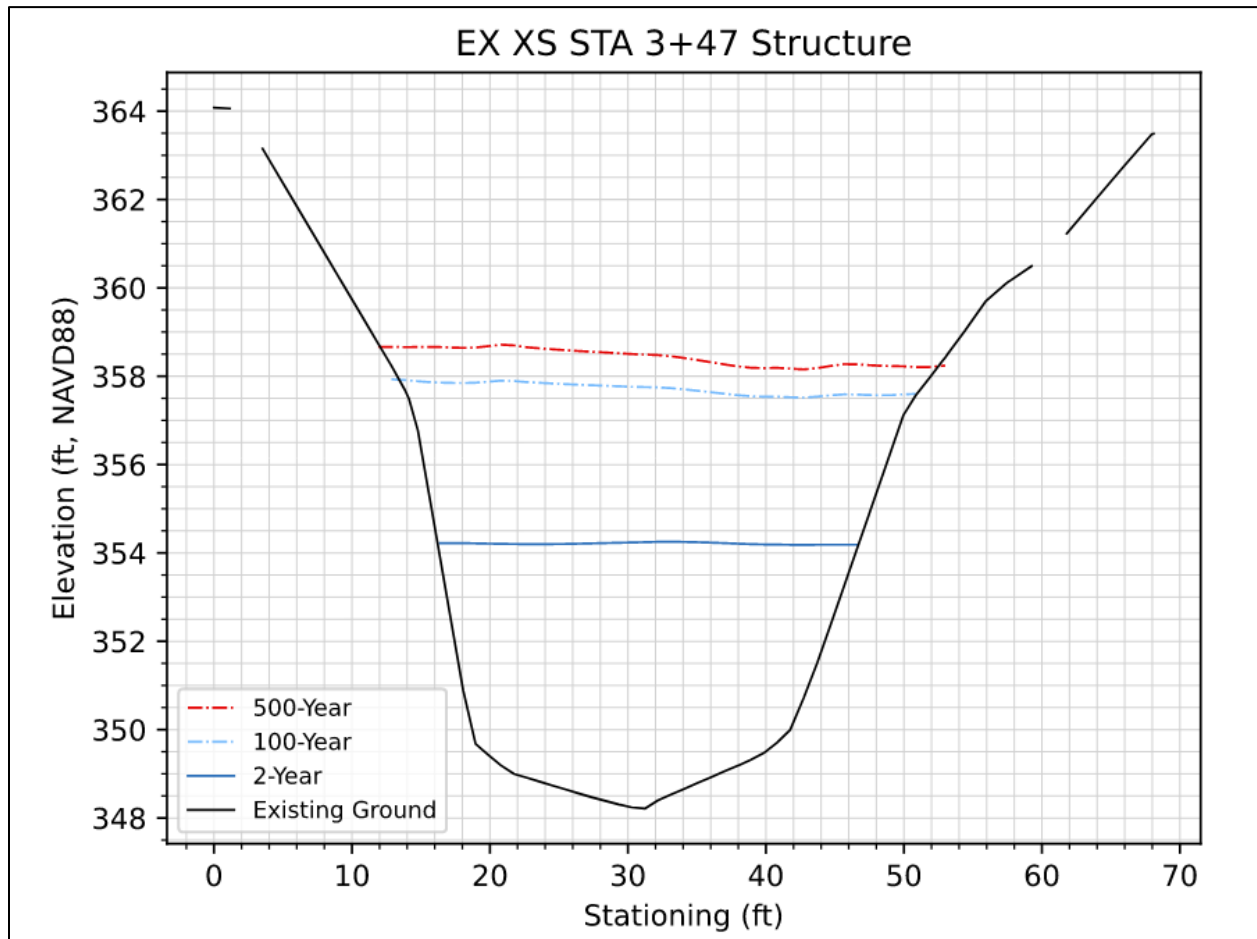


Figure 5: Existing (EX) cross section (XS) spanning the existing bridge

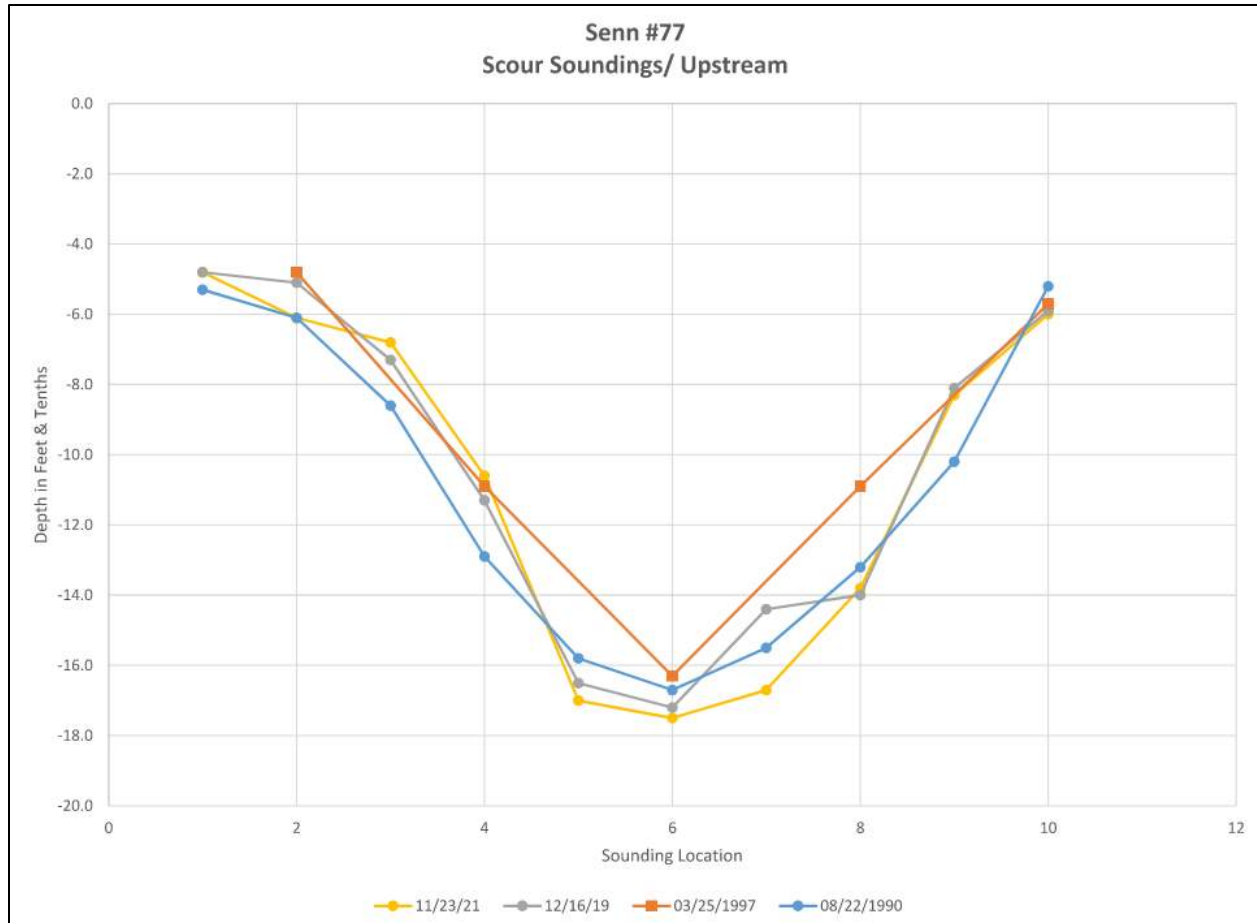


Figure 6: Historical Cross Section Data

3.2 Scour Countermeasure Design

Conceptual scour countermeasures were designed using the hydraulic and scour results described above. The countermeasure alternatives include:

3. Class B Rock Revetment with Class B Rock Apron
4. A-Jacks Revetment with Class B Rock Apron

Alternatives 1 and 2 have been developed by Otak and are not documented in this report. The alternative is structural in nature and is not documented in this report. Conceptual designs for Alternative 3 and Alternative 4 are included in Appendix C.

3.2.1 Material Sizing

The rock class for Alternatives 3 and 4 was calculated using the Federal Highway Administration's (FHWA) HEC-23: Bridge Scour and Stream Instability Countermeasures Experience, Selection, and Design Guidance Volume 2 (HEC 23 V2), Equation 4.1 Design Guidelines for Revetment Riprap (FHWA 2009). The inputs and results of this calculation are provided in Appendix D. For this conceptual design a conservative factor of safety of 1.4 was used in the calculations compared to the recommended safety factor of 1.1 from HEC 23. This may be reduced based on engineering judgement during future design phases. Based on these calculations the D_{30} and D_{50} of the proposed rock material must be greater than

1.5 and 1.8 feet, respectively, and therefore Washington State Department of Transportation (WSDOT) Standard Specifications 9-13.4(2) Class B Rock for Erosion and Scour Protection is proposed (WSDOT 2025).

Pier scour was evaluated separately using Equations 11.1 and 11.3 from HEC 23 V2 to calculate the required rock class size for pier protection resulting in Rock for Erosion and Scour Protection Class B.

Sizing of the A-jacks included in Alternative 4 will be conducted at a later design stage in coordination with the material supplier if that alternative is selected.

3.2.2 Layout

A preliminary layout of the revetment and aprons included in Alternatives 3 and 4 was prepared using The FHWA Hydraulic Considerations of Abutments on Deep Foundations and Bridge Embankment Protection Tech Brief (TechBrief) (FHWA 2023) as well as recommendations from HEC 23 V2 Design Guidelines 4 and 11 (FHWA 2009). Figure 7, Figure 8, Figure 9, and Figure 10 illustrate the suggested countermeasure extents from the two guidelines.

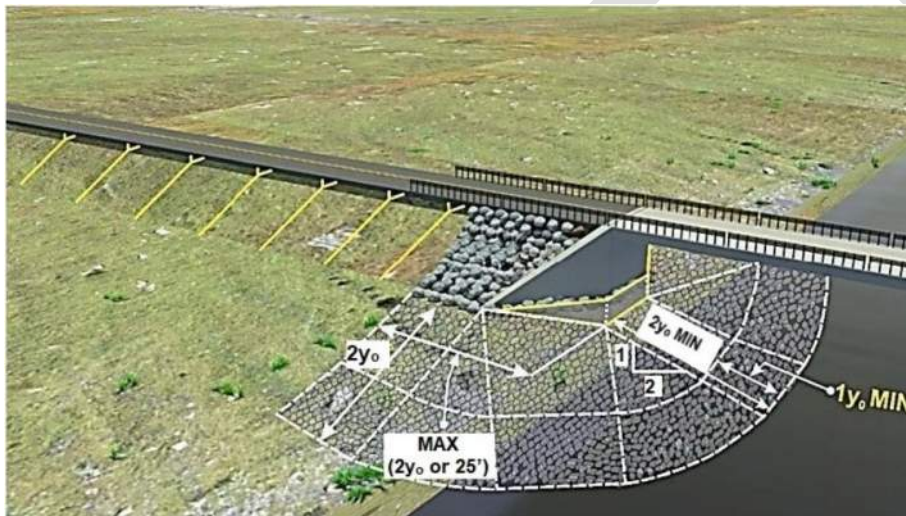


Figure 7: Countermeasure extents (y_o = main channel flow depth through the bridge) (TechBrief)

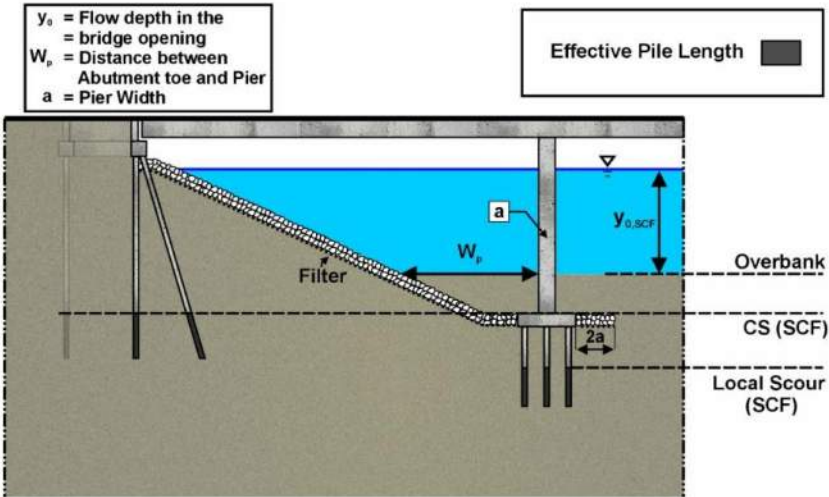


Figure 8: Countermeasure for scour condition B and a closely located pier (TechBrief)

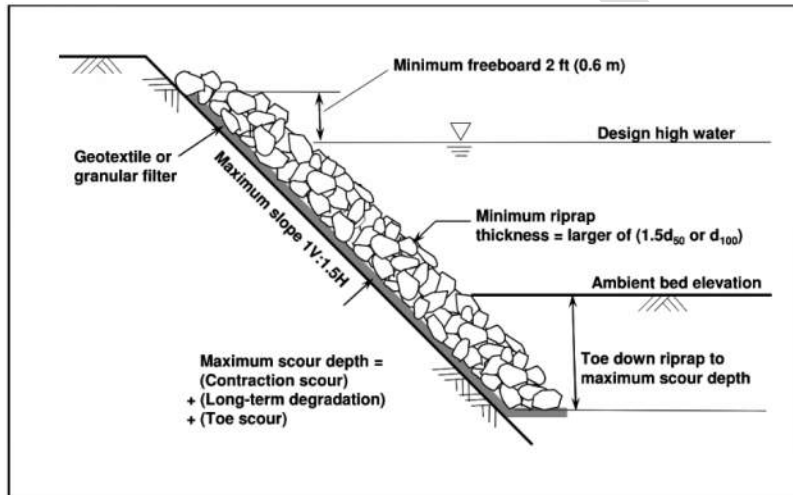


Figure 9: Riprap revetment with buried toe (HEC 23 V2 Design Guideline 4)

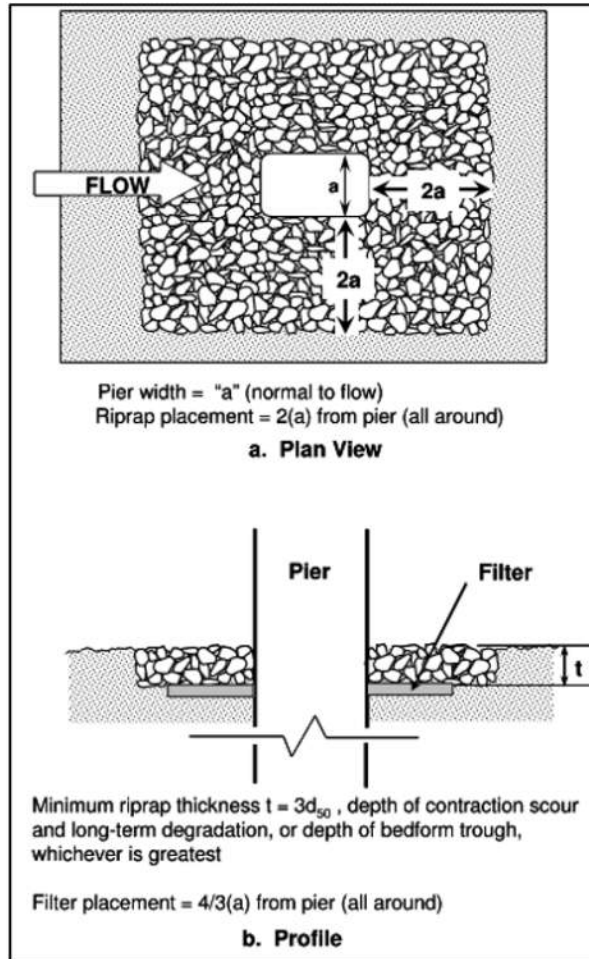


Figure 10: Riprap Pier Protection (HEC 23 V2 Design Guideline 11)

The conceptual design incorporates elements from several of the recommended scour countermeasure treatments shown above, while accommodating project requirements, site constraints, constructability, and cost considerations.

1. 1.5H:1V slopes were used for the revetment design, as the proposed rock for erosion and scour protection material can sustain that slope.
2. The revetment extends deeper than the contraction scour depth to allow for the placement of four feet of streambed material above the Rock for Erosion and Scour Protection.

The proposed revetment and apron do not extend the full 2Y0 (20 feet) from the abutment parallel to the roadway on the downstream side of the crossing. Generally, this additional material is placed to prevent end-running of the countermeasure resulting from lateral channel migration. The cross sections shown in Figure 6 indicate that over the last 30 years there has not been channel migration at the crossing. If either Alternative 3 or Alternative 4 are selected, this design decision should be further evaluated and discussed with the project team and external stakeholders.

3. Design Guideline 11 recommends that rock pier protection be installed at the surface to facilitate inspection. In this case, since the piers are located near the abutments, the proposed pier protection would be installed as shown in the TechBrief.

4. The toe of the revetment and the apron was extended further below the channel grade than required to provide placement of streambed material above the countermeasure. Placing streambed material above the countermeasure is beneficial from a habitat and project permitting perspective and will not negatively impact the effectiveness of the countermeasure.

SECTION 4 CONCLUSIONS

The hydrologic and hydraulic analyses of the project site were used to inform two hydraulic scour countermeasure alternatives which are both anticipated to provide protection to the piers and abutments of the existing Senn Road Bridge. Installation of Alternative 3 or Alternative 4 would successfully meet the project goal of attaining the NCI Code rating for the bridge to a 7-Design Countermeasures Installed.

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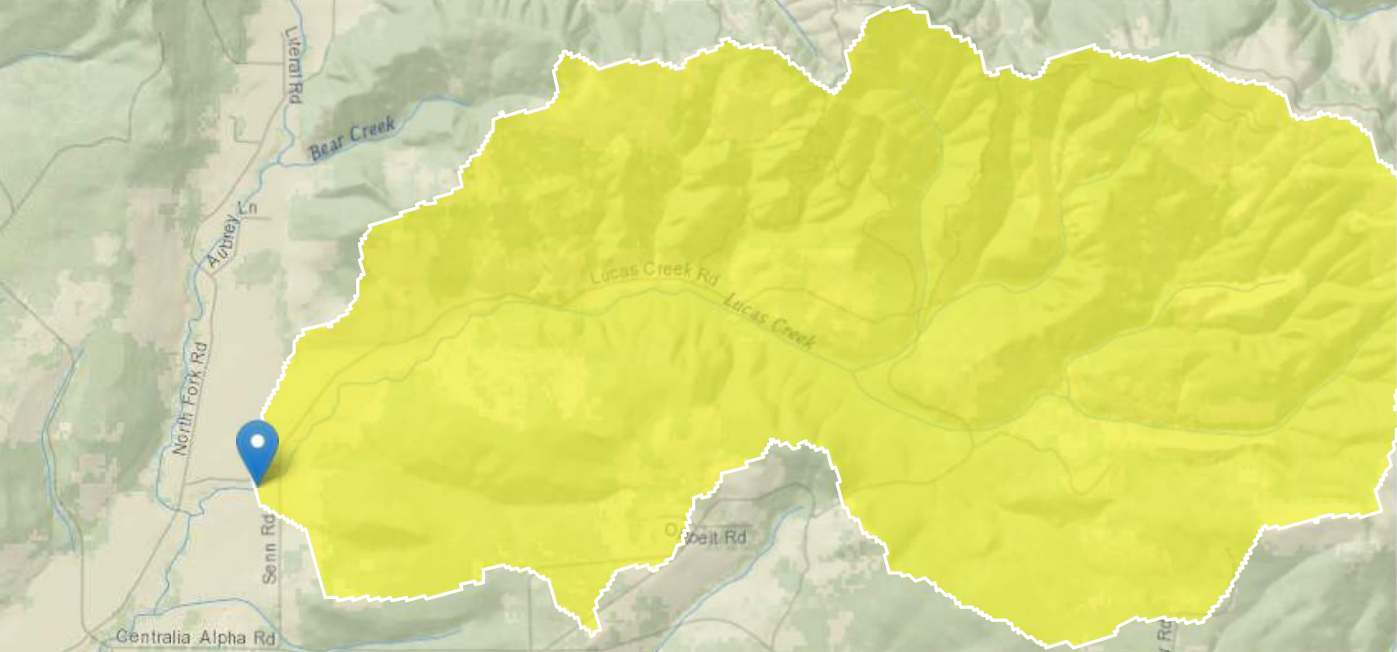
Attachments: **Appendix A: StreamStats Report**
Appendix B: Flood Q Regression and Ratio Tool
Appendix C: Original Bridge Plans
Appendix D: Conceptual Designs for Alternatives
Appendix E: Revetment Rock Sizing Calculations
Appendix F: Pier Rock Sizing Calculations

Appendix A: StreamStats Report

DRAFT

StreamStats Report

Region ID: WA
Workspace ID: WA20250305190040916000
Clicked Point (Latitude, Longitude): 46.63823, -122.77406
Time: 2025-03-05 11:01:19 -0800



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CANOPY_PCT	Percentage of drainage area covered by canopy as described in OK SIR 2009_5267	68.6	percent
DRNAREA	Area that drains to a point on a stream	13.14	square miles
PRECIP	Mean Annual Precipitation	56.5	inches
PRECPRIS10	Basin average mean annual precipitation for 1981 to 2010 from PRISM	58	inches

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Region 4 2016 5118]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	13.14	square miles	0.18	2230
PRECPRIS10	Mean Annual Precip PRISM 1981 2010	58	inches	11.9	187

Peak-Flow Statistics Flow Report [Peak Region 4 2016 5118]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR²: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
50-percent AEP flood	425	ft ³ /s	113	1600	52.5
20-percent AEP flood	697	ft ³ /s	190	2560	50.6
10-percent AEP flood	914	ft ³ /s	246	3390	50.5
4-percent AEP flood	1200	ft ³ /s	308	4680	51.7
2-percent AEP flood	1430	ft ³ /s	351	5830	52.9
1-percent AEP flood	1670	ft ³ /s	392	7110	54.2
0.5-percent AEP flood	1900	ft ³ /s	428	8430	55.5
0.2-percent AEP flood	2270	ft ³ /s	477	10800	58

Peak-Flow Statistics Citations

Mastin, M.C., Konrad, C.P., Veilleux, A.G., and Tecca, A.E., 2016, Magnitude, frequency, and trends of floods at gaged and ungaged sites in Washington, based on data through water year 2014 (ver 1.1, October 2016): U.S. Geological Survey Scientific Investigations Report 2016–5118, 70 p. (<http://dx.doi.org/10.3133/sir20165118>)

➤ Maximum Probable Flood Statistics

Maximum Probable Flood Statistics Parameters [Crippen Bue Region 17]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	13.14	square miles	0.1	10000

Maximum Probable Flood Statistics Flow Report [Crippen Bue Region 17]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	48300	ft ³ /s

Maximum Probable Flood Statistics Citations

Crippen, J.R. and Bue, Conrad D. 1977, Maximum Floodflows in the Conterminous United States, Geological Survey Water-Supply Paper 1887, 52p. (<https://pubs.usgs.gov/wsp/1887/report.pdf>)

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USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.28.0

StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

Appendix B: Flood Q Regression and Ratio Tool

DRAFT

Flood Q Regression Tool. Use to estimate flood discharge in Washington State at ungaged sites based on regional regression equations and user-determined basin characteristics.

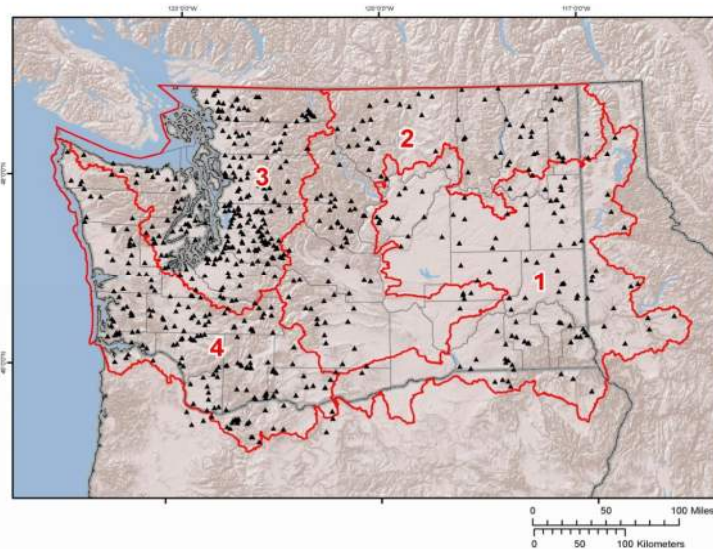
DA = Drainage Area, in square miles; P = Average Basin Annual Precipitation, in inches (from PRISM data set, years 1981-2010); CAN = Percent canopy cover (NLCD 2001); AEP = Annual Exceedance Probability; Qu = Flood Discharge, in cubic feet per second at ungaged site for the indicated AEP; PI_L, PI_U = Prediction Intervals (L=Lower and U=Upper)

Instructions for using the Flood Q Tool to estimate Flood Discharges at Ungaged Sites using the regional regression equations

- | Steps | Instructions |
|-------|---|
| 1 | Select the Regression Region below from the List Box |
| 2 | Determine the drainage area, DA and the Annual Precipitation, P for the ungage drainage basin. If you pick Regression Region 1 or 2, determine the percent canopy cover, CAN . Enter these basin characteristic values in the green-shade cells. If the cell changes to red, than the value is outside the range of valid values for this regression. Valid value range listed to the right of the green cells. |
| 3 | |
| 4 | Rows 23-30 will have the results. Estimated flood discharge, Q_u , will be found in column O and the 90% prediction limits for these flood discharges will be found in columns R and T. |

Regression Region 1	☐
Regression Region 2	☐
Regression Region 3	☐
Regression Region 4	☒

Regression Regions in Washington State



User determined basin characteristics for ungaged site

Selected Region:	Regression Region 4	Range of values that are valid for the regression
Drainage Area, DA	= 13.14 square miles	0.18 - 2230
Annual Precipitation, P	= 56.50 inches	11.94 - 186.6
Percent Canopy, CAN	= 68.6 %	value not used in regression

Selected Region: Regression Region 4

Estimate of indicated flood discharge for Regression Region 4 using regional regression equations

		Prediction Intervals, 90% confidence level	
AEP	Q_u , ft ³ /s	PI_L , in ft ³ /s	PI_U , in ft ³ /s
0.5	= 414	112.9	1517.9
0.2	= 683	190.9	2443.4
0.1	= 897	248.2	3241.2
0.04	= 1180	311.0	4477.4
0.02	= 1410	356.0	5584.4
0.01	= 1650	399.6	6812.5
0.005	= 1870	434.9	8041.6
0.002	= 2240	486.7	10308.5

*rounded to 3 significant figures

Flood Q Ratio Tool. Estimates of flood discharge for an ungaged sites in Washington State using the Drainage-Area Ratio Method

Station Index=

26

A_u , contributing drainage area of ungaged site; A_g , contributing drainage area of the streamflow gaging site; $Q_{(u)g}$, gage-based estimate of flood discharge in cubic feet per second at ungaged site; $Q_{(u)wtd}$, weighted estimate of flood discharge in cubic feet per second for the ungaged site and indicated streamflow characteristic; $Q_{(u)reg}$, regression estimate of flood discharge in cubic feet per second for ungaged site; $Q_{(g)wtd}$, weighted estimate of flood discharge for streamgaging station]

Instructions for estimating streamflow characteristics at an ungaged site using the Drainage-Area Ratio Method

- Steps** Instructions
1 Select a streamflow-gaging station from the list box below which is on the same stream as the ungaged site.
2 Determine contributing drainage area for ungaged site (A_u , in square miles) and enter value in the green cell (F12), where $0.5A_g \leq A_u \leq 1.5A_g$. If the drainage area is outside the appropriate range, the cell will turn red. An initial estimate of the flood discharges will be computed in column G, rows 23 to 30.
3 The estimates will be improved by computing weighted estimates using the regional regression estimates. To do this, enter the Mean Annual Precipitation in the green box (column I, row x). If the site is in regression region 1 or 2, enter the percent canopy coverage for the ungaged basin in the green box (column I, row x). If either of these values are outside the acceptable range, the cell will turn red.
4 The final answer, the weighted estimates of flood discharge ($Q_{(u)wtd}$), will be listed in column G, rows 37-44.

12016700 JOE CREEK NEAR COSMOPOLIS, WA
12017000 NORTH RIVER NEAR RAYMOND, WA
12019600 WATER MILL CREEK NEAR PE ELL, WA
12020000 CHEHALIS RIVER NEAR DOTY, WA
12020500 ELK CREEK NEAR DOTY, WA
12020800 SOUTH FORK CHEHALIS RIVER NEAR WILDWOOD, WA
12020900 SOUTH FORK CHEHALIS RIVER NEAR BOISTFORT, WA
12021000 SOUTH FORK CHEHALIS RIVER AT BOISTFORT, WA
12024000 SOUTH FORK NEWAUKUM RIVER NEAR ONALASKA, WA
12024400 NF NEWAUKUM RIVER ABV BEAR CREEK NR FOREST, WA
12025000 NEWAUKUM RIVER NEAR CHEHALIS, WA
12025300 SALZER CREEK NEAR CENTRALIA, WA
12025700 SKOOKUMCHUCK RIVER NEAR VAIL, WA
12026000 SKOOKUMCHUCK RIVER NEAR CENTRALIA, WA
12026150 SKOOKUMCHUCK RIVER BLW BLDY RUN CR NR CENTRALIA, WA
12026300 SKOOKUMCHUCK RIVER TRIBUTARY NEAR BUCODA, WA
12027500 CHEHALIS RIVER NEAR GRAND MOUND, WA
12029700 CHEHALIS RIVER NEAR OAKVILLE, WA
12030000 ROCK CREEK AT CEDARVILLE, WA
12031000 CHEHALIS RIVER AT PORTER, WA
12032500 CLOQUALLUM CREEK AT ELMA, WA
12034200 EAST FORK SATSOP RIVER NEAR ELMA, WA
12034700 WEST FORK SATSOP RIVER TRIBUTARY NEAR MATLOCK, WA
12035000 SATSOP RIVER NEAR SATSOP, WA

Estimates of streamflow characteristics based on Drainage-Area Ratio method

Contributing drainage areas of the streamflow-gaging station (A_g) and ungaged site (A_u), located on the same stream		Range of drainage areas for which drainage area adjustment is valid	
---	--	---	--

Drainage area of selected index site, A_g	=	29.7	square miles	—
Drainage area of ungaged location, A_u	=	13.14	square miles	14.8 - 44.5

Selected Streamflow-gaging Station: 12024400
Station Number Number of Years of Record 16

Regression Region: 4

Initial estimate of Flood Discharges at ungaged site, Q_u (eq. 10)

AEP		$Q_{(g)wtd}$	$Q_{(u)g}$, ft ³ /s
0.5	=	1,610.0	766.2
0.2	=	2,810.0	1,335.0
0.1	=	3,700.0	1,755.0
0.04	=	4,920.0	2,328.0
0.02	=	5,870.0	2,773.0
0.01	=	6,840.0	3,228.6
0.005	=	7,820.0	3,685.1
0.002	=	9,210.0	4,329.5

$$2[(A_g - A_u)]/A_g = 1.114853486$$

Regression Region: 4

Weighted estimate of Flood Discharge at ungaged site, using regression estimate, $Q_{(u)wtd}$ (eq. 11)	Basin Characteristics for Regional Regression Estimate, $Q_{(u)reg}$	
--	--	--

AEP		$Q_{(u)reg}$	* $Q_{(u)wtd}$	Applicable Range
0.5	=	414.5	374	Enter Mean Annual Precipitation of ungaged basin= 56.5 11.94 - 186.6
0.2	=	682.8	608	
0.1	=	896.6	798	
0.04	=	1,178.7	1050	If ungaged location is in regression region 1 or 2, enter percent canopy coverage= 0.8 not applicable
0.02	=	1,406.2	1250	
0.01	=	1,649.0	1470	
0.005	=	1,874.4	1670	
0.002	=	2,240.1	2000	

*rounded to 3 significant figures

Appendix C: Original Bridge Plans

DRAFT

GENERAL NOTES

All material & workmanship shall be in accordance with the requirements of the State of Washington Department of Highways, Standard Specifications for Road and Bridge Construction dated 1963.

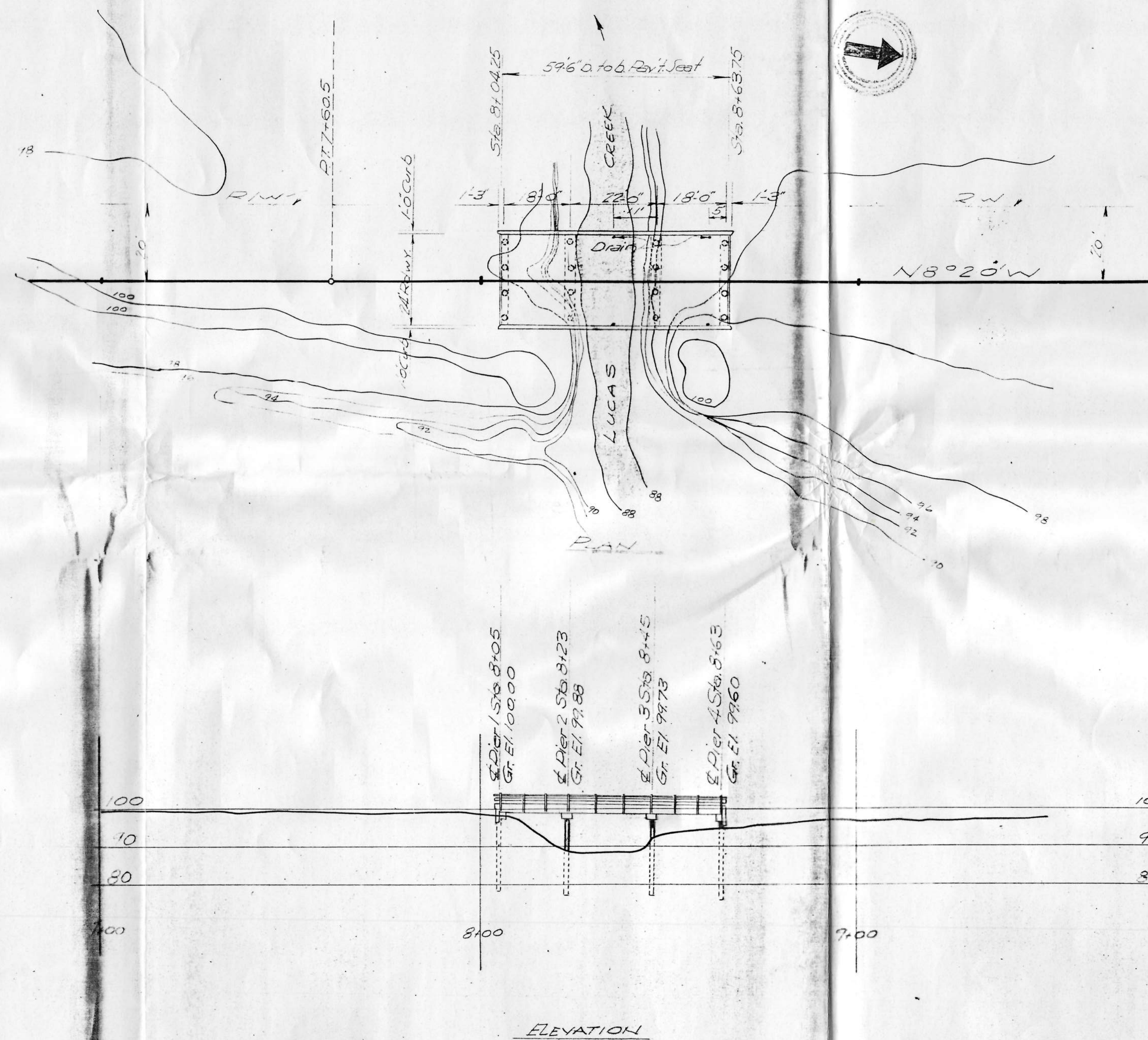
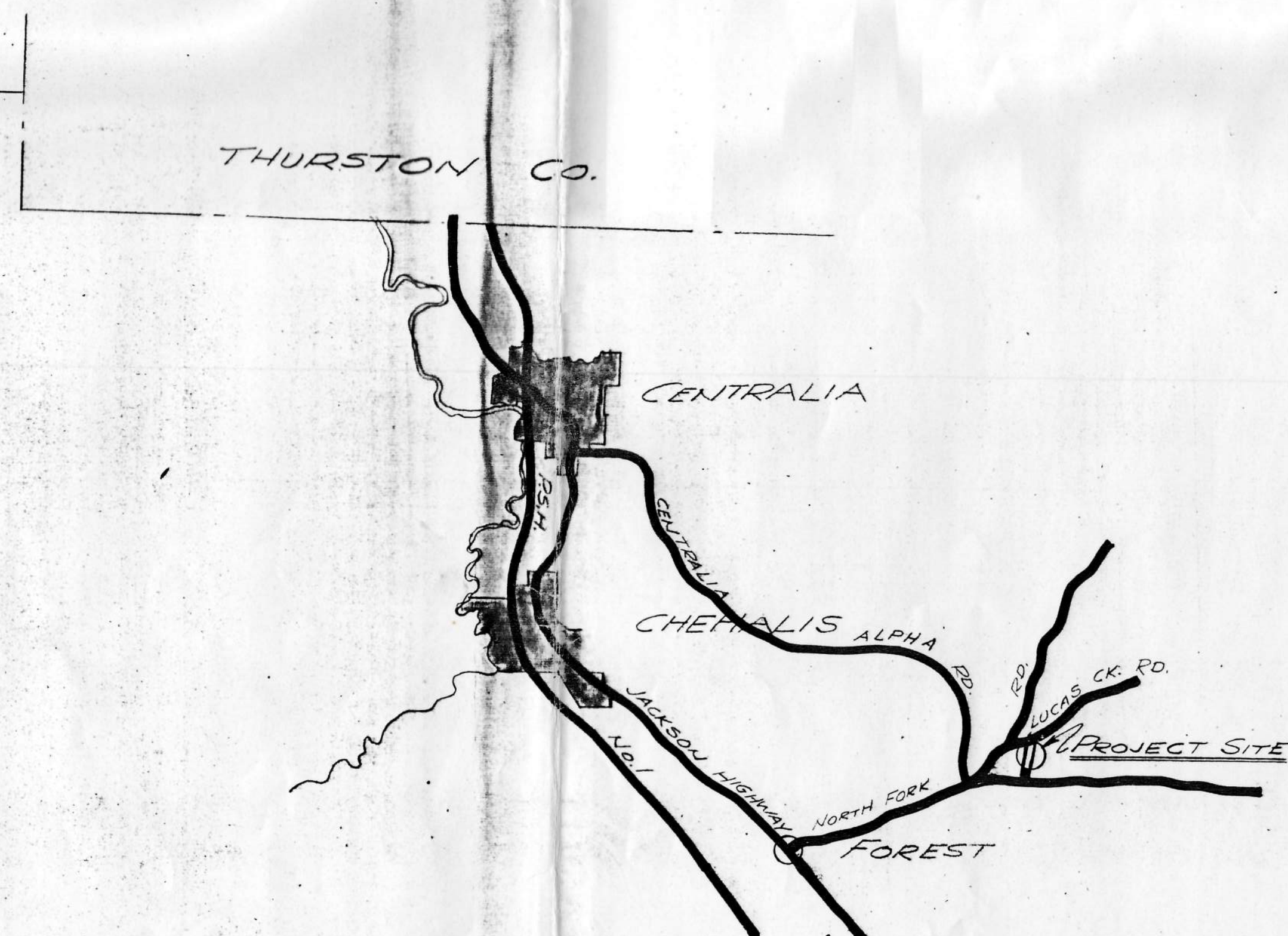
All concrete shall be Class A mix.

Each pile shall be driven to a depth sufficient to develop a minimum load bearing capacity of twenty (20) tons.

Falsework shall not be released in any span until all concrete has been in place the required length of time and has developed sufficient strength as outlined in the specifications.

Falsework shall be carefully released to prevent impact or undue stresses in the structure.

SUMMARY OF QUANTITIES 1 Lin. Ft. = 0.01 Mile			
ITEM NO.	ITEM	QUANTITY	UNIT
1.	Superstructure	Lump Sum	L.S.
2.	Special Bridge Railing	122	L.F.
3.	Furn & Drive Concrete Test Pile	1	Only
4.	Furnishing Concrete Piling	450	L.F.
5.	Driving Concrete Piles	15	Only
6.	Removing Existing Structure	Lump Sum	L.S.



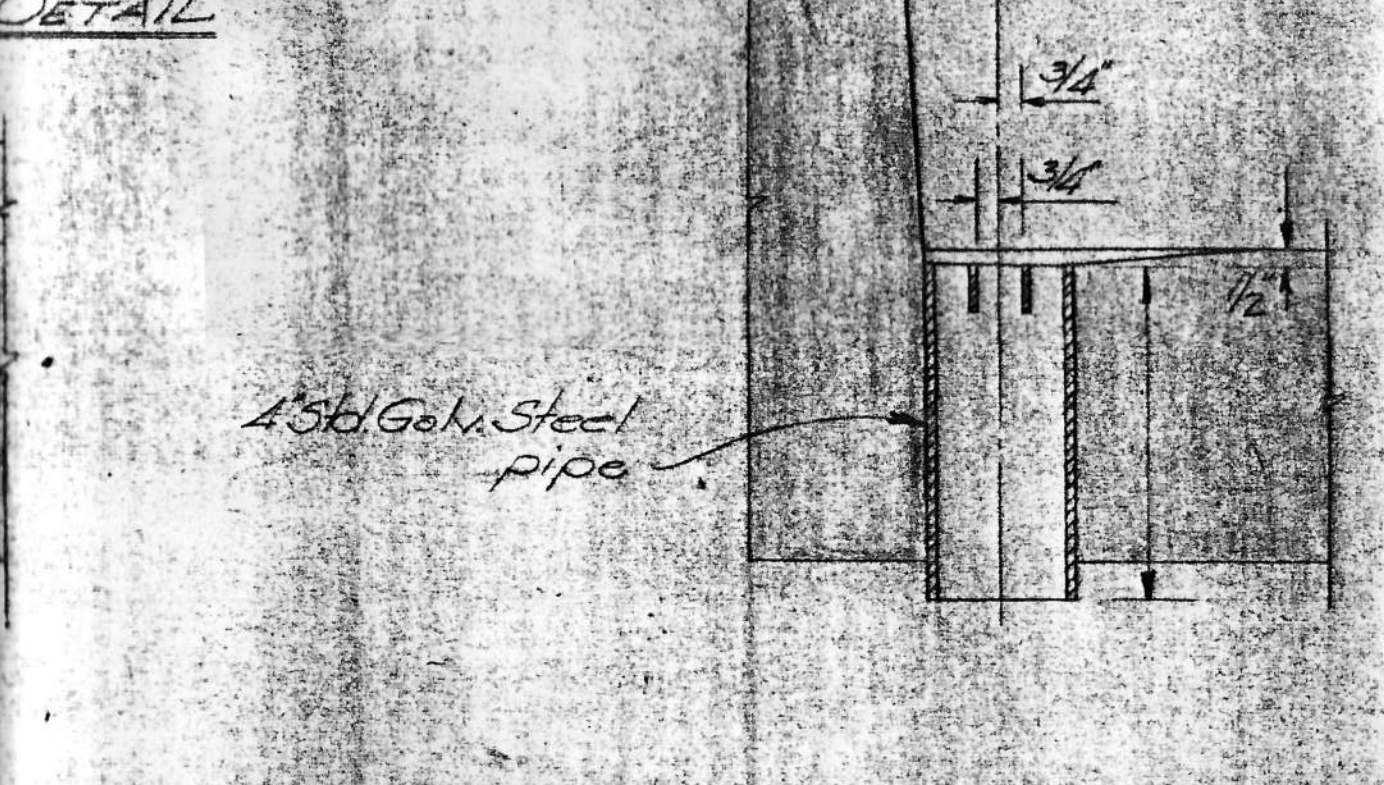
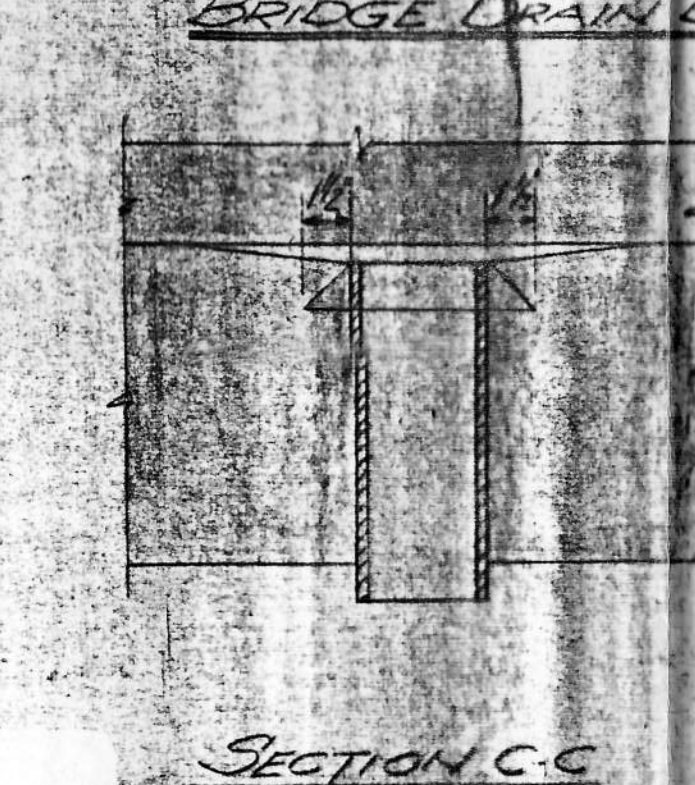
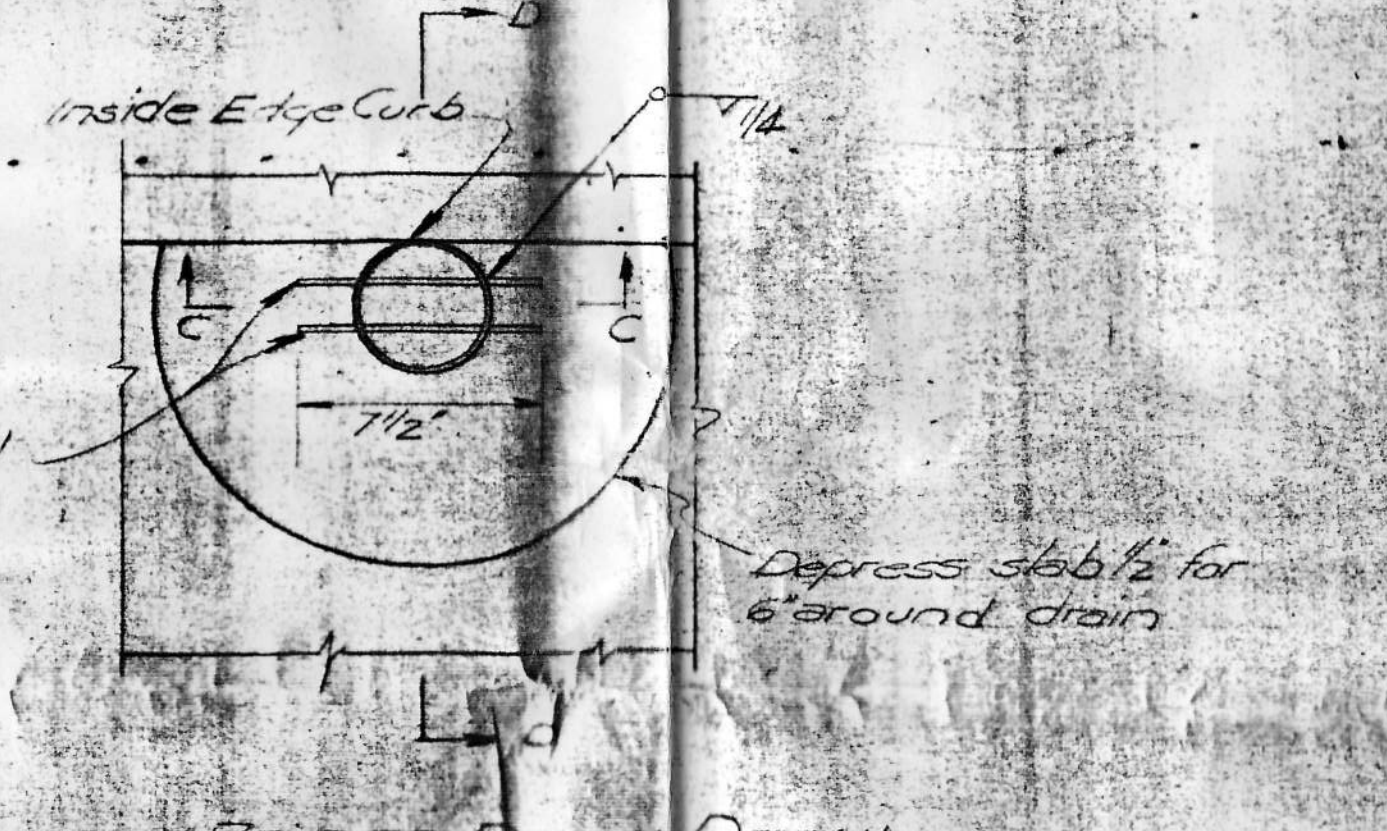
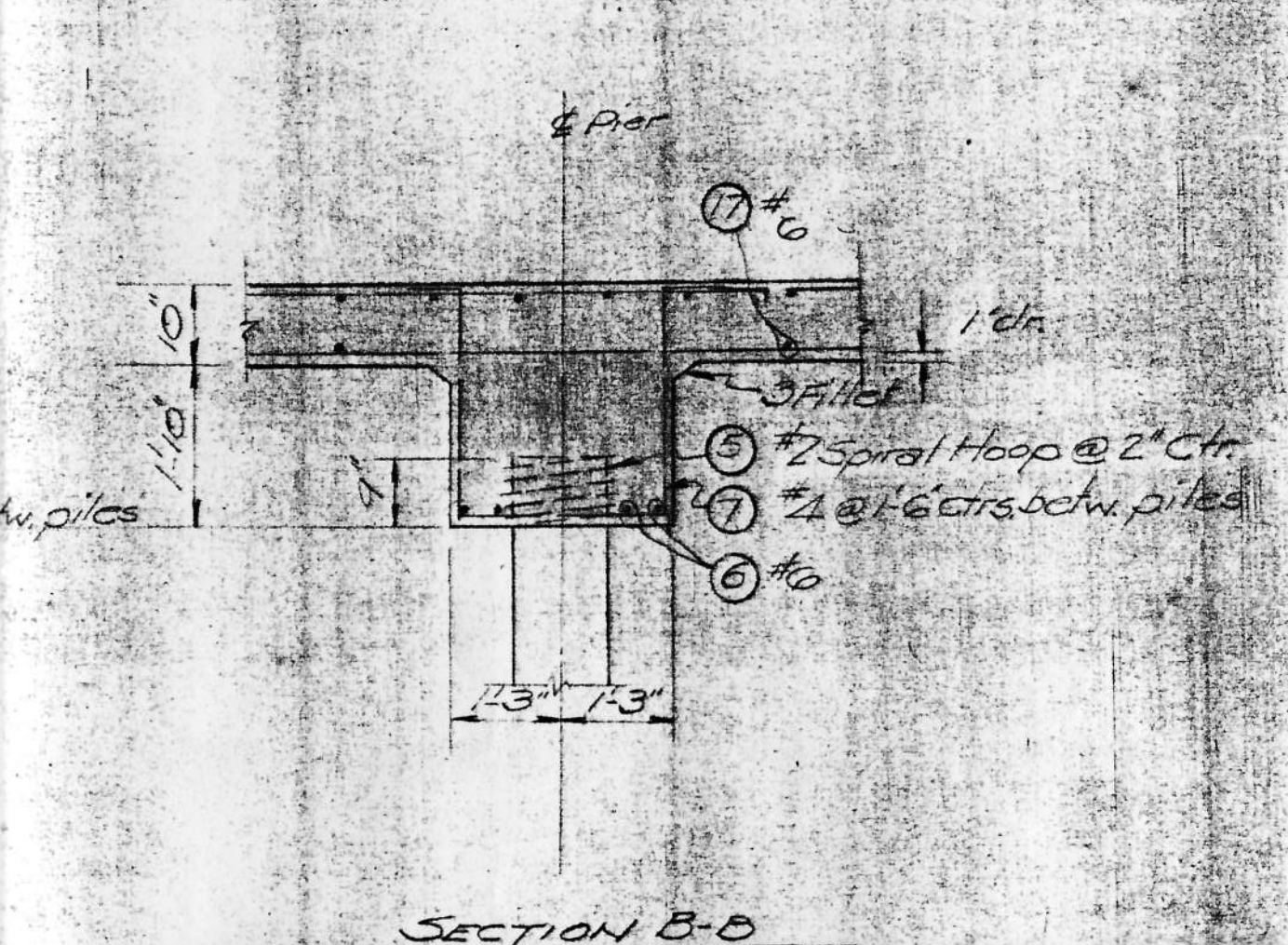
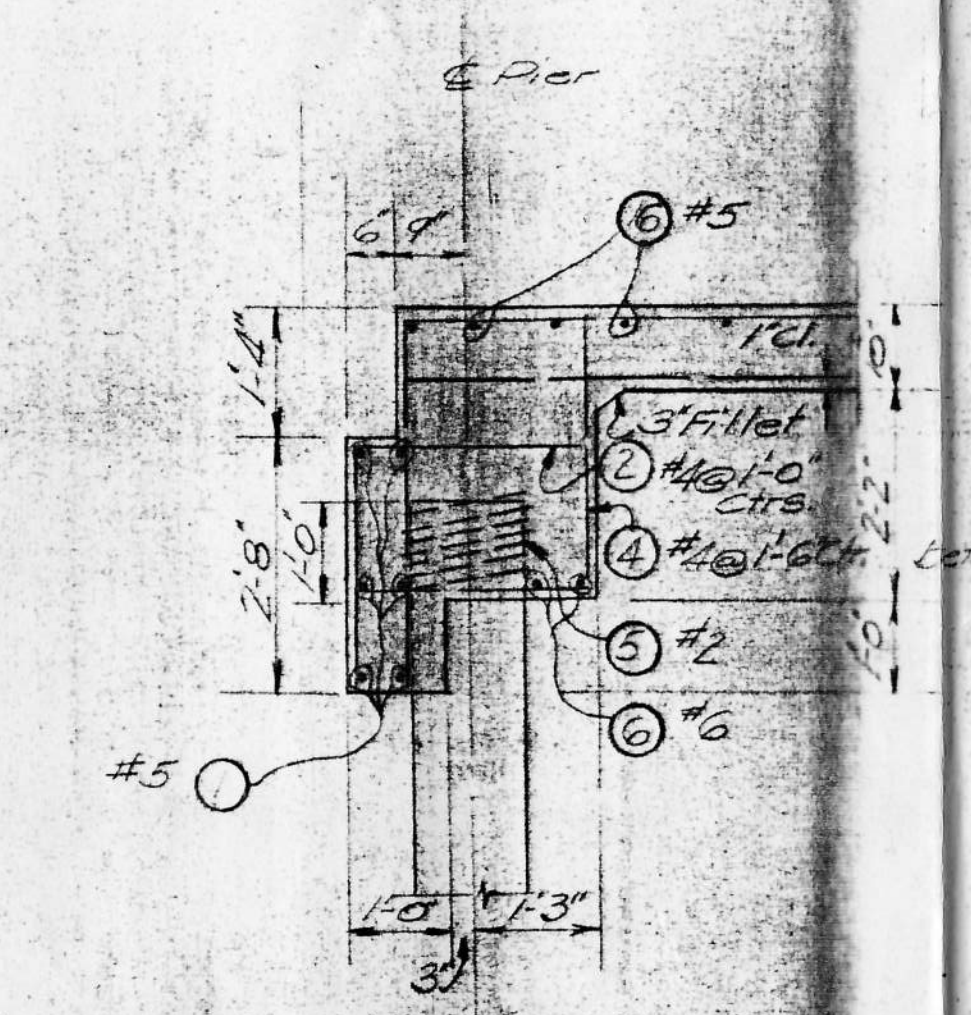
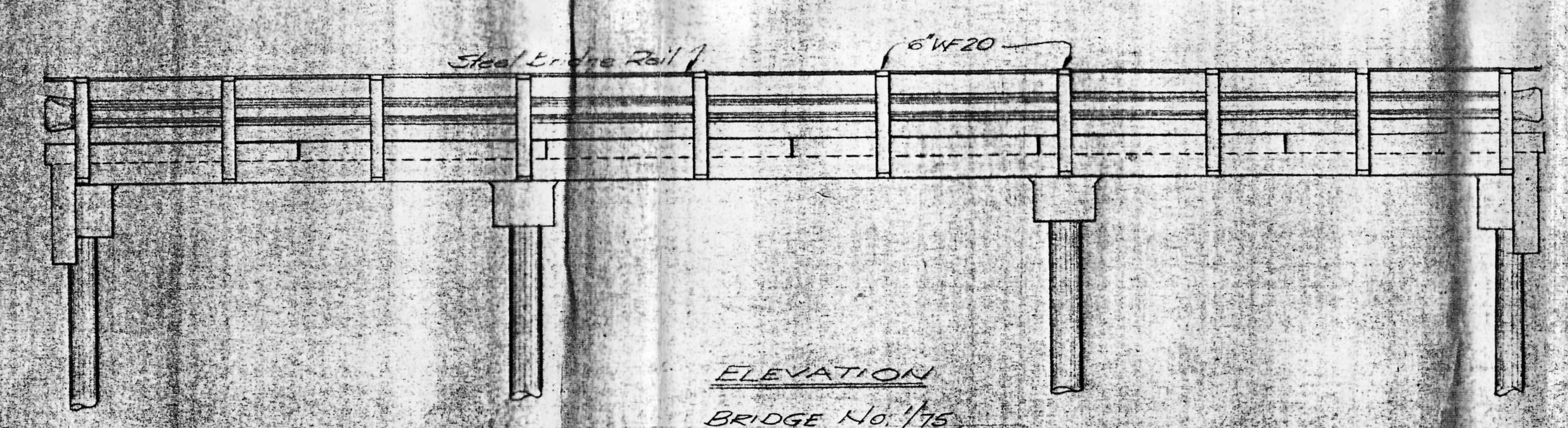
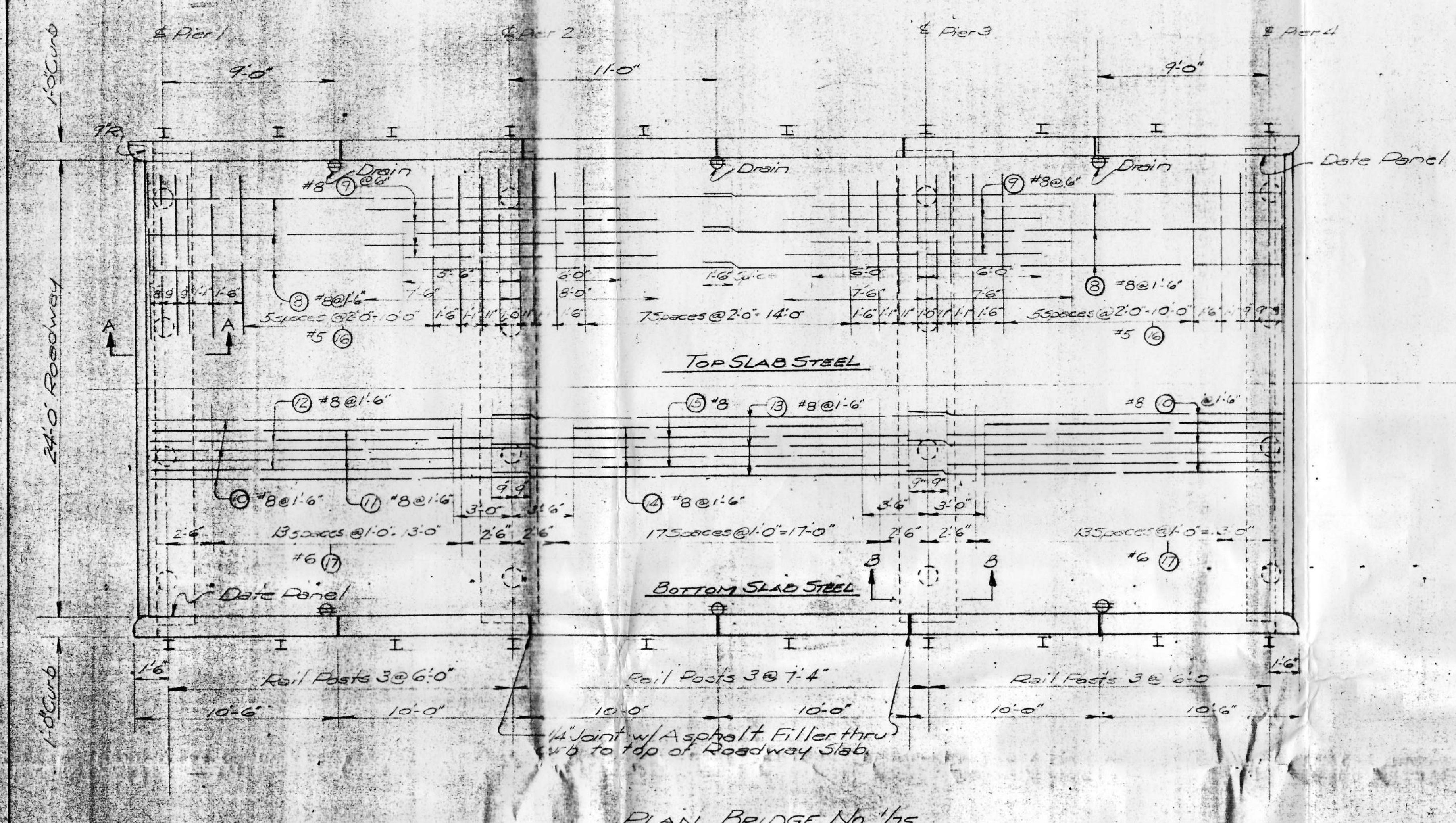
COUNTY ROAD PROJECT NO. 813

LUCAS CREEK BRIDGE

Paul Boudette
County Road Engineer

March, 1966

Sheet 4 of 6 Sheets



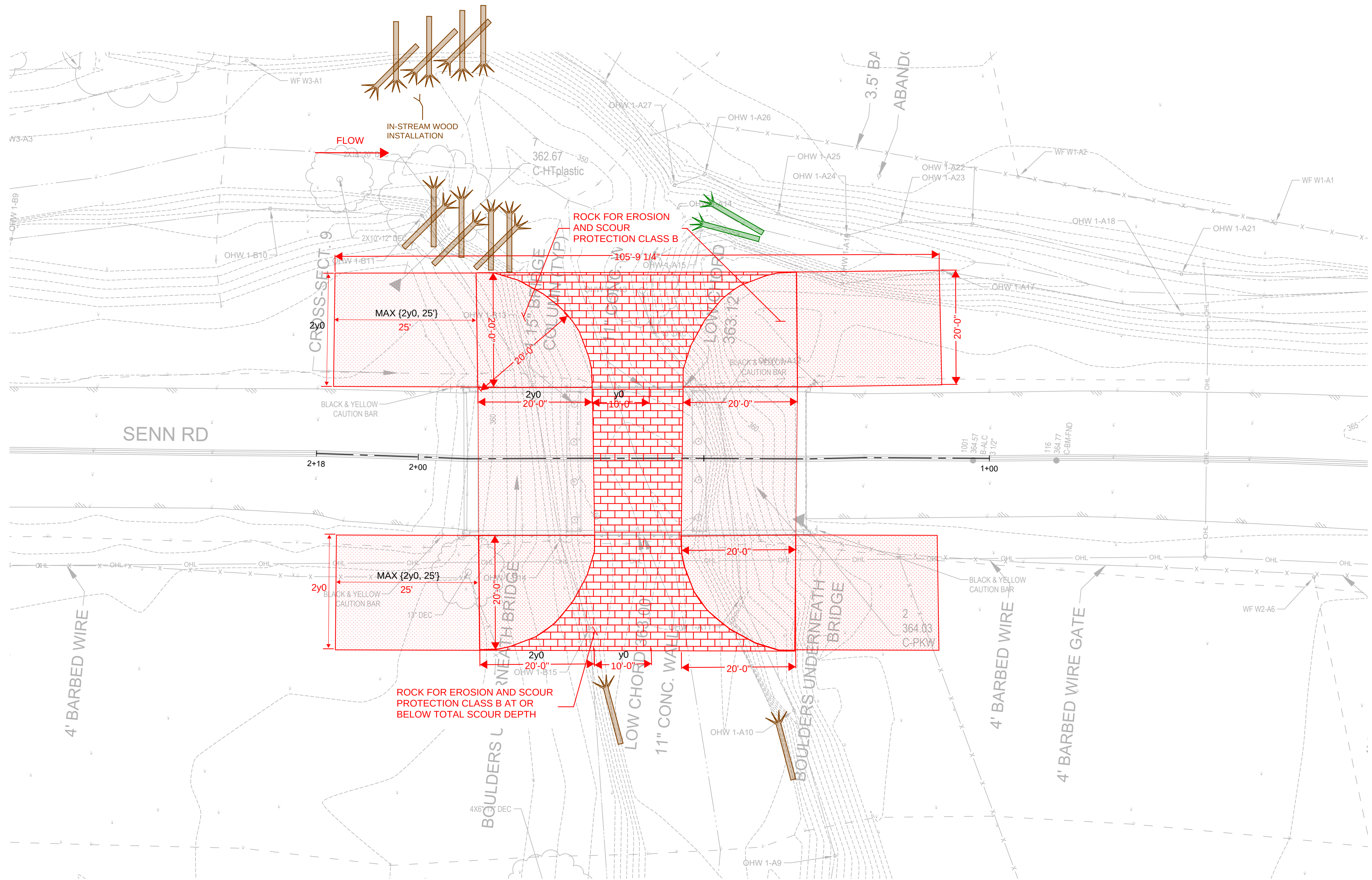
COUNTY ROAD PROJECT NO. 813
LUCAS CREEK BRIDGE
 Paul Bourque
 County Road Engineer
 March 1966
 Sheet 5 of 6 Sheets

18-89-3

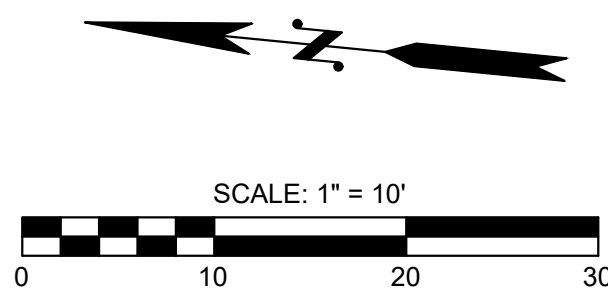
Appendix D: Conceptual Designs for Alternatives

DRAFT

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PLAN VIEW



PRELIMINARY - NOT FOR CONSTRUCTION

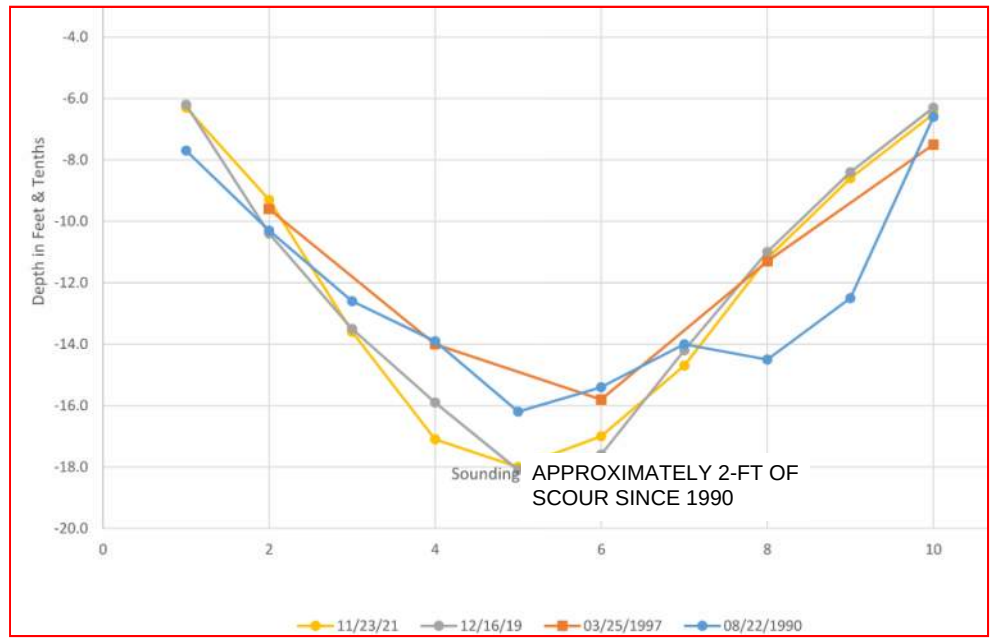
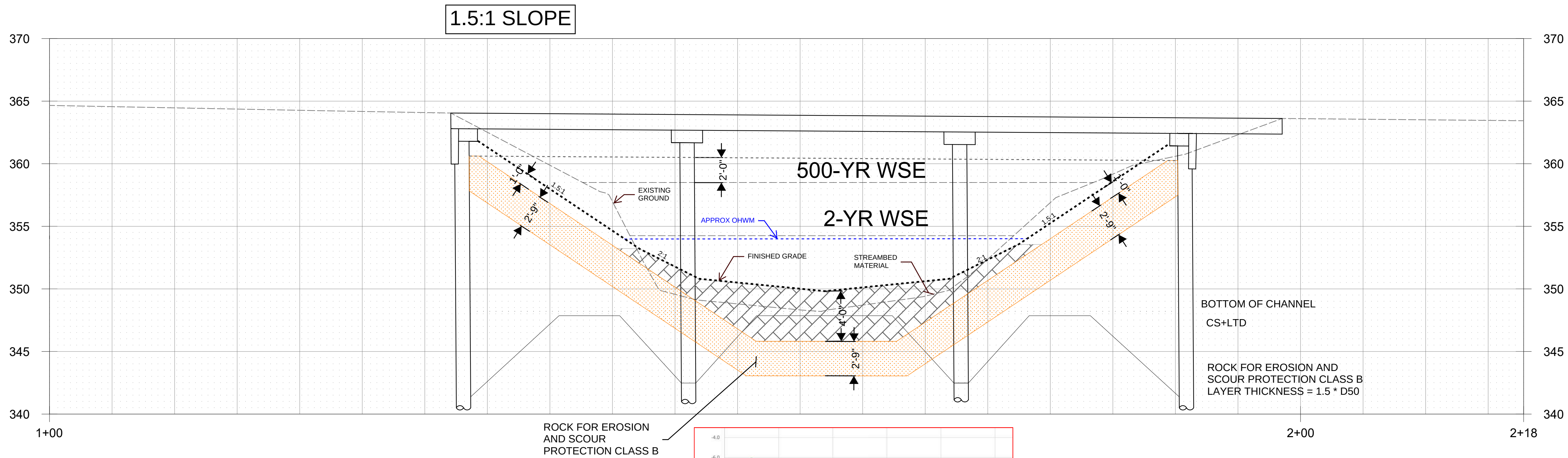
DESIGNED BY	OSBORN CONSULTING INCORPORATED	Osborn Consulting, Inc.
DRAWN BY		Bellevue Seattle Spokane Bellingham
CHECKED BY		www.osbornconsulting.com

NO.	DATE	REVISION	BY

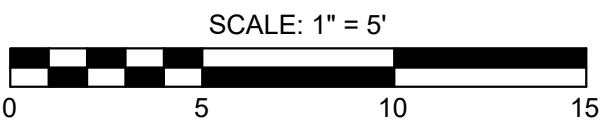
LEWIS COUNTY SENN ROAD
PRELIMINARY SCOUR ANALYSIS

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SECTION VIEW



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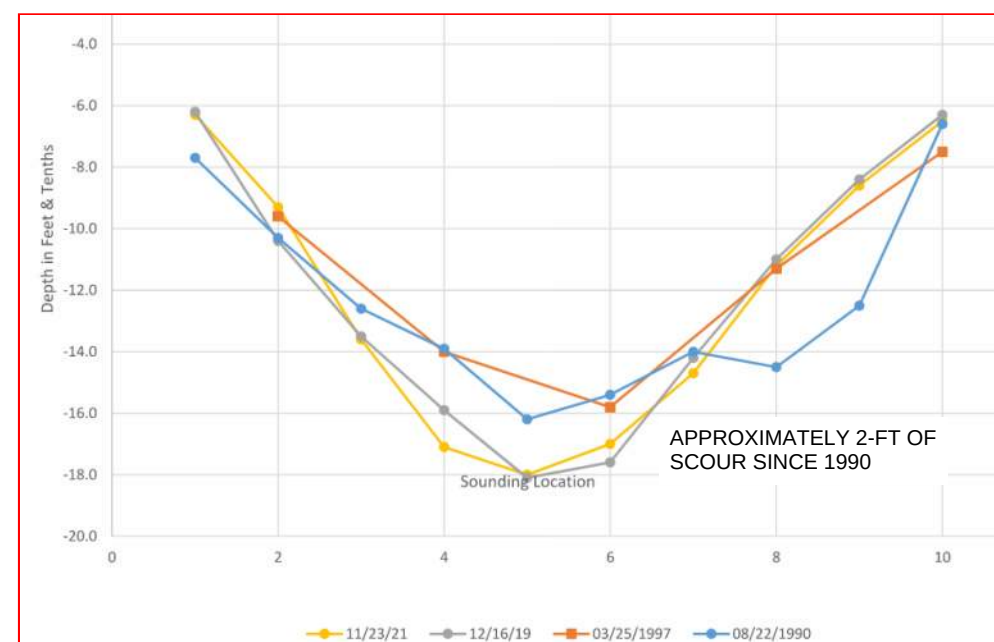
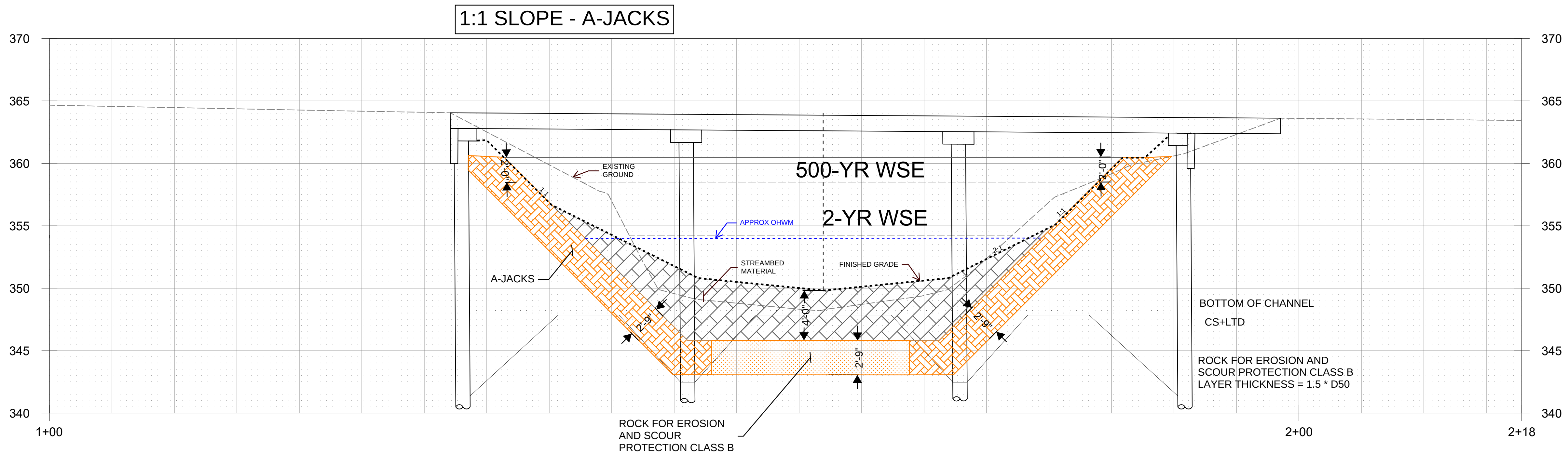
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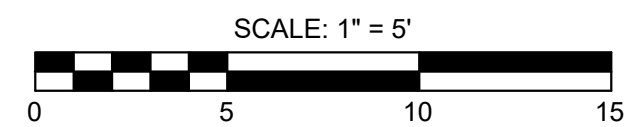
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USER NAME: MONIKA KANESHIGE



SECTION VIEW



PRELIMINARY - NOT FOR CONSTRUCTION

DESIGNED BY	OSBORN CONSULTING INCORPORATED	Osborn Consulting, Inc. Bellevue Seattle Spokane Bellingham www.osbornconsulting.com										JOB# / DWG 20-230005	DATE 06/02/2025
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Appendix E: Revetment Rock Sizing Calculations

DRAFT

Particle size for which 30% is finer by weight, ft (m)	d30	1.522	ft	
Local depth of flow, ft (m)	y	9.2	ft	
Safety factor (must be > 1.0)	Sf	1.4		
Stability coefficient (for blanket thickness = d100 or 1.5d50, whichever is greater, and uniformity ratio d85/d15 = 1.7 to 5.2)	Cs	0.3	<-- select which Cs to use	
	angular rock	0.3		
	rounded rock	0.375		
Velocity distribution coefficient	Cv	1.08	<-- select which Cv to use	
for straight channels or the inside of bends		1.00	Countermeasure not on bed. 2D model used	
for the outside of bends (1.0 for Rc/W > 26)	Cv = 1.283 - 0.2log(Rc/W)	1.08		
downstream from concrete channels		1.25		
at the end of dikes		1.25		
Blanket thickness coefficient given as a function of the uniformity ratio d85/d15. CT = 1.0 is recommended because it is based on very limited data.	CT	1		
Characteristic velocity for design, defined as the depth-averaged velocity at a point 20% upslope from the toe of the revetment, ft/s (m/s)	Vdes	12.50	<-- select which Vdes to use	
For natural channels	Vdes = Vavg(1.74 – 0.52log(Rc/W))	13.02	ft/s	Countermeasure not on bed. 2D model used
	Vdes = Vavg for Rc/W > 26	7.82	ft/s	
For trapezoidal channels	Vdes = Vavg (1.71 – 0.78 log (Rc/W))	12.50	ft/s	
	Vdes = Vavg for Rc/W > 8	7.82	ft/s	
	Rc/W	1.39		
Channel cross-sectional average velocity, ft/s (m/s)	Vavg	7.82	ft/s	
Side slope correction factor	K1(see equation on right)	0.72		
bank angle in degrees	θ	33.70	degrees	1.5:1 slope = 33.7 degrees
Centerline radius of curvature of channel bend, ft (m)	Rc	64	ft	
Width of water surface at upstream end of channel bend, ft (m)	W	46	ft	
Specific gravity of riprap	Sg	2.65		
Acceleration due to gravity	g	32.2	ft/s2	
	d50	1.826	ft	

SMS Results - 500yr upstream observation line

Reach	Station	Vel_Mag_ft_p	Water_Depth_ft
reach_2	364.7	Ave 9.5	Max 9.2
reach_2	438.14	6.14	9.6

$$d_{30} = y(S_f C_S C_V C_T) \left[\frac{(V_{des})}{\sqrt{K_1(S_g - 1)gy}} \right]^{2.0} \quad (4.1)$$

- where:
- d_{30} = Particle size for which 30% is finer by weight, ft (m)
 - y = Local depth of flow, ft (m)
 - S_f = Safety factor (must be > 1.0)
 - C_S = Stability coefficient (for blanket thickness = d_{100} or $1.5d_{50}$, whichever is greater, and uniformity ratio d_{85}/d_{15} = 1.7 to 5.2)
 - = 0.30 for angular rock
 - = 0.375 for rounded rock
 - C_V = Velocity distribution coefficient
 - = 1.0 for straight channels or the inside of bends
 - = $1.283 - 0.2\log(R_c/W)$ for the outside of bends (1.0 for $R_c/W > 26$)
 - = 1.25 downstream from concrete channels
 - = 1.25 at the end of dikes
 - C_T = Blanket thickness coefficient given as a function of the uniformity ratio d_{85}/d_{15} . $C_T = 1.0$ is recommended because it is based on very limited data.
 - V_{des} = Characteristic velocity for design, defined as the depth-averaged velocity at a point 20% upslope from the toe of the revetment, ft/s (m/s)
 - For natural channels, $V_{des} = V_{avg}(1.74 - 0.52\log(R_c/W))$
 $V_{des} = V_{avg}$ for $R_c/W > 26$
 - For trapezoidal channels, $V_{des} = V_{avg}(1.71 - 0.78\log(R_c/W))$
 $V_{des} = V_{avg}$ for $R_c/W > 8$
 - V_{avg} = Channel cross-sectional average velocity, ft/s (m/s)
 - K_1 = Side slope correction factor

$$K_1 = \sqrt{1 - \left(\frac{\sin(\theta - 14^\circ)}{\sin(32^\circ)} \right)^{1.6}}$$
 - where: θ is the bank angle in degrees
 - R_c = Centerline radius of curvature of channel bend, ft (m)
 - W = Width of water surface at upstream end of channel bend, ft (m)
 - S_g = Specific gravity of riprap (usually taken as 2.65)
 - g = Acceleration due to gravity, 32.2 ft/s² (9.81 m/s²)

$$d_{50} = 1.20 d_{30}$$

Appendix F: Pier Rock Sizing Calculations

DRAFT

Particle size for which 50% is finer by weight, ft (m)	d ₅₀	1.85 ft
Design velocity for local conditions at the pier, ft/s (m/s)	V _{des}	16.88 ft/s
Specific gravity of riprap (usually taken as 2.65)	S _g	2.65
Acceleration due to gravity	g	32.2 ft/s ²
Shape factor equal to	K ₁	1.5 <-- select which K ₁ to use
1.5 for round-nose piers		1.5
1.7 for square-faced piers		1.7
V _{max}		11.25 ft/s

11.3 SIZING ROCK RIPRAP AT BRIDGE PIERS

To determine the required size of stone for riprap at bridge piers, NCHRP Project 24-23 recommends using the rearranged Isbash equation from the Federal Highway Administration's Hydraulic Engineering Circular No. 23 (Second Edition) (Lagasse et al. 2001) to solve for the median stone diameter:

$$d_{50} = \frac{0.692(V_{des})^2}{(S_g - 1)2g} \quad (11.1)$$

where:

- d₅₀ = Particle size for which 50% is finer by weight, ft (m)
- V_{des} = Design velocity for local conditions at the pier, ft/s (m/s)
- S_g = Specific gravity of riprap (usually taken as 2.65)
- g = Acceleration due to gravity, 32.2 ft/s² (9.81 m/s²)

It is important that the velocity used in Equation 11.1 is representative of conditions in the immediate vicinity of the bridge pier including the constriction caused by the bridge. If the cross-section or channel average velocity, V_{avg}, is used, then it must be multiplied by factors that are a function of the shape of the pier and its location in the channel:

$$V_{des} = K_1 K_2 V_{avg} \quad (11.2)$$

If a velocity is distribution available from stream tube or flow distribution output of a 1-D model or directly from a 2-D model, then only the pier shape coefficient should be used. The maximum velocity in the active channel V_{max} is often used since the channel could shift and the highest velocity could impact any pier.

$$V_{des} = K_1 V_{max} \quad (11.3)$$

where:

- V_{des} = Local velocity at pier, ft/s (m/s)
- K₁ = Shape factor equal to 1.5 for round-nose piers or 1.7 for square-faced piers
- K₂ = Velocity adjustment factor for location in the channel (ranges from 0.9 for a pier near the bank in a straight reach, to 1.7 for a pier located in the main current of flow around a sharp bend)
- V_{avg} = Channel average velocity at the bridge, ft/s (m/s)
- V_{max} = Maximum velocity in the active channel, ft/s (m/s)

Appendix D

Critical Areas Report



Senn MP 0.89 Bridge Scour Project

Wetland and Stream Delineation Report

Submitted to:

Rodney Lakey
Lewis County
57 West Main Street
Chehalis, WA 98532

Prepared by:

Otak, Inc.
805 Broadway Street
Suite 130
Vancouver, WA 98660

October 22, 2025

Project No. 21588.A

Executive Summary

The Lewis County Department of Public Works (County) is proposing to install scour countermeasures at the Senn Road milepost (MP) 0.89 Bridge spanning Lucas Creek (Lewis County Bridge No. 77) in unincorporated Lewis County. The 60-foot three span bridge was originally constructed in 1966 and is currently classified as scour critical.

The County requested Otak, Inc. (Otak) to identify, characterize, and delineate wetland and stream boundaries and assess wildlife habitat at the Senn Road and Lucas Creek crossing as part of the County's repair of Lewis County Bridge No. 77. This Wetland and Stream Delineation Report was completed for the project by reviewing background information, delineating wetland and stream boundaries in the field, classifying wetlands and stream habitats and assessing their functions, and determining buffer widths per the Lewis County Code (LCC) Chapter 17.38 (Critical Areas) and Shoreline Master Program at LCC 17.25. Critical areas covered in this report include wetlands, streams, and fish and wildlife habitat conservation areas (FWHCAs).

Otak biologists conducted field investigations on December 3 and 4, 2024. The study area for this report included areas along both sides of Senn Road and Lucas Creek, upstream and downstream of Bridge No. 77. Areas immediately beyond the study area were also visually assessed to identify any wetlands and streams with buffers that could extend into the study area.

Six wetlands (Wetlands 1 – 6) were identified in the study area. Per the hydrogeomorphic (HGM) classification system, Wetlands 1, 2, and 6 are depressional wetlands and Wetlands 3, 4, and 5 are riverine wetlands. All six wetlands were rated as Category III wetlands per the *Washington State Wetland Rating System for Western Washington – 2014 Update Version 2.0* (Hruby and Yhanke 2023). All six wetlands have a standard buffer width of 75 feet per LCC 17.38.270 (Required wetland buffers) based on category, habitat score, and impact intensity.

Three streams (Lucas Creek, Tributary 1, and Tributary 2) were identified in the study area. Lucas Creek is a Type S (Shoreline of the State) stream with an assigned buffer of 0 feet per the Lewis County Shoreline Master Program (Table 4-1, Section 4.04.02). Tributary 1 is located along the east side of Senn Road and enters Lucas Creek east of Lewis County Bridge No. 77 from the south. Tributary 1 is a perennial Type F (Fish Habitat) stream with an assigned buffer of 100 feet per Table 17.38-6 in LCC 17.38.420 (Fish and Wildlife Habitat Conservation Areas – Designations). Tributary 2 is an intermittent Type Ns (Seasonal, Non-fish Habitat) stream located to the east of Lucas Creek. Tributary 2 enters Lucas Creek from the east through Wetland 3. Tributary 2 has an assigned buffer of 75 feet per Table 17.38-6 in LCC 17.38.420 (Fish and Wildlife Habitat Conservation Areas – Designations).

The project is located within the 100-year floodplain of Lucas Creek. The study area falls within Rural Conservancy Shoreline Environment Designation per the Lewis County Shoreline Master Program.

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APPENDICES

Appendix A Methods and Tools

Table A-1 – Methods and Tools Used to Prepare the Report

Appendix B Project Figures and Background Information

Figure 1: Vicinity Map

Figure 2: Study Area

Figure 3: USGS Topo Map

Figure 4: National Wetland Inventory

Figure 5: NRCS Soil Survey

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Figure 7: Lewis County Shoreline Designation

Figure 8: Delineated Wetlands, Streams, and Buffers

Appendix C Wetland Determination Forms

Appendix D Wetland Rating Forms and Figures

Appendix E Site Photos

Section 1. Introduction

Lewis County (County) requested Otak, Inc. (Otak) to identify, characterize, and delineate wetlands and streams and assess wildlife habitat for the County's repair of Lewis County Bridge No. 77. This Wetland and Stream Delineation Report was completed along the road right-of-way, Lucas Creek, and potential access and staging areas by reviewing background information, delineating wetland and stream boundaries in the field, classifying wetlands and stream habitats and assessing their functions, and determining buffer widths per the Lewis County Code (LCC) Chapter 17.38 (Critical Areas) and the Lewis County Shoreline Management Program (LCC 17.25)(Lewis County 2021). This Wetland and Stream Delineation Report has been prepared in accordance with county, state, and federal standards to document baseline conditions regarding frequently flooded areas, wetlands, streams, and fish and wildlife habitat conservation areas (FWHCAs).

1.1. Project Location and Landscape Setting

The proposed project is located on Senn Road at the crossing of Lucas Creek in unincorporated Lewis County, Washington (Appendix B: Figure 1—Vicinity Map). It is located in Section 2, Township 13 North, Range 1 West, in Water Resource Inventory Area (WRIA) 23 – Upper Chehalis. The project area generally includes areas along Senn Road within 100 feet of the Lucas Creek bridge. Land abutting the study area includes agricultural and forested areas. Lucas Creek flows through the project area from northeast to southwest passing under Senn Road at milepost (MP) 0.89. The project area is entirely within the 100-year floodplain of Lucas Creek.

1.2. Project Description

The County is proposing to install scour countermeasures at Lewis County Bridge No. 77 in unincorporated Lewis County. The 60-foot three span bridge was originally constructed in 1966 and is currently classified as scour critical. The project intends to complete necessary repairs to the bridge in order to maintain vehicular access and protect public safety along Senn Road.

Section 2. Methods

This chapter summarizes the methods used in accordance with local, state, and federal guidance in delineating wetland and stream boundaries in Washington State. See Table A-1 in Appendix A for further details regarding the methods used to produce this report.

2.1. Review of Available Published Information

Available published information was reviewed prior to the field investigation to identify any previously documented wetlands, streams, or other pertinent site characteristics (e.g., vegetation community patterns, topography, soils, or water courses) that would indicate the presence of wetlands, streams and other critical areas within the project site. These maps are typically used as guidance, and do not supersede conditions in the field. As part of this effort Otak biologists reviewed the following sources:

- Soil survey from the United States Natural Resources Conservation Service (NRCS) (NRCS 2025a);
- National Wetlands Inventory (NWI) map (USFWS 2025a);
- United States Geological Survey (USGS) topographic maps (USGS 2025)
- Washington Department of Natural Resources (WDNR) Forest Practices Application Mapping Tool (WDNR 2025);
- Lewis County GIS Web Map (Lewis County 2025a);
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) maps (WDFW 2025a);
- Statewide Washington Integrated Fish Distribution Map (SWIFD) (WDFW 2025b);
- U.S. Fish & Wildlife Service (USFWS) Information for Planning and Consultation Tool (IPaC) (USFWS 2025b).

Appendix B contains figures associated with the background review, including: an aerial photograph of the study area (Figure 2), USGS Topographic map (Figure 3), NWI map (Figure 4), NRCS Soils map (Figure 5), Lewis County Critical Areas Inventory (Figure 6), and Lewis County Shoreline Environment Designations (Figure 7).

Soil units mapped within the study area include one soil series: Chehalis silty clay (Table 2-1)(Figure 5). Major soil components of the map unit soil series are classified non-hydric. Minor components of the soil series are classified as hydric.

Table 2-1 – NRCS Soil Units Mapped in Study Area.

Mapped Soil Unit	Slope %	Drainage Class	Landform	Parent Material	Hydric?
Chehalis silty clay	0-3	Well drained	Flood Plains and Terraces	Alluvium	No (10% hydric minor components)

The NWI map identifies the Lucas Creek corridor as a seasonally flooded palustrine forested (PFOC) wetland through the study area. Two areas of permanently flooded, unconsolidated bottom, unknown perennial riverine (R5UBH) habitat are also mapped in the study area along tributaries to Lucas Creek.

The WDNR Forest Practices Application Mapping Tool maps Lucas Creek as a Type S (Shoreline of the State) waterbody, a stream along the east side of Senn Road (Tributary 1) as a Type F (Fish Habitat) waterbody, and a stream entering Lucas Creek from the east (Tributary 2) as a Type N (Non-fish Habitat)

waterbody. Wetlands are mapped by Lewis County in the study area along Lucas Creek. Species identified by the WDFW PHS mapper include occurrence, migration, and breeding of rainbow trout and steelhead (*Oncorhynchus mykiss*), occurrence and breeding of Chinook salmon (*Oncorhynchus tshawytscha*), occurrence and migration of resident coastal cutthroat (*Oncorhynchus clarki*), and occurrence and breeding of coho salmon (*Oncorhynchus kisutch*) in Lucas Creek. The WDFW PHS mapper also identified occurrence and migration of rainbow trout and steelhead and occurrence and migration of coho salmon in Tributary 1.

Regarding species listed under the Endangered Species Act (ESA), the USFWS IPaC tool maps the potential presence of marbled murrelet (*Brachyramphus marmoratus*), streaked horned lark (*Eremophila alpestris strigata*), yellow-billed cuckoo (*Coccyzus americanus*), northwestern pond turtle (*Actinemys marmorata*), bull trout (*Salvelinus confluentus*), monarch butterfly (*Danaus plexippus*), Suckley's Cuckoo Bumble Bee (*Bombus suckleyi*) and Kincaid's lupine (*Lupinus sulphureus ssp. kincaidii*). However, suitable habitats for these ESA-listed species do not occur in the study area and no designated critical habitats for ESA-listed species are mapped at this location.

2.2. Precipitation Data and Analysis

2.2.1. Evaluation of Growing Season

Wetland hydrologic conditions are considered present if soils are inundated or saturated to the surface continuously for at least 5 percent of the growing season in most years (50 percent probability of recurrence) (USACE 1987). The technical standard for disturbed or problematic sites requires 14 or more consecutive days of flooding or ponding, or a water table 12 inches or less below the soil surface, during the growing season, at a minimum frequency of 5 years in 10 (USACE 2010).

The beginning and ending dates of the growing season can be defined based on two indicators of biological activity that are readily observable in the field: (1) above ground growth and development of vascular plants, and (2) soil temperature. However, due to seasonal fluctuations from year to year the growing season dates may also be approximated by the number of frost-free days, defined as the time from the last date in spring when the ambient air temperature drops to 28°F, to the first date in fall when it drops to 28°F, over a 30-year period (USACE 2010).

Due to insufficient data, the beginning and ending dates for the growing season for the project site were not estimated from long-term weather records (1994-2023) at the Mayfield Power Plant Climate Station as the median dates (70 percent probability) for the first and last 28°F days. The estimated dates corresponding with the growing season are based on historical climate data and information obtained from the nearest climate station with sufficient data. The nearest climate station with complete monthly precipitation data for the 30-year period prior to the site visit is the Centralia Climate Station (NRCS 2025b). Based on long-term weather records at this station, the average start and end dates for the growing season for the area are March 23 and November 15, respectively, for a total growing season of 237 days (NRCS 2025b). As such, continuing wetland hydrologic conditions must be present for at least 12 consecutive days during the growing season for this site.

2.2.2. Precipitation Data during Field Investigation

The field survey for the project was conducted on December 3 and 4, 2024. The area received 3.51 inches of precipitation in the two-week period (November 18 – December 2) prior to the field survey as measured at the Mayfield Power Plant Climate Station (NRCS 2025c). The Mayfield Power Plant Climate Station was used to evaluate recent precipitation during the field visit because the Centralia Climate Station did not have recent data available. Precipitation amounts for the three months preceding the field

survey were normal in September 2024, above normal in October 2024, and normal in November 2024 (Table 2-2) as measured at the Mayfield Power Plant Climate Station.

Table 2-2—Summary of Precipitation Data from September 1 to November 30, 2024

Category	September 2024	October 2024	November 2024
Recorded Precipitation (inches)	1.40	5.38	7.57
Precipitation Average	1.63	4.01	6.59
30-70% Normal Range (inches) from 1995-2024	0.61 – 1.92	2.94 – 4.72	4.17 – 7.80
Comparison to Normal Range	Normal	Above Normal	Normal

Source: NRCS 2025c.

2.3. Field Investigation

Wetland and stream boundaries were delineated in the field by Otak biologists on December 3 and 4, 2024. Wetland boundaries were marked with sequentially numbered pink wetland flagging. The OHWM of the streams were marked with sequentially numbered orange flagging.

2.3.1. Wetlands

The delineation was conducted utilizing techniques published in the *1987 US Army Corps of Engineers Wetlands Delineation Manual* (USACE 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE 2010). Following routine methodology, data on vegetation, soils, and hydrology were collected at paired (wetland/upland) data points. Wetland determination data forms are provided in Appendix C.

Vegetation

Representative upland and wetland vegetation communities were documented during the field survey. Typically, three vegetation strata are inventoried including trees within a 30-foot diameter plot, shrubs within a 15-foot diameter plot, and non-woody herbaceous plants (including forbs, grasses, sedges, and rushes) within a 5-foot diameter plot. Plant species in each stratum were identified and absolute percent cover was visually assessed. Each species was listed following the scientific nomenclature given in the United States Department of Agriculture (USDA) PLANTS database (NRCS 2025d). The wetland indicator status for each species was assigned using the *2022 National Wetland Plant List for the Western Mountains, Valleys & Coast Region* (USACE 2022).

The dominance test was the primary indicator used to determine the presence or absence of hydrophytic vegetation. A data point is considered to have a hydrophytic vegetation community if more than 50 percent of the dominant species have an indicator status of facultative (FAC), facultative-wetland (FACW), or obligate (OBL). Dominant species are defined as those that individually or collectively account for more than 50 percent of the total areal coverage of vegetation in the stratum, plus any other species that, by itself, accounts for at least 20 percent of the total areal coverage (USACE 2010). If more than 50 percent of the dominant plant species in a community have wetland indicator status of OBL, FACW, or FAC, then the plant community is considered hydrophytic (wetland).

Soils

Per USACE protocol, soil samples were obtained at representative data points by digging a pit to a depth of at least 18 inches (if possible). The Field Indicators of Hydric Soils in the United States, Version 9.0 (NRCS 2024) was used to determine the presence or absence of hydric soil. Soil colors were evaluated using a Munsell® soil color chart (Munsell Color 2010) to distinguish hydric from non-hydric soils. Soils were textured using the Guide to Texture by Feel chart (NRCS 2022).

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (USACE 2010). Hydric soils may exhibit certain characteristics that can be observed in the field, such as: high organic content, accumulation of sulfidic material, greenish or bluish-gray color (gleyed formation), depleted matrices, and development of redoximorphic features.

Hydrology

Wetland hydrologic conditions are considered present if, during the growing season, an area has 14 or more consecutive days of flooding or ponding; or a water table 12 inches or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10 (USACE 1987 and 2010). The presence of primary and secondary wetland hydrologic indicators was determined at each wetland data point.

Primary indicators of wetland hydrology may include, but are not limited to, surface water, soil saturation within 12 inches of the surface, shallow water table, and evidence of previous water inundation or saturation (e.g., watermarks, algal mats, sediment deposits). Secondary indicators may include wetland drainage patterns, geomorphic position, stunted or stressed plants, and water-stained leaves. When at least one primary or two secondary indicators were observed, wetland hydrology was determined to occur during the growing season long enough to result in wetland hydrology conditions.

2.3.2. Ordinary High-Water Mark

The OHWM along streams within the study area were determined in the field based on the methodology outlined in *National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams* (USACE 2025) and *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Ecology 2016). Identification of OHWM was based on the evaluation of stream physical characteristics, such as: presence of bed and banks, a natural line impressed on the bank, change in sediment and vegetation characteristics, wracking, erosion/scour, and silt deposits.

2.3.3. Fish and Wildlife Habitat Conservation Areas

Fish and Wildlife Habitat Conservation Areas (FWHCAs) are regulated per LCC 17.38 Article 4. Regulated FWHCAs include Aquatic Priority Habitat, WDFW Priority Habitats and Species, Locally Important Habitats and Species, and Designated Wildlife Areas (LCC 17.38.420)(Lewis County 2025b). Presence of listed species was visually assessed on December 3 and 4, 2024, during the field visit by Otak biologists (USFWS 2025b).

2.4. Wetland and Stream Classification and Ratings

Wetlands were rated using the *Washington State Wetland Rating System for Western Washington* (Hruby and Yhanke 2023). Buffer widths were determined based on wetland category, habitat score, and impact intensity per Table 17.38-3 (Wetland Buffers) at LCC 17.38.270 (Lewis County 2025b). Wetland buffer conditions were qualitatively assessed based on vegetation cover, land use, and presence of invasive species.

Stream classifications were identified using WDNR’s Forest Practices Activity Mapping Tool (WDNR 2025) and classified in accordance with LCC 17.38.470 and the Shoreline Master Program at LCC 17.25 (Lewis County 2021 and 2025b). Buffer widths were determined according to LCC 17.38.470 (Fish and Wildlife Habitat Conservation Areas – Classification), 17.38-6 (Fish and Wildlife Habitat Conservation Areas – Regulated Areas), and the Lewis County Shoreline Master Program (Table 4-1, Section 4.04.02).

2.5. Mapping Methods

Sample points, wetland boundary flags, and OHWM flags were collected using traditional survey methods as part of the civil survey for engineering design. Survey data was converted to GIS files and imported to project maps for this report.

Section 3. Existing Conditions

3.1. Delineated Wetlands

Otak biologists identified and delineated six wetlands (Wetlands 1 – 6) in the study area as shown in Figure 8 in Appendix B.

Wetland classifications, ratings, sizes, and buffer widths are summarized in Table 3-1. Wetland profiles and photographs are provided in Tables 3-2 to 3-7. Wetland determination data forms are provided in Appendix C. Ecology rating forms and figures are provided in Appendix D. Additional site photographs are provided in Appendix E.

Table 3-1—Delineated Wetlands

Wetland ¹	Wetland Classification		Ecology Rating	Wetland Size (Acres)	Standard Buffer Width (feet) ⁵	Representative Data Sheets
	Cowardin ²	HGM ³	Category (Habitat Score) ⁴			
1	PSS, PEM	Depressional	III (6)	4.95	75	W1-DP1, W1-DP2
2	PEM	Depressional	III (6)	0.42	75	W2-DP1, W2-DP2
3	PEM	Riverine	III (6)	0.007	75	W3-DP1, W3-DP2
4	PEM	Riverine	III (6)	0.01	75	W4-DP1, W4-DP2
5	PEM	Riverine	III (6)	0.03	75	W5-DP1, W5-DP2
6	PEM	Depressional	III (6)	0.05	75	W6-DP1, W6-DP2

Note:

1. Wetlands shown on Figure 8 in Appendix B.
2. Cowardin et al. (1979). Habitat class based on vegetation: PSS = palustrine scrub-shrub, PEM = palustrine emergent.
3. HGM = Hydrogeomorphic class (Brinson 1993)
3. Wetlands rated according to Hruby and Yhanke 2023 (LCC 17.38.230).
4. Wetland standard buffer widths per LCC Table 17.38-3 Buffers (Lewis County 2025b).

Table 3-2—Wetland 1 Summary

WETLAND 1 – INFORMATION SUMMARY			
Location:		Field to the east of Senn Road and Tributary 1 and south of Lucas Creek	
		Local Jurisdiction	Lewis County
		WRIA	23 – Upper Chehalis
		Ecology Rating (Hruby & Yhanke 2023)	III (Habitat Score – 6)
		Buffer Width	75 feet
		Wetland Size	4.95 acres
		Cowardin Classification	PSS, PEM
		HGM Classification	Depressional
		Upland Data Sheet	W1-DP2
		Wetland Data Sheet	W1-DP1
		Flag color	Pink flagging
Dominant Vegetation	Slough sedge (<i>Carex obnupta</i>), soft rush (<i>Juncus effusus</i>) in PEM habitats. PSS habitat includes redosier dogwood (<i>Cornus sericea</i>) and salmonberry (<i>Rubus spectabilis</i>).		
Soils	Loam; Depleted Matrix of 10YR 4/2 with 7.5YR 4/6 redoximorphic concentrations in the matrix and pore linings to depth of 20 inches.		
Hydrology	Oxidized Rhizospheres along Living Roots, Water-Stained Leaves, Drainage Patterns, and FAC-Neutral Test		
Rationale for Delineation	Satisfies all three wetland criteria.		
Rationale for Local Rating	Follows Ecology rating system (Hruby & Yhanke 2023) per LCC 17.38.230 (Wetlands – Classification) (Lewis County 2025b).		
Wetland Functions Summary	Wetland 1 scored low to high for water quality functions. Wetland 1 scored moderate for hydrologic functions. Wetland 1 scored low to high for habitat function. A complete assessment of functions is provided in Appendix D.		

Table 3-3—Wetland 2 Summary

WETLAND 2 – INFORMATION SUMMARY			
Location:		Field to the west of Senn Road and south of Lucas Creek	
		Local Jurisdiction	Lewis County
		WRIA	23 – Upper Chehalis
		Ecology Rating (Hruby & Yhanke 2023)	III (Habitat Score – 6)
		Buffer Width	75 feet
		Wetland Size	0.42 acres
		Cowardin Classification	PEM
		HGM Classification	Depressional
		Upland Data Sheet	W2-DP2
		Wetland Data Sheet	W2-DP1
		Flag color	Pink flagging
Dominant Vegetation	Kentucky bluegrass (<i>Poa pratensis</i>) and soft rush		
Soils	Loam; 10YR 3/2 to depth of 2 inches. Below 2 inches depleted matrix of 10YR 4/2 with 7.5YR 4/6 redoximorphic concentrations in the matrix and pore linings. Saturated at 4 inches.		
Hydrology	Saturation, High Water Table, Oxidized Rhizospheres along Living Roots, Geomorphic Position, and FAC-Neutral Test		
Rationale for Delineation	Satisfies all three wetland criteria.		
Rationale for Local Rating	Follows Ecology rating system (Hruby & Yhanke 2023) per LCC 17.38.230 (Wetlands – Classification) (Lewis County 2025b).		
Wetland Functions Summary	Wetland 2 scored low to high for water quality functions. Wetland 2 scored moderate for hydrologic functions. Wetland 2 scored low to high for habitat function. A complete assessment of functions is provided in Appendix D.		

Table 3-4—Wetland 3 Summary

WETLAND 3 – INFORMATION SUMMARY			
Location:		Along east bank of Lucas Creek upstream of Senn Road crossing	
		Local Jurisdiction	Lewis County
		WRIA	23 – Upper Chehalis
		Ecology Rating (Hruby & Yhanke 2023)	III (Habitat Score – 6)
		Buffer Width	75 feet
		Wetland Size	0.007 acres
		Cowardin Classification	PEM
		HGM Classification	Riverine
		Upland Data Sheet	W3-DP2
		Wetland Data Sheet	W3-DP1
		Flag color	Pink flagging
Dominant Vegetation		Reed canarygrass (<i>Phalaris arundinacea</i>) and Sitka willow (<i>Salix sitchensis</i>)	
Soils		Loam; Depleted Matrix of 10YR 4/2 with 10YR 4/6 redoximorphic concentrations in the matrix to depth of 20 inches. Saturated at the soil surface. Soil mixed with approximately 40 percent gravel through the profile.	
Hydrology		Saturation, High Water Table, Geomorphic Position, and FAC-Neutral Test	
Rationale for Delineation		Satisfies all three wetland criteria.	
Rationale for Local Rating		Follows Ecology rating system (Hruby & Yhanke 2023) per LCC 17.38.230 (Wetlands – Classification) (Lewis County 2025b).	
Wetland Functions Summary		Wetland 3 scored moderate to high for water quality functions. Wetland 3 scored low to moderate for hydrologic functions. Wetland 3 scored low to high for habitat function. A complete assessment of functions is provided in Appendix D.	

Table 3-5—Wetland 4 Summary

WETLAND 4 – INFORMATION SUMMARY			
Location:		Along west bank of Lucas Creek upstream of Senn Road crossing	
		Local Jurisdiction	Lewis County
		WRIA	23 – Upper Chehalis
		Ecology Rating (Hruby & Yhanke 2023)	III (Habitat Score – 6)
		Buffer Width	75 feet
		Wetland Size	0.01 acres
		Cowardin Classification	PEM
		HGM Classification	Riverine
		Upland Data Sheet	W4-DP2
		Wetland Data Sheet	W4-DP1
		Flag color	Pink flagging
Dominant Vegetation	Reed canarygrass, slough sedge, and creeping buttercup (<i>Ranunculus repens</i>)		
Soils	Loam; Depleted Matrix of 10YR 4/1 with 7.5YR 4/6 redoximorphic concentrations in the matrix and pore linings to depth of 20 inches. Saturated at a depth of 8 inches.		
Hydrology	High Water Table, Saturation, Oxidized Rhizospheres along Living Roots, Geomorphic Position, and FAC-Neutral Test		
Rationale for Delineation	Satisfies all three wetland criteria.		
Rationale for Local Rating	Follows Ecology rating system (Hruby & Yhanke 2023) per LCC 17.38.230 (Wetlands – Classification) (Lewis County 2025b).		
Wetland Functions Summary	Wetland 4 scored moderate to high for water quality functions. Wetland 4 scored low to moderate for hydrologic functions. Wetland 4 scored low to high for habitat function. A complete assessment of functions is provided in Appendix D.		

Table 3-6—Wetland 5 Summary

WETLAND 5 – INFORMATION SUMMARY			
Location:		Along north bank of Lucas Creek downstream of Senn Road Crossing	
		Local Jurisdiction	Lewis County
		WRIA	23 – Upper Chehalis
		Ecology Rating (Hruby & Yhanke 2023)	III (Habitat Score – 6)
		Buffer Width	75 feet
		Wetland Size	0.03 acres
		Cowardin Classification	PEM
		HGM Classification	Riverine
		Upland Data Sheet	W5-DP2
		Wetland Data Sheet	W5-DP1
		Flag color	Pink flagging
Dominant Vegetation	Slough sedge and soft rush		
Soils	Clay loam; Depleted Matrix of 10YR 4/2 with 10YR 4/6 redoximorphic concentrations in the matrix and pore linings to depth of 20 inches. Saturated at the soil surface.		
Hydrology	High Water Table, Saturation, Oxidized Rhizospheres along Living Roots, Geomorphic Position, and FAC-Neutral Test		
Rationale for Delineation	Satisfies all three wetland criteria.		
Rationale for Local Rating	Follows Ecology rating system (Hruby & Yhanke 2023) per LCC 17.38.230 (Wetlands – Classification) (Lewis County 2025b).		
Wetland Functions Summary	Wetland 5 scored low to high for water quality functions. Wetland 5 scored low to moderate for hydrologic functions. Wetland 5 scored low to high for habitat function. A complete assessment of functions is provided in Appendix D.		

Table 3-7—Wetland 6 Summary

WETLAND 6 – INFORMATION SUMMARY			
Location:		Field to the west of Senn Road and north of Lucas Creek	
		Local Jurisdiction	Lewis County
		WRIA	23 – Upper Chehalis
		Ecology Rating (Hruby & Yhanke 2023)	III (Habitat Score – 6)
		Buffer Width	75 feet
		Wetland Size	0.05 acres
		Cowardin Classification	PEM
		HGM Classification	Depressional
		Upland Data Sheet	W6-DP2
		Wetland Data Sheet	W6-DP1
		Flag color	Pink flagging
Dominant Vegetation	Slough sedge, soft rush, velvetgrass (<i>Holcus lanatus</i>), and Kentucky bluegrass.		
Soils	Loam; 10YR 3/2 to depth of 2 inches. Below 2 inches depleted matrix of 10YR 4/2 with 10YR 4/6 redoximorphic concentrations in the matrix and pore to a depth of 18 inches.		
Hydrology	Oxidized Rhizospheres along Living Roots, Geomorphic Position, and FAC-Neutral Test		
Rationale for Delineation	Satisfies all three wetland criteria.		
Rationale for Local Rating	Follows Ecology rating system (Hruby & Yhanke 2023) per LCC 17.38.230 (Wetlands – Classification) (Lewis County 2025b).		
Wetland Functions Summary	Wetland 6 scored low to high for water quality functions. Wetland 6 scored low to moderate for hydrologic functions. Wetland 6 scored low to high for habitat function. A complete assessment of functions is provided in Appendix D.		

3.2. Wetland Functions, Ratings, and Buffer Widths

All 6 wetlands in the study area were determined to be Category III wetlands according to the *Washington State Wetland Rating System for Western Washington 2014 Update Version 2.0* (Hruby & Yhanke 2023). Table 3-8 summarizes the functions of each wetland. Complete rating forms and figures are provided in Appendix D. Wetland buffers have a standard 75-foot width, and have been reduced to intervening road edges where applicable in accordance with the contiguous vegetation requirement per LCC 17.10.020.

Table 3-8—Summary of Wetland Functions

Wetland	Functions	Site Potential Rating	Landscape Potential Rating	Societal Value Rating	Score	Total (Class)
Wetland 1	Water Quality	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	18 (III)
	Hydrologic	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	6	
	Habitat	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	
Wetland 2	Water Quality	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	18 (III)
	Hydrologic	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	6	
	Habitat	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	
Wetland 3	Water Quality	<i>Moderate</i>	<i>Moderate</i>	<i>High</i>	7	18 (III)
	Hydrologic	<i>Low</i>	<i>Moderate</i>	<i>Moderate</i>	5	
	Habitat	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	
Wetland 4	Water Quality	<i>Moderate</i>	<i>Moderate</i>	<i>High</i>	7	18 (III)
	Hydrologic	<i>Low</i>	<i>Moderate</i>	<i>Moderate</i>	5	
	Habitat	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	
Wetland 5	Water Quality	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	17 (III)
	Hydrologic	<i>Low</i>	<i>Moderate</i>	<i>Moderate</i>	5	
	Habitat	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	
Wetland 6	Water Quality	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	17 (III)
	Hydrologic	<i>Moderate</i>	<i>Low</i>	<i>Moderate</i>	5	
	Habitat	<i>Low</i>	<i>Moderate</i>	<i>High</i>	6	

3.3. Delineated Watercourses and Riparian Buffers

Otak biologists identified and delineated three watercourses (Lucas Creek, Tributary 1, and Tributary 2) in the study area as shown in Figure 8 in Appendix B. Lucas Creek does not have a stream buffer for the bridge scour protection project per the Lewis County Shoreline Master Program (SMP). Per the SMP, shoreline buffers for bridge projects are 0 feet regardless of the land use intensity or shoreline designation. Stream buffers for Tributary 1 and Tributary 2 have been reduced to intervening road edges where applicable in accordance with the contiguous vegetation requirement per LCC 17.10.020. Streams, water type, and buffer widths are summarized in Table 3-9. Stream characteristics are summarized in Tables 3-10 to 3-12. Additional site photographs are provided in Appendix E.

Table 3-9–Delineated Watercourses

Stream Name	Lewis County Water Type ^{1,2}	Lewis County Buffer Width (Feet)
Lucas Creek	S	0 ³
Tributary 1	F	100 ⁴
Tributary 2	Ns	75 ⁴

¹ Water Types: Type S = shorelines of the state, Type F = fish bearing or with physical criteria to support potential fish use,

Type Ns = non-fish bearing seasonal (WDNR 2025)

² LCC 17.38.470 (Lewis County 2025b)

³ Lewis County Shoreline Master Program (Lewis County 2021)

⁴ LCC 17.38.420 (Lewis County 2025b)

Table 3-10–Lucas Creek Summary

Lucas Creek Information Summary			
Location:		Looking south/downstream, upstream of bridge	
	Stream Name		Lucas Creek
	Local Jurisdiction		Lewis County
	Stream Type		Type S
	Buffer Width		0 Feet
	Cowardin Class		R5UBH
Documented Fish Use		The Statewide Integrated Fish Distribution (SWIFD) (WDFW 2025b) inventory lists the documented presence of coastal cutthroat trout (<i>Oncorhynchus clarkii</i>); the documented spawning of steelhead (<i>Oncorhynchus mykiss</i>), coho salmon (<i>Oncorhynchus kisutch</i>), and Chinook salmon (<i>Oncorhynchus tshawytscha</i>); and the presumed presence of rainbow trout (<i>Oncorhynchus mykiss</i>). According to NOAA Fisheries, Lucas Creek is not Critical Habitat nor are any of the aforementioned fishes protected under the Endangered Species Act.	
Stream Buffer Condition		Lucas Creek does not have a stream buffer for the bridge scour protection project per the Lewis County Shoreline Master Program (SMP). Per the SMP, shoreline buffers for bridge projects are 0 feet regardless of the land use intensity or shoreline designation. East of Senn Road, the Lucas Creek riparian area is forested with mixed coniferous and deciduous trees. West of Senn Road, the Lucas Creek riparian area is dominated by pastures with a mix of grasses, rushes, and sedges. A few trees are also located along Lucas Creek	
Flow Regime and Flow Path		Lucas Creek originates on forested slopes of the Cascade foothills approximately 5.5 miles east of the study area. Lucas Creek continues west of the study area approximately 3,000 feet before discharging into the North Fork Newaukum River. The North Fork Newaukum River flows generally southwest for approximately 4.2 river miles and discharges to the Newaukum River. From the confluence of the North Fork and South Fork Newaukum Rivers, the Newaukum River flows generally Northwest for approximately 6.75 miles and discharges to the Chehalis River. The Chehalis River flows northwest for approximately 60 miles and outlets to Grays Harbor.	

Table 3-11–Tributary 1 Summary

Tributary 1 Information Summary		
Location:	East of Senn Road, Parallel to Senn Road, Looking south	
	Stream Name	Tributary 1
	Local Jurisdiction	Lewis County
	Stream Type	Type F
	Buffer Width	100 feet
	Cowardin Class	R5UBH
Documented Fish Use	The SWIFD (WDFW 2025b) inventory lists the documented presence of steelhead and coho salmon and the presumed presence of rainbow trout (<i>Oncorhynchus mykiss</i>). According to NOAA Fisheries, Tributary 1 is not Critical Habitat nor are any of the aforementioned fishes protected under the Endangered Species Act.	
Stream Buffer Condition	The standard buffer width for Type F streams per the LCC is 150 feet; however, Tributary 1 is less than 10 feet wide. LCC 17.38.420 allows for the reduction of buffers on Type F streams that are less than 10 feet wide from 150 feet to 100 feet. The buffer of Tributary 1 is truncated to the west by Senn Road. To the east, the buffer is dominated by pastures with a mix of grasses, rushes, and sedges. Woody shrubs are present along the banks of Tributary 1.	
Flow Regime and Flow Path	Tributary 1 begins in the hills approximately 3,000 feet southeast of the study area. In the study area, Tributary 1 flows north along Senn Road and discharges to Lucas Creek just east of Lewis County Bridge No. 77. Lucas Creek continues west of the study area approximately 3,000 feet before discharging into the North Fork Newaukum River. The North Fork Newaukum River flows generally southwest for approximately 4.2 river miles and discharges to the Newaukum River. From the confluence of the North Fork and South Fork Newaukum Rivers, the Newaukum River flows generally Northwest for approximately 6.75 miles and discharges to the Chehalis River. The Chehalis River flows northwest for approximately 60 miles and outlets to Grays Harbor.	

Table 3-12–Tributary 2 Summary

Tributary 2 Information Summary			
Location:		East of Lucas Creek and Wetland 3, Looking east from Wetland 3	
	Stream Name		Tributary 2
	Local Jurisdiction		Lewis County
	Stream Type		Type Ns
	Buffer Width		75 feet
	Cowardin Class		R4
Documented Fish Use		There is no documented fish use in Tributary 2. Tributary 2 does not meet the definition of fish habitat as outlined in the Washington Administrative Code (WAC) 222-16-030 – Water Typing.	
Stream Buffer Condition		The buffer on both sides of Tributary 2 consists of mixed upland forest with invasive Himalayan blackberry in the understory.	
Flow Regime and Flow Path		Tributary 2 is a short, intermittent stream that flows for approximately 55 feet in the study area. Tributary 2 discharges to Lucas Creek through Wetland 3. Lucas Creek continues west of the study area approximately 3,000 feet before discharging into the North Fork Newaukum River. The North Fork Newaukum River flows generally southwest for approximately 4.2 river miles and discharges to the Newaukum River. From the confluence of the North Fork and South Fork Newaukum Rivers, the Newaukum River flows generally Northwest for approximately 6.75 miles and discharges to the Chehalis River. The Chehalis River flows northwest for approximately 60 miles and outlets to Grays Harbor.	

Section 4. Regulatory Summary

4.1. U.S. Army Corps of Engineers

The Environmental Protection Agency (EPA) and USACE regulate waters of the United States (WOTUS) under Section 404 of the Clean Water Act (CWA). The agencies are currently interpreting “waters of the United States” per the “Revised definition of Waters of the United States” rule as published on January 18, 2023. This rule became effective on September 8, 2023. Tributaries of waters of the United States and wetlands adjacent to waters of the United States are included in the definition.

Lucas Creek and Tributary 1 are classified as a tributaries to traditionally navigable waters. Wetlands 3 and 5 are located within the ordinary high water of Lucas Creek and Wetland 4 has a continuous surface connection to Lucas Creek. Wetlands 3, 4, and 5 meet the adjacency criteria for determining CWA jurisdiction. Discharge of fill material into these waterbodies is regulated under Section 404 and 401 of the CWA.

4.2. Washington State Department of Fish and Wildlife

WDFW requires issuance of a Hydraulic Permit Approval (HPA) prior to any activities that may directly or indirectly affect streams or associated aquatic resources considered as waters of the state per the Revised Code of Washington (RCW) 90.48.020. Construction in or near state waters that will “use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters in the state” (RCW 77.55.011(11)) require an HPA. Lucas Creek, Tributary 1, and Tributary 2 are considered waters of the state, and any work within or over the OHWM of these watercourses will require an HPA per the Hydraulic Code Rules (WAC 220-660).

4.3. Washington State Department of Ecology

Ecology regulates activities in wetlands and streams under Section 401 of the CWA through the Water Quality Certification process. Ecology has authority over discharge into all wetlands and streams and can impose buffers and compensatory mitigation for impacts per RCW 90.48 (Water Pollution Act) depending on the proposed project and impacts to aquatic resources.

4.4. Local Jurisdiction – Lewis County

Wetlands, streams, associated buffers, floodplains, and FWHCAs are regulated by Lewis County under LCC 17.38 (Critical Areas) and the Lewis County Shoreline Master Program. Lucas Creek is classified as a Type S (Shoreline of the State) watercourse.

Lucas Creek is a shoreline of the state (Type S) and regulated under the Lewis County Shoreline Master Program along with all shorelands within 200 feet of the ordinary high water of Lucas Creek. Shoreline jurisdiction extends for 200 feet from the OHWM at a minimum or the extent of the floodway, whichever is larger. A floodway is not mapped on this stretch of Lucas Creek, but the entire study area is within shoreline jurisdiction as it is within 200 feet of the OHWM on each bank. The study area is located in the rural conservancy shoreline environment designation. Under the Lewis County SMP, Lucas Creek has a Standard Shoreline Buffer from the OHWM of 0 feet per Table 4-1 in Section 4.04.02 for projects that include transportation facilities, including bridges for motorized or non-motorized uses.

Section 5. References

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Appendix A: Methods and Tools

Table A-1—Methods and Tools Used to Prepare the Report

Parameter	Method or Tool	Website	Reference
Wetland Delineation	Corps of Engineers Wetlands Delineation Manual	https://www.sac.usace.army.mil/portals/43/docs/regulatory/1987_wetland_delineation_manual_reg.pdf	U.S. Army Corps of Engineers. 1987. <i>Corps of Engineers Wetland Delineation Manual</i> . Environmental Laboratory Wetlands Research Program Technical Report Y-87-1, U.S. Army Corps of Engineers, Engineer Waterways Experiment Station, Vicksburg, Mississippi.
	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: WMVC	https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7646	U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), ed. J.S. Wakely, R. W. Lichvar, and C.V. noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
Wetland Classification	USFWS / Cowardin Classification System	https://www.epa.gov/sites/default/files/2017-05/documents/cowardin_1979.pdf	Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. Government Printing Office, Washington, D.C.
	Hydrogeomorphic Classification (HGM) System	https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/3348/	Brinson, M. M. 1993. “A hydrogeomorphic classification for wetlands,” Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A270 053.
Wetland Rating	Washington State Wetland Rating System: Western WA	https://apps.ecology.wa.gov/publications/SummaryPages/2306009.html	Hruby & Yhanke. 2023. Washington State Wetland Rating System for Western Washington –2014 Update Version 2.0. Publication # 23-06-009.
	Lewis County Code	https://www.codepublishing.com/WA/LewisCounty/#!/LewisCounty17/LewisCounty1738.html#17.38	Website. Requires compliance with Lewis County Code (17.38) and use of 2014 Ecology rating system or revised and approved by Ecology.
Stream Delineation	OHW	https://erdc-library.erdc.dren.mil/items/76c61f8f-6d75-4a35-aaf3-39aa64918afb	U.S. Army Corps of Engineers. National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams (National OHWM Manual). ERDC/CRREL TR-25-1, US Army Engineer Research and Development Center Cold Regions Research and Engineering Laboratory. Hanover, NH.
	OHW	https://www.ecfr.gov/current/title-33/chapter-II/part-328?toc=1	Congressional Federal Register 33 Part 328 Definition of Waters of the United States.
	OHW	https://fortress.wa.gov/ecy/publications/documents/1606029.pdf	Washington State Department of Ecology. 2016. Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State – Revised October 2016. Ecology publication #16-06-

Parameter	Method or Tool	Website	Reference
Stream Classification	Department of Natural Resources (DNR) Water Typing System	Forest Practices Water Typing: https://dnr.wa.gov/forest-regulation/forest-practices-application/forest-practices-water-typing WAC 222-16-030: https://app.leg.wa.gov/WAC/default.aspx?cite=222-16-030 Water Type Mapping: https://fpamt.dnr.wa.gov/default.aspx	Washington Administrative Code (WAC) 222-16-030. DNR Water typing system.
	Lewis County Code	https://www.codepublishing.com/WA/LewisCounty/#!/LewisCounty17/LewisCounty1738.html#17.38.470	Lewis County Code 17.38.470 – Classification of Fish and Wildlife Habitat.
Wetland Indicator Status	WMVC 2020 Regional Wetland Plant List	https://wetland-plants.sec.usace.army.mil/static/reports/NWPL%20Cover%20Page%20National_v3.pdf	USACE. 2022. Western Mountains, Valleys & Coasts: 2020 Regional Plant List. Version 3.6.
Plant Names	USDA PLANTS Database	https://plants.usda.gov/	Website
Soils Data	Soil Survey	Web Soil Survey: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx	Website
Threatened and Endangered Species	WDNR - WA Wetlands of High Conservation Value Mapper	http://wadnr.maps.arcgis.com/apps/webappviewer/index.html?id=5cf9e5b22f584ad7a4e2aebc63c47bda	Website
	Washington Priority Habitats and Species	https://geodataservices.wdfr.wa.gov/hp/phs/	Priority Habitats and Species (PHS) Program – August 2008 Washington State Priority Habitats and Species List (revised June 2023)
	NOAA National NMFS ESA Critical Habitat Mapper	https://www.fisheries.noaa.gov/resource/map/national-esa-critical-habitat-mapper	Website
	USFWS IPaC species lists	https://ecos.fws.gov/ipac/	Website

Appendix B: Background Information and Figures

Figure 1: Vicinity Map

Figure 2: Study Area

Figure 3: USGS Topo Map

Figure 4: National Wetland Inventory

Figure 5: NRCS Soil Survey

Figure 6: Lewis County Wetland Inventory

Figure 7: Lewis County Shoreline Designation

Figure 8: Delineated Wetlands, Streams, and Buffers

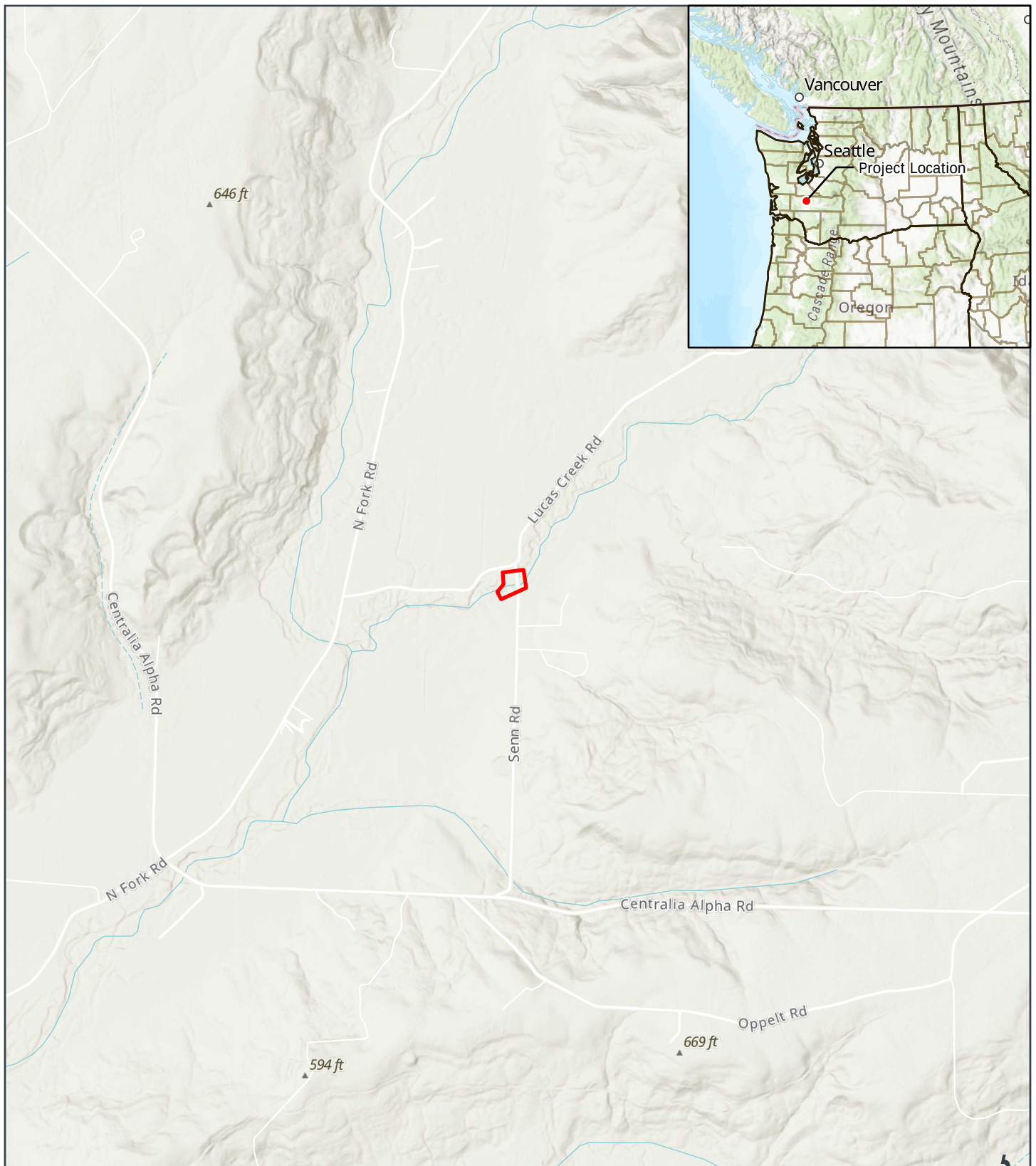


FIGURE 1
VICINITY MAP

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

Study Area

0 2,000 ft



FIGURE 2
SITE OVERVIEW

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- ▭ Study Area
- WA DNR Stream Inventory

0 100 ft

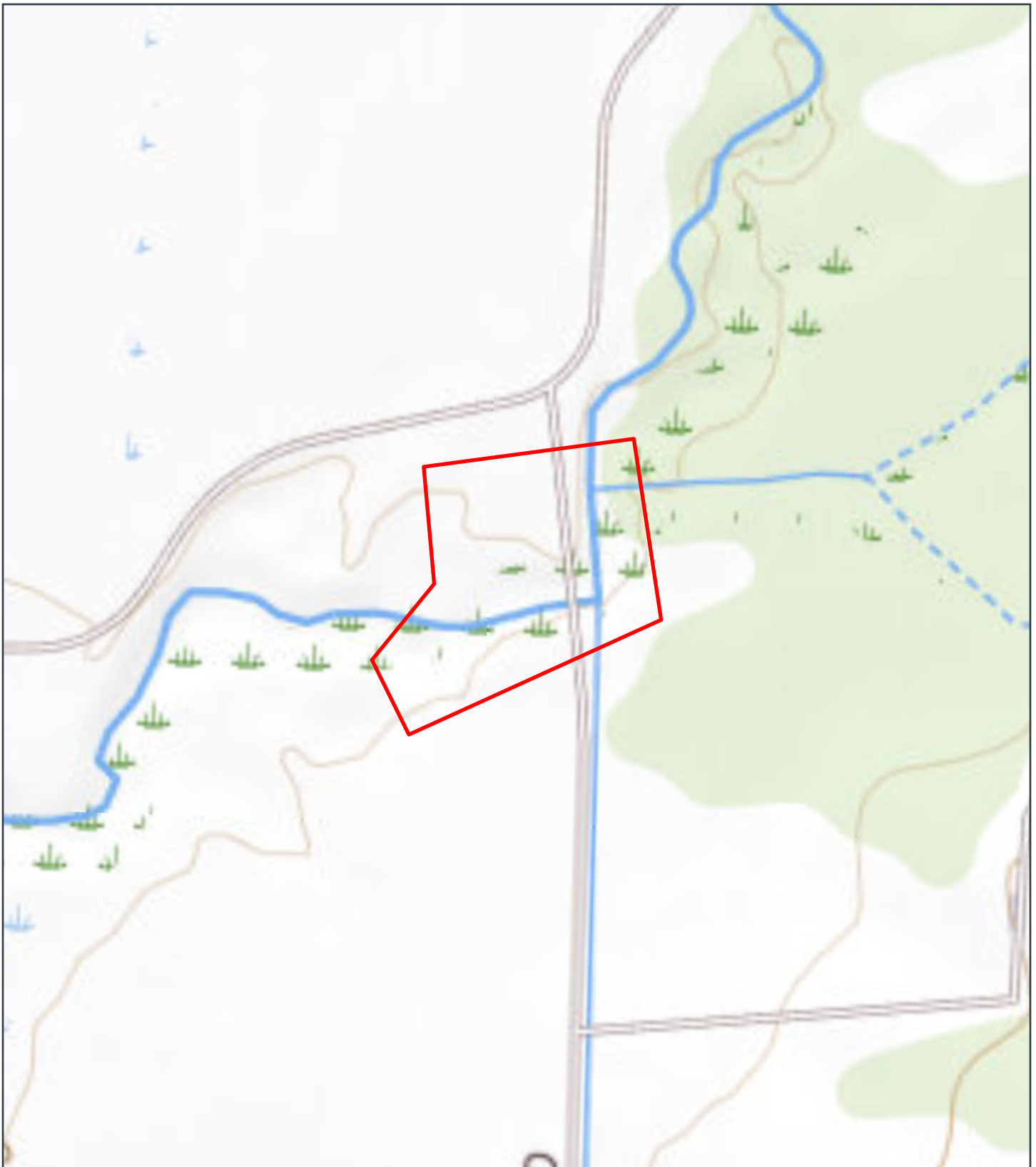


FIGURE 3
USGS TOPO

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

 StudyArea

0 200 ft

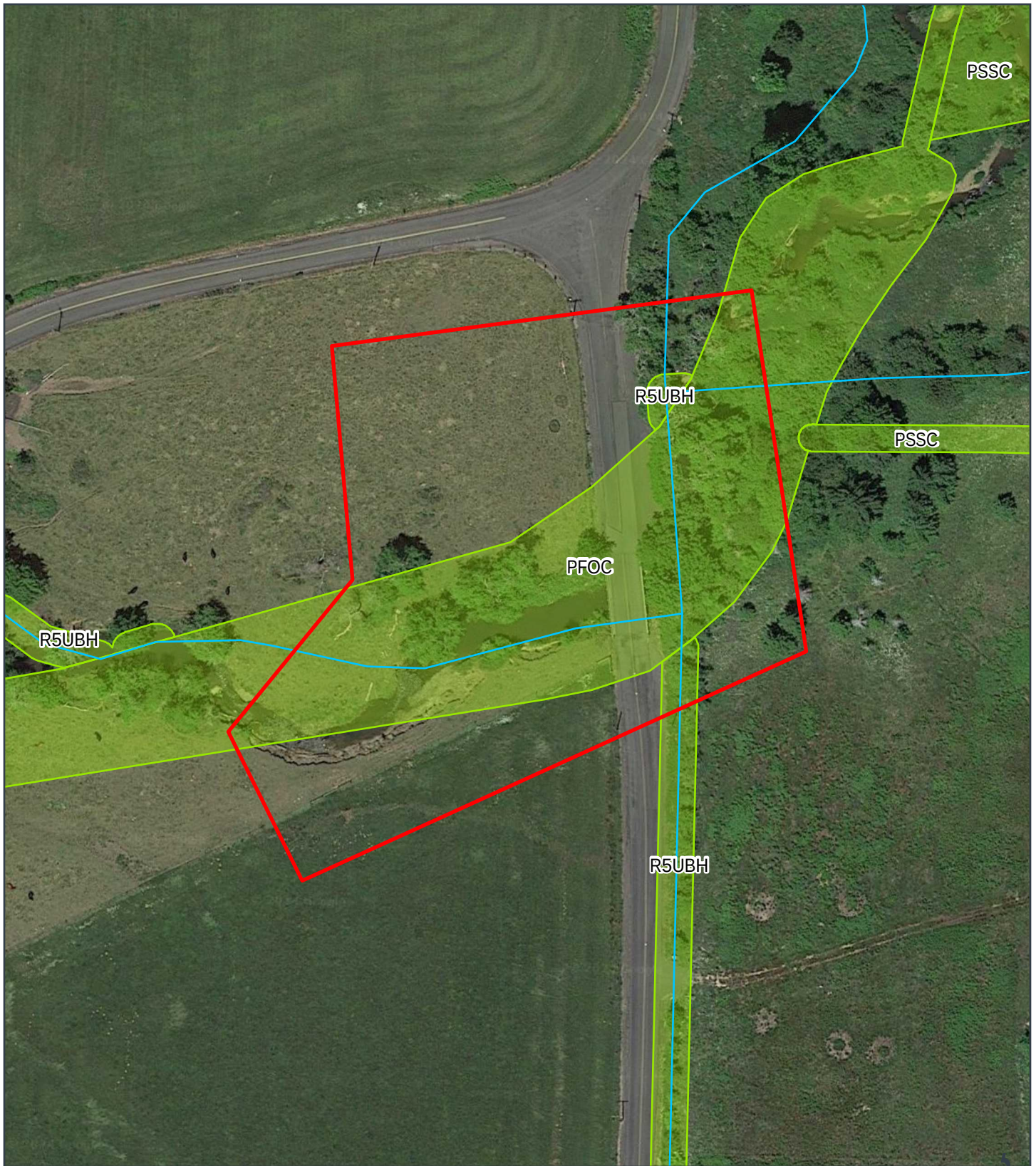


FIGURE 4
NATIONAL WETLANDS INVENTORY
 SENN ROAD BRIDGE SCOUR REPAIR | 21588A
 LEWIS COUNTY, WASHINGTON

LEGEND

- National Wetlands Inventory
- WA DNR Stream Inventory
- Study Area

Data Sources:
 Date: 9/22/2024
 Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.
 O:\PROJECT\21500\21588A\04 CAD\GIS\MXDs\21588A_SennRd.aprx



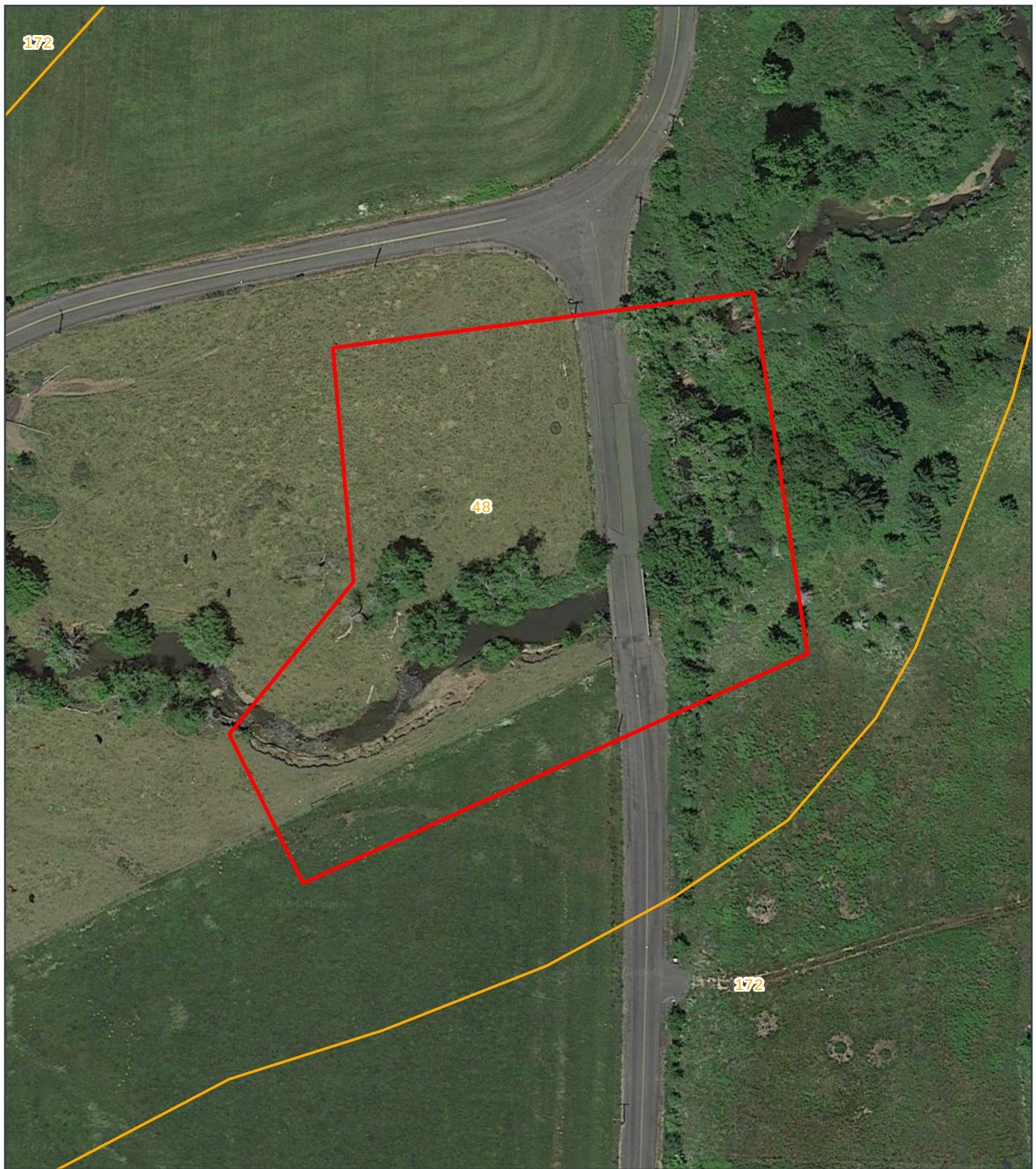


FIGURE 5 NRCS SOIL SURVEY

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- ▬ USGS Soil Survey Map Units
- ▬ Study Area

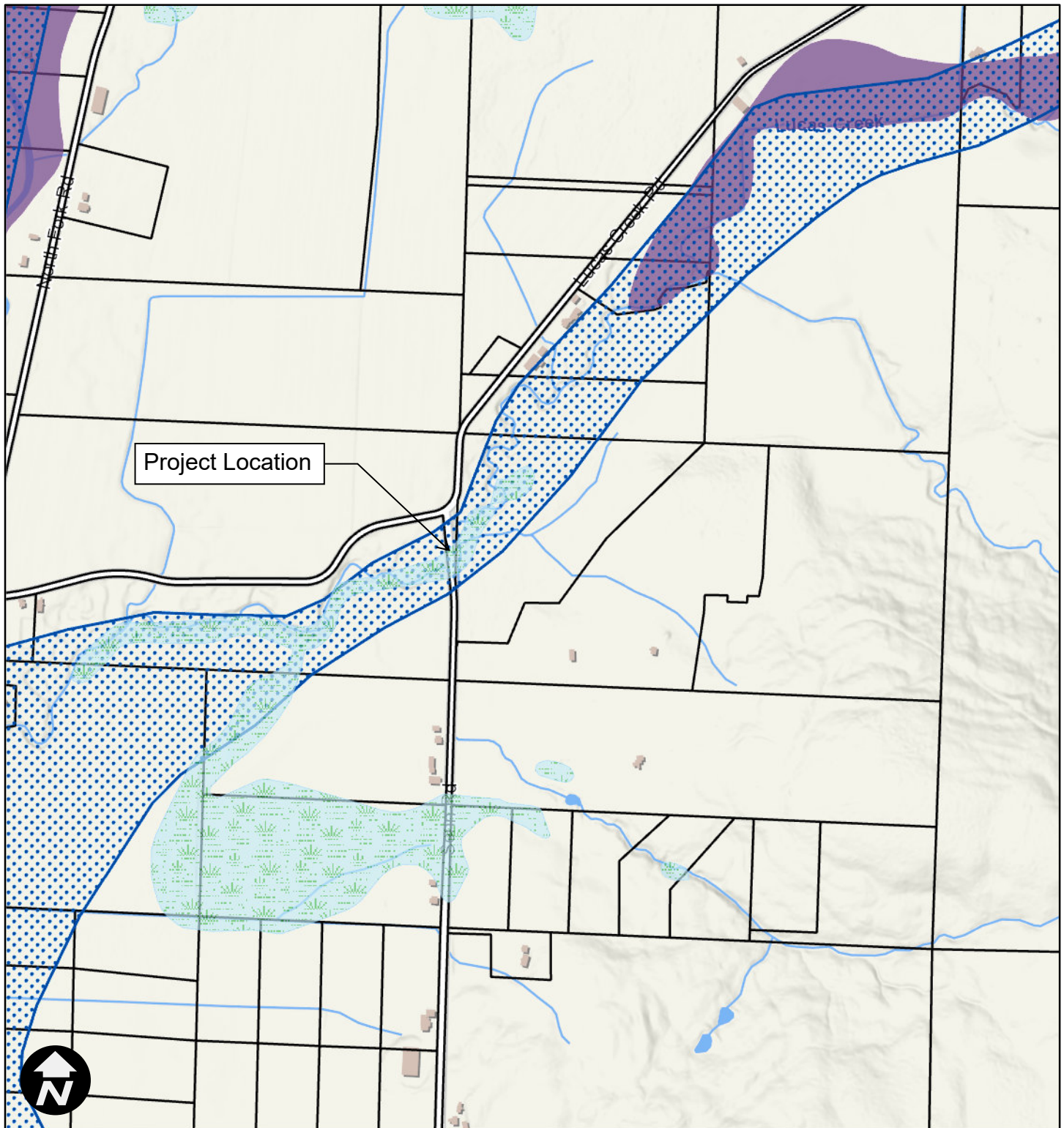
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172 - Reed silty clay loam
172 - Reed silty clay loam
48 - Chehalis silty clay

Data Sources:
Date: 9/22/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.
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Figure 6 - Lewis County Critical Areas Inventory



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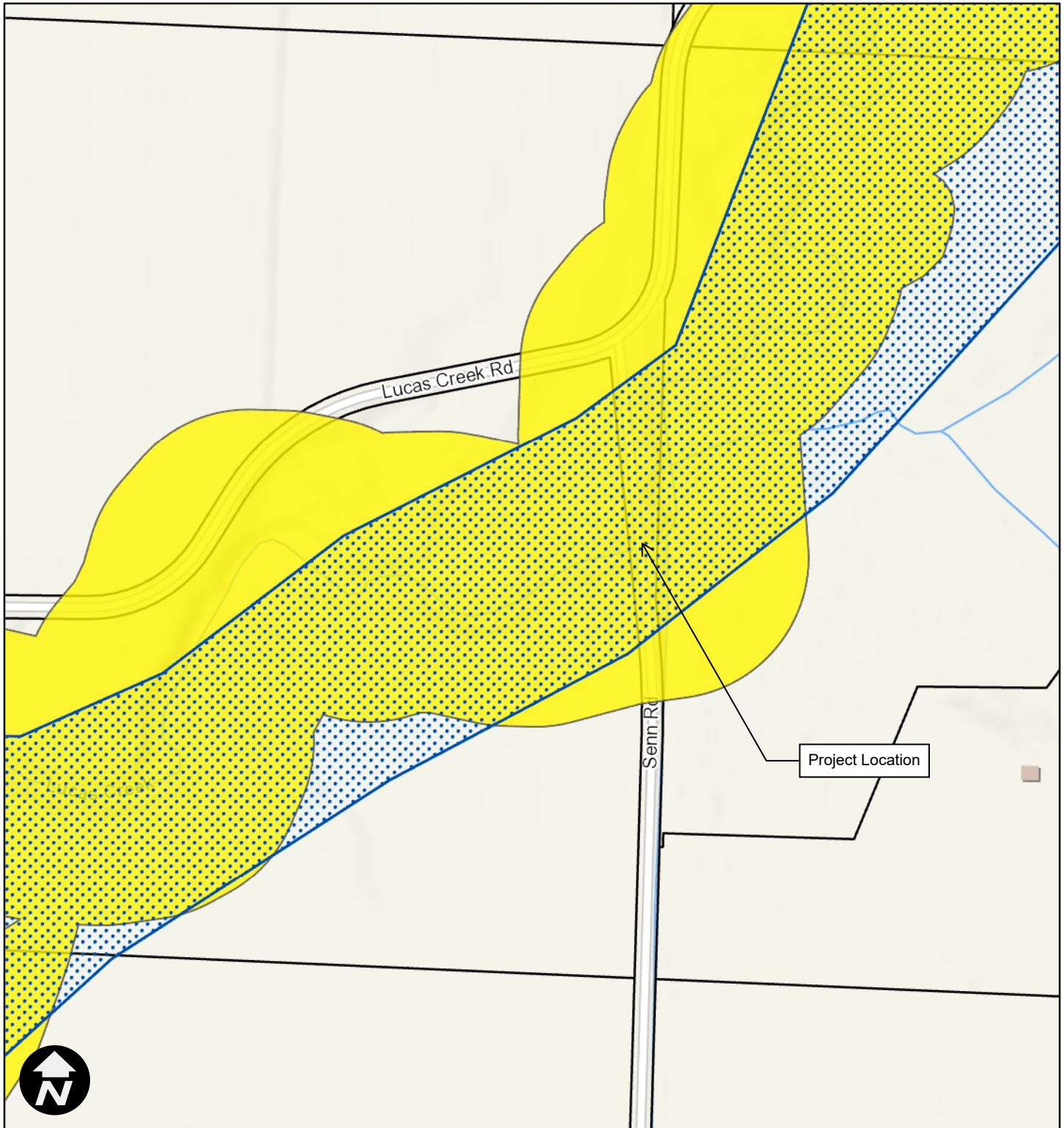
- | | | | |
|-------------------|-----------------|--|--------------|
| | Wetlands | | Category III |
| | FEMA 100-Year | | Parcels |
| | CARA Category I | | |
| CARA Soils | | | |
| | Category II | | |

0 400 800 1,600 ft
NAD 1983 StatePlane Washington South FIPS 4602 Feet



Lewis County does not guarantee the accuracy of the information shown on this map and is not responsible for any use or misuse by others regarding this material. It is provided for general informational purposes only. This map does not meet legal, engineering, or survey standards. Please practice due diligence and consult with licensed experts before making decisions.

Figure 8: Lewis County Shoreline Designation



2/5/2025, 3:56:54 PM

1:2,400

- | | | | |
|-------------------------------|---------------|--|----------------------------|
| | FEMA 100-Year | | Rural or Urban Conservancy |
| | Floodway | | Shoreline Residential |
| Shoreline Environments | | | High Intensity |
| | Aquatic | | Parcels |
| | Natural | | |

0 105 210 420 ft
NAD 1983 StatePlane Washington South FIPS 4602 Feet



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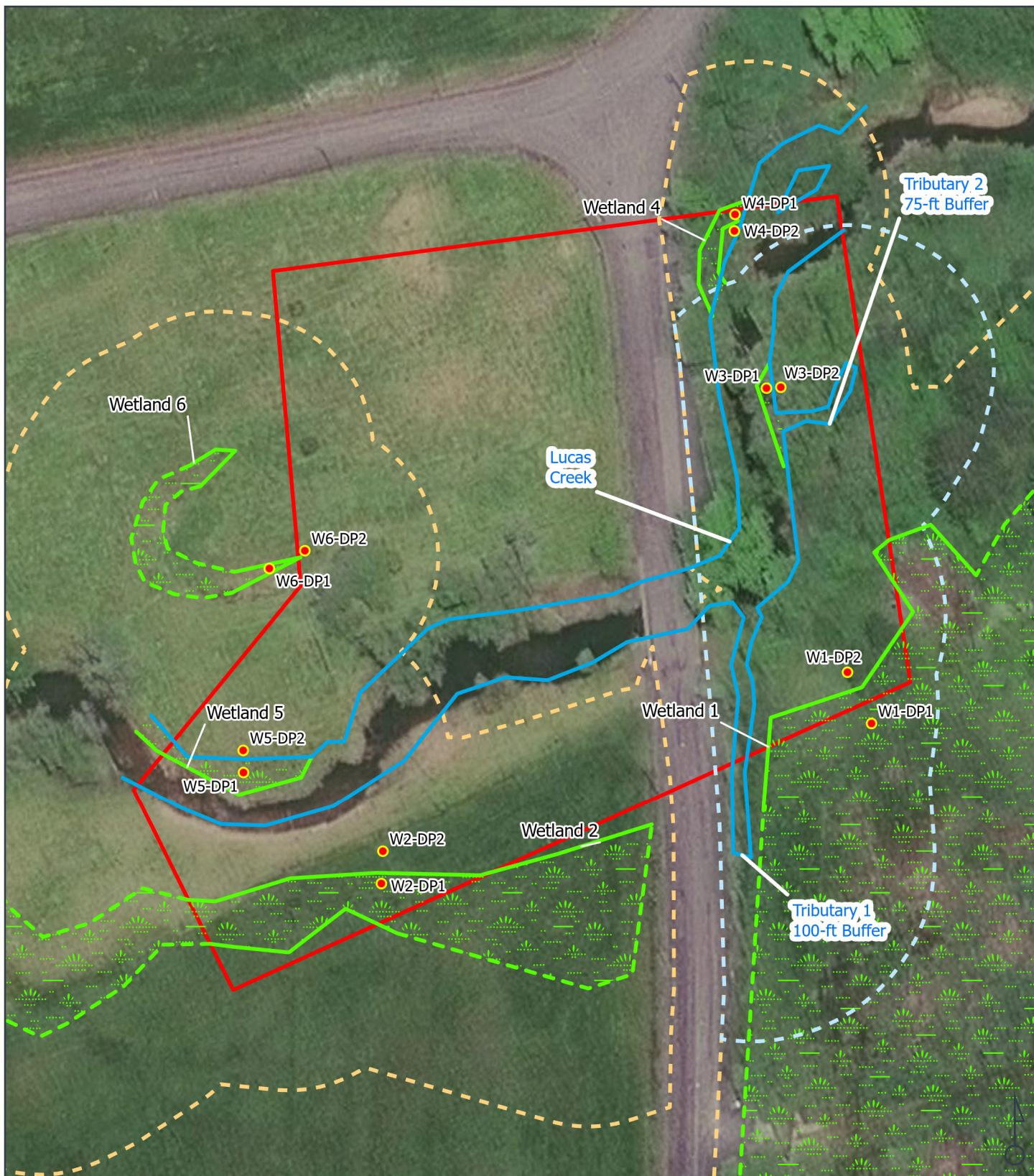


FIGURE 8
DELINEATED WETLANDS, STREAMS,
& BUFFERS

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

Data Sources:
Date: 9/10/2025
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.
O:\PROJECT\21500\21588A\04 CAD\GIS\MXDs\21588A_SennRd.aprx

LEGEND

- Delineated Wetland Boundary
- - - Estimated Wetland Boundary
- ||||| WetlandArea
- Data Point
- Ordinary High Water
- - - Wetland Buffer (75 ft)
- - - Stream Buffer
- Study Area

0 75 ft



Appendix C: Wetland Determination Data Forms

W1-DP1

W1-DP2

W2-DP1

W2-DP2

W3-DP1

W3-DP2

W4-DP1

W4-DP2

W5-DP1

W5-DP2

W6-DP1

W6-DP2

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

Project Site: Senn Road City/County: ____/Lewis County Sampling Date: 12/3/2024
Applicant/Owner: Lewis County State: WA Sampling Point: W1-DP1
Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): 0-1
Subregion (LRR): A Lat: 46.638893 Long: -122.771274 Datum: WGS84
Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: Data point is located approximately 15 feet SSE of flag W1-A3. Indicators of hydrophytic vegetation, hydric soils, and wetland hydrology observed at W1-DP1. W1-DP1 is located in wetland			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: <u>30-ft diam.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <u>--</u>	<u> </u>			Number of Dominant Species That Are OBL, FACW, or FAC: <u> </u> (A)
2. <u> </u>	<u> </u>			Total Number of Dominant Species Across All Strata: <u> </u> (B)
3. <u> </u>	<u> </u>			Percent of Dominant Species That Are OBL, FACW, or FAC: <u> </u> (A/B)
4. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15-ft diam.</u>)				Prevalence Index worksheet:
1. <u>--</u>	<u> </u>			Total % Cover of: Multiply by:
2. <u> </u>	<u> </u>			OBL species <u> </u> x1 = <u> </u>
3. <u> </u>	<u> </u>			FACW species <u> </u> x2 = <u> </u>
4. <u> </u>	<u> </u>			FAC species <u> </u> x3 = <u> </u>
5. <u> </u>	<u> </u>			FACU species <u> </u> x4 = <u> </u>
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		UPL species <u> </u> x5 = <u> </u>
Herb Stratum (Plot size: <u>5-ft diam.</u>)				Column Totals: <u> </u> (A) <u> </u> (B)
1. <u>Carex obnupta</u>	<u>60</u>	<u>yes</u>	<u>OBL</u>	Prevalence Index = B/A = <u> </u>
2. <u>Juncus effusus</u>	<u>25</u>	<u>yes</u>	<u>FACW</u>	
3. <u>Holcus lanatus</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	
4. <u>Poa sp.</u>	<u>5</u>	<u>no</u>	<u>FAC</u>	
5. <u> </u>	<u> </u>			
6. <u> </u>	<u> </u>			
7. <u> </u>	<u> </u>			
8. <u> </u>	<u> </u>			
9. <u> </u>	<u> </u>			
10. <u> </u>	<u> </u>			
11. <u> </u>	<u> </u>			
50% = <u>50</u> , 20% = <u>20</u>	<u>100</u>	= Total Cover		
Woody Vine Stratum (Plot size: <u>15-ft diam.</u>)				Hydrophytic Vegetation Indicators:
1. <u>--</u>	<u> </u>			☒ 1 – Rapid Test for Hydrophytic Vegetation
2. <u> </u>	<u> </u>			☐ 2 - Dominance Test is >50%
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		☐ 3 - Prevalence Index is ≤3.0 ¹
% Bare Ground in Herb Stratum <u>0</u>				☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
				☐ 5 - Wetland Non-Vascular Plants ¹
				☐ Problematic Hydrophytic Vegetation ¹ (Explain)
				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Hydrophytic Vegetation Present? Yes ☒ No ☐
Remarks: Vegetation at W1-DP1 passes the Rapid Test for Hydrophytic Vegetation hydrophytic vegetation indicator.				

Project Site: Senn Rd

SOIL

Sampling Point: W1-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features			Texture	Remarks	
	Color (moist)	%	Color (moist)	%	Type ¹			
0-20	10YR 4/2	85	7.5YR 4/6	15	C	PL, M	Loam	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :	
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)	
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)	
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)	
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)	
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)		
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)		
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)		
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)		

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☒ No ☐
--	--

Remarks: Hydric soil indicator Depleted matrix (F3) observed at W1-DP1.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☐ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☐ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☒ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☒ 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 ☐
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary wetland hydrology indicator Oxidized Rhizospheres along Living Roots (C3) observed at W1-DP1.
 Secondary wetland hydrology indicators Water-Stained Leaves (B9), Drainage Patterns (B10), and FAC-Neutral Test (D5) observed at W1-DP1.
 Surface water ponded in depressions near W1-DP1.

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

Project Site: Senn Road City/County: _____/Lewis County Sampling Date: 12/3/2024
 Applicant/Owner: Lewis County State: WA Sampling Point: W1-DP2
 Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): convex Slope (%): 0-1
 Subregion (LRR): A Lat: 46.638968 Long: -122.771329 Datum: WGS84
 Soil Map Unit Name: Chehalis Silty Clay NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☐ No ☒	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Data point is located approximately 15 feet SSE of flag W1-A3. Indicators of hydrophytic vegetation, hydric soils, or wetland hydrology were not observed at W1-DP2. W1-DP2 is not located in wetland.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30-ft diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <u>Pseudotsuga menziesii</u>	<u>15</u>	<u>yes</u>	<u>FACU</u>	
2. _____	_____			Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____	_____			Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
4. _____	_____			
50% = _____, 20% = _____	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft diam.)				Prevalence Index worksheet:
1. <u>--</u>	_____			
2. _____	_____			OBL species _____ x1 = _____
3. _____	_____			FACW species _____ x2 = _____
4. _____	_____			FAC species _____ x3 = _____
5. _____	_____			FACU species _____ x4 = _____
50% = _____, 20% = _____	<u>0</u>	= Total Cover		UPL species _____ x5 = _____
Herb Stratum (Plot size: 5-ft diam.)				Column Totals: _____ (A) _____ (B)
1. <u>Poa pratensis</u>	<u>25</u>	<u>yes</u>	<u>FAC</u>	Prevalence Index = B/A = _____
2. <u>Poa bulbosa</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators: ☐ 1 – Rapid Test for Hydrophytic Vegetation ☐ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ 5 - Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
3. <u>Hypochaeris radicata</u>	<u>15</u>	<u>no</u>	<u>FACU</u>	
4. <u>Agrostis sp.</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	
5. <u>Cardamine sp.</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	
6. <u>Unknown grass</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	
7. _____	_____			
8. _____	_____			
9. _____	_____			
10. _____	_____			
11. _____	_____			
50% = <u>45</u> , 20% = <u>18</u>	<u>90</u>	= Total Cover		
Woody Vine Stratum (Plot size: 15-ft diam.)				Hydrophytic Vegetation Present? Yes ☐ No ☒
1. <u>--</u>	_____			
2. _____	_____			
50% = _____, 20% = _____	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>10</u>				
Remarks: No hydrophytic vegetation indicators observed at W1-DP2.				

Project Site: Senn Rd

SOIL

Sampling Point: W1-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20	7.5YR 3/3	100					Loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :	
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)	
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)	
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)	
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)		
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)		
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)		
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)		

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____		Hydric Soils Present? Yes ☐ No ☒
--	--	--

Remarks: No hydric soil indicators observed at W1-DP2.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☐ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☐ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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 ☒
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators observed at W1-DP2.

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

Project Site: Senn Road City/County: ____/Lewis County Sampling Date: 12/3/2024
 Applicant/Owner: Lewis County State: WA Sampling Point: W2-DP1
 Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 1-2
 Subregion (LRR): A Lat: 46.638632 Long: -122.772325 Datum: WGS84
 Soil Map Unit Name: Chehalis Silty Clay NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: Data point is located approximately 8 feet S of flag W2-A3. W2 is located in a mowed ag field. Indicators of hydrophytic vegetation, hydric soil, and wetland hydrology observed at W2-DP1. W2-DP1 is located in wetland.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30-ft diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>--</u>	_____			
2. _____	_____			
3. _____	_____			
4. _____	_____			
50% = _____, 20% = _____	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft diam.)				
1. <u>--</u>	_____			
2. _____	_____			
3. _____	_____			
4. _____	_____			
5. _____	_____			
50% = _____, 20% = _____	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: 5-ft diam.)				
1. <u>Poa pratensis</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: ☐ 1 – Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ 5 - Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Juncus effusus</u>	<u>25</u>	<u>yes</u>	<u>FACW</u>	
3. <u>Unknown grass</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	
4. <u>Holcus lanatus</u>	<u>15</u>	<u>no</u>	<u>FAC</u>	
5. _____	_____			
6. _____	_____			
7. _____	_____			
8. _____	_____			
9. _____	_____			
10. _____	_____			
11. _____	_____			
50% = <u>50</u> , 20% = <u>20</u>	<u>100</u>	= Total Cover		
Woody Vine Stratum (Plot size: 15-ft diam.)				
1. <u>--</u>	_____			
2. _____	_____			
50% = _____, 20% = _____	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>0</u>				

Remarks: **Vegetation at W2-DP1 passes the Dominance Test hydrophytic vegetation indicator.**

Project Site: Senn Rd

SOIL

Sampling Point: W2-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/2	100					Loam	
2-20	10YR 4/2	85	7.5YR 4/6	15	C	PL, M	Loam	Prominent redox concentrations
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☒ No ☐
--	--

Remarks: Hydric soil indicator Depleted matrix (F3) observed at W2-DP1.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☒ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☒ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☒ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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): <u>6</u> Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): <u>4</u>	Wetland Hydrology Present? Yes ☒ No ☐
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary wetland hydrology indicators High Water Table (A2), Saturation (A3), and Oxidized Rhizospheres along Living Roots observed at W2-DP1.
 Secondary wetland hydrology indicators Geomorphic Position (D2) and FAC-Neutral Test (D5) observed at W2-DP1.
 Areas of surface ponding observed adjacent to W2-DP1.

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

Project Site: Senn Road City/County: /Lewis County Sampling Date: 12/3/2024
Applicant/Owner: Lewis County State: WA Sampling Point: W2-DP2
Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): convex Slope (%): 2
Subregion (LRR): A Lat: 46.638681 Long: -122.772323 Datum: WGS84
Soil Map Unit Name: Chehalis Silty Clay NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	
Remarks: Data point is located approximately 8 feet N of flag W2-A3. W2 is located in a mowed ag field. Indicators of hydrophytic vegetation observed at W2-DP2. Indicators of hydric soil and wetland hydrology not observed at W2-DP2. W2-DP2 is not located in wetland.		

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30-ft diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>--</u>	<u> </u>			
2. <u> </u>	<u> </u>			
3. <u> </u>	<u> </u>			
4. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft diam.)				Prevalence Index worksheet: <u>Total % Cover of:</u> <u> </u> <u>Multiply by:</u> OBL species <u> </u> x1 = <u> </u> FACW species <u> </u> x2 = <u> </u> FAC species <u> </u> x3 = <u> </u> FACU species <u> </u> x4 = <u> </u> UPL species <u> </u> x5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u>--</u>	<u> </u>			
2. <u> </u>	<u> </u>			
3. <u> </u>	<u> </u>			
4. <u> </u>	<u> </u>			
5. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: 5-ft diam.)				
1. <u>Unknown grass</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Poa pratensis</u>	<u>35</u>	<u>yes</u>	<u>FAC</u>	
3. <u>Agrostis sp.</u>	<u>25</u>	<u>yes</u>	<u>FAC</u>	
4. <u> </u>	<u> </u>			
5. <u> </u>	<u> </u>			
6. <u> </u>	<u> </u>			
7. <u> </u>	<u> </u>			
8. <u> </u>	<u> </u>			
9. <u> </u>	<u> </u>			
10. <u> </u>	<u> </u>			
11. <u> </u>	<u> </u>			
50% = <u>50</u> , 20% = <u>20</u>	<u>100</u>	= Total Cover		
Woody Vine Stratum (Plot size: 15-ft diam.)				
1. <u>--</u>	<u> </u>			
2. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>0</u>				
Hydrophytic Vegetation Indicators: ☐ 1 – Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ 5 - Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Hydrophytic Vegetation Present? Yes ☒ No ☐				
Remarks: Vegetation at W2-DP2 passes the Dominance Test hydrophytic vegetation indicator.				

Project Site: Senn Rd

SOIL

Sampling Point: W2-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20	7.5YR 4/3	100					Loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :	
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)	
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)	
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)	
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)		
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)		
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)		
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)		

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____		Hydric Soils Present? Yes ☐ No ☒
--	--	--

Remarks: No hydric soil indicators observed at W2-DP2.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☐ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☐ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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 ☒
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators observed at W2-DP2.

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

Project Site: Senn Road City/County: /Lewis County Sampling Date: 12/4/2024
Applicant/Owner: Lewis County State: WA Sampling Point: W3-DP1
Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): A Lat: 46.639387 Long: -122.771522 Datum: WGS84
Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: Data point is located approximately 6 feet east of flag W3-A2. Indicators of hydrophytic vegetation, hydric soil, and wetland hydrology observed at W3-DP1. W3-DP1 is located in wetland.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: <u>30-ft diam.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
1. <u>--</u>	_____			
2. _____	_____			
3. _____	_____			
4. _____	_____			
50% = _____, 20% = _____	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15-ft diam.</u>)				Prevalence Index worksheet: <u>Total % Cover of:</u> _____ <u>Multiply by:</u> _____ OBL species _____ x1 = _____ FACW species _____ x2 = _____ FAC species _____ x3 = _____ FACU species _____ x4 = _____ UPL species _____ x5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. <u>Salix sitchensis</u>	<u>15</u>	<u>yes</u>	<u>FACW</u>	
2. _____	_____			
3. _____	_____			
4. _____	_____			
5. _____	_____			
50% = <u>7.5</u> , 20% = <u>3</u>	<u>15</u>	= Total Cover		
Herb Stratum (Plot size: <u>5-ft diam.</u>)				Hydrophytic Vegetation Indicators: ☒ 1 – Rapid Test for Hydrophytic Vegetation ☐ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ 5 - Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Phalaris arundinacea</u>	<u>90</u>	<u>yes</u>	<u>FACW</u>	
2. _____	_____			
3. _____	_____			
4. _____	_____			
5. _____	_____			
6. _____	_____			
7. _____	_____			
8. _____	_____			
9. _____	_____			
10. _____	_____			
11. _____	_____			
50% = <u>45</u> , 20% = <u>18</u>	<u>90</u>	= Total Cover		
Woody Vine Stratum (Plot size: <u>15-ft diam.</u>)				Hydrophytic Vegetation Present? Yes ☒ No ☐
1. <u>--</u>	_____			
2. _____	_____			
50% = _____, 20% = _____	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>10</u>				
Remarks: Vegetation at W3-DP1 passes the Rapid Test for Hydrophytic Vegetation hydrophytic vegetation indicator.				

Project Site: Senn Rd

SOIL

Sampling Point: W3-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20	10YR 4/2	85	10YR 4/6	15	C	M	Loam	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☒ No ☐
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Remarks: Hydric soil indicator Depleted Matrix (F3) observed at W3-DP1.
 Soil profile mixed with approximately 40% gravel.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☒ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☒ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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): <u>2</u> Saturation Present? Yes ☒ No ☐ Depth (inches): <u>0</u> (includes capillary fringe)	Wetland Hydrology Present? Yes ☒ No ☐
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary wetland hydrology indicators High Water Table (A2) and Saturation (A3) observed at W3-DP1.
 Secondary wetland hydrology indicators Geomorphic Position (D2) and FAC-Neutral Test (D5) observed at W3-DP1.

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

Project Site: Senn Road City/County: _____/Lewis County Sampling Date: 12/4/2024
 Applicant/Owner: Lewis County State: WA Sampling Point: W3-DP2
 Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 2
 Subregion (LRR): A Lat: 46.639389 Long: -122.771491 Datum: WGS84
 Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Data point is located approximately 13 feet east of flag W3-A2 and approximately 4 feet east of the ordinary high water of Lucas Creek. Indicators of hydrophytic vegetation observed at W3-DP2. Indicators of hydric soil and wetland hydrology not observed at W3-DP2.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: <u>30-ft diam.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u><i>Alnus rubra</i></u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	
2. <u><i>Fraxinus latifolia</i></u>	<u>25</u>	<u>yes</u>	<u>FACW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
50% = <u>32.5</u> , 20% = <u>13</u>	<u>65</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15-ft diam.</u>)				
1. <u><i>Rubus armeniacus</i></u>	<u>15</u>	<u>yes</u>	<u>FAC</u>	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x1 = _____ FACW species _____ x2 = _____ FAC species _____ x3 = _____ FACU species _____ x4 = _____ UPL species _____ x5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
50% = <u>7.5</u> , 20% = <u>3</u>	<u>15</u>	= Total Cover		
Herb Stratum (Plot size: <u>5-ft diam.</u>)				
1. <u><i>Phalaris arundinacea</i></u>	<u>90</u>	<u>yes</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: ☐ 1 – Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ 5 - Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
50% = <u>45</u> , 20% = <u>18</u>	<u>90</u>	= Total Cover		
Woody Vine Stratum (Plot size: <u>15-ft diam.</u>)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☒ No ☐
2. _____	_____	_____	_____	
50% = _____, 20% = _____	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>10</u>				

Remarks: **Vegetation at W3-DP2 passes the Dominance Test hydrophytic vegetation indicator.**

Project Site: Senn Rd

SOIL

Sampling Point: W3-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20	7.5YR 3/3	100						

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☐ No ☒
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Remarks: No hydric soil indicators observed at W3-DP2.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☐ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☐ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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 ☒
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No primary wetland hydrology indicators observed at W3-DP2, and only one secondary indicator (D5).

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

Project Site: Senn Road City/County: ____/Lewis County Sampling Date: 12/4/2024
 Applicant/Owner: Lewis County State: WA Sampling Point: W4-DP1
 Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 2
 Subregion (LRR): A Lat: 46.639645 Long: -122.771601 Datum: WGS84
 Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: Data point is located approximately 6 feet W flag W4-A10. Indicators of hydrophytic vegetation, hydric soil, and wetland hydrology observed at W4-DP1. W4-DP1 is located in wetland.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30-ft diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <u>--</u>	<u> </u>			Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. <u> </u>	<u> </u>			
3. <u> </u>	<u> </u>			
4. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: OBL species <u> </u> x1 = <u> </u> FACW species <u> </u> x2 = <u> </u> FAC species <u> </u> x3 = <u> </u> FACU species <u> </u> x4 = <u> </u> UPL species <u> </u> x5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
Sapling/Shrub Stratum (Plot size: 15-ft diam.)				
1. <u>--</u>	<u> </u>			
2. <u> </u>	<u> </u>			
3. <u> </u>	<u> </u>			
4. <u> </u>	<u> </u>			
5. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: 5-ft diam.)				
1. <u>Phalaris arundinacea</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: ☐ 1 – Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ 5 - Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Carex obnupta</u>	<u>15</u>	<u>yes</u>	<u>OBL</u>	
3. <u>Ranunculus repens</u>	<u>15</u>	<u>yes</u>	<u>FAC</u>	
4. <u> </u>	<u> </u>			
5. <u> </u>	<u> </u>			
6. <u> </u>	<u> </u>			
7. <u> </u>	<u> </u>			
8. <u> </u>	<u> </u>			
9. <u> </u>	<u> </u>			
10. <u> </u>	<u> </u>			
11. <u> </u>	<u> </u>			
50% = <u>25</u> , 20% = <u>10</u>	<u>50</u>	= Total Cover		
Woody Vine Stratum (Plot size: 15-ft diam.)				
1. <u>--</u>	<u> </u>			Hydrophytic Vegetation Present? Yes ☒ No ☐
2. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>50</u>				
Remarks: Vegetation at W4-DP1 passes the Dominance Test hydrophytic vegetation indicator.				

Project Site: Senn Rd

SOIL

Sampling Point: W4-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features			Texture	Remarks	
	Color (moist)	%	Color (moist)	%	Type ¹			
0-20	10YR 4/1	80	7.5YR 4/6	20	C	PL, M	Loam	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☒ No ☐
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Remarks: Hydric soil indicator Depleted matrix (F3) observed at W4-DP1.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☒ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☒ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☒ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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): <u>10</u> Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): <u>8</u>	Wetland Hydrology Present? Yes ☒ No ☐
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary wetland hydrology indicators high Water Table (A2) and Saturation (A3) observed at W4-DP1.
 Secondary wetland hydrology indicators Geomorphic Position (D2) and FAC-Neutral Test (D5) observed at W4-DP1.

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

Project Site: Senn Road City/County: /Lewis County Sampling Date: 12/4/2024
 Applicant/Owner: Lewis County State: WA Sampling Point: W4-DP2
 Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): convex Slope (%): 2
 Subregion (LRR): A Lat: 46.63962 Long: -122.771601 Datum: WGS84
 Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Data point is located approximately 6 feet toward water from flag W4-A9. Indicators of hydrophytic vegetation observed at W4-DP2. Indicators of hydric soil and wetland hydrology not observed at W4-DP2. W4-DP2 is not located in wetland.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30-ft diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>--</u>	<u> </u>			
2. <u> </u>	<u> </u>			
3. <u> </u>	<u> </u>			
4. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft diam.)				
1. <u>--</u>	<u> </u>			Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x1 = <u> </u> FACW species <u> </u> x2 = <u> </u> FAC species <u> </u> x3 = <u> </u> FACU species <u> </u> x4 = <u> </u> UPL species <u> </u> x5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
2. <u> </u>	<u> </u>			
3. <u> </u>	<u> </u>			
4. <u> </u>	<u> </u>			
5. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: 5-ft diam.)				
1. <u>Poa pratensis</u>	<u>60</u>	<u>yes</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: ☐ 1 – Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ 5 - Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Phalaris arundinacea</u>	<u>40</u>	<u>yes</u>	<u>FACW</u>	
3. <u> </u>	<u> </u>			
4. <u> </u>	<u> </u>			
5. <u> </u>	<u> </u>			
6. <u> </u>	<u> </u>			
7. <u> </u>	<u> </u>			
8. <u> </u>	<u> </u>			
9. <u> </u>	<u> </u>			
10. <u> </u>	<u> </u>			
11. <u> </u>	<u> </u>			
50% = <u>50</u> , 20% = <u>20</u>	<u>100</u>	= Total Cover		
Woody Vine Stratum (Plot size: 15-ft diam.)				
1. <u>--</u>	<u> </u>			Hydrophytic Vegetation Present? Yes ☒ No ☐
2. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>50</u>				
Remarks: Vegetation at W4-DP2 passes the Dominance Test hydrophytic vegetation indicator.				

Project Site: Senn Rd

SOIL

Sampling Point: W4-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20	7.5YR 3/3	100					Loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☐ No ☒
--	--

Remarks: No hydric soil indicators observed at W4-DP2.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☐ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☐ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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 ☒
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators observed at W4-DP2.

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

Project Site: Senn Road City/County: /Lewis County Sampling Date: 12/4/2024
Applicant/Owner: Lewis County State: WA Sampling Point: W5-DP1
Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): 2
Subregion (LRR): A Lat: 46.638793 Long: -122.77263 Datum: WGS84
Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	
Remarks: Data point is located half way between flags W5-A3 and OHW1-B23. Indicators of hydrophytic vegetation, hydric soil, and wetland hydrology observed at W5-DP1. W5-DP1 is located in wetland.		

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: <u>30-ft diam.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <u>--</u>	<u> </u>			Number of Dominant Species That Are OBL, FACW, or FAC: <u> </u> (A)
2. <u> </u>	<u> </u>			Total Number of Dominant Species Across All Strata: <u> </u> (B)
3. <u> </u>	<u> </u>			Percent of Dominant Species That Are OBL, FACW, or FAC: <u> </u> (A/B)
4. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15-ft diam.</u>)				Prevalence Index worksheet:
1. <u>--</u>	<u> </u>			Total % Cover of: Multiply by:
2. <u> </u>	<u> </u>			OBL species <u> </u> x1 = <u> </u>
3. <u> </u>	<u> </u>			FACW species <u> </u> x2 = <u> </u>
4. <u> </u>	<u> </u>			FAC species <u> </u> x3 = <u> </u>
5. <u> </u>	<u> </u>			FACU species <u> </u> x4 = <u> </u>
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		UPL species <u> </u> x5 = <u> </u>
Herb Stratum (Plot size: <u>5-ft diam.</u>)				Column Totals: <u> </u> (A) <u> </u> (B)
1. <u>Carex obnupta</u>	<u>25</u>	<u>yes</u>	<u>OBL</u>	Prevalence Index = B/A = <u> </u>
2. <u>Juncus effusus</u>	<u>25</u>	<u>yes</u>	<u>FACW</u>	
3. <u>Poa sp.</u>	<u>5</u>	<u>no</u>	<u>FAC</u>	
4. <u> </u>	<u> </u>			Hydrophytic Vegetation Indicators:
5. <u> </u>	<u> </u>			☒ 1 – Rapid Test for Hydrophytic Vegetation
6. <u> </u>	<u> </u>			☐ 2 - Dominance Test is >50%
7. <u> </u>	<u> </u>			☐ 3 - Prevalence Index is ≤3.0 ¹
8. <u> </u>	<u> </u>			☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
9. <u> </u>	<u> </u>			☐ 5 - Wetland Non-Vascular Plants ¹
10. <u> </u>	<u> </u>			☐ Problematic Hydrophytic Vegetation ¹ (Explain)
11. <u> </u>	<u> </u>			¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% = <u>27.5</u> , 20% = <u>11</u>	<u>55</u>	= Total Cover		
Woody Vine Stratum (Plot size: <u>15-ft diam.</u>)				Hydrophytic Vegetation Present? Yes ☒ No ☐
1. <u>--</u>	<u> </u>			
2. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>50</u>				
Remarks: Vegetation at W5-DP1 passes the Rapid Test for Hydrophytic Vegetation hydrophytic vegetation indicator.				

Project Site: Senn Rd

SOIL

Sampling Point: W5-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features			Texture	Remarks	
	Color (moist)	%	Color (moist)	%	Type ¹			
0-20	10YR 4/2	80	10YR 4/6	20	C	PL, M	ClayLoam	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☒ No ☐
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Remarks: Hydric soil indicator Depleted matrix (F3) observed at W4-DP1.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☒ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☒ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☒ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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): <u>5</u> Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): <u>0</u>	Wetland Hydrology Present? Yes ☒ No ☐
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Primary wetland hydrology indicators high Water Table (A2), Saturation (A3), and Oxidized Rhizospheres along Living Roots (C3) observed at W5-DP1.
 Secondary wetland hydrology indicators Geomorphic Position (D2) and FAC-Neutral Test (D5) observed at W5-DP1.

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

Project Site: Senn Road City/County: /Lewis County Sampling Date: 12/4/2024
Applicant/Owner: Lewis County State: WA Sampling Point: W5-DP2
Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): convex Slope (%): 2
Subregion (LRR): A Lat: 46.638826 Long: -122.772632 Datum: WGS84
Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Data point is located approximately 12 feet west of flag OHW1-B23. Indicators of hydrophytic vegetation observed at W5-DP2. Indicators of hydric soil and wetland hydrology not observed at W5-DP2. W5-DP2 not located in wetland.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: <u>30-ft diam.</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <u>--</u>	<u> </u>			Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. <u> </u>	<u> </u>			Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. <u> </u>	<u> </u>			Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15-ft diam.</u>)				Prevalence Index worksheet:
1. <u>--</u>	<u> </u>			Total % Cover of: Multiply by:
2. <u> </u>	<u> </u>			OBL species <u> </u> x1 = <u> </u>
3. <u> </u>	<u> </u>			FACW species <u> </u> x2 = <u> </u>
4. <u> </u>	<u> </u>			FAC species <u> </u> x3 = <u> </u>
5. <u> </u>	<u> </u>			FACU species <u> </u> x4 = <u> </u>
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		UPL species <u> </u> x5 = <u> </u>
Herb Stratum (Plot size: <u>5-ft diam.</u>)				Column Totals: <u> </u> (A) <u> </u> (B)
1. <u>Poa pratensis</u>	<u>90</u>	<u>yes</u>	<u>FAC</u>	Prevalence Index = B/A = <u> </u>
2. <u>Juncus effusus</u>	<u>10</u>	<u>no</u>	<u>FACW</u>	
3. <u> </u>	<u> </u>			Hydrophytic Vegetation Indicators:
4. <u> </u>	<u> </u>			☐ 1 – Rapid Test for Hydrophytic Vegetation
5. <u> </u>	<u> </u>			☒ 2 - Dominance Test is >50%
6. <u> </u>	<u> </u>			☐ 3 - Prevalence Index is ≤3.0 ¹
7. <u> </u>	<u> </u>			☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
8. <u> </u>	<u> </u>			☐ 5 - Wetland Non-Vascular Plants ¹
9. <u> </u>	<u> </u>			☐ Problematic Hydrophytic Vegetation ¹ (Explain)
10. <u> </u>	<u> </u>			¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
11. <u> </u>	<u> </u>			
50% = <u>50</u> , 20% = <u>20</u>	<u>100</u>	= Total Cover		
Woody Vine Stratum (Plot size: <u>15-ft diam.</u>)				Hydrophytic Vegetation Present? Yes ☒ No ☐
1. <u>--</u>	<u> </u>			
2. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>50</u>				
Remarks: Vegetation at W5-DP2 passes the Dominance Test hydrophytic vegetation indicator.				

Project Site: Senn Rd

SOIL

Sampling Point: W5-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20	7.5YR 3/3	100					Loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☐ No ☒
--	--

Remarks: No hydric soil indicators observed at W5-DP2.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☐ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☐ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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: No wetland hydrology indicators observed at W5-DP2.

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

Project Site: Senn Road City/County: /Lewis County Sampling Date: 12/4/2024
Applicant/Owner: Lewis County State: WA Sampling Point: W6-DP1
Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 1-2
Subregion (LRR): A Lat: 46.639098 Long: -122.772587 Datum: WGS84
Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	
Remarks: W6 is located in a mowed pasture. Indicators of hydrophytic vegetation, hydric soils, and wetland hydrology observed at W6-DP1. W6-DP1 is located in wetland.		

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30-ft diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <u>--</u>	<u> </u>			Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)
2. <u> </u>	<u> </u>			Total Number of Dominant Species Across All Strata: <u>4</u> (B)
3. <u> </u>	<u> </u>			Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. <u> </u>	<u> </u>			
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft diam.)				Prevalence Index worksheet:
1. <u>--</u>	<u> </u>			Total % Cover of: Multiply by:
2. <u> </u>	<u> </u>			OBL species <u> </u> x1 = <u> </u>
3. <u> </u>	<u> </u>			FACW species <u> </u> x2 = <u> </u>
4. <u> </u>	<u> </u>			FAC species <u> </u> x3 = <u> </u>
5. <u> </u>	<u> </u>			FACU species <u> </u> x4 = <u> </u>
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		UPL species <u> </u> x5 = <u> </u>
Herb Stratum (Plot size: 5-ft diam.)				Column Totals: <u> </u> (A) <u> </u> (B)
1. <u>Carex obnupta</u>	<u>25</u>	<u>yes</u>	<u>OBL</u>	Prevalence Index = B/A = <u> </u>
2. <u>Holcus lanatus</u>	<u>25</u>	<u>yes</u>	<u>FAC</u>	
3. <u>Juncus effusus</u>	<u>25</u>	<u>yes</u>	<u>FACW</u>	
4. <u>Poa pratensis</u>	<u>25</u>	<u>yes</u>	<u>FAC</u>	
5. <u> </u>	<u> </u>			
6. <u> </u>	<u> </u>			
7. <u> </u>	<u> </u>			
8. <u> </u>	<u> </u>			
9. <u> </u>	<u> </u>			
10. <u> </u>	<u> </u>			
11. <u> </u>	<u> </u>			
50% = <u>50</u> , 20% = <u>20</u>	<u>100</u>	= Total Cover		
Woody Vine Stratum (Plot size: 15-ft diam.)				Hydrophytic Vegetation Indicators:
1. <u>--</u>	<u> </u>			☐ 1 – Rapid Test for Hydrophytic Vegetation
2. <u> </u>	<u> </u>			☒ 2 - Dominance Test is >50%
50% = <u> </u> , 20% = <u> </u>	<u>0</u>	= Total Cover		☐ 3 - Prevalence Index is ≤3.0 ¹
% Bare Ground in Herb Stratum <u>0</u>				☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
				☐ 5 - Wetland Non-Vascular Plants ¹
				☐ Problematic Hydrophytic Vegetation ¹ (Explain)
				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Hydrophytic Vegetation Present? Yes ☒ No ☐
Remarks: Vegetation at W6-DP1 passes the Dominance Test hydrophytic vegetation indicator.				

Project Site: Senn Rd

SOIL

Sampling Point: W6-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/2	100					Loam	
2-18	10YR 4/2	90	10YR 4/6	10	C	PL, M	Loam	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :	
☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)	
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)	
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Very Shallow Dark Surface (TF12)	
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Other (Explain in Remarks)	
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)		
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)		
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)		
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)		

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soils Present? Yes ☒ No ☐
--	--

Remarks: Hydric soil indicator Depleted matrix (F3) observed at W6-DP1.

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☐ High Water Table (A2) (except MLRA 1, 2, 4A, and 4B) ☐ Saturation (A3) ☐ Salt Crust (B11) ☐ Water Marks (B1) ☐ Aquatic Invertebrates (B13) ☐ Sediment Deposits (B2) ☐ Hydrogen Sulfide Odor (C1) ☐ Drift Deposits (B3) ☒ Oxidized Rhizospheres along Living Roots (C3) ☐ Algal Mat or Crust (B4) ☐ Presence of Reduced Iron (C4) ☐ Iron Deposits (B5) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Surface Soil Cracks (B6) ☐ Stunted or Stresses Plants (D1) (LRR A) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) ☐ Sparsely Vegetated Concave Surface (B8)	☐ 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: Primary wetland hydrology indicator Oxidized Rhizospheres along Living Roots observed at W6-DP1.
 Secondary wetland hydrology indicators Geomorphic Position (D2) and FAC-Neutral Test (D5) observed at W6-DP1.

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

Project Site: Senn Road City/County: _____/Lewis County Sampling Date: 12/4/2024
 Applicant/Owner: Lewis County State: WA Sampling Point: W6-DP2
 Investigator(s): J. Gray, K. Corrigan Section, Township, Range: S2 T13N R1W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): convex Slope (%): 2
 Subregion (LRR): A Lat: 46.639126 Long: -122.772511 Datum: WGS84
 Soil Map Unit Name: Chehalis Silty Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☒, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: W6 is located in a mowed/grazed pasture. Indicators of hydrophytic vegetation observed at W6-DP2. No indicators of hydric soils or wetland hydrology observed at W6-DP2. W6-DP2 is not located in wetland.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30-ft diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <u>--</u>	_____			
2. <u>_____</u>	_____			Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. <u>_____</u>	_____			Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. <u>2</u>	_____			
50% = <u>_____</u> , 20% = <u>_____</u>	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft diam.)				Prevalence Index worksheet:
1. <u>--</u>	_____			
2. <u>_____</u>	_____			OBL species _____ x1 = _____
3. <u>_____</u>	_____			FACW species _____ x2 = _____
4. <u>_____</u>	_____			FAC species _____ x3 = _____
5. <u>_____</u>	_____			FACU species _____ x4 = _____
50% = <u>_____</u> , 20% = <u>_____</u>	<u>0</u>	= Total Cover		UPL species _____ x5 = _____
Herb Stratum (Plot size: 5-ft diam.)				Column Totals: _____ (A) _____ (B)
1. <u>Agrostis sp.</u>	<u>50</u>	<u>yes</u>	<u>FAC</u>	Prevalence Index = B/A = _____
2. <u>Poa pratensis</u>	<u>50</u>	<u>yes</u>	<u>FAC</u>	
3. <u>_____</u>	_____			Hydrophytic Vegetation Indicators: ☐ 1 – Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ 5 - Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4. <u>_____</u>	_____			
5. <u>_____</u>	_____			
6. <u>_____</u>	_____			
7. <u>_____</u>	_____			
8. <u>_____</u>	_____			
9. <u>_____</u>	_____			
10. <u>_____</u>	_____			
11. <u>_____</u>	_____			
50% = <u>50</u> , 20% = <u>20</u>	<u>100</u>	= Total Cover		
Woody Vine Stratum (Plot size: 15-ft diam.)				Hydrophytic Vegetation Present? Yes ☒ No ☐
1. <u>--</u>	_____			
2. <u>_____</u>	_____			
50% = <u>_____</u> , 20% = <u>_____</u>	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation at W6-DP2 passes the Dominance Test hydrophytic vegetation indicator.				

SOIL

Profile Description: (Describe to the depth needed to document the presence or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	7.5YR 3/3	100					Loam	
¹ Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.			² Location: PL=Pore Lining, M=Matrix					
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)							Indicators for Problematic Hydric Soils³:	
☐	Histosol (A1)		☐	Sandy Redox (S5)		☐	2 cm Muck (A10)	
☐	Histic Epipedon (A2)		☐	Stripped Matrix (S6)		☐	Red Parent Material (TF2)	
☐	Black Histic (A3)		☐	Loamy Mucky Mineral (F1) (except MLRA 1)		☐	Very Shallow Dark Surface (TF12)	
☐	Hydrogen Sulfide (A4)		☐	Loamy Gleyed Matrix (F2)		☐	Other (Explain in Remarks)	
☐	Depleted Below Dark Surface (A11)		☐	Depleted Matrix (F3)		³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		
☐	Thick Dark Surface (A12)		☐	Redox Dark Surface (F6)				
☐	Sandy Mucky Mineral (S1)		☐	Depleted Dark Surface (F7)				
☐	Sandy Gleyed Matrix (S4)		☐	Redox Depressions (F8)				
Restrictive Layer (if present):								
Type: _____						Hydric Soils Present? Yes ☐ No ☒		
Depth (inches): _____								
Remarks: No hydric soil indicators observed at W6-DP2.								

Wetland Hydrology Indicators:									
Primary Indicators (minimum of one required; check all that apply)					Secondary Indicators (2 or more required)				
☐ Surface Water (A1)		☐ Water-Stained Leaves (B9)			☐ Water-Stained Leaves (B9)				
☐ High Water Table (A2)		(except MLRA 1, 2, 4A, and 4B)			(MLRA 1, 2, 4A, and 4B)				
☐ Saturation (A3)		☐ Salt Crust (B11)			☐ Drainage Patterns (B10)				
☐ Water Marks (B1)		☐ Aquatic Invertebrates (B13)			☐ Dry-Season Water Table (C2)				
☐ Sediment Deposits (B2)		☐ Hydrogen Sulfide Odor (C1)			☐ Saturation Visible on Aerial Imagery (C9)				
☐ Drift Deposits (B3)		☐ Oxidized Rhizospheres along Living Roots (C3)			☐ Geomorphic Position (D2)				
☐ Algal Mat or Crust (B4)		☐ Presence of Reduced Iron (C4)			☐ Shallow Aquitard (D3)				
☐ Iron Deposits (B5)		☐ Recent Iron Reduction in Tilled Soils (C6)			☐ FAC-Neutral Test (D5)				
☐ Surface Soil Cracks (B6)		☐ Stunted or Stresses Plants (D1) (LRR A)			☐ Raised Ant Mounds (D6) (LRR A)				
☐ Inundation Visible on Aerial Imagery (B7)		☐ Other (Explain in Remarks)			☐ Frost-Heave Hummocks (D7)				
☐ Sparsely Vegetated Concave Surface (B8)									
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: No wetland hydrology indicators observed at W6-DP2.									

Appendix D: Wetland Ratings

Wetland name or number W1

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland 1 Date of site visit: 12/3/2024
Rated by K. Corrigan & J. Gray Trained by Ecology? ☒ Yes ☐ No Date of training 2022
HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Y ☒ N

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

Source of base aerial photo/map Google

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 - 27
 Category II – Total score = 20 - 22
 X Category III – Total score = 16 - 19
 Category IV – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	H M <u>L</u>	H <u>M</u> L	H M <u>L</u>	
Landscape Potential	H <u>M</u> L	H <u>M</u> L	H <u>M</u> L	
Value	<u>H</u> M L	H <u>M</u> L	<u>H</u> M L	TOTAL
Score Based on Ratings	6	6	6	18

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

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	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	NA

Wetland name or number W1

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

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

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 (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	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 total 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 (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total 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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☒ NO – go to 2

☐ YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☒ NO – **Saltwater Tidal Fringe (Estuarine)**

☐ YES – **Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.

2. The entire wetland unit is flat, and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒ NO – go to 3

☐ YES – The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size,
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☒ NO – go to 4

☐ YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The wetland is on a slope (slope can be very gradual),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheet flow, 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).

Wetland name or number W1

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

NO – go to 6

YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? This means that any outlet, if present, is higher than the interior of the wetland.

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
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 W1

DEPRESSIONAL AND FLATS WETLANDS

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

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

D 1.1. <u>Characteristics of surface water outflows from the wetland:</u> Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 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. <u>The soil 2 in. below the surface (or duff layer) is true clay or true organic (use NRCS definitions).</u> Yes = 4 <u>No = 0</u>		0
D 1.3. <u>Characteristics and distribution of persistent plants</u> (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area points = 5 Wetland has persistent, ungrazed plants > 1/2 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. <u>Characteristics of seasonal ponding or inundation:</u> <i>This is the area that is ponded for at least 2 months. See description in manual.</i> Area seasonally ponded is > 1/2 total area of wetland points = 4 Area seasonally ponded is ≥ 1/4 total area of wetland points = 2 Area seasonally ponded is < 1/4 total area of wetland points = 0		0
Total for D 1		3

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

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

D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 <u>No = 0</u>	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	<u>Yes = 1</u> No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 <u>No = 0</u>	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source _____	Yes = 1 <u>No = 0</u>	0
Total for D 2		1

Rating of Landscape Potential If score is: 3 or 4 = H X 1 or 2 = M 0 = L *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?

D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 <u>No = 0</u>	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 <u>No = 0</u>	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 in development or in effect for the basin in which the unit is found.)	<u>Yes = 2</u> No = 0	2
Total for D 3		2

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

HUC12: 171001030203 - North Fork Newaukum River

Upper Chehalis River Bacteria TMDL, Upper Chehalis River Basin Temperature TMDL,
& Upper Chehalis River Basin Dissolved Oxygen TMDL

Wetland name or number W1

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/ditch, OR highly constricted permanently flowing outlet <u>points = 2</u> 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 <u>points = 1</u> Marks of ponding less than 0.5 ft (6 in) points = 0		1
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 area of the wetland unit itself. The area of the basin is less than 10 times the area of the unit <u>points = 5</u> The area of the basin is 10 to 100 times the area of the unit <u>points = 3</u> 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		6

Rating of Site Potential If score is: 12-16 = H X 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 <u>No = 0</u>		0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? <u>Yes = 1</u> 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 <u>No = 0</u>		0
Total for D 5		1

Rating of Landscape Potential If score is: 3 = H X 1 or 2 = M 0 = L Record the rating on the first page

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. Is the unit in a landscape that has flooding problems? Choose the description that best matches conditions around the wetland unit being rated. Do not add points. <u>Choose the highest score if more than one condition is met.</u> The wetland captures surface water that would otherwise flow downgradient 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 downgradient of unit. points = 2 - Surface flooding problems are in a sub-basin farther downgradient. <u>points = 1</u> - 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. <i>Explain why</i> _____ 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 <u>No = 0</u>		0
Total for D 6		1

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

These questions apply to wetlands of all HGM classes.**HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat**H 1.0. Does the site have the potential to provide habitat?**

H 1.1. Structure of plant community: Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

☐ 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/groundcover) 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 if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 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☐ Intermittently or 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 ft².

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, Canada 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 interspersions among Cowardin plant 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 = 3 points



1

Wetland name or number W1

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 extend at least 3.3 ft (1 m) over open water or 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)

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 X 0-6 = L

Record the rating on the first page

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

H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland.

- Calculate: % relatively undisturbed habitat 15 + [(% moderate and low intensity land uses)/2] 11.2 = 26.2 %
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. Total habitat in 1 km Polygon around the wetland.

- Calculate: % relatively undisturbed habitat 22.6 + [(% moderate and low intensity land uses)/2] 21.7 = 44.3 %
Total habitat > 50% of Polygon points = 3
Total habitat 10-50% and in 1-3 patches points = 2
Total habitat 10-50% and > 3 patches points = 1
Total habitat < 10% of 1 km Polygon points = 0

1

H 2.3. Land use intensity in 1 km Polygon:

- > 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

3

Rating of Landscape Potential If score is: 4-6 = H X 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 data
☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan
Site has 1 or 2 Priority Habitats (listed on next page) within 100 m points = 1
Site does not meet any of the criteria above points = 0

2

Rating of Value If score is: X 2 = H 1 = M 0 = L

Record the rating on the first page

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). [Priority Habitat and Species List](#).¹³³ This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

- **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.
- **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.
- **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **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. Do not select if Fresh Deepwater habitat is also present.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.
- **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) diameter at breast height (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.

¹³³ <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>
Wetland Rating System for Western WA: 2014 Update
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- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, [WDFW's Management Recommendations for Oregon White Oak](#)¹³⁴ provides more detail for determining if they are Priority Habitats
- ☒ **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☒ **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.
- **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.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

¹³⁴ <https://wdfw.wa.gov/publications/00030/wdfw00030.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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 <i>Spartina</i> , see chapter 4.8 in the manual. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed 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. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer ? ¹³⁵ Yes = Category I No – Go to SC 2.2 SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination , ¹³⁶ Go to SC 2.3 No = Not a WHCV SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? 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? <i>Use the key below. If you answer YES, you will still need to rate the wetland based on its functions.</i> 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 = 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 = 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 = Category I bog No = Not a bog	Cat. I

¹³⁵ <https://www.dnr.wa.gov/NHPdata>¹³⁶ https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf

SC 4.0. Forested Wetlands Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as Priority Habitats? <i>If you answer YES, you will still need to rate the wetland based on its functions.</i> — 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 (<i>needs to be measured near the bottom</i>) — The lagoon retains some of its <u>surface water at low tide</u> during spring tides 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 in H 1.5 in the manual). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) 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)? <i>If you answer YES, you will still need to rate the wetland based on its habitat functions.</i> 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 and Ocean Shores Blvd SW, including lands west of E. Oceans Shores Blvd SW. 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	NA

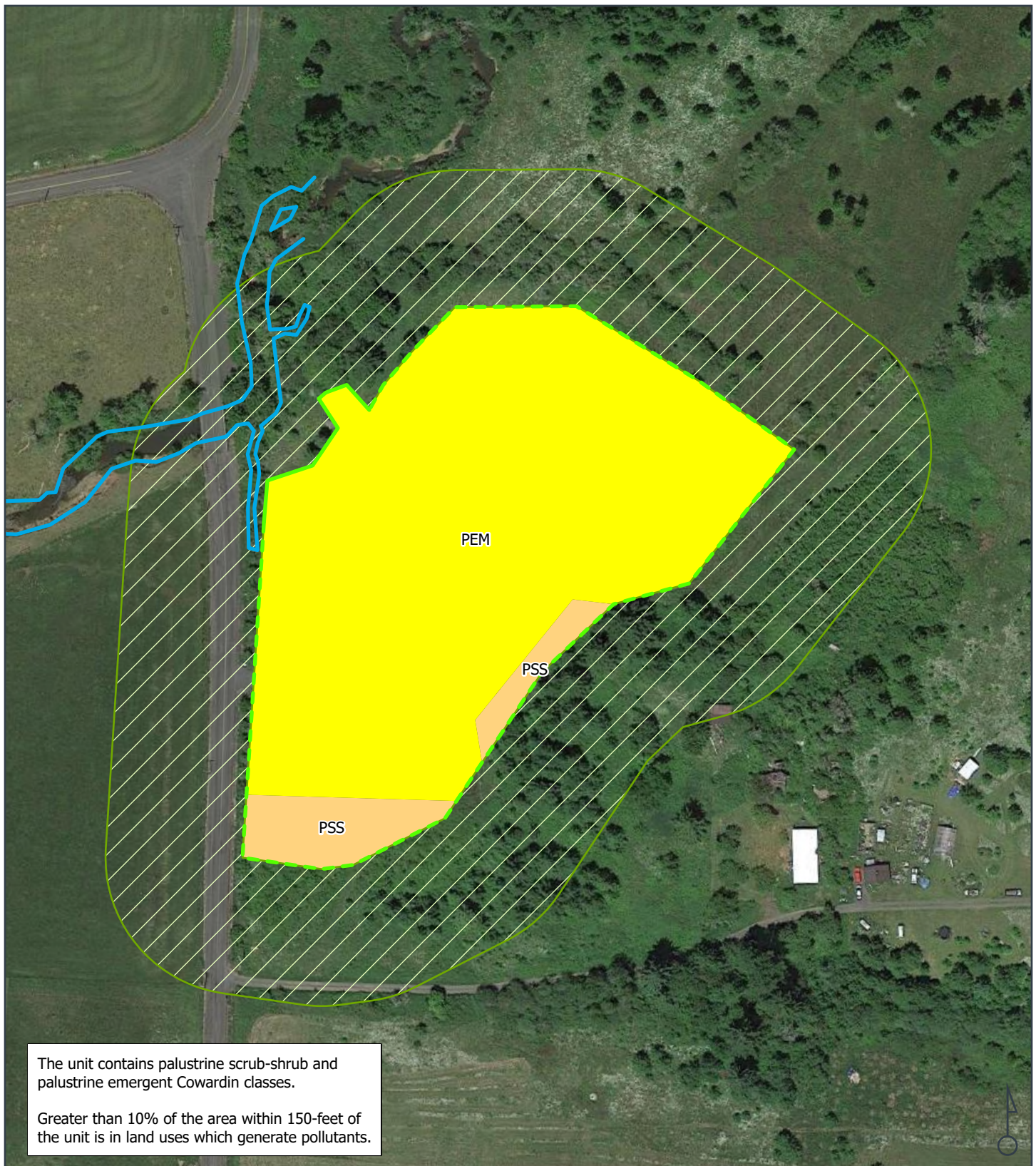


FIGURE 1
COWARDIN CLASSES & 150-FT BUFFER
WETLAND 1
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Palustrine Scrub-Shrub (PSS)
- Palustrine Emergent (PEM)
- Wetland Buffer (150 ft)
- Delineated Wetland Boundary
- Estimated Wetland Boundary
- Ordinary High Water

0 150 ft

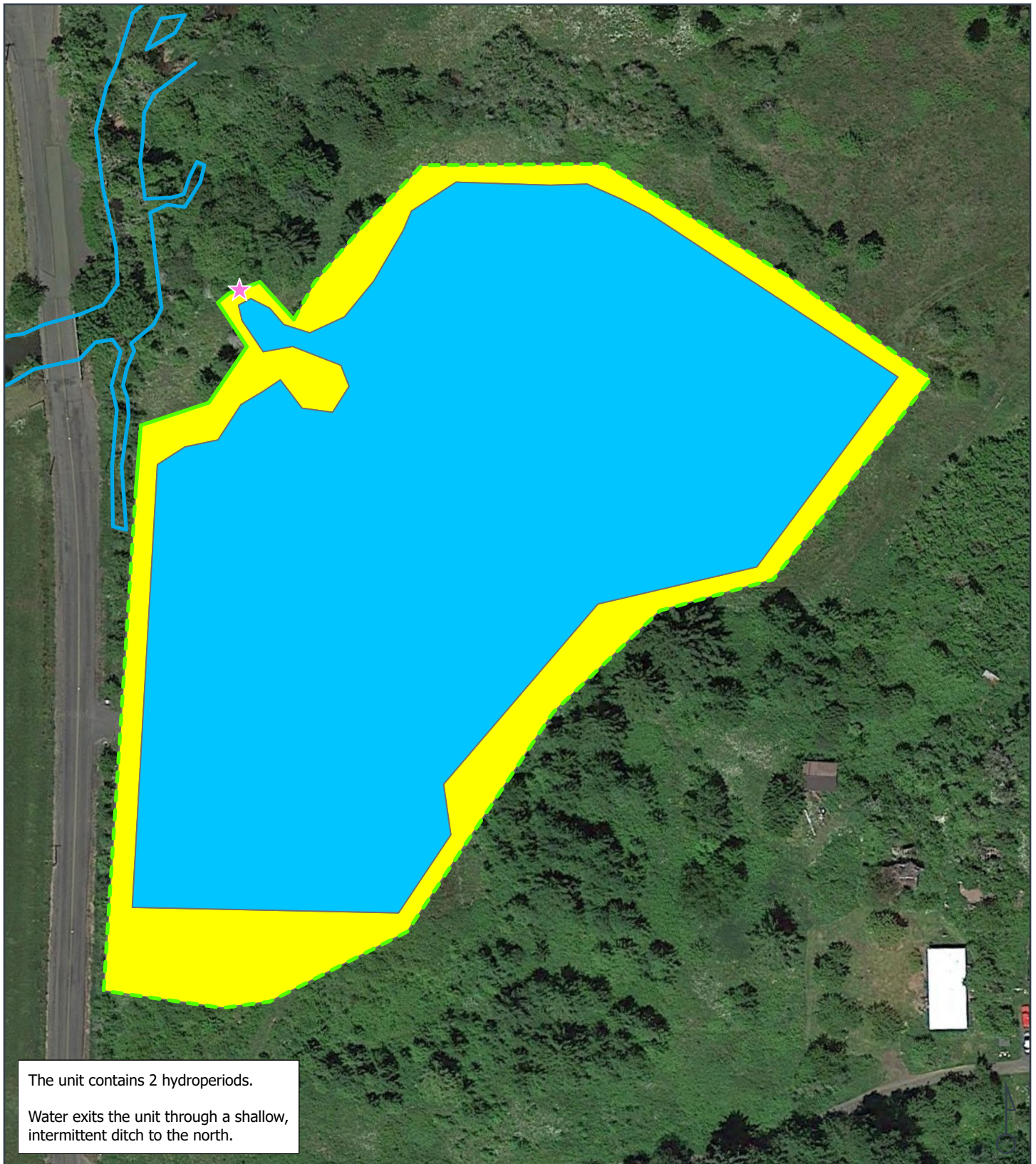


FIGURE 2
HYDROPERIODS
WETLAND 1
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Saturated Only
- Occasionally Flooded
- Wetland Outlet
- Delineated Wetland Boundary
- Estimated Wetland Boundary
- Ordinary High Water

0

ft

 100

Data Sources:
Date: 1/23/2025
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only.
K:\PROJECT\21500\21588A\04 CAD\GIS\MXD\WetlandRatings\Wetland1_Rating.aprx



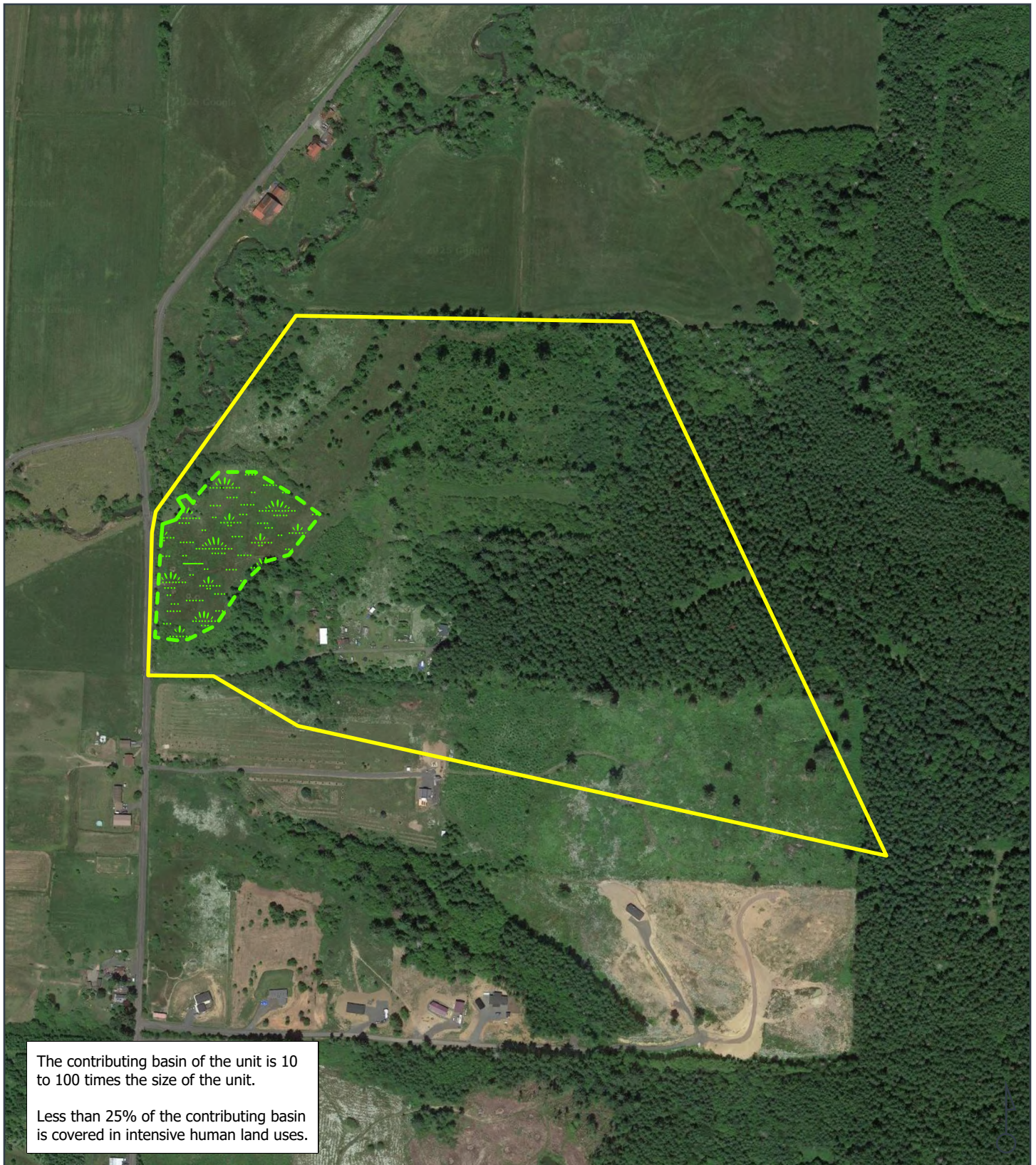


FIGURE 3
CONTRIBUTING BASIN
WETLAND 1
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Contributing Basin
- Delineated Wetland Boundary
- Estimated Wetland Boundary

0 500 ft

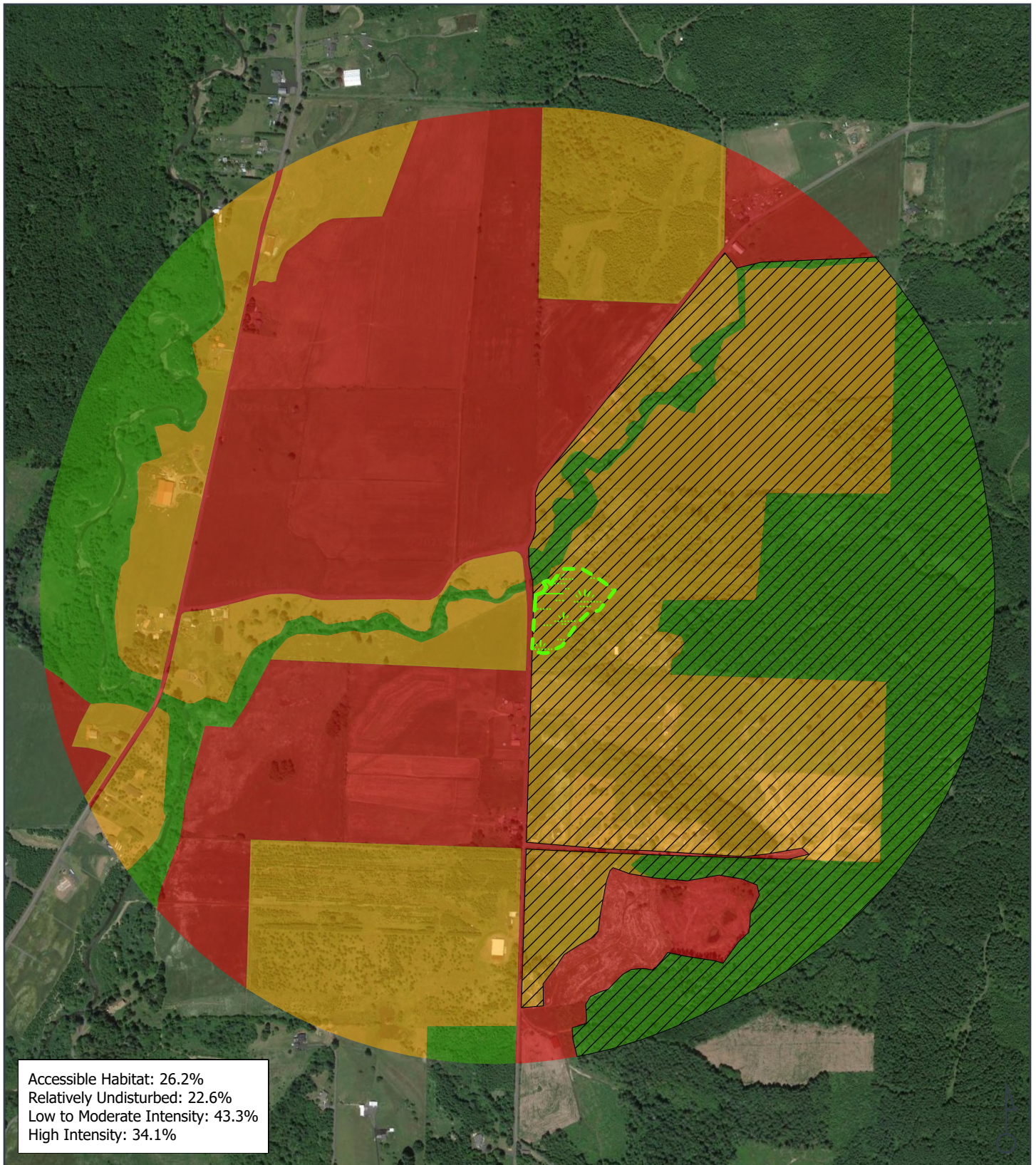


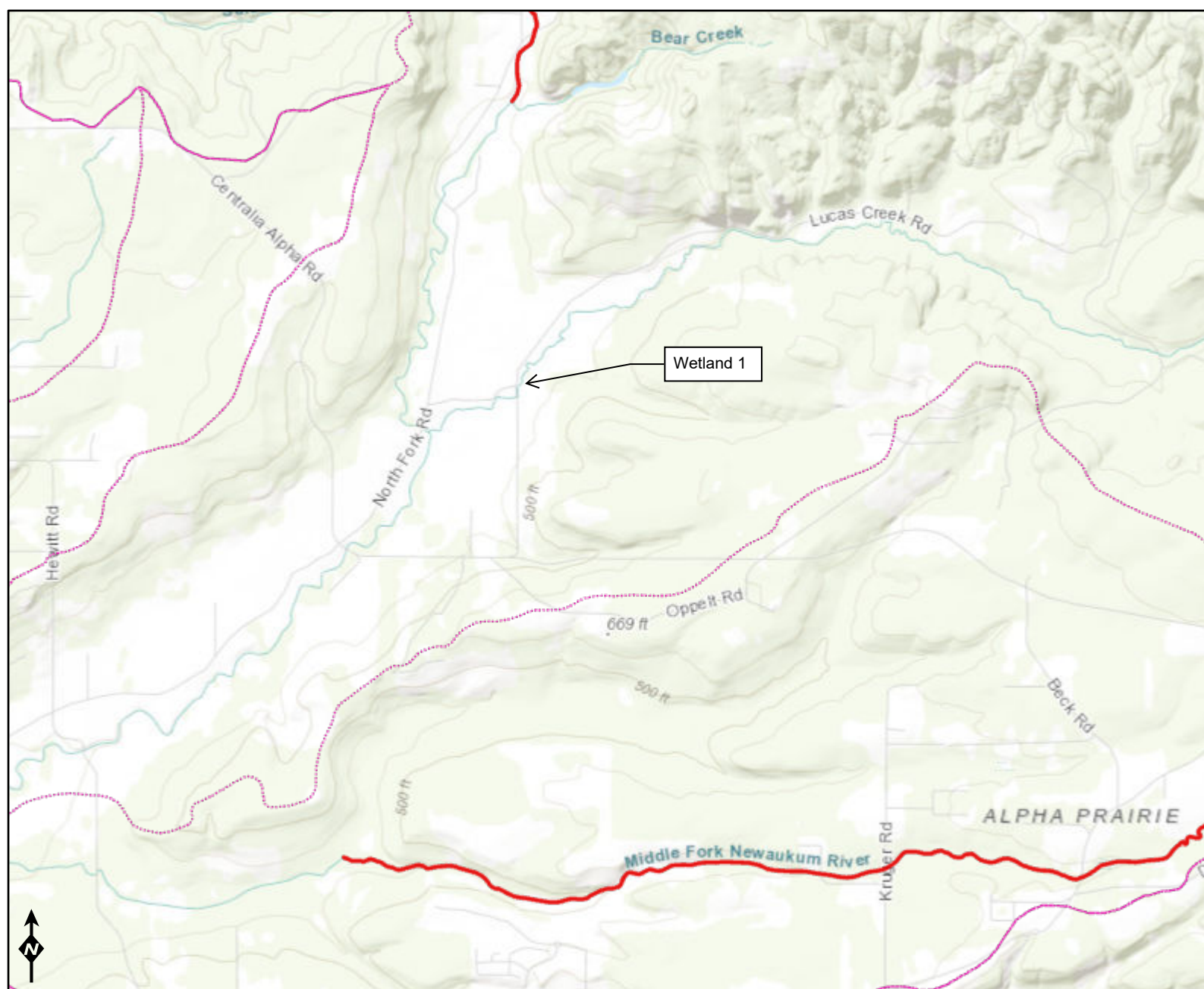
FIGURE 4
LAND USE INTENSITY
WETLAND 1
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Accessible Habitat
- High Intensity
- Low to Moderate Intensity
- Relatively Undisturbed
- Delineated Wetland Boundary
- Estimated Wetland Boundary
- Wetland Area

0 1,000 ft

Figure 5 - 303(d) Listed Waters

**Assessed Water/Sediment****Water**

- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment

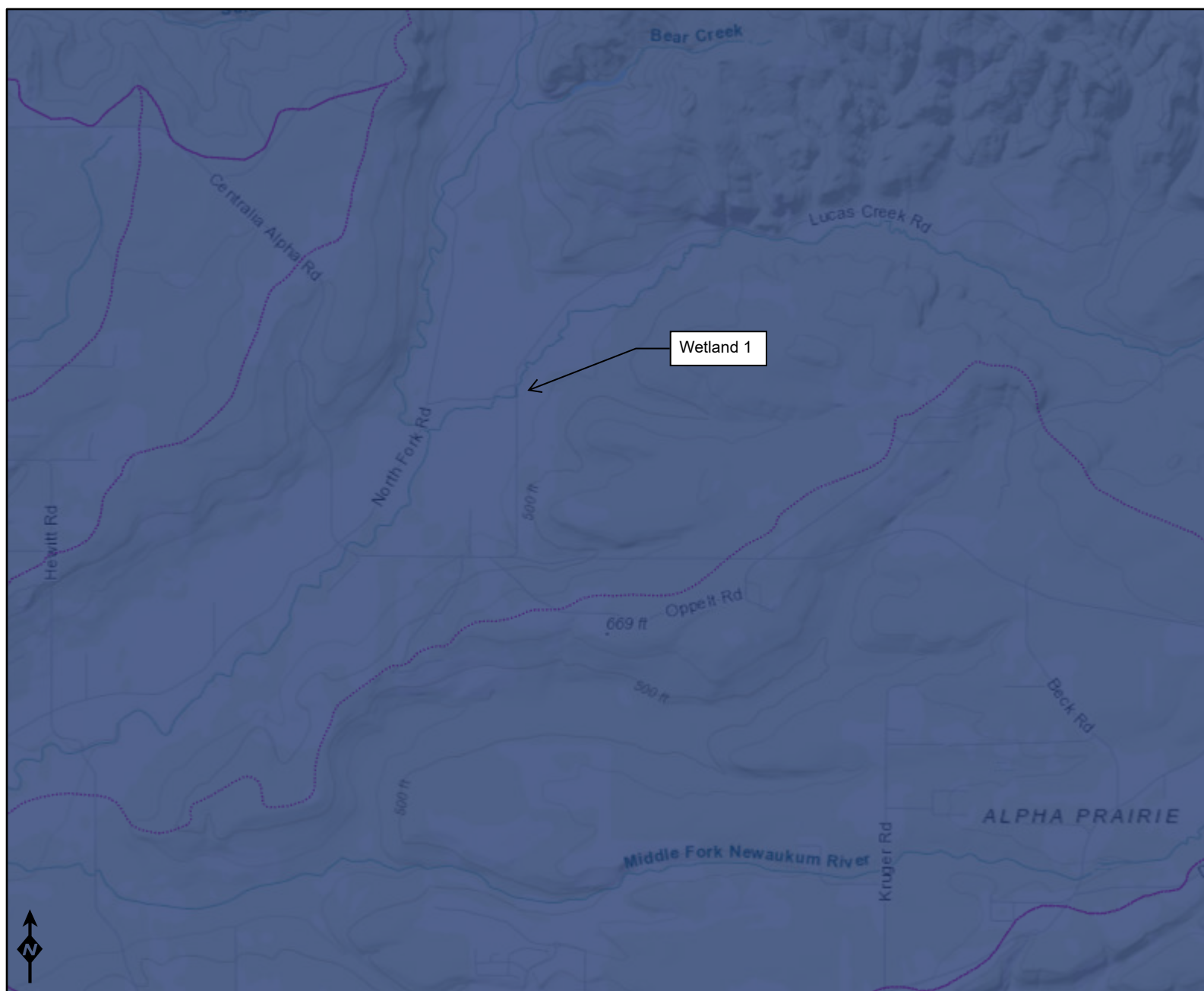
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Figure 6 - TMDLs

**WQ Improvement Projects**

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Upper Chehalis River Bacteria TMDL

Upper Chehalis River Basin
Temperature TMDL

Upper Chehalis River Basin
Dissolved Oxygen TMDL

Wetland name or number W2

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland 2 Date of site visit: 12/3/2024
Rated by K. Corrigan & J. Gray Trained by Ecology? ☒ Yes ☐ No Date of training 2022
HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Y ☒ N

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

Source of base aerial photo/map Google

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 - 27
 Category II – Total score = 20 - 22
☒ 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 <u>L</u>	H <u>M</u> L	H M <u>L</u>	
Landscape Potential	H <u>M</u> L	H <u>M</u> L	H <u>M</u> L	
Value	<u>H</u> M L	H <u>M</u> L	<u>H</u> M L	TOTAL
Score Based on Ratings	6	6	6	18

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

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

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	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	NA

Wetland name or number W2

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

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

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 (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	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 total 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 (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total 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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☒ NO – go to 2

☐ YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☒ NO – **Saltwater Tidal Fringe (Estuarine)**

☐ YES – **Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.

2. The entire wetland unit is flat, and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒ NO – go to 3

☐ YES – The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size,
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☒ NO – go to 4

☐ YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The wetland is on a slope (slope can be very gradual),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheet flow, 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).

Wetland name or number W2

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

NO – go to 6

YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? This means that any outlet, if present, is higher than the interior of the wetland.

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
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 W2

DEPRESSIONAL AND FLATS WETLANDS

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

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

D 1.1. <u>Characteristics of surface water outflows from the wetland:</u> Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 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. <u>The soil 2 in. below the surface (or duff layer) is true clay or true organic (use NRCS definitions).</u> Yes = 4 <u>No = 0</u>		0
D 1.3. <u>Characteristics and distribution of persistent plants</u> (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area points = 5 Wetland has persistent, ungrazed plants > 1/2 of area points = 3 Wetland has persistent, ungrazed plants ≥ 1/10 of area points = 1 Wetland has persistent, ungrazed plants < 1/10 of area points = 0		0
D 1.4. <u>Characteristics of seasonal ponding or inundation:</u> <i>This is the area that is ponded for at least 2 months. See description in manual.</i> Area seasonally ponded is > 1/2 total area of wetland points = 4 Area seasonally ponded is ≥ 1/4 total area of wetland points = 2 Area seasonally ponded is < 1/4 total area of wetland points = 0		0
Total for D 1		2

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

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

D 2.1. Does the wetland unit receive stormwater discharges?	<u>Yes = 1</u> No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	<u>Yes = 1</u> No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 <u>No = 0</u>	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source _____	Yes = 1 <u>No = 0</u>	0
Total for D 2		2

Rating of Landscape Potential If score is: 3 or 4 = H X 1 or 2 = M 0 = L Record the rating on the first page

D 3.0. Is the water quality improvement provided by the site valuable to society?

D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 <u>No = 0</u>	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 <u>No = 0</u>	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 in development or in effect for the basin in which the unit is found.)	<u>Yes = 2</u> No = 0	2
Total for D 3		2

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

HUC12: 171001030203 - North Fork Newaukum River

Upper Chehalis River Bacteria TMDL, Upper Chehalis River Basin Temperature TMDL,
& Upper Chehalis River Basin Dissolved Oxygen TMDL

Wetland name or number W2

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. <u>Characteristics of surface water outflows from the wetland:</u>			
Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	2	
Wetland has an intermittently flowing stream/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		
D 4.2. <u>Depth of storage during wet periods:</u> Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.			
Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	1	
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		
D 4.3. <u>Contribution of the wetland to storage in the watershed:</u> Estimate the ratio of the area of upstream basin contributing surface water to the area of the wetland unit itself.			
The area of the basin is less than 10 times the area of the unit	points = 5	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		
Total for D 4		Add the points in the boxes above	8

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

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

D 5.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	1	
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1	
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	0	
Total for D 5		Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3 = H X 1 or 2 = M 0 = L Record the rating on the first page

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. Is <u>the unit in a landscape that has flooding problems</u> ? Choose the description that best matches conditions around the wetland unit being rated. Do not add points. <u>Choose the highest score if more than one condition is met.</u>			
The wetland captures surface water that would otherwise flow downgradient 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 downgradient of unit.	points = 2	1	
• Surface flooding problems are in a sub-basin farther downgradient.	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. <i>Explain why</i> _____	points = 0		
• There are no problems with flooding downstream of the wetland.	points = 0		
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?			
Yes = 2 No = 0		0	
Total for D 6		Add the points in the boxes above	1

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

These questions apply to wetlands of all HGM classes.**HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat**H 1.0. Does the site have the potential to provide habitat?**

H 1.1. Structure of plant community: Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

☐ 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/groundcover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 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

☐ Intermittently or 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 ft².

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, Canada 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 interspersions among Cowardin plant 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



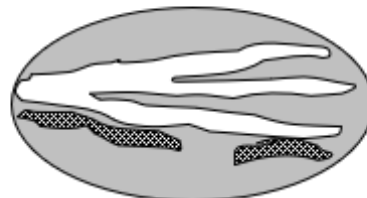
Low = 1 point



Moderate = 2 points



All three diagrams
in this row
are High = 3 points



0

Wetland name or number W2

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 extend at least 3.3 ft (1 m) over open water or 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)

1

Total for H 1

Add the points in the boxes above

3

Rating of Site Potential If score is: 15-18 = H 7-14 = M X 0-6 = L

Record the rating on the first page

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

H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland.

- Calculate: % relatively undisturbed habitat 1.6 + [(% moderate and low intensity land uses)/2] 2.2 = 3.8 %
- Total accessible habitat is:
- > 1/3 (33.3%) of 1 km Polygon points = 3
- 20-33% of 1 km Polygon points = 2
- 10-19% of 1 km Polygon points = 1
- < 10% of 1 km Polygon points = 0

0

H 2.2. Total habitat in 1 km Polygon around the wetland.

- Calculate: % relatively undisturbed habitat 22.6 + [(% moderate and low intensity land uses)/2] 21.7 = 44.3 %
- Total habitat > 50% of Polygon points = 3
- Total habitat 10-50% and in 1-3 patches points = 2
- Total habitat 10-50% and > 3 patches points = 1
- Total habitat < 10% of 1 km Polygon points = 0

1

H 2.3. Land use intensity in 1 km Polygon:

- > 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

1

Rating of Landscape Potential If score is: 4-6 = H X 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 data
- ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan
- Site has 1 or 2 Priority Habitats (listed on next page) within 100 m points = 1
- Site does not meet any of the criteria above points = 0

2

Rating of Value If score is: X 2 = H 1 = M 0 = L

Record the rating on the first page

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). [Priority Habitat and Species List](#).¹³³ This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

- **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.
- **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.
- **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **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. Do not select if Fresh Deepwater habitat is also present.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.
- **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) diameter at breast height (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.

¹³³ <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

Wetland name or number W2

- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, [WDFW's Management Recommendations for Oregon White Oak](#)¹³⁴ provides more detail for determining if they are Priority Habitats
- ☒ **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☒ **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.
- **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.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

¹³⁴ <https://wdfw.wa.gov/publications/00030/wdfw00030.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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 <i>Spartina</i> , see chapter 4.8 in the manual. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed 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. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer ? ¹³⁵ Yes = Category I No – Go to SC 2.2 SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination , ¹³⁶ Go to SC 2.3 No = Not a WHCV SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? 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? <i>Use the key below. If you answer YES, you will still need to rate the wetland based on its functions.</i> 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 = 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 = 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 = Category I bog No = Not a bog	Cat. I

¹³⁵ <https://www.dnr.wa.gov/NHPdata>¹³⁶ https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf

SC 4.0. Forested Wetlands Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as Priority Habitats? <i>If you answer YES, you will still need to rate the wetland based on its functions.</i> — 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 (<i>needs to be measured near the bottom</i>) — The lagoon retains some of its <u>surface water at low tide</u> during spring tides 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 in H 1.5 in the manual). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) 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)? <i>If you answer YES, you will still need to rate the wetland based on its habitat functions.</i> 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 and Ocean Shores Blvd SW, including lands west of E. Oceans Shores Blvd SW. 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	NA

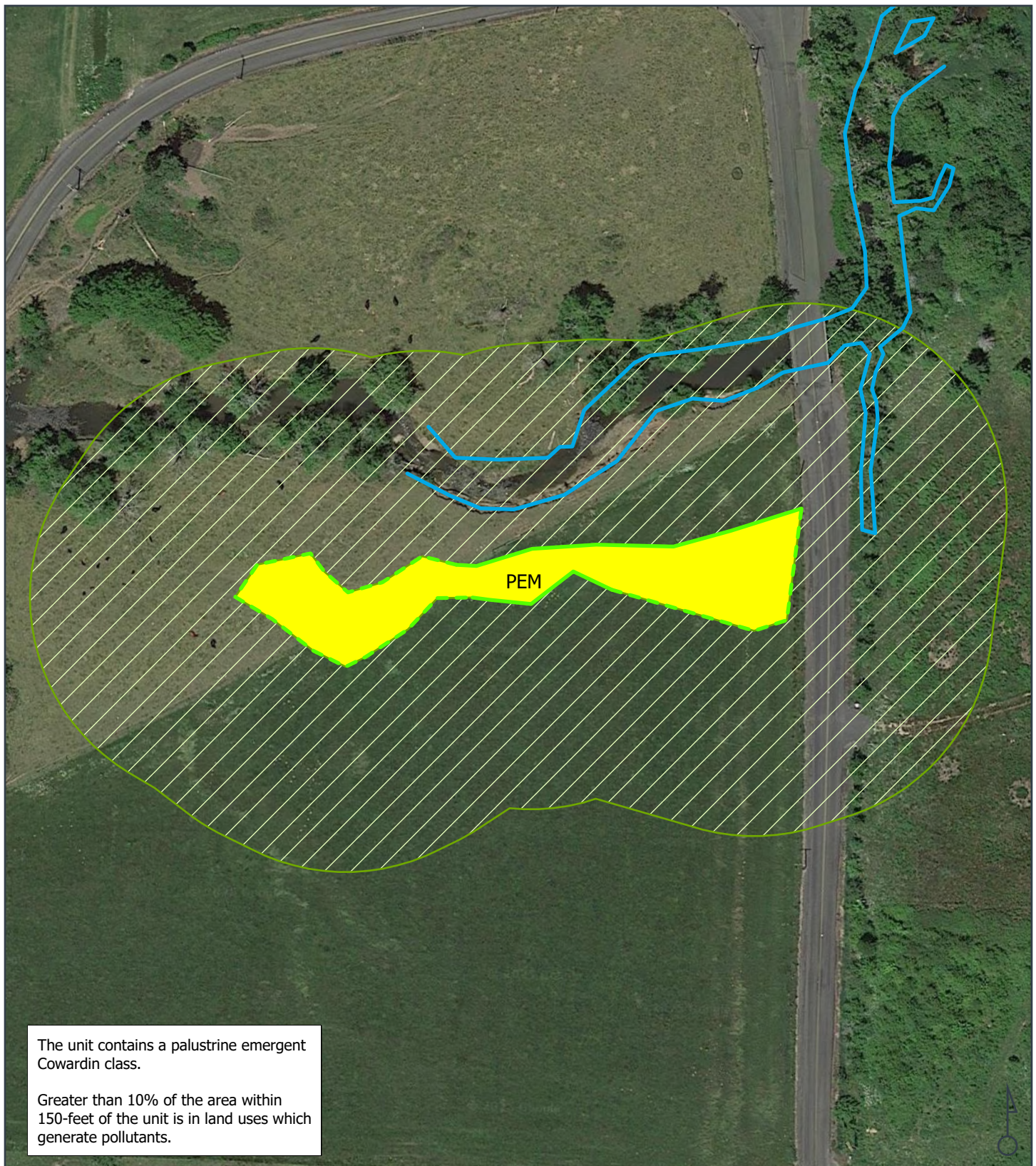


FIGURE 1
COWARDIN CLASSES & 150-FT BUFFER
WETLAND 1
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Palustrine Emergent (PEM)
- Wetland Buffer (150 ft)
- Delineated Wetland Boundary
- Estimated Wetland Boundary
- Ordinary High Water

0 100 ft

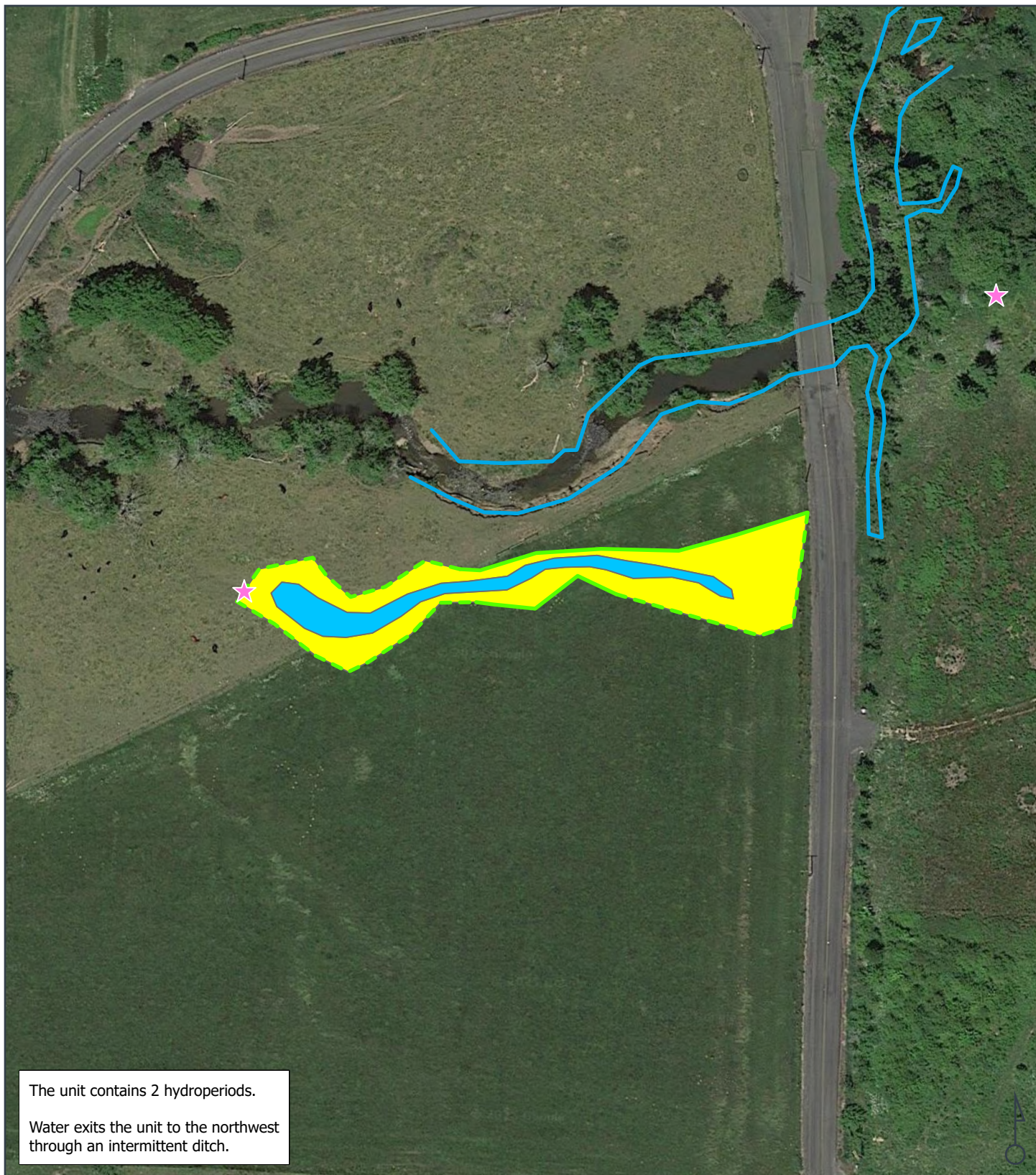


FIGURE 2 HYDROPERIODS WETLAND 2

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Saturated Only
- Occasionally Flooded
- ★ Wetland Outlet
- Delineated Wetland Boundary
- Estimated Wetland Boundary
- Ordinary High Water

0 100 ft

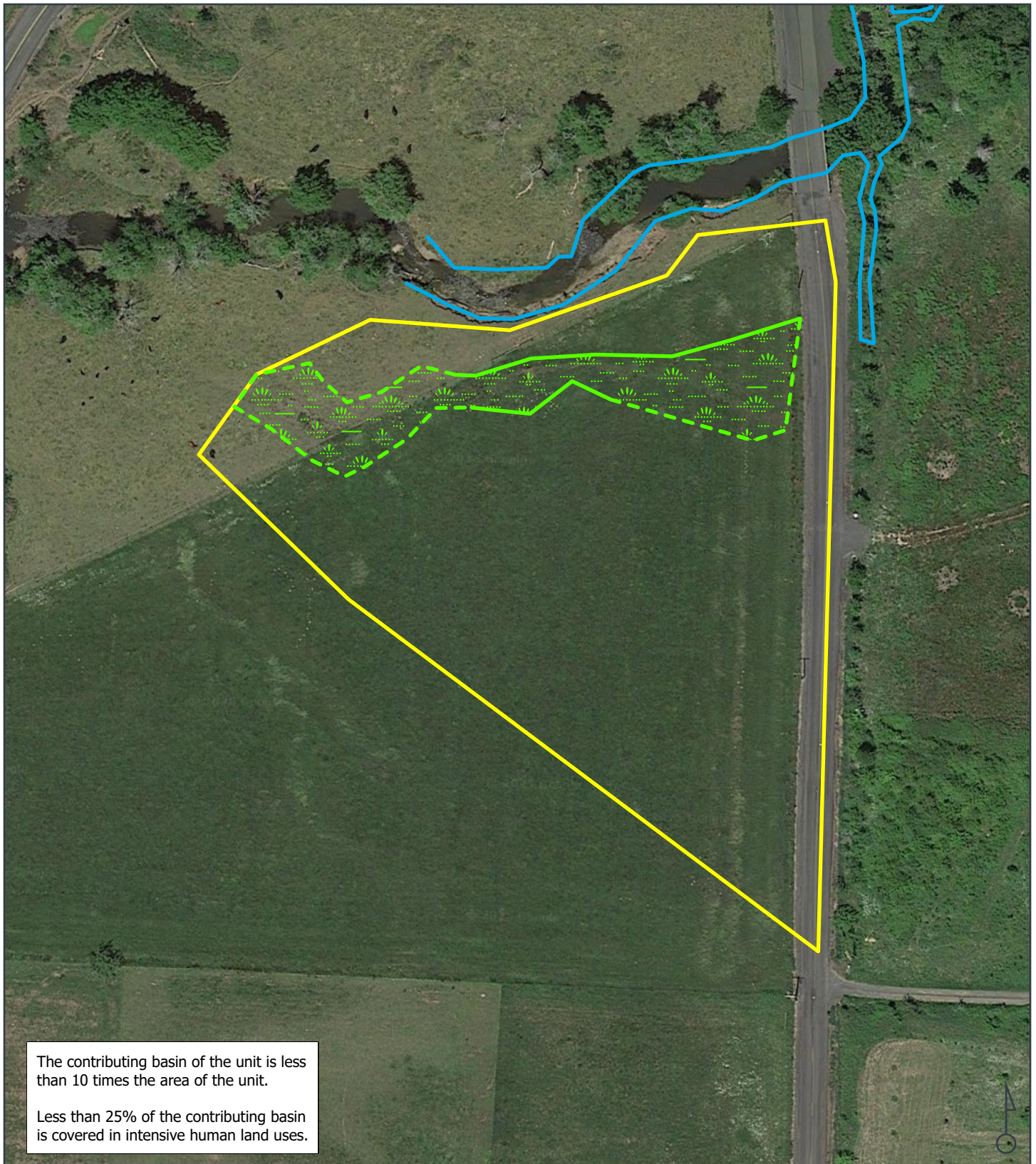


FIGURE 3
CONTRIBUTING BASIN
WETLAND 2
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- ▬ Contributing Basin
- ▬ Delineated Wetland Boundary
- - - Estimated Wetland Boundary
- ... Wetland Area
- ▬ Ordinary High Water

0 100 ft

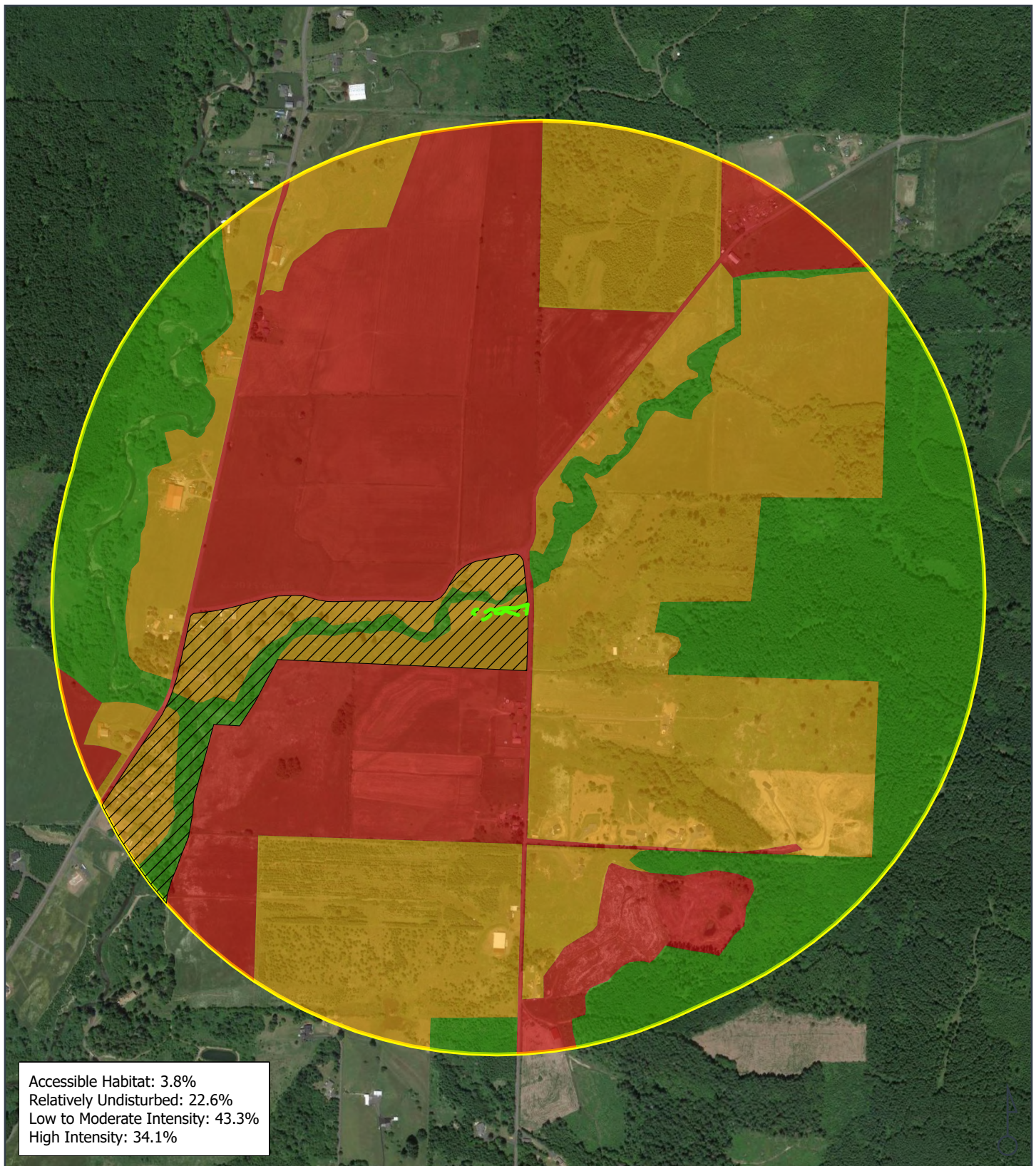


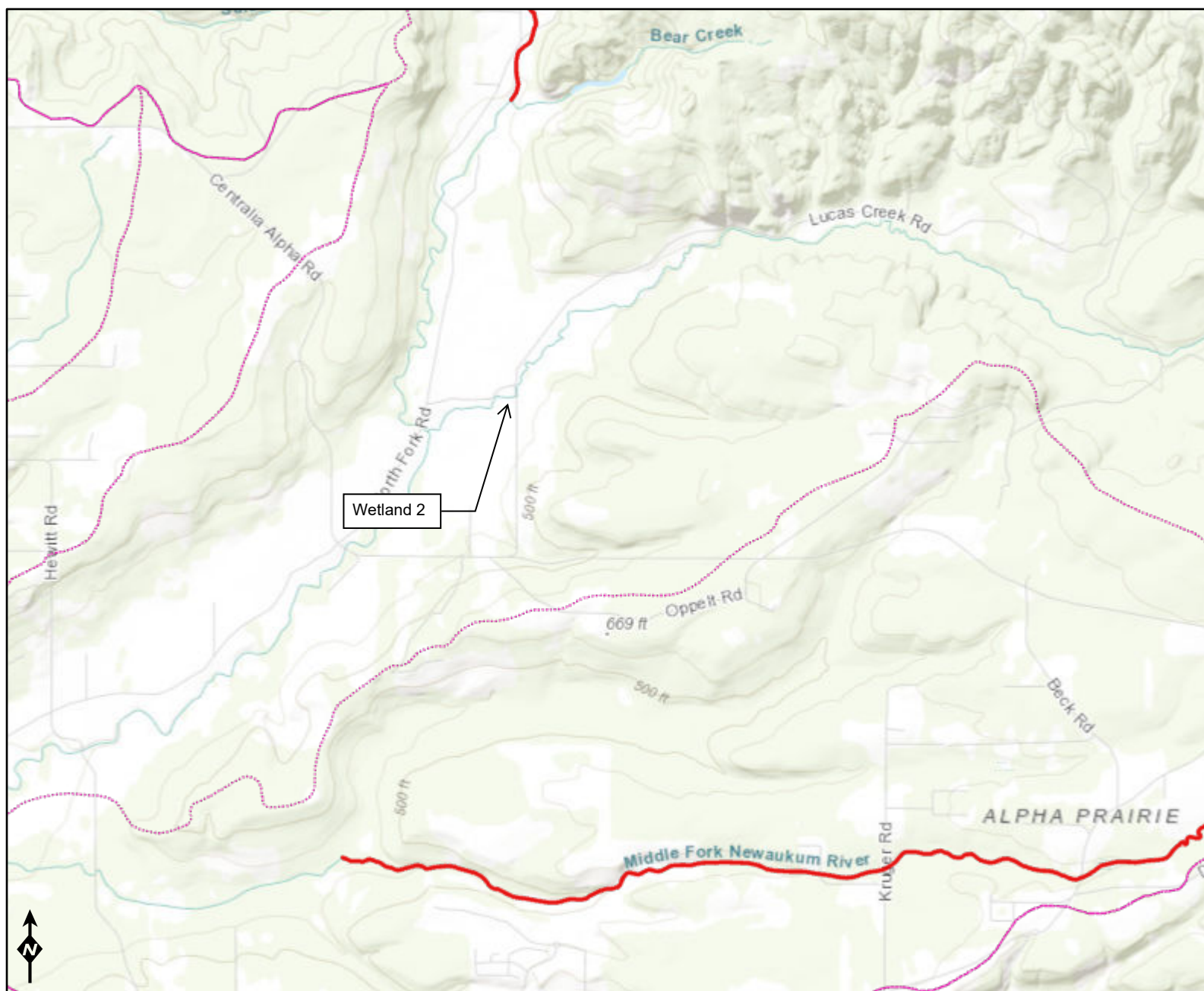
FIGURE 4
LAND USE INTENSITY
WETLAND 2
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Accessible Habitat
- High Intensity
- Low to Moderate Intensity
- Relatively Undisturbed
- Delineated Wetland Boundary
- Estimated Wetland Boundary
- WetlandArea

0 1,000 ft

Figure 5 - 303(d) Listed Waters

**Assessed Water/Sediment****Water**

- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment

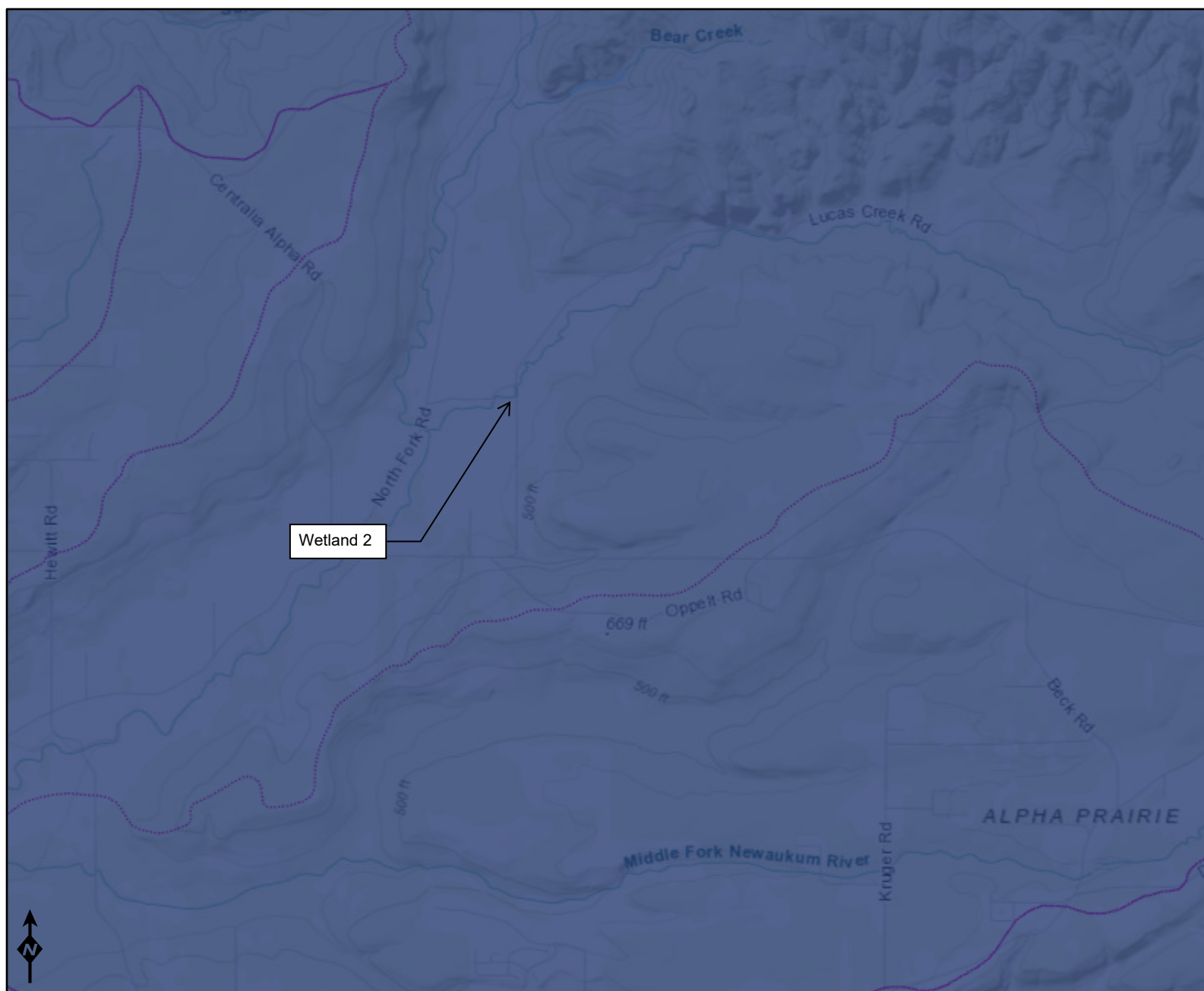
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Figure 6 - TMDLs

**WQ Improvement Projects**

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Upper Chehalis River Bacteria TMDL

Upper Chehalis River Basin
Temperature TMDL

Upper Chehalis River Basin
Dissolved Oxygen TMDL

Wetland name or number W3

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland 3 Date of site visit: 12/3/2024

Rated by K. Corrigan & J. Gray Trained by Ecology? ☒ Yes ☐ No Date of training 2022

HGM Class used for rating Riverine Wetland has multiple HGM classes? ☐ Y ☒ N

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

Source of base aerial photo/map Google

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 - 27

 Category II – Total score = 20 - 22

☒ 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	5	6	18

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

9 = H, H, H

8 = H, H, M

7 = H, H, L

7 = H, M, M

6 = H, M, L

6 = M, M, M

5 = H, L, L

5 = M, M, L

4 = M, L, L

3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	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	NA

Maps and figures required to answer questions correctly for Western Washington**Depressional Wetlands**

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

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	2
Ponded depressions	R 1.1	2
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	1
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	2
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	2
Map of the contributing basin	R 2.2, R 2.3, R 5.2	3
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	6

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 (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total 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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – **Saltwater Tidal Fringe (Estuarine)**

YES – **Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.

2. The entire wetland unit is flat, and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet all** of the following criteria?

- ___ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size,
___ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ___ The wetland is on a slope (slope can be very gradual),
___ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheet flow, 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).

Wetland name or number W3

5. Does the entire wetland unit **meet all** of the following criteria?

X The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
X The overbank flooding occurs at least once every 2 years.

NO – go to 6

YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? This means that any outlet, if present, is higher than the interior of the wetland.

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
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 W3

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?

R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		
Depressions cover $>3/4$ area of wetland	points = 8	
Depressions cover $> 1/2$ area of wetland	points = 4	
Depressions present but cover $\leq 1/2$ area of wetland	points = 2	2
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with $>90\%$ cover at person height, not Cowardin classes)		
Trees or shrubs $> 2/3$ area of the wetland	points = 8	
Trees or shrubs $> 1/3$ area of the wetland	points = 6	
Herbaceous plants (> 6 in. high) $> 2/3$ area of the wetland	points = 6	6
Herbaceous plants (> 6 in. high) $> 1/3$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous $< 1/3$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	8

Rating of Site Potential If score is: 12-16 = H X 6-11 = M 0-5 = L

Record the rating on the first page

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

R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	0
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	0
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	1
R 2.4. Is $> 10\%$ of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Other sources _____	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3-6 = H X 1 or 2 = M 0 = L

Record the rating on the first page

R 3.0. Is the water quality improvement provided by the site valuable to society?

R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (Answer YES if there is a TMDL in development or in effect for the drainage in which the unit is found.)	Yes = 2 No = 0	2
Total for R 3	Add the points in the boxes above	2

Rating of Value If score is: X 2-4 = H 1 = M 0 = L

Record the rating on the first page

HUC12: 171001030203 - North Fork Newaukum River

Upper Chehalis River Bacteria TMDL, Upper Chehalis River Basin Temperature TMDL,
& Upper Chehalis River Basin Dissolved Oxygen TMDL

Wetland name or number W3

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 4.0. Does the site have the potential to reduce flooding and erosion?

R 4.1. Characteristics of the overbank storage the wetland provides: Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks). If the ratio is more than 20 Wetland width = 5 ft points = 9 If the ratio is 10-20 Stream width = 20 ft points = 6 If the ratio is 5-<10 5/20 = 0.25 points = 4 If the ratio is 1-<5 points = 2 If the ratio is < 1 <u>points = 1</u>	1
R 4.2. Characteristics of plants that slow down water velocities during floods: Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are <u>NOT</u> Cowardin classes). Forest or shrub for >¹/₃ area OR emergent plants > ²/₃ area points = 7 Forest or shrub for > ¹/₁₀ area OR emergent plants > ¹/₃ area points = 4 Plants do not meet above criteria <u>points = 0</u>	0
Total for R 4	1

Rating of Site Potential If score is: 12-16 = H 6-11 = M X 0-5 = L

Record the rating on the first page

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

R 5.1. Is the stream or river adjacent to the wetland downcut? Yes = 0 <u>No = 1</u>	1
R 5.2. Does the upgradient watershed include a UGA or incorporated area? Yes = 1 <u>No = 0</u>	0
R 5.3. Is the upgradient stream or river controlled by dams? Yes = 0 <u>No = 1</u>	1
Total for R 5	2

Rating of Landscape Potential If score is: 3 = H X 1 or 2 = M 0 = L

Record the rating on the first page

R 6.0. Are the hydrologic functions provided by the site valuable to society?

R 6.1. Distance to the nearest areas downstream that have flooding problems? Choose the description that best fits the site. The sub-basin immediately downgradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther downgradient <u>points = 1</u> No flooding problems anywhere downstream points = 0	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 <u>No = 0</u>	0
Total for R 6	1

Rating of Value If score is: 2-4 = H X 1 = M 0 = L

Record the rating on the first page

These questions apply to wetlands of all HGM classes.**HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat**H 1.0. Does the site have the potential to provide habitat?**

H 1.1. Structure of plant community: Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

☐ 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/groundcover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 ac to count (see text for descriptions of hydroperiods).

☐ Permanently flooded or inundated

4 or more types present: points = 3

☐ Seasonally flooded or inundated3 types present: points = 2☒ Occasionally flooded or inundated2 types present: points = 1☐ Saturated only

1 type present: points = 0

☒ Permanently flowing stream or river in, or adjacent to, the wetland☐ Intermittently or 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 ft².

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, Canada thistle**

If you counted: > 19 species

points = 2

5 - 19 species

points = 1

< 5 species

points = 0

0

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. If you have four or more plant classes or three classes and open water, the rating is always high.



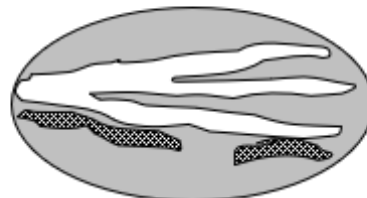
None = 0 points

Low = 1 point

Moderate = 2 points



All three diagrams
in this row
are **High** = 3 points



1

Wetland name or number W3

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 extend at least 3.3 ft (1 m) over open water or 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)

0

Total for H 1

Add the points in the boxes above

2

Rating of Site Potential If score is: 15-18 = H 7-14 = M X 0-6 = L

Record the rating on the first page

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

H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland.

- Calculate:* % relatively undisturbed habitat 15 + [(% moderate and low intensity land uses)/2] 11.2 = 26.2 %
- 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. Total habitat in 1 km Polygon around the wetland.

- Calculate:* % relatively undisturbed habitat 22.6 + [(% moderate and low intensity land uses)/2] 21.7 = 44.3 %
- Total habitat > 50% of Polygon points = 3
- Total habitat 10-50% and in 1-3 patches points = 2
- Total habitat 10-50% and > 3 patches ~~points = 1~~
- Total habitat < 10% of 1 km Polygon points = 0

1

H 2.3. Land use intensity in 1 km Polygon:

- > 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

3

Rating of Landscape Potential If score is: 4-6 = H X 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 data
- ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan
- Site has 1 or 2 Priority Habitats (listed on next page) within 100 m points = 1
- Site does not meet any of the criteria above points = 0

2

Rating of Value If score is: X 2 = H 1 = M 0 = L

Record the rating on the first page

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). [Priority Habitat and Species List](#).¹³³ This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

- **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.
- **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.
- **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **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. Do not select if Fresh Deepwater habitat is also present.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.
- **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) diameter at breast height (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.

¹³³ <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

Wetland name or number W3

- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, [WDFW's Management Recommendations for Oregon White Oak](#)¹³⁴ provides more detail for determining if they are Priority Habitats
- ☒ **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☒ **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.
- **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.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

¹³⁴ <https://wdfw.wa.gov/publications/00030/wdfw00030.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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 <i>Spartina</i> , see chapter 4.8 in the manual. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed 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. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer ? ¹³⁵ Yes = Category I No – Go to SC 2.2 SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination , ¹³⁶ Go to SC 2.3 No = Not a WHCV SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? 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? <i>Use the key below. If you answer YES, you will still need to rate the wetland based on its functions.</i> 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 = 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 = 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 = Category I bog No = Not a bog	Cat. I

¹³⁵ <https://www.dnr.wa.gov/NHPdata>¹³⁶ https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf

SC 4.0. Forested Wetlands Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as Priority Habitats? <i>If you answer YES, you will still need to rate the wetland based on its functions.</i> — 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) <u>exceeding 21 in. (53 cm).</u> 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 (<i>needs to be measured near the bottom</i>) — The lagoon retains some of its <u>surface water at low tide</u> during spring tides 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 in H 1.5 in the manual). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) 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)? <i>If you answer YES, you will still need to rate the wetland based on its habitat functions.</i> 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 and Ocean Shores Blvd SW, including lands west of E. Oceans Shores Blvd SW. 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	NA



FIGURE 1
COWARDIN CLASSES & 150-FT BUFFER
WETLAND 3

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Palustrine Emergent (PEM)
- Wetland Buffer (150 ft)
- Delineated Wetland Boundary
- Ordinary High Water

0 100 ft

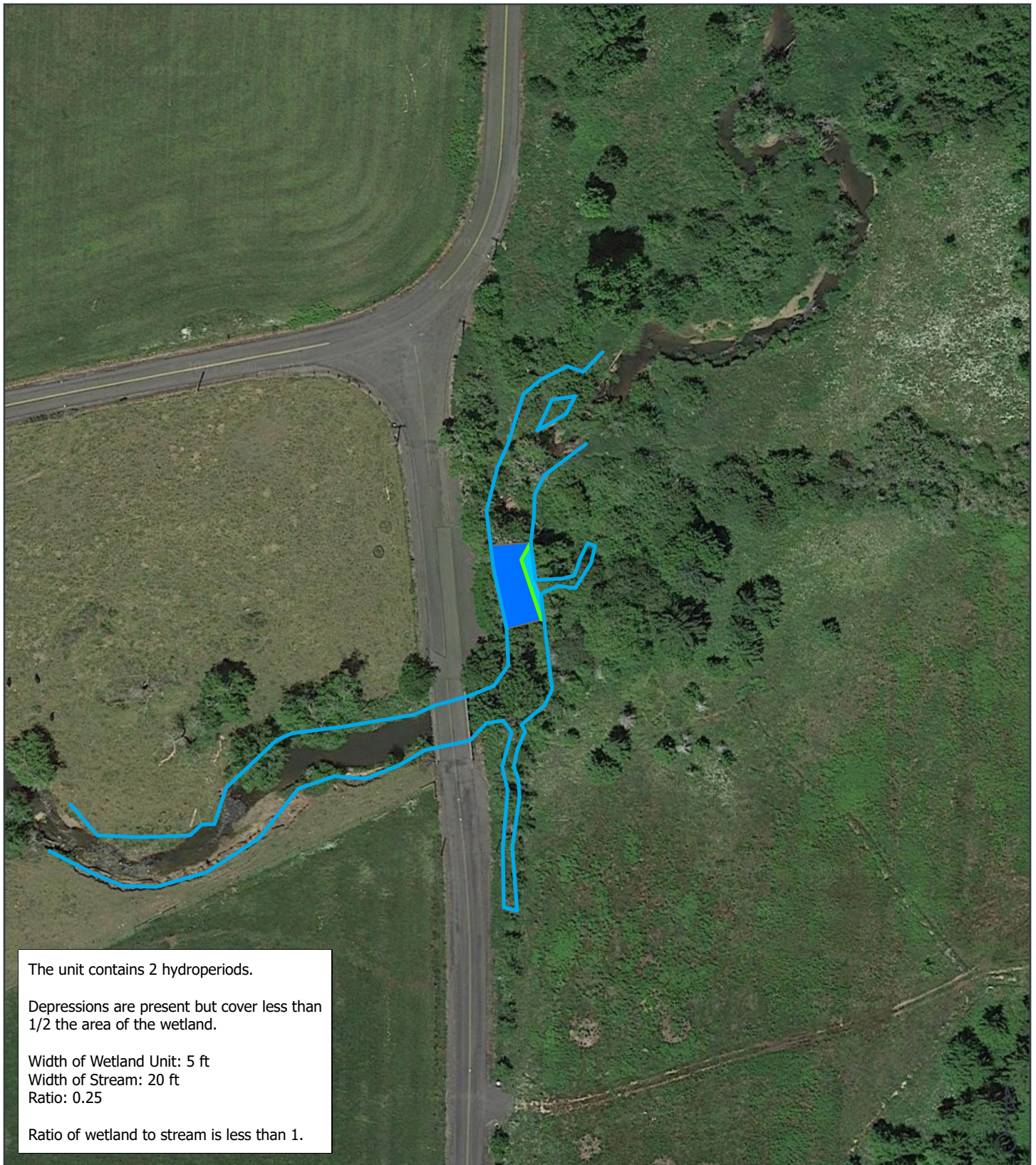


FIGURE 2

HYDROPERIODS

WETLAND 3

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Occasionally Flooded
- Permanent Stream
- Delineated Wetland Boundary
- Ordinary High Water

0 100 ft

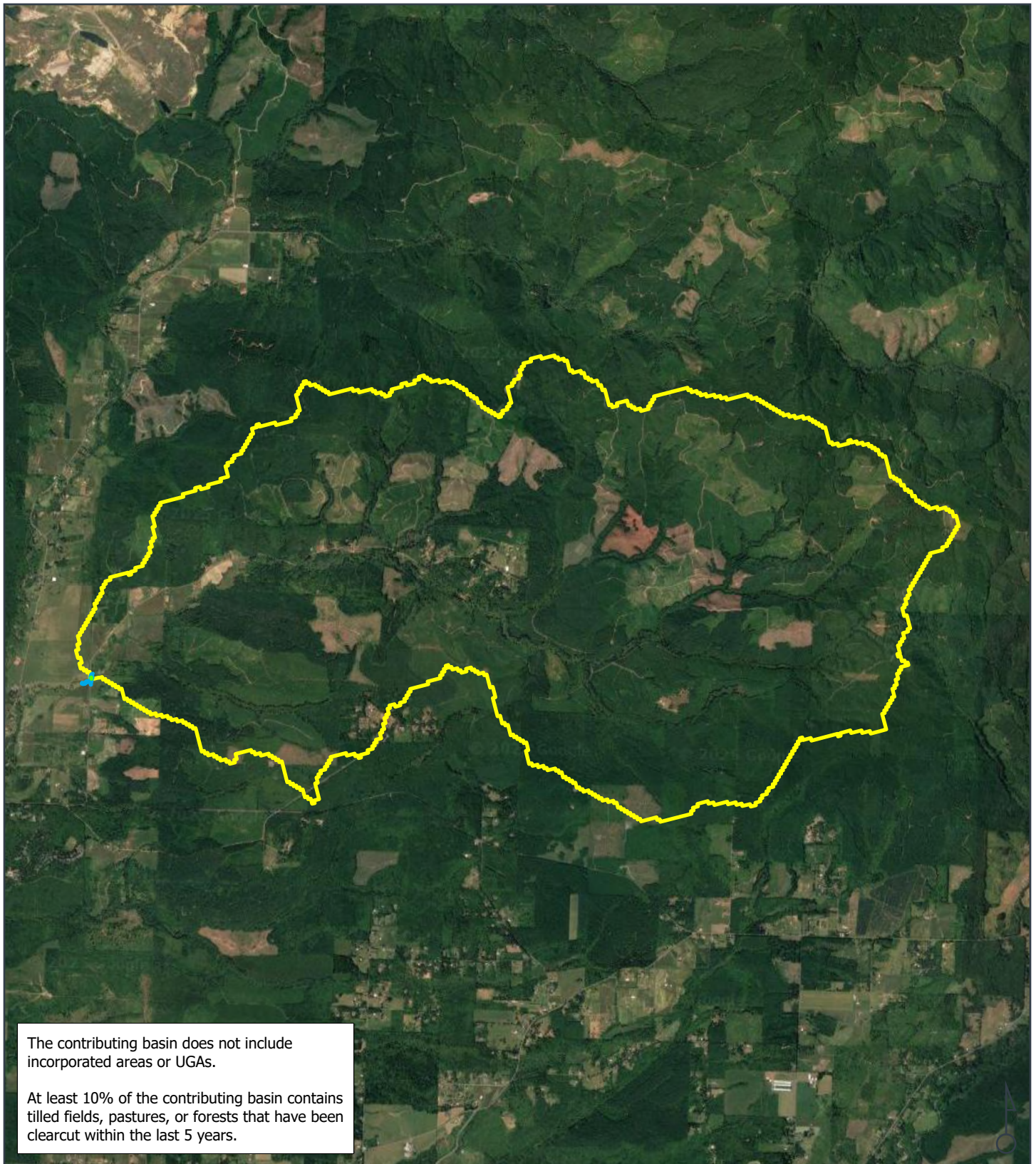


FIGURE 3
CONTRIBUTING BASIN
WETLAND 3
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- ▬ Contributing Basin
- ▬ Delineated Wetland Boundary
- ▬ Ordinary High Water

0 5,000 ft

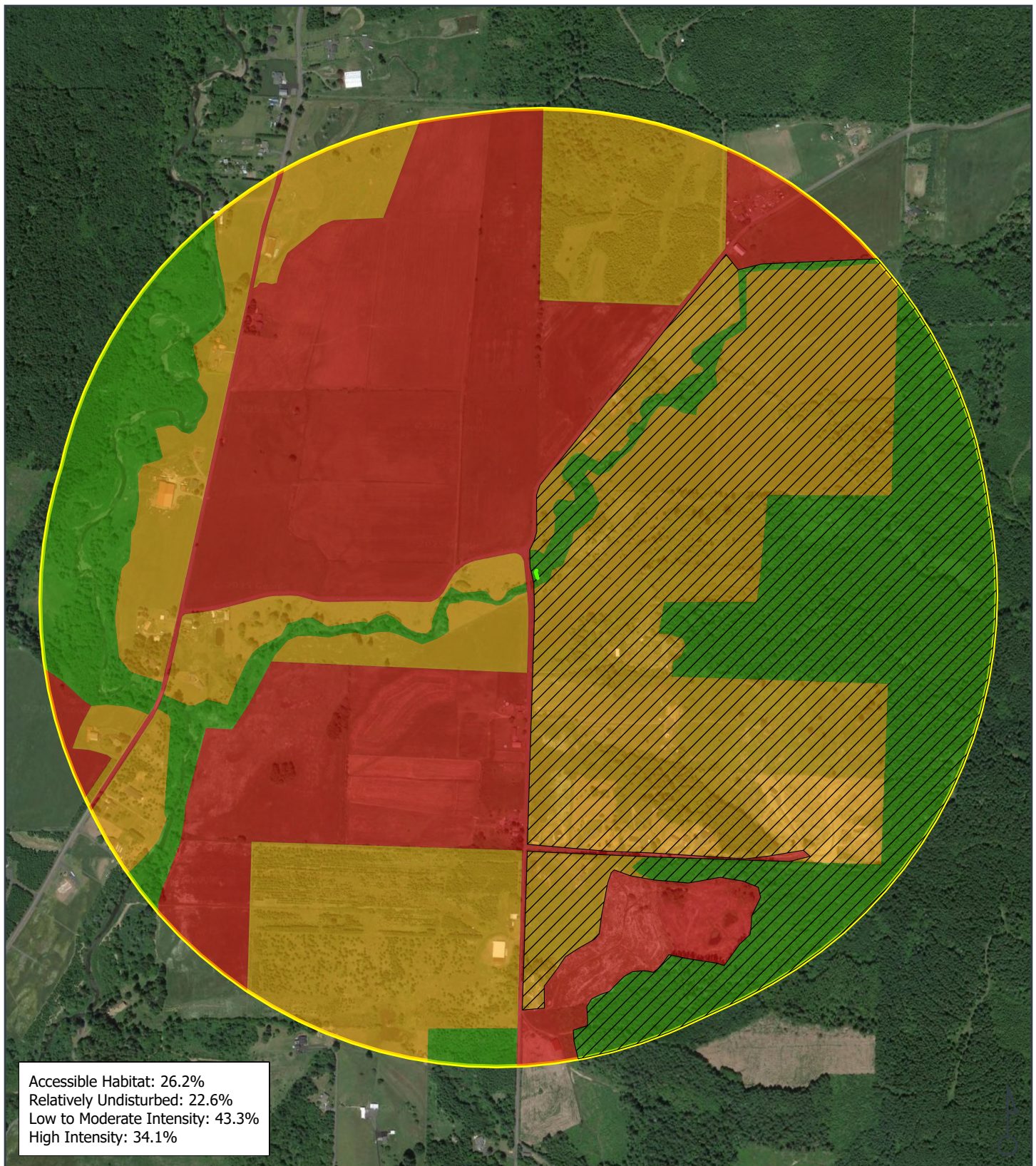


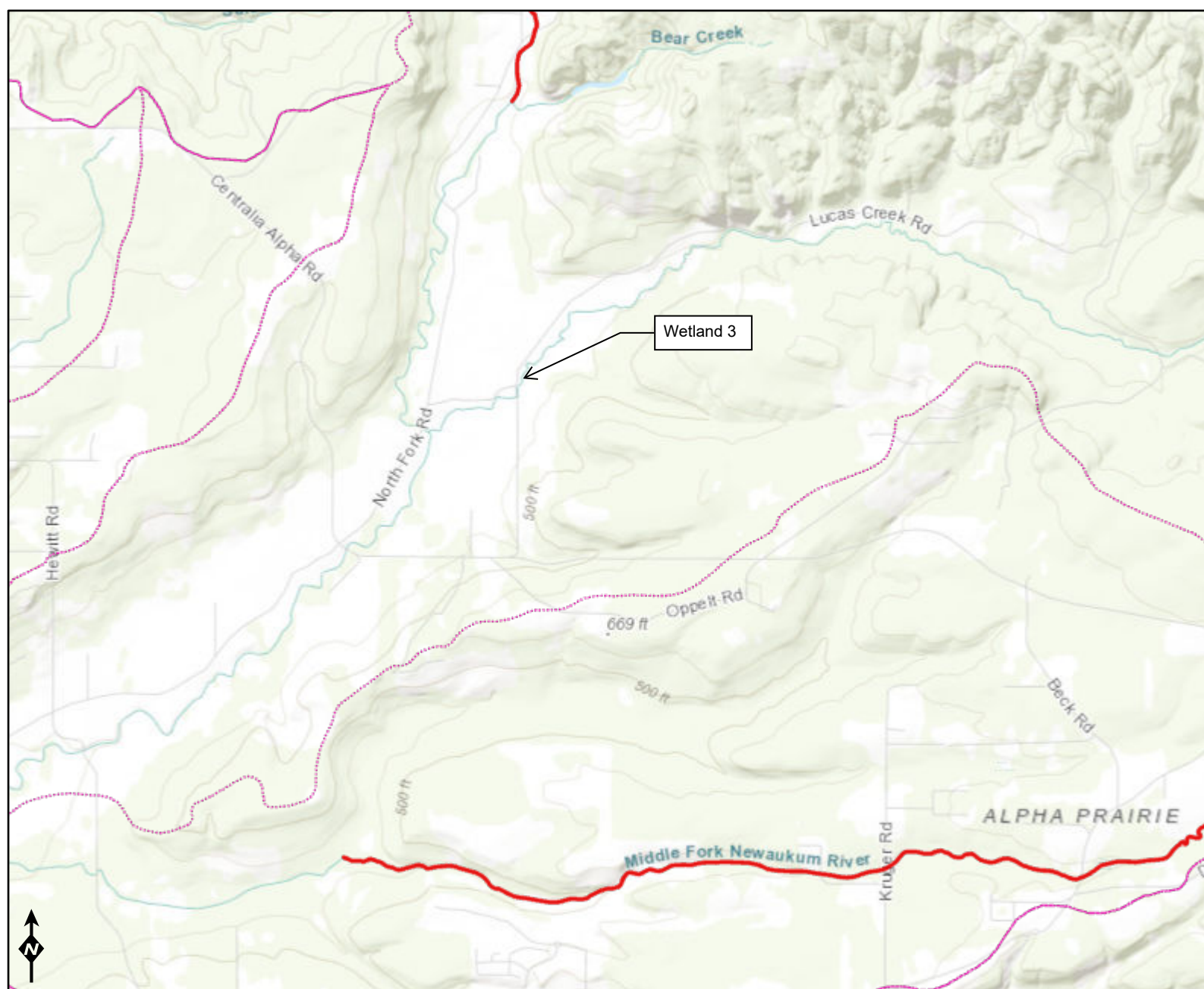
FIGURE 4
LAND USE INTENSITY
WETLAND 3
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

-  Accessible Habitat
-  High Intensity
-  Low to Moderate Intensity
-  Relatively Undisturbed
-  Delineated Wetland Boundary

0 1,000 ft

Figure 5 - 303(d) Listed Waters

**Assessed Water/Sediment****Water**

- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment

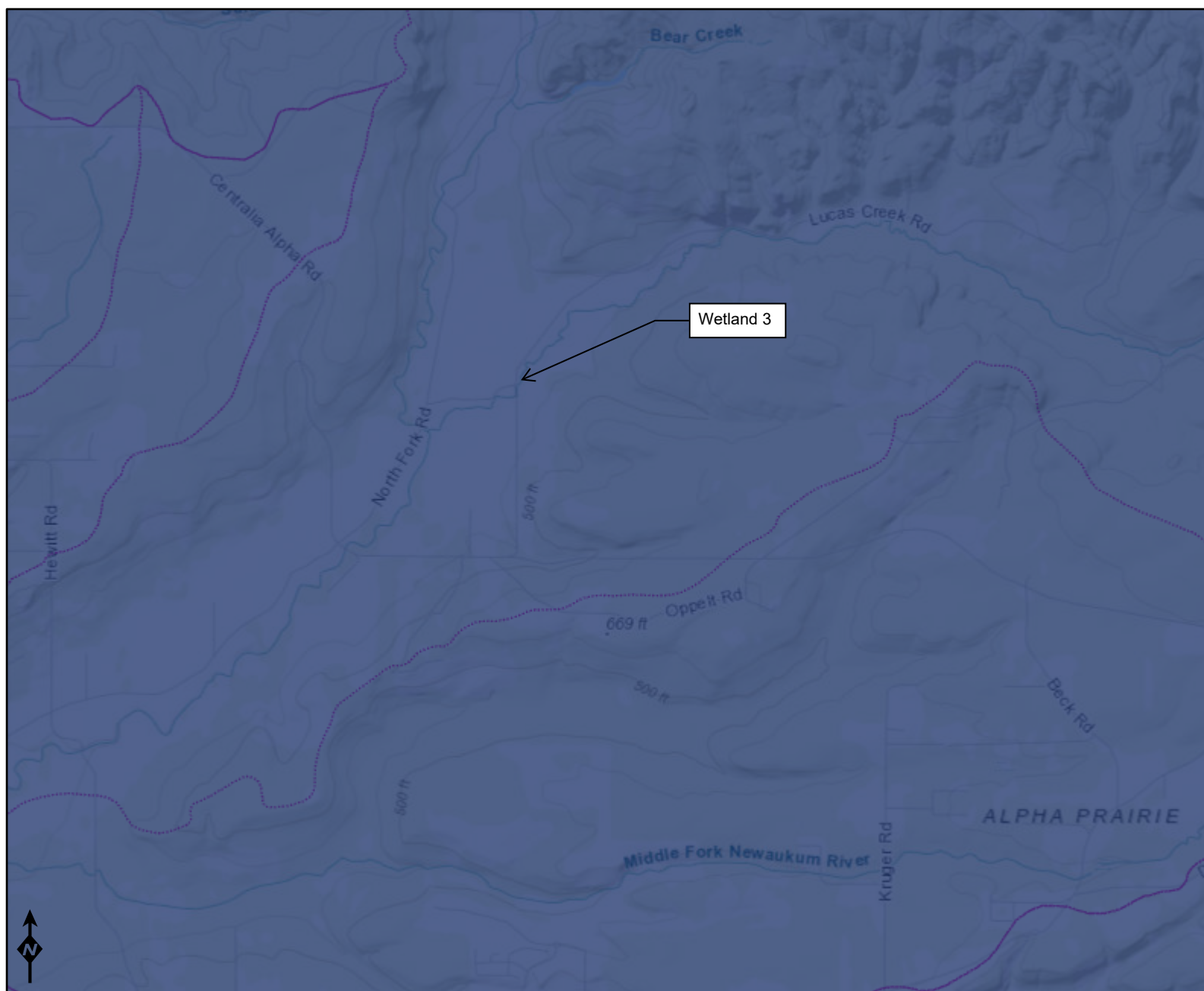
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Figure 6 - TMDLs

**WQ Improvement Projects**

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Upper Chehalis River Bacteria TMDL

Upper Chehalis River Basin
Temperature TMDL

Upper Chehalis River Basin
Dissolved Oxygen TMDL

Wetland name or number W4

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland 4 Date of site visit: 12/3/2024

Rated by K. Corrigan & J. Gray Trained by Ecology? ☒ Yes ☐ No Date of training 2022

HGM Class used for rating Riverine Wetland has multiple HGM classes? ☐ Y ☒ N

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

Source of base aerial photo/map Google

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 - 27

 Category II – Total score = 20 - 22

☒ 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	5	6	18

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

9 = H, H, H

8 = H, H, M

7 = H, H, L

7 = H, M, M

6 = H, M, L

6 = M, M, M

5 = H, L, L

5 = M, M, L

4 = M, L, L

3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	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	NA

Wetland name or number W4

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

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

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	2
Ponded depressions	R 1.1	2
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	1
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	2
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	2
Map of the contributing basin	R 2.2, R 2.3, R 5.2	3
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	6

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 (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total 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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – **Saltwater Tidal Fringe (Estuarine)**

YES – **Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.

2. The entire wetland unit is flat, and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet all** of the following criteria?

- ___ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size,
___ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ___ The wetland is on a slope (slope can be very gradual),
___ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheet flow, 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).

Wetland name or number W4

5. Does the entire wetland unit **meet all** of the following criteria?

X The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
X The overbank flooding occurs at least once every 2 years.

NO – go to 6

YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? This means that any outlet, if present, is higher than the interior of the wetland.

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
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 W4

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?

R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		
Depressions cover $>3/4$ area of wetland	points = 8	8
Depressions cover $> 1/2$ area of wetland	points = 4	
Depressions present but cover $\leq 1/2$ area of wetland	points = 2	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with $>90\%$ cover at person height, not Cowardin classes)		
Trees or shrubs $> 2/3$ area of the wetland	points = 8	0
Trees or shrubs $> 1/3$ area of the wetland	points = 6	
Herbaceous plants (> 6 in. high) $> 2/3$ area of the wetland	points = 6	
Herbaceous plants (> 6 in. high) $> 1/3$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous $< 1/3$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	8

Rating of Site Potential If score is: 12-16 = H X 6-11 = M 0-5 = L

Record the rating on the first page

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

R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	0
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	0
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	1
R 2.4. Is $> 10\%$ of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Other sources _____	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3-6 = H X 1 or 2 = M 0 = L

Record the rating on the first page

R 3.0. Is the water quality improvement provided by the site valuable to society?

R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (Answer YES if there is a TMDL in development or in effect for the drainage in which the unit is found.)	Yes = 2 No = 0	2
Total for R 3	Add the points in the boxes above	2

Rating of Value If score is: X 2-4 = H 1 = M 0 = L

Record the rating on the first page

HUC12: 171001030203 - North Fork Newaukum River

Upper Chehalis River Bacteria TMDL, Upper Chehalis River Basin Temperature TMDL,
& Upper Chehalis River Basin Dissolved Oxygen TMDL

Wetland name or number W4

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 4.0. Does the site have the potential to reduce flooding and erosion?

R 4.1. Characteristics of the overbank storage the wetland provides: Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks). If the ratio is more than 20 Wetland width = 10 ft points = 9 If the ratio is 10-20 Stream width = 20 ft points = 6 If the ratio is 5-<10 10/20 = 0.5 points = 4 If the ratio is 1-<5 points = 2 If the ratio is < 1 points = 1	1
R 4.2. Characteristics of plants that slow down water velocities during floods: Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are <u>NOT</u> Cowardin classes). Forest or shrub for >¹/₃ area OR emergent plants > ²/₃ area points = 7 Forest or shrub for > ¹/₁₀ area OR emergent plants > ¹/₃ area points = 4 Plants do not meet above criteria points = 0	0
Total for R 4 Add the points in the boxes above	1

Rating of Site Potential If score is: 12-16 = H 6-11 = M X 0-5 = L

Record the rating on the first page

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

R 5.1. Is the stream or river adjacent to the wetland downcut? Yes = 0 No = 1	1
R 5.2. Does the upgradient watershed include a UGA or incorporated area? Yes = 1 No = 0	0
R 5.3. Is the upgradient stream or river controlled by dams? Yes = 0 No = 1	1
Total for R 5 Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3 = H X 1 or 2 = M 0 = L

Record the rating on the first page

R 6.0. Are the hydrologic functions provided by the site valuable to society?

R 6.1. Distance to the nearest areas downstream that have flooding problems? Choose the description that best fits the site. The sub-basin immediately downgradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther downgradient points = 1 No flooding problems anywhere downstream points = 0	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for R 6 Add the points in the boxes above	1

Rating of Value If score is: 2-4 = H X 1 = M 0 = L

Record the rating on the first page

These questions apply to wetlands of all HGM classes.**HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat**H 1.0. Does the site have the potential to provide habitat?**

H 1.1. Structure of plant community: Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

☐ 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/groundcover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 ac to count (see text for descriptions of hydroperiods).

☐ Permanently flooded or inundated

4 or more types present: points = 3

☒ Seasonally flooded or inundated3 types present: points = 2☐ Occasionally flooded or inundated2 types present: points = 1☐ Saturated only

1 type present: points = 0

☒ Permanently flowing stream or river in, or adjacent to, the wetland☐ Intermittently or 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 ft².

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, Canada 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 interspersions among Cowardin plant 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.



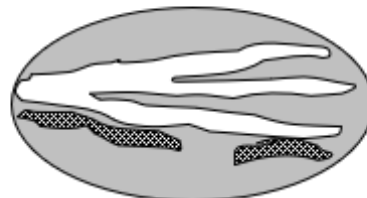
None = 0 points

Low = 1 point

Moderate = 2 points



All three diagrams
in this row
are **High** = 3 points



1

Wetland name or number W4

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 extend at least 3.3 ft (1 m) over open water or 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)

1

Total for H 1

Add the points in the boxes above

4

Rating of Site Potential If score is: 15-18 = H 7-14 = M X 0-6 = L

Record the rating on the first page

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

H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland.

- Calculate: % relatively undisturbed habitat 15 + [(% moderate and low intensity land uses)/2] 11.2 = 26.2 %
- 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. Total habitat in 1 km Polygon around the wetland.

- Calculate: % relatively undisturbed habitat 22.6 + [(% moderate and low intensity land uses)/2] 21.7 = 44.3 %
- Total habitat > 50% of Polygon points = 3
 - Total habitat 10-50% and in 1-3 patches points = 2
 - Total habitat 10-50% and > 3 patches points = 1
 - Total habitat < 10% of 1 km Polygon points = 0

1

H 2.3. Land use intensity in 1 km Polygon:

- > 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

3

Rating of Landscape Potential If score is: 4-6 = H X 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 data
 - ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan
- Site has 1 or 2 Priority Habitats (listed on next page) within 100 m points = 1
- Site does not meet any of the criteria above points = 0

2

Rating of Value If score is: X 2 = H 1 = M 0 = L

Record the rating on the first page

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). [Priority Habitat and Species List](#).¹³³ This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

- **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.
- **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.
- **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **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. Do not select if Fresh Deepwater habitat is also present.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.
- **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) diameter at breast height (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.

¹³³ <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

Wetland name or number W4

- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, [WDFW's Management Recommendations for Oregon White Oak](#)¹³⁴ provides more detail for determining if they are Priority Habitats
- ☒ **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☒ **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.
- **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.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

¹³⁴ <https://wdfw.wa.gov/publications/00030/wdfw00030.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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 <i>Spartina</i> , see chapter 4.8 in the manual. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed 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. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer ? ¹³⁵ Yes = Category I No – Go to SC 2.2 SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination,¹³⁶ Go to SC 2.3 No = Not a WHCV SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? 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? <i>Use the key below. If you answer YES, you will still need to rate the wetland based on its functions.</i> 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 = 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 = 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 = Category I bog No = Not a bog	Cat. I

¹³⁵ <https://www.dnr.wa.gov/NHPdata>¹³⁶ https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf

SC 4.0. Forested Wetlands Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as Priority Habitats? <i>If you answer YES, you will still need to rate the wetland based on its functions.</i> — 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) <u>exceeding 21 in. (53 cm).</u> Yes = Category I <u>No = Not a forested wetland for this section</u>	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 (<i>needs to be measured near the bottom</i>) — The lagoon retains some of its <u>surface water at low tide</u> during spring tides Yes – Go to SC 5.1 <u>No = Not a wetland in a coastal lagoon</u> 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 in H 1.5 in the manual). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) 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)? <i>If you answer YES, you will still need to rate the wetland based on its habitat functions.</i> 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 and Ocean Shores Blvd SW, including lands west of E. Oceans Shores Blvd SW. Yes – Go to SC 6.1 <u>No = Not an interdunal wetland for rating</u> 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	NA



FIGURE 1
COWARDIN CLASSES & 150-FT BUFFER
WETLAND 4
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Palustrine Emergent (PEM)
- Wetland Buffer (150 ft)
- Delineated Wetland Boundary
- Ordinary High Water

0 100 ft



FIGURE 2

HYDROPERIODS

WETLAND 4

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Seasonally Flooded
- Permanent Stream
- Delineated Wetland Boundary
- Ordinary High Water

0 100 ft

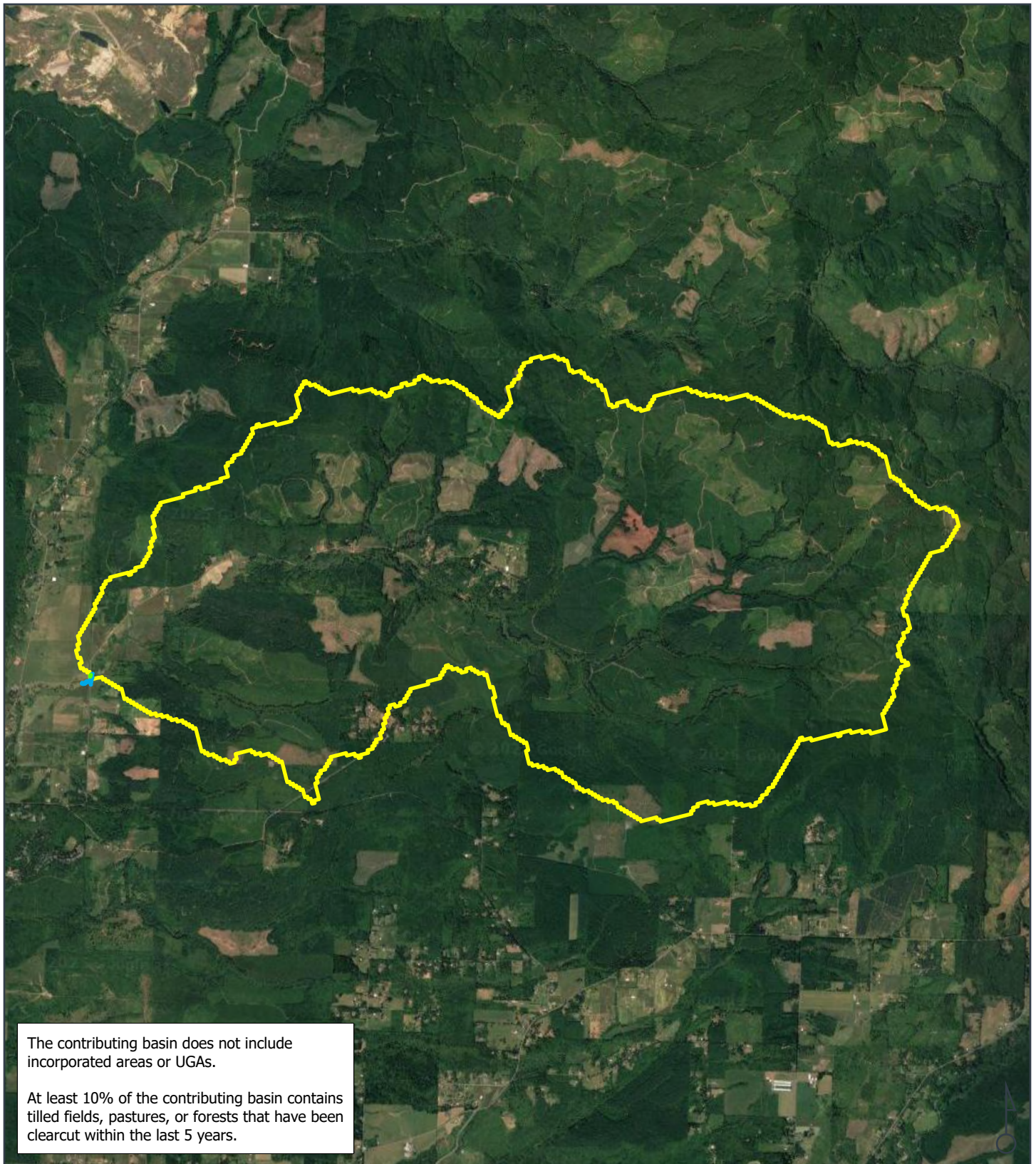


FIGURE 3
CONTRIBUTING BASIN
WETLAND 4
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- ▭ Contributing Basin
- ▭ Delineated Wetland Boundary
- ▭ Ordinary High Water

0 5,000 ft

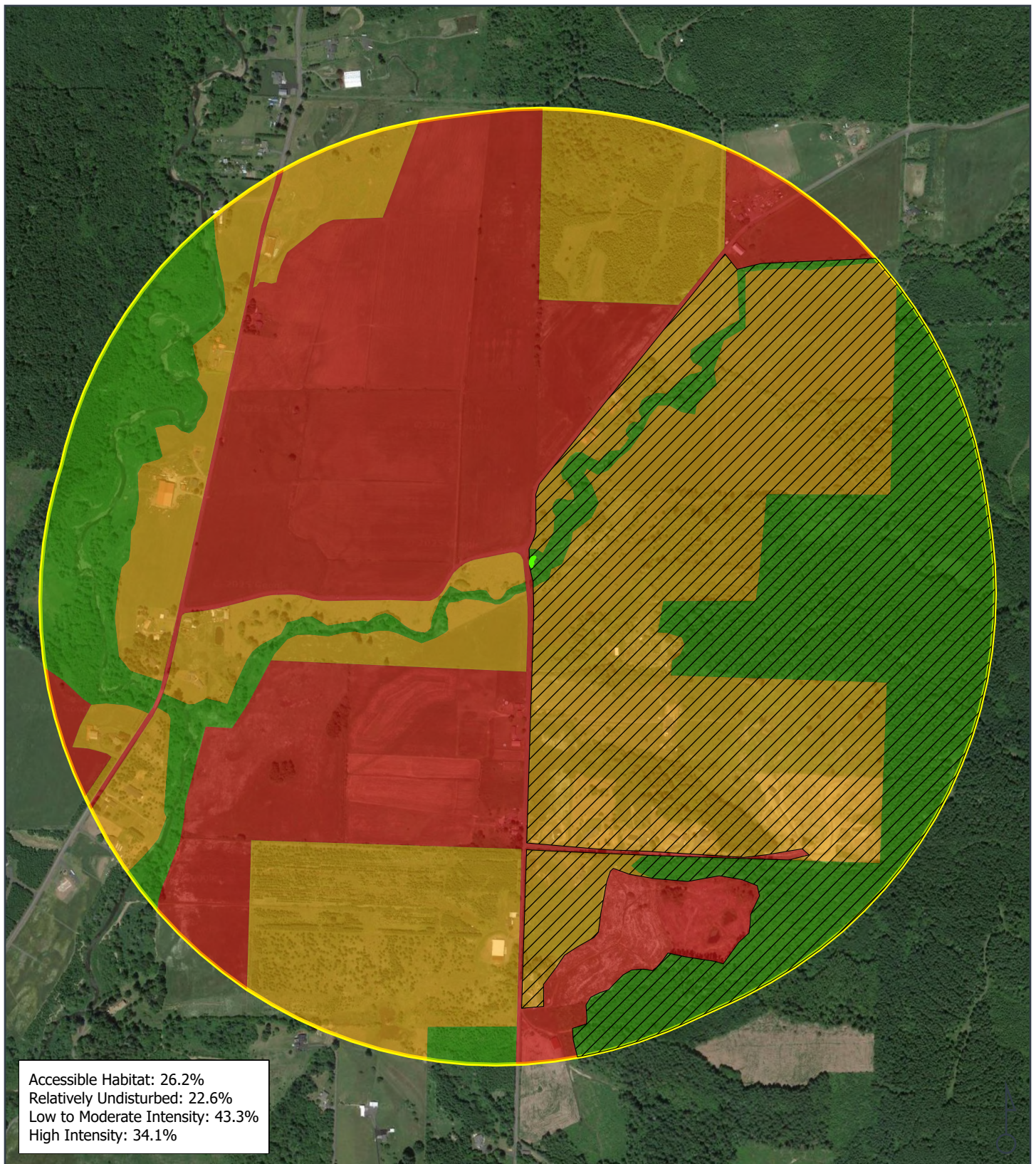


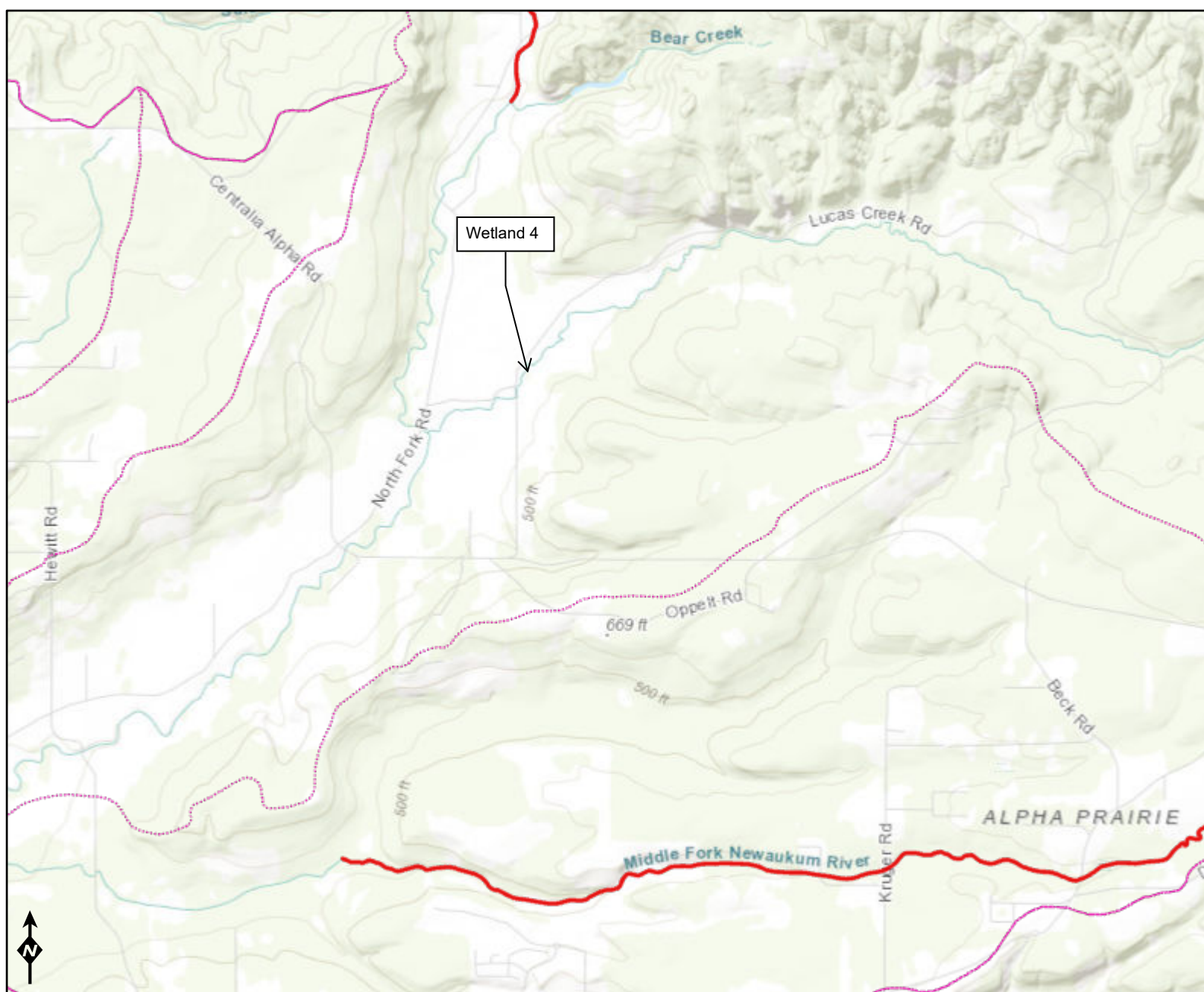
FIGURE 4
LAND USE INTENSITY
WETLAND 4
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

-  Accessible Habitat
-  High Intensity
-  Low to Moderate Intensity
-  Relatively Undisturbed
-  Delineated Wetland Boundary

0 1,000 ft

Figure 5 - 303(d) Listed Waters

**Assessed Water/Sediment****Water**

- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment

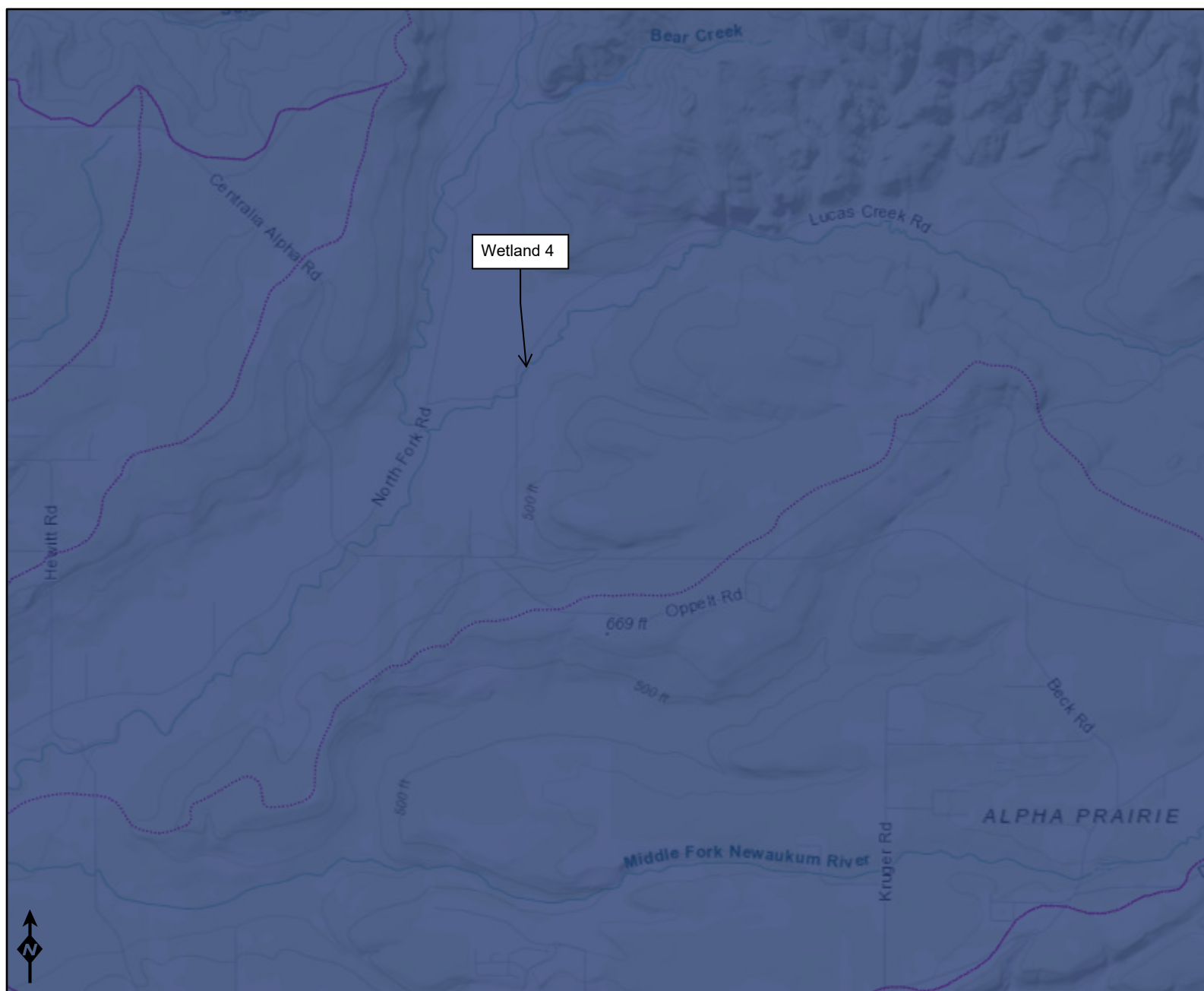
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Figure 6 - TMDLs

**WQ Improvement Projects**

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Upper Chehalis River Bacteria TMDL

Upper Chehalis River Basin
Temperature TMDL

Upper Chehalis River Basin
Dissolved Oxygen TMDL

Wetland name or number W5

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland 5 Date of site visit: 12/3/2024

Rated by K. Corrigan & J. Gray Trained by Ecology? ☒ Yes ☐ No Date of training 2022

HGM Class used for rating Riverine Wetland has multiple HGM classes? ☐ Y ☒ N

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

Source of base aerial photo/map Google

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 - 27

 Category II – Total score = 20 - 22

☒ 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 <u>L</u>	H M <u>L</u>	H M <u>L</u>	
Landscape Potential	H <u>M</u> L	H <u>M</u> L	H <u>M</u> L	
Value	<u>H</u> M L	H <u>M</u> L	<u>H</u> M L	TOTAL
Score Based on Ratings	6	5	6	17

**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	NA

Wetland name or number W5

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

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

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	2
Ponded depressions	R 1.1	2
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	1
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	2
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	2
Map of the contributing basin	R 2.2, R 2.3, R 5.2	3
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	6

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 (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total 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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☐ NO – go to 2

☐ YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

☐ NO – **Saltwater Tidal Fringe (Estuarine)**

☐ YES – **Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.

2. The entire wetland unit is flat, and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☐ NO – go to 3

☐ YES – The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size,
☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☐ NO – go to 4

☐ YES – The wetland class is **Lake Fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The wetland is on a slope (slope can be very gradual),
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheet flow, 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).

Wetland name or number W5

5. Does the entire wetland unit **meet all** of the following criteria?

X The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
X The overbank flooding occurs at least once every 2 years.

NO – go to 6

YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? This means that any outlet, if present, is higher than the interior of the wetland.

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
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 W5

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 1.0. Does the site have the potential to improve water quality?

R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event:		
Depressions cover $>3/4$ area of wetland	points = 8	
Depressions cover $> 1/2$ area of wetland	points = 4	
Depressions present but cover $\leq 1/2$ area of wetland	points = 2	2
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with $>90\%$ cover at person height, not Cowardin classes)		
Trees or shrubs $> 2/3$ area of the wetland	points = 8	
Trees or shrubs $> 1/3$ area of the wetland	points = 6	
Herbaceous plants (> 6 in. high) $> 2/3$ area of the wetland	points = 6	3
Herbaceous plants (> 6 in. high) $> 1/3$ area of the wetland	points = 3	
Trees, shrubs, and ungrazed herbaceous $< 1/3$ area of the wetland	points = 0	
Total for R 1	Add the points in the boxes above	5

Rating of Site Potential If score is: 12-16 = H 6-11 = M X 0-5 = L

Record the rating on the first page

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

R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	0
R 2.2. Does the contributing basin to the wetland include a UGA or incorporated area?	Yes = 1 No = 0	0
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	1
R 2.4. Is $> 10\%$ of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Other sources _____	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3-6 = H X 1 or 2 = M 0 = L

Record the rating on the first page

R 3.0. Is the water quality improvement provided by the site valuable to society?

R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Is the wetland along a stream or river that has TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? (Answer YES if there is a TMDL in development or in effect for the drainage in which the unit is found.)	Yes = 2 No = 0	2
Total for R 3	Add the points in the boxes above	2

Rating of Value If score is: X 2-4 = H 1 = M 0 = L

Record the rating on the first page

HUC12: 171001030203 - North Fork Newaukum River

Upper Chehalis River Bacteria TMDL, Upper Chehalis River Basin Temperature TMDL,
& Upper Chehalis River Basin Dissolved Oxygen TMDL

Wetland name or number W5

RIVERINE AND FRESHWATER TIDAL FRINGE WETLANDS

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

R 4.0. Does the site have the potential to reduce flooding and erosion?

R 4.1. Characteristics of the overbank storage the wetland provides: Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks). If the ratio is more than 20 Wetland width = 20 ft points = 9 If the ratio is 10-20 Stream width = 30 ft points = 6 If the ratio is 5-<10 20/30 = 0.66 points = 4 If the ratio is 1-<5 points = 2 If the ratio is < 1 points = 1		1
R 4.2. Characteristics of plants that slow down water velocities during floods: Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have >90% cover at person height. These are <u>NOT</u> Cowardin classes). Forest or shrub for > ¹ / ₃ area OR emergent plants > ² / ₃ area points = 7 Forest or shrub for > ¹ / ₁₀ area OR emergent plants > ¹ / ₃ area points = 4 Plants do not meet above criteria points = 0		4
Total for R 4 Add the points in the boxes above		5

Rating of Site Potential If score is: 12-16 = H 6-11 = M X 0-5 = L

Record the rating on the first page

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

R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 No = 1	1
R 5.2. Does the upgradient watershed include a UGA or incorporated area?	Yes = 1 No = 0	0
R 5.3. Is the upgradient stream or river controlled by dams?	Yes = 0 No = 1	1
Total for R 5 Add the points in the boxes above		2

Rating of Landscape Potential If score is: 3 = H X 1 or 2 = M 0 = L

Record the rating on the first page

R 6.0. Are the hydrologic functions provided by the site valuable to society?

R 6.1. Distance to the nearest areas downstream that have flooding problems? Choose the description that best fits the site. The sub-basin immediately downgradient of the wetland has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther downgradient points = 1 No flooding problems anywhere downstream points = 0		1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0		0
Total for R 6 Add the points in the boxes above		1

Rating of Value If score is: 2-4 = H X 1 = M 0 = L

Record the rating on the first page

These questions apply to wetlands of all HGM classes.**HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat**H 1.0. Does the site have the potential to provide habitat?**

H 1.1. Structure of plant community: Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

☐ 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/groundcover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 ac to count (see text for descriptions of hydroperiods).

☐ Permanently flooded or inundated

4 or more types present: points = 3

☐ Seasonally flooded or inundated3 types present: points = 2☒ Occasionally flooded or inundated2 types present: points = 1☐ Saturated only

1 type present: points = 0

☒ Permanently flowing stream or river in, or adjacent to, the wetland☐ Intermittently or 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 ft².

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, Canada thistle**

If you counted: > 19 species

points = 2

5 - 19 species

points = 1

< 5 species

points = 0

0

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. If you have four or more plant classes or three classes and open water, the rating is always high.



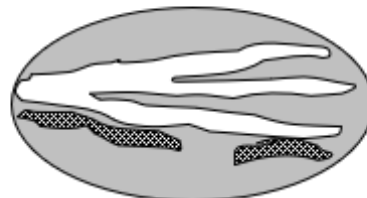
None = 0 points

Low = 1 point

Moderate = 2 points



All three diagrams
in this row
are **High** = 3 points



1

Wetland name or number W5

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 extend at least 3.3 ft (1 m) over open water or 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)

1

Total for H 1

Add the points in the boxes above

3

Rating of Site Potential If score is: 15-18 = H 7-14 = M X 0-6 = L

Record the rating on the first page

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

H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland.

- Calculate: % relatively undisturbed habitat 1.6 + [(% moderate and low intensity land uses)/2] 2.2 = 3.8 %
- Total accessible habitat is:
- > 1/3 (33.3%) of 1 km Polygon points = 3
- 20-33% of 1 km Polygon points = 2
- 10-19% of 1 km Polygon points = 1
- < 10% of 1 km Polygon points = 0

0

H 2.2. Total habitat in 1 km Polygon around the wetland.

- Calculate: % relatively undisturbed habitat 22.6 + [(% moderate and low intensity land uses)/2] 21.7 = 44.3 %
- Total habitat > 50% of Polygon points = 3
- Total habitat 10-50% and in 1-3 patches points = 2
- Total habitat 10-50% and > 3 patches points = 1
- Total habitat < 10% of 1 km Polygon points = 0

1

H 2.3. Land use intensity in 1 km Polygon:

- > 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

1

Rating of Landscape Potential If score is: 4-6 = H X 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 data
- ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan
- Site has 1 or 2 Priority Habitats (listed on next page) within 100 m points = 1
- Site does not meet any of the criteria above points = 0

2

Rating of Value If score is: X 2 = H 1 = M 0 = L

Record the rating on the first page

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). [Priority Habitat and Species List](#).¹³³ This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

- **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.
- **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.
- **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **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. Do not select if Fresh Deepwater habitat is also present.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.
- **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) diameter at breast height (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.

¹³³ <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

Wetland name or number W5

- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, [WDFW's Management Recommendations for Oregon White Oak](#)¹³⁴ provides more detail for determining if they are Priority Habitats
- ☒ **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☒ **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.
- **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.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

¹³⁴ <https://wdfw.wa.gov/publications/00030/wdfw00030.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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 <i>Spartina</i> , see chapter 4.8 in the manual. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed 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. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer ? ¹³⁵ Yes = Category I No – Go to SC 2.2 SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination,¹³⁶ Go to SC 2.3 No = Not a WHCV SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? 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? <i>Use the key below. If you answer YES, you will still need to rate the wetland based on its functions.</i> 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 = 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 = 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 = Category I bog No = Not a bog	Cat. I

¹³⁵ <https://www.dnr.wa.gov/NHPdata>¹³⁶ https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf

SC 4.0. Forested Wetlands Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as Priority Habitats? <i>If you answer YES, you will still need to rate the wetland based on its functions.</i> — 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) <u>exceeding 21 in. (53 cm).</u> 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 (<i>needs to be measured near the bottom</i>) — The lagoon retains some of its <u>surface water at low tide</u> during spring tides 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 in H 1.5 in the manual). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) 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)? <i>If you answer YES, you will still need to rate the wetland based on its habitat functions.</i> 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 and Ocean Shores Blvd SW, including lands west of E. Oceans Shores Blvd SW. 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	NA

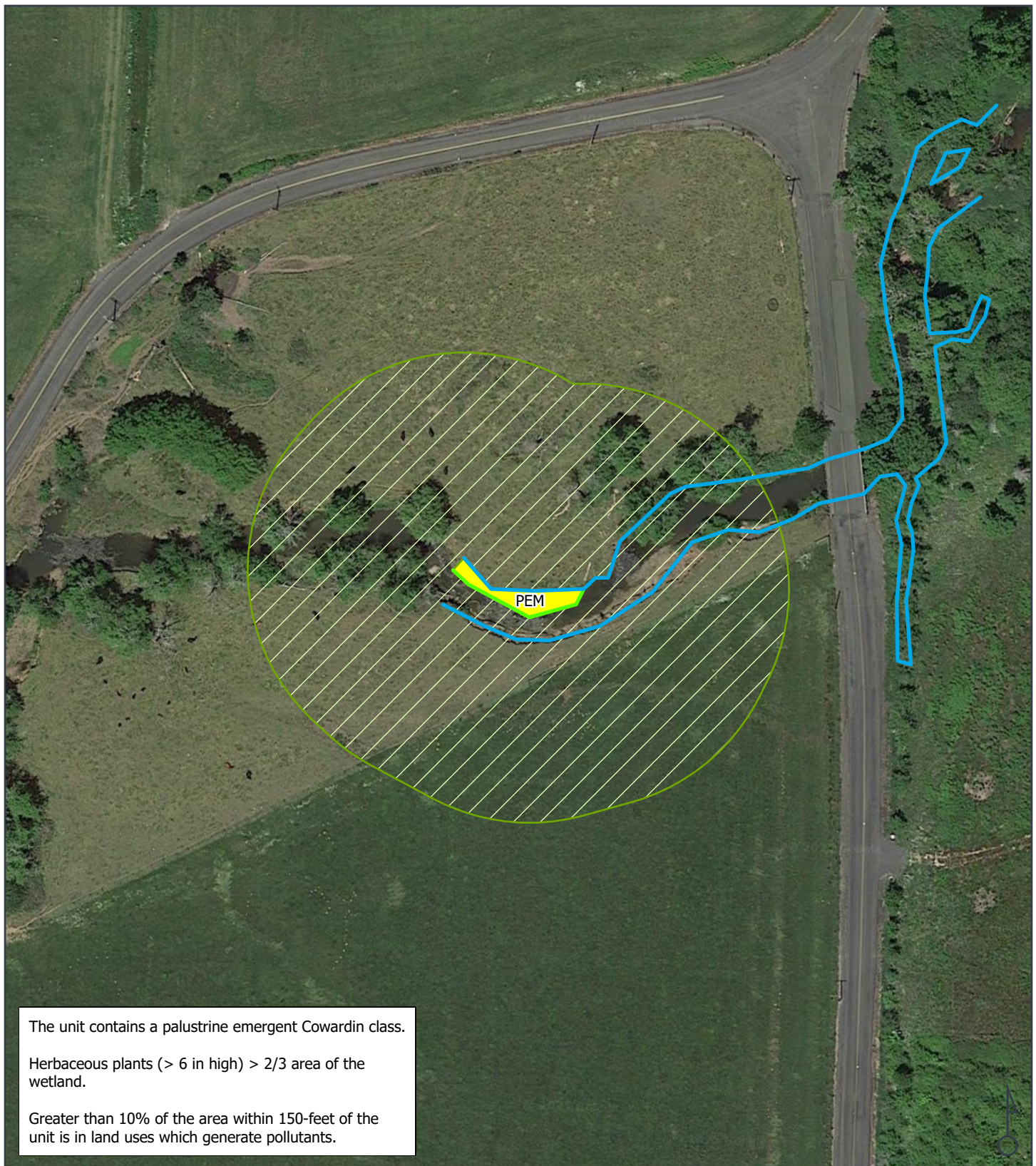


FIGURE 1
COWARDIN CLASSES & 150-FT BUFFER
WETLAND 5

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Palustrine Emergent (PEM)
- Wetland Buffer (150 ft)
- Delineated Wetland Boundary
- Ordinary High Water

0

ft

 100

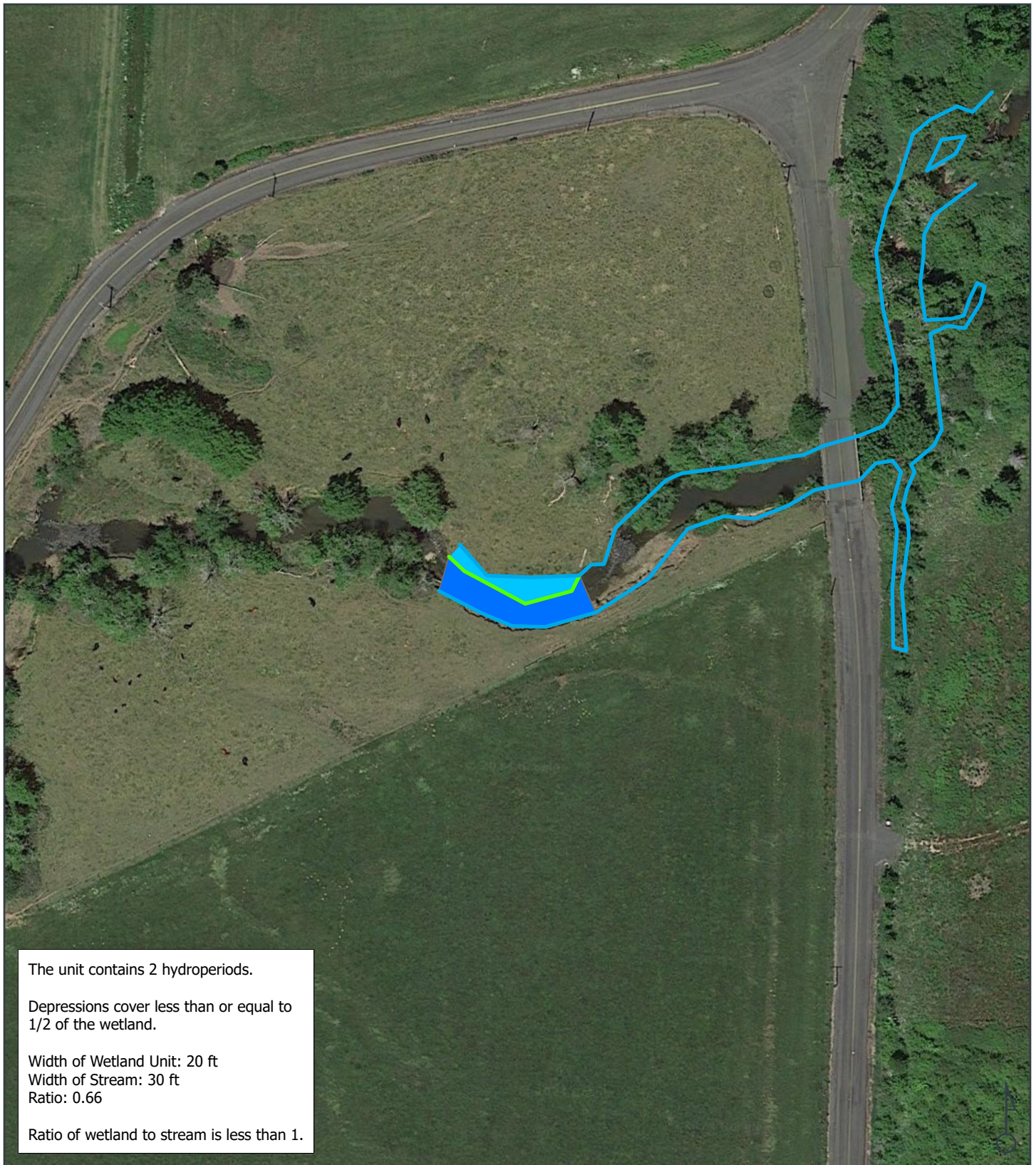


FIGURE 2 HYDROPERIODS WETLAND 5

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Occasionally Flooded
- Permanent Stream
- Delineated Wetland Boundary
- Ordinary High Water

0 100 ft

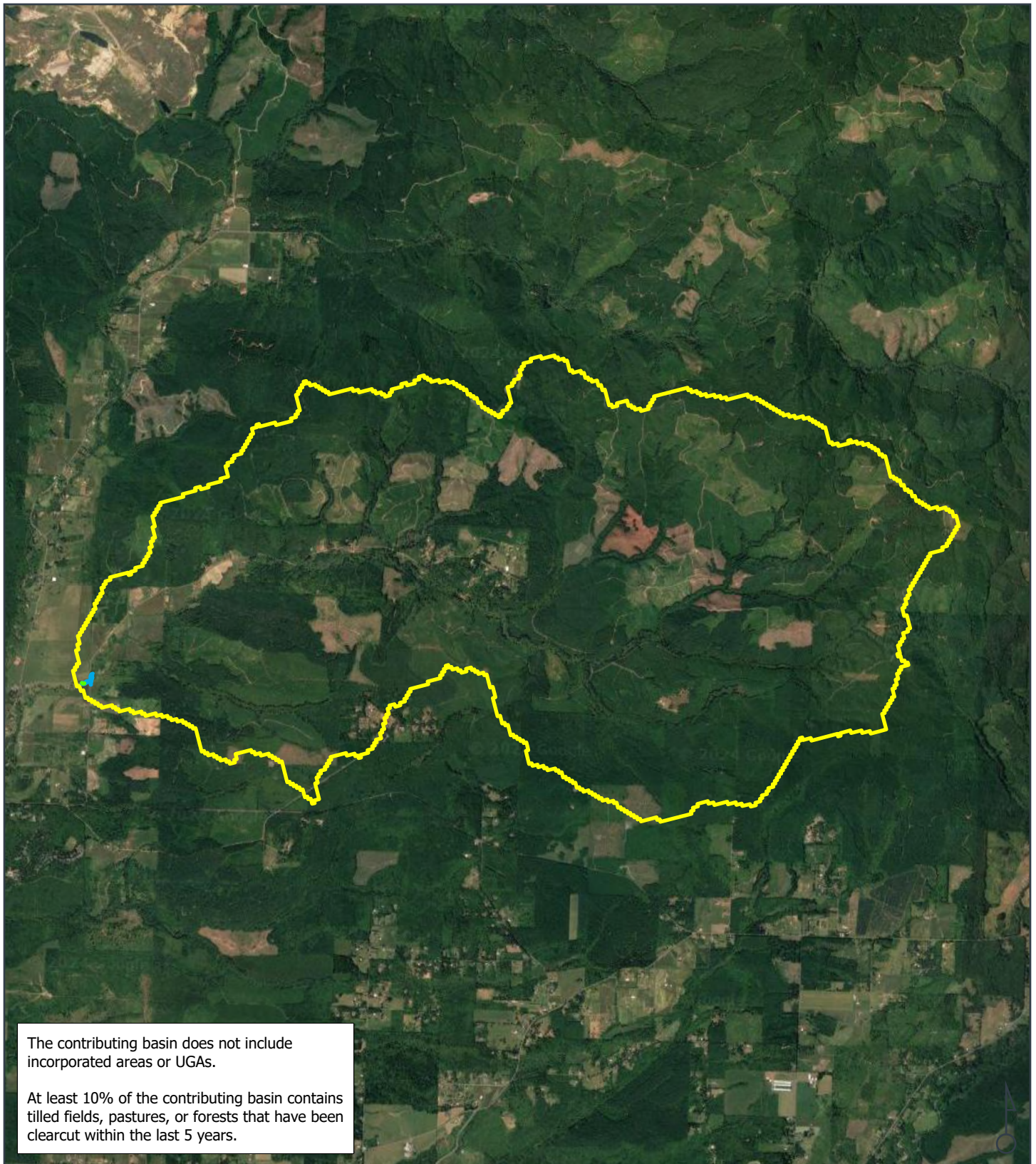


FIGURE 3
CONTRIBUTING BASIN
WETLAND 5
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- ▬ Contributing Basin
- ▬ Delineated Wetland Boundary
- ▬ Ordinary High Water

0 5,000 ft

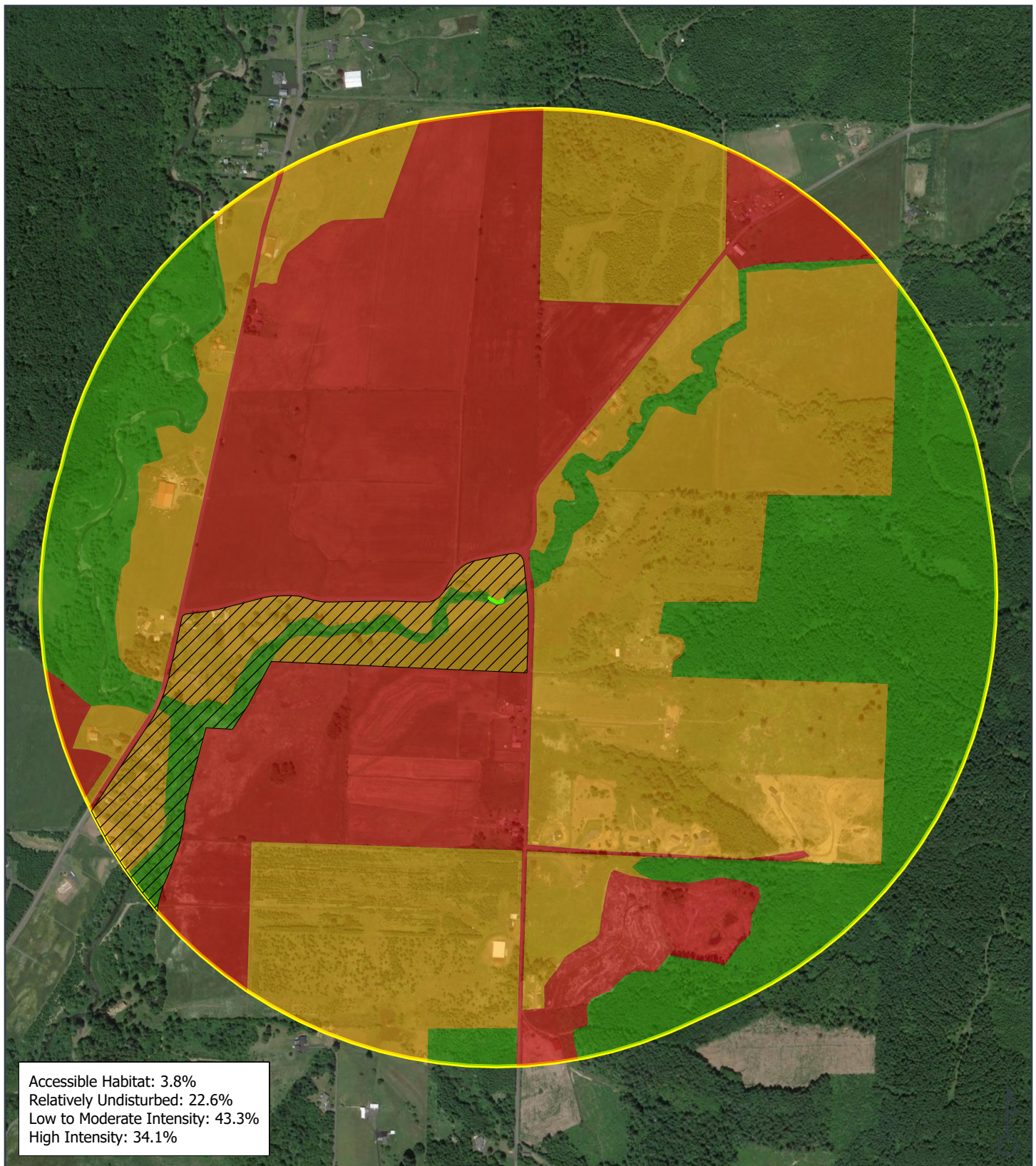


FIGURE 4
LAND USE INTENSITY
WETLAND 5
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

-  Accessible Habitat
-  High Intensity
-  Low to Moderate Intensity
-  Relatively Undisturbed
-  Delineated Wetland Boundary

0 1,000 ft

Figure 5 - 303(d) Listed Waters

**Assessed Water/Sediment****Water**

- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment

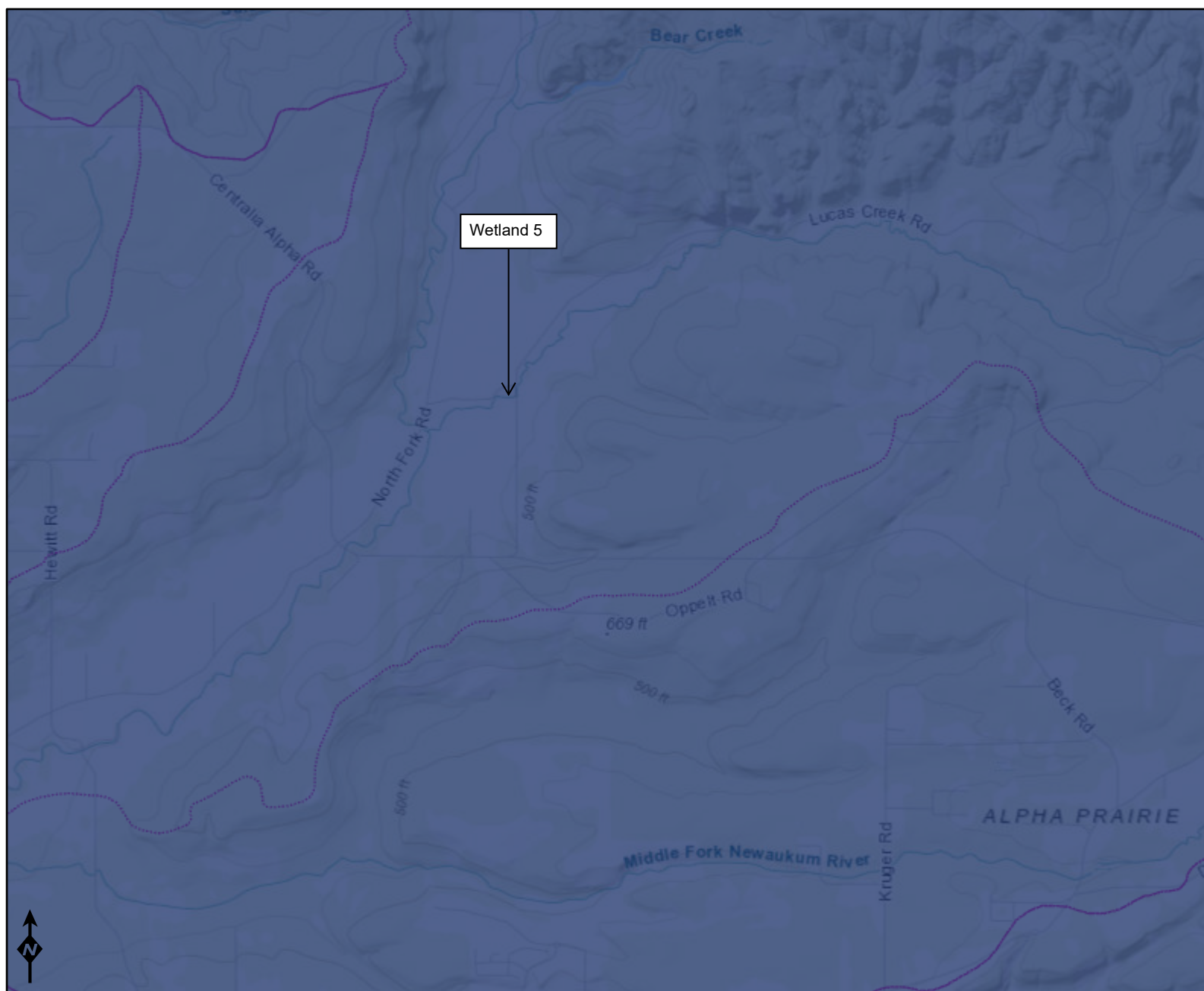
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Figure 6 - TMDLs

**WQ Improvement Projects**

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Upper Chehalis River Bacteria TMDL

Upper Chehalis River Basin
Temperature TMDL

Upper Chehalis River Basin
Dissolved Oxygen TMDL

Wetland name or number W6

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland 6 Date of site visit: 12/3/2024
Rated by K. Corrigan & J. Gray Trained by Ecology? ☒ Yes ☐ No Date of training 2022
HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Y ☒ N

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

Source of base aerial photo/map Google

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 - 27
 Category II – Total score = 20 - 22
 X Category III – Total score = 16 - 19
 Category IV – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	H M <u>(L)</u>	H <u>(M)</u> L	H M <u>(L)</u>	
Landscape Potential	H <u>(M)</u> L	H M <u>(L)</u>	H <u>(M)</u> L	
Value	<u>(H)</u> M L	H <u>(M)</u> L	<u>(H)</u> M L	TOTAL
Score Based on Ratings	6	5	6	17

**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	NA

Wetland name or number W6

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

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

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 (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	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 total 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 (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total 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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and total habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – **Saltwater Tidal Fringe (Estuarine)**

YES – **Freshwater Tidal Fringe**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe, it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.

2. The entire wetland unit is flat, and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet all** of the following criteria?

- ___ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size,
___ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ___ The wetland is on a slope (slope can be very gradual),
___ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheet flow, 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).

Wetland name or number W6

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
☐ The overbank flooding occurs at least once every 2 years.

NO – go to 6

YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? This means that any outlet, if present, is higher than the interior of the wetland.

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
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 W6

DEPRESSIONAL AND FLATS WETLANDS

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

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

D 1.1. <u>Characteristics of surface water outflows from the wetland:</u> Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 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		3
D 1.2. <u>The soil 2 in. below the surface (or duff layer) is true clay or true organic (use NRCS definitions).</u> Yes = 4 <u>No = 0</u>		0
D 1.3. <u>Characteristics and distribution of persistent plants</u> (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed plants > 95% of area points = 5 Wetland has persistent, ungrazed plants > 1/2 of area points = 3 Wetland has persistent, ungrazed plants ≥ 1/10 of area points = 1 Wetland has persistent, ungrazed plants < 1/10 of area points = 0		0
D 1.4. <u>Characteristics of seasonal ponding or inundation:</u> <i>This is the area that is ponded for at least 2 months. See description in manual.</i> Area seasonally ponded is > 1/2 total area of wetland points = 4 Area seasonally ponded is ≥ 1/4 total area of wetland points = 2 Area seasonally ponded is < 1/4 total area of wetland points = 0		0
Total for D 1		3

Rating of Site Potential If score is: 12-16 = H 6-11 = M X 0-5 = L

Record the rating on the first page

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

D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 <u>No = 0</u>	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	<u>Yes = 1</u> No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 <u>No = 0</u>	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source _____	Yes = 1 <u>No = 0</u>	0
Total for D 2		1

Rating of Landscape Potential If score is: 3 or 4 = H X 1 or 2 = M 0 = L

Record the rating on the first page

D 3.0. Is the water quality improvement provided by the site valuable to society?

D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 <u>No = 0</u>	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 <u>No = 0</u>	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 in development or in effect for the basin in which the unit is found.)	<u>Yes = 2</u> No = 0	2
Total for D 3		2

Rating of Value If score is: X 2-4 = H 1 = M 0 = L

Record the rating on the first page

HUC12: 171001030203 - North Fork Newaukum River

Upper Chehalis River Bacteria TMDL, Upper Chehalis River Basin Temperature TMDL,
& Upper Chehalis River Basin Dissolved Oxygen TMDL

Wetland name or number W6

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/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		4
D 4.2. Depth of storage during wet periods: Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part. Marks 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 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		10

Rating of Site Potential If score is: 12-16 = H X 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 <u>No = 0</u>		0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 <u>No = 0</u>		0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 <u>No = 0</u>		0
Total for D 5		0

Rating of Landscape Potential If score is: 3 = H 1 or 2 = M X 0 = L Record the rating on the first page

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. Is the unit in a landscape that has flooding problems? Choose the description that best matches conditions around the wetland unit being rated. Do not add points. <u>Choose the highest score if more than one condition is met.</u> The wetland captures surface water that would otherwise flow downgradient 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 downgradient of unit. points = 2 - Surface flooding problems are in a sub-basin farther downgradient. 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. <i>Explain why</i> _____ 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 <u>No = 0</u>		0
Total for D 6		1

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

These questions apply to wetlands of all HGM classes.**HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat**H 1.0. Does the site have the potential to provide habitat?**

H 1.1. Structure of plant community: Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac if the unit is at least 2.5 ac, or more than 10% of the unit if it is smaller than 2.5 ac.

☐ 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/groundcover) that each cover 20% within the Forested polygon

0

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if the unit is < 2.5 ac, or ¼ ac if the unit is at least 2.5 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 only1 type present: points = 0☐ Permanently flowing stream or river in, or adjacent to, the wetland☐ Intermittently or seasonally flowing stream in, or adjacent to, the wetland☐ **Lake Fringe wetland****2 points**☐ **Freshwater tidal wetland****2 points**

0

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft².

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, Canada 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 interspersions among Cowardin plant 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

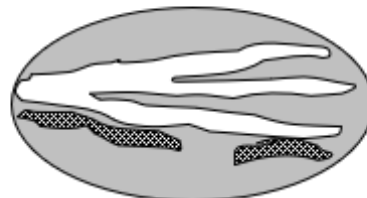
Low = 1 point



Moderate = 2 points



All three diagrams
in this row
are **High** = 3 points



0

Wetland name or number W6

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 extend at least 3.3 ft (1 m) over open water or 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 above for the list of strata and H 1.5 in the manual for the list of aggressive plant species)

1

Total for H 1

Add the points in the boxes above

2

Rating of Site Potential If score is: 15-18 = H 7-14 = M X 0-6 = L

Record the rating on the first page

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

H 2.1. Accessible habitat (include only habitat polygons accessible from the wetland.

- Calculate: % relatively undisturbed habitat $\frac{1.6}{2.2} + [(\% \text{ moderate and low intensity land uses})/2] = 3.8\%$
- Total accessible habitat is:
- > 1/3 (33.3%) of 1 km Polygon points = 3
 - 20-33% of 1 km Polygon points = 2
 - 10-19% of 1 km Polygon points = 1
 - < 10% of 1 km Polygon points = 0

0

H 2.2. Total habitat in 1 km Polygon around the wetland.

- Calculate: % relatively undisturbed habitat $\frac{22.6}{21.7} = 44.3\%$
- Total habitat > 50% of Polygon points = 3
 - Total habitat 10-50% and in 1-3 patches points = 2
 - Total habitat 10-50% and > 3 patches points = 1
 - Total habitat < 10% of 1 km Polygon points = 0

1

H 2.3. Land use intensity in 1 km Polygon:

- > 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

1

Rating of Landscape Potential If score is: 4-6 = H X 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 data
 - ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan
- Site has 1 or 2 Priority Habitats (listed on next page) within 100 m points = 1
- Site does not meet any of the criteria above points = 0

2

Rating of Value If score is: X 2 = H 1 = M 0 = L

Record the rating on the first page

WDFW Priority Habitats

See complete descriptions of Priority Habitats listed by WDFW, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008 (current year, as revised). [Priority Habitat and Species List](#).¹³³ This list was updated for consistency with guidance from WDFW.

This question is independent of the land use between the wetland unit and the Priority Habitat. All vegetated wetlands are by definition a Priority Habitat but are not included in this list because they are addressed by this rating system.

Count how many of the following Priority Habitats are within 330 ft (100 m) of the wetland unit:

- **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. This habitat automatically counts if mapped on the PHS online map within 100m of the wetland. If not mapped, a determination can be made in the field.
- **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.
- **Fresh Deepwater:** Lands permanently flooded with freshwater, including environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live. Substrate does not support emergent vegetation. Do not select if Instream habitat is also present, or if the entire Deepwater feature is included in the wetland unit being rated (such as a pond with a vegetated fringe).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **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. Do not select if Fresh Deepwater habitat is also present.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore.
- **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) diameter at breast height (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.

¹³³ <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

Wetland name or number W6

- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important. For single oaks or oak stands <0.4 ha in urban areas, [WDFW's Management Recommendations for Oregon White Oak](#)¹³⁴ provides more detail for determining if they are Priority Habitats
- X **Riparian:** The area adjacent to freshwater aquatic systems with flowing or standing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- X **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.
- **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.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie.

¹³⁴ <https://wdfw.wa.gov/publications/00030/wdfw00030.pdf>
Wetland Rating System for Western WA: 2014 Update
Rating Form – Version 2, July 2023

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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 <i>Spartina</i> , see chapter 4.8 in the manual. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed 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. Does the wetland overlap with any known or historical rare plant or rare & high-quality ecosystem polygons on the WNHP Data Explorer ? ¹³⁵ Yes = Category I No – Go to SC 2.2 SC 2.2. Does the wetland have a rare plant species, rare ecosystem (e.g., plant community), or high-quality common ecosystem that may qualify the site as a WHCV? Contact WNHP for resources to help determine the presence of these elements. Yes – Submit data to WA Natural Heritage Program for determination,¹³⁶ Go to SC 2.3 No = Not a WHCV SC 2.3. Did WNHP review the site within 30 days and determine that it has a rare plant or ecosystem that meets their criteria? 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? <i>Use the key below. If you answer YES, you will still need to rate the wetland based on its functions.</i> 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 = 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 = 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 = Category I bog No = Not a bog	Cat. I

¹³⁵ <https://www.dnr.wa.gov/NHPdata>¹³⁶ https://www.dnr.wa.gov/Publications/amp_nh_sighting_form.pdf



FIGURE 1
COWARDIN CLASSES & 150-FT BUFFER
WETLAND 6
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Palustrine Emergent (PEM)
- Wetland Buffer (150 ft)
- Delineated Wetland Boundary
- Estimated Wetland Boundary
- Ordinary High Water

0 100 ft



FIGURE 2

HYDROPERIODS

WETLAND 6

SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Occasionally Flooded
- Delineated Wetland Boundary
- Estimated Wetland Boundary

0 100 ft

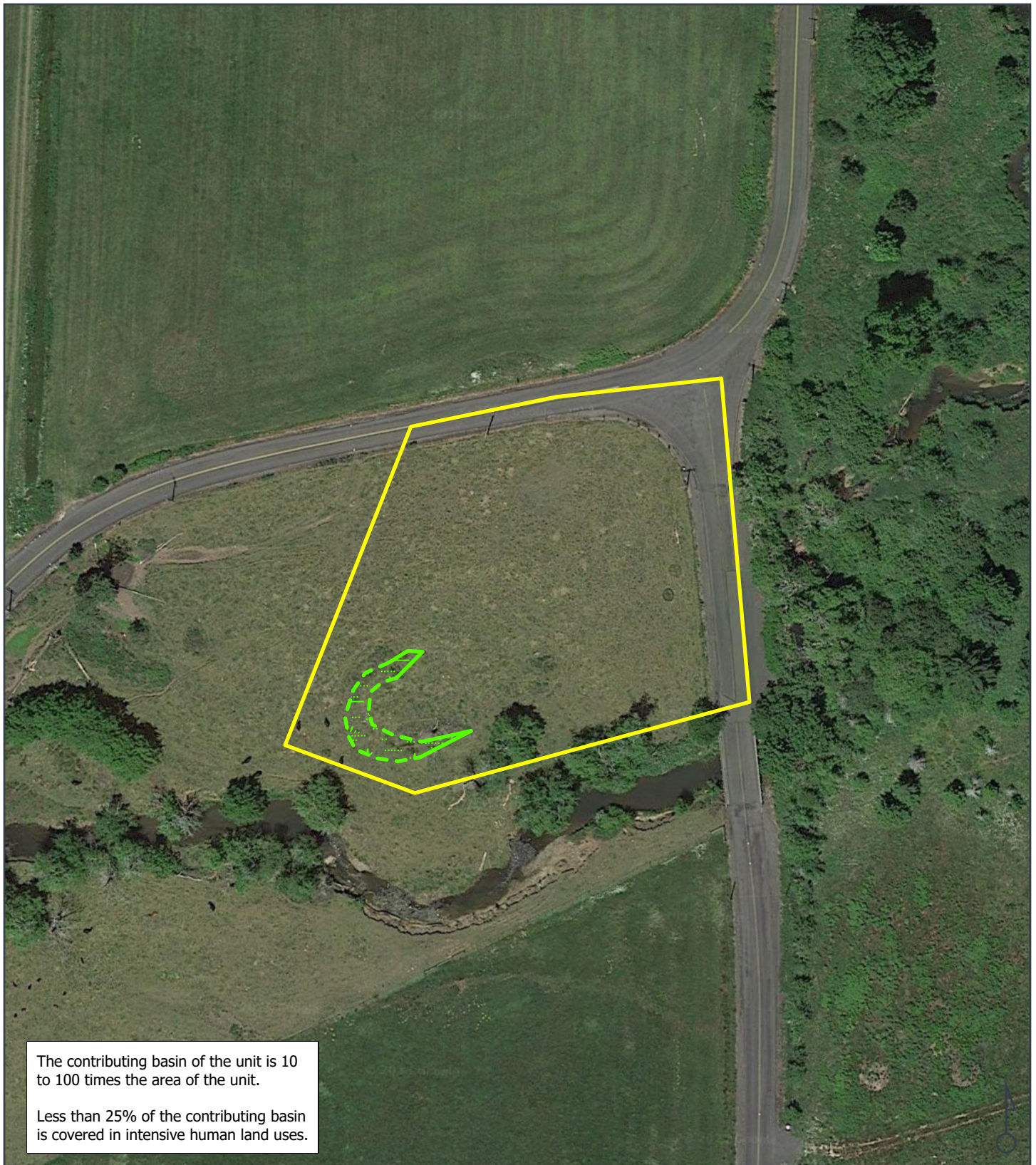


FIGURE 3
CONTRIBUTING BASIN
WETLAND 6
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- ▮ Contributing Basin
- ▮ Delineated Wetland Boundary
- - - Estimated Wetland Boundary
- ▮ Wetland Area

0 100 ft

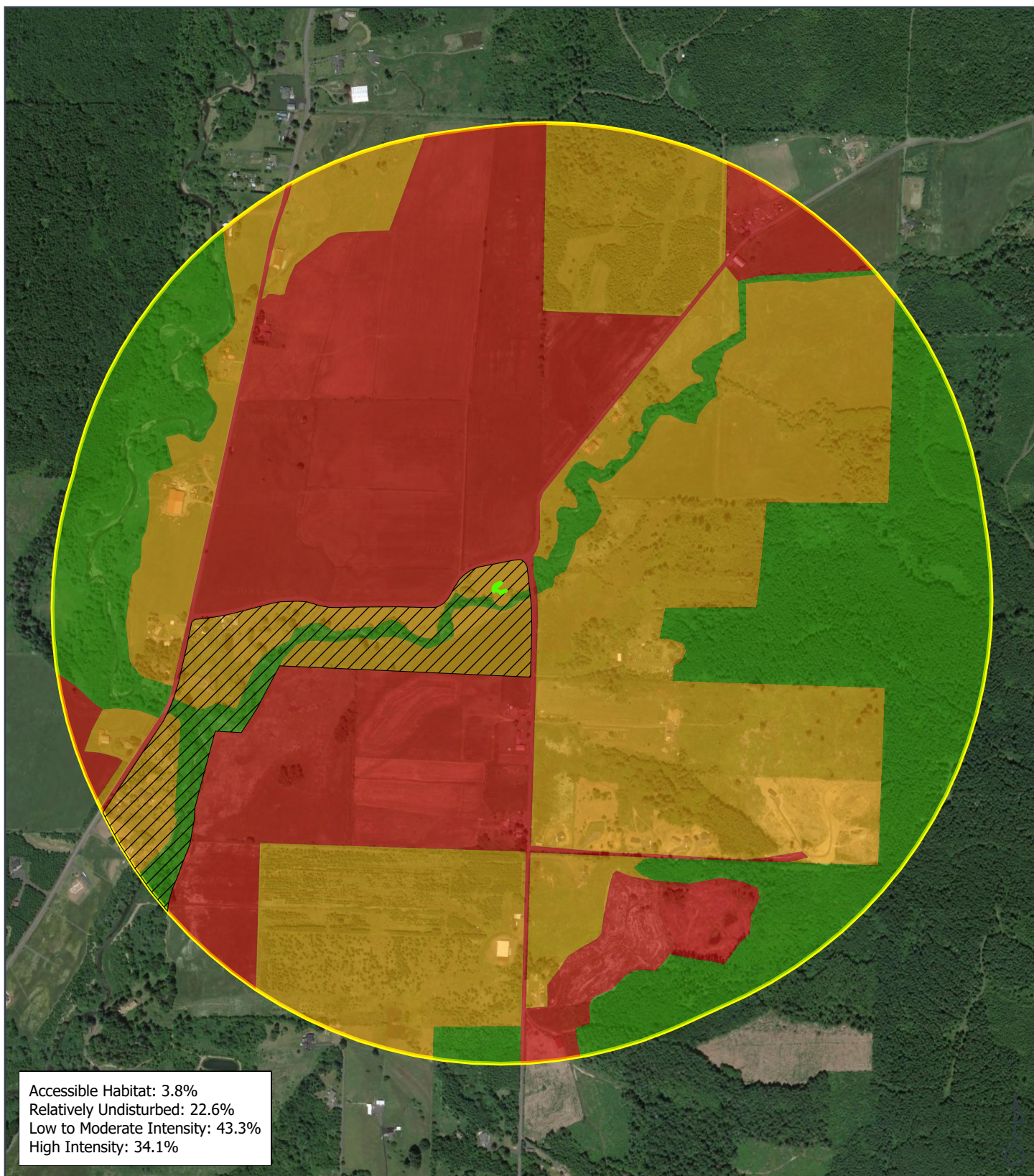


FIGURE 4
LAND USE INTENSITY
WETLAND 6
SENN ROAD BRIDGE SCOUR REPAIR | 21588A
LEWIS COUNTY, WASHINGTON

LEGEND

- Accessible Habitat
- High Intensity
- Low to Moderate Intensity
- Relatively Undisturbed
- Delineated Wetland Boundary
- Estimated Wetland Boundary

0 1,000 ft

Figure 5 - 303(d) Listed Waters

**Assessed Water/Sediment****Water**

- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment

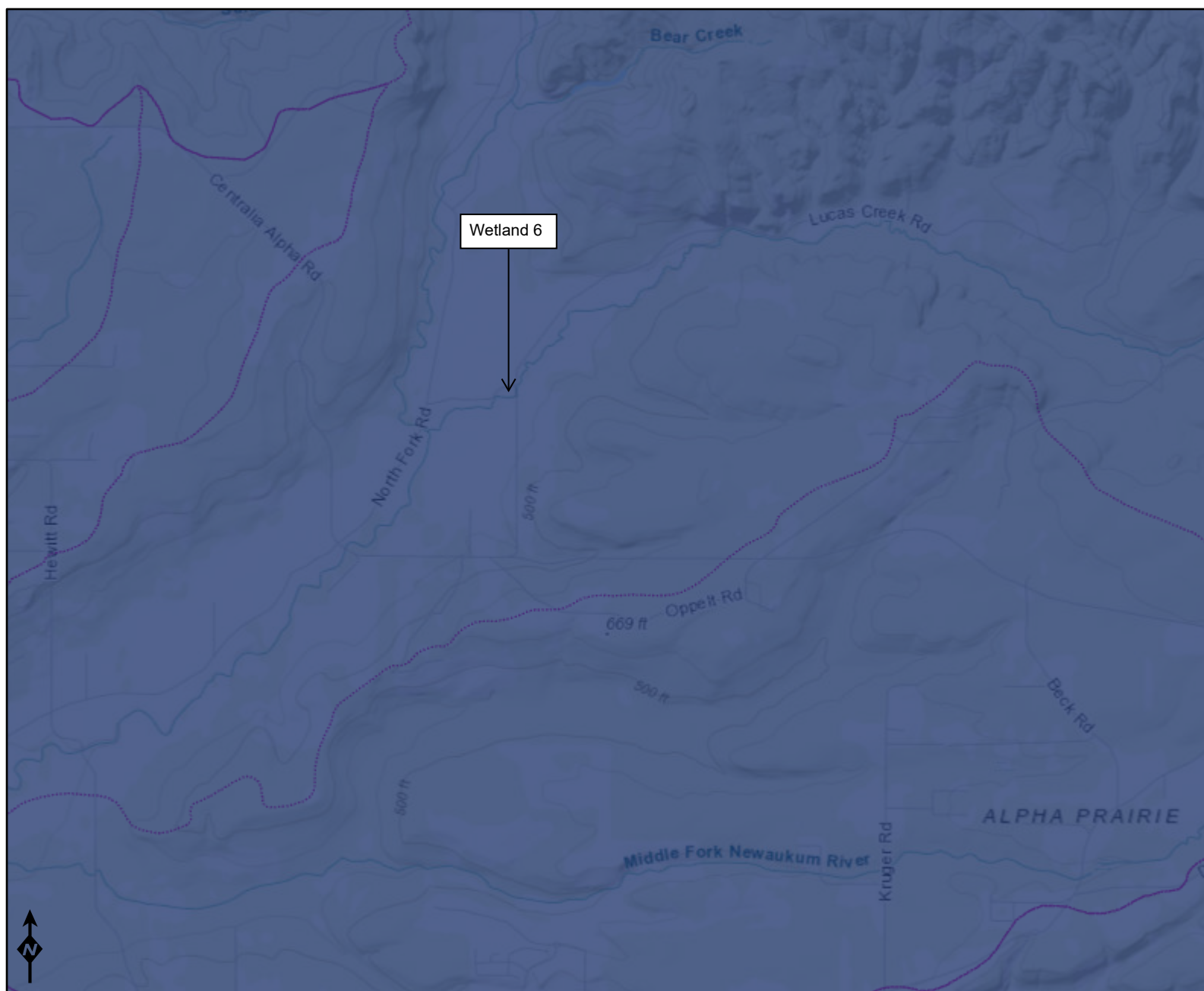
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Figure 6 - TMDLs

**WQ Improvement Projects**

- TMDL - Approved
- 4B - Approved
- STI - Approved
- ARP - Approved
- TMDL - In Development
- STI - In Development
- ARP - In Development

Subbasins (12 digit HUCs)

- HUC boundary

HUC12: 171001030203 -
North Fork Newaukum River

Upper Chehalis River Bacteria TMDL

Upper Chehalis River Basin
Temperature TMDL

Upper Chehalis River Basin
Dissolved Oxygen TMDL

Appendix E: Site Photos

Site Photographs – December 3 & 4, 2024



1. Wetland 1 from its northern boundary, looking south.



2. Typical conditions in Wetland 2, looking east towards Senn Road



3. Wetland 3 and Lucas Creek, looking north along the east bank of Lucas Creek



4. Typical conditions in Wetland 4, looking west toward Senn Road



5. Typical conditions in Wetland 5, looking east along north bank Lucas Creek



6. Typical conditions in Wetland 6, looking northwest



7. Lucas Creek from Senn Road looking west



8. Lucas Creek from Senn Road looking northeast



9. Senn Road bridge over Lucas Creek



10. Typical erosion along south bank of Lucas Creek west of Senn Road.



11. Lucas Creek east of Senn Road



12. Confluence of Tributary 1 and Lucas Creek



13. Typical conditions in Tributary 1, looking north



14. Tributary 2, looking east from Lucas Creek

Appendix E

Cultural Resources Report

CULTURAL RESOURCES REPORT COVER SHEET

DAHP Project Number: 2025-04-02252

Author: Emily Boutain, Jessica Gardner, and Margaret Berger

Title of Report: Cultural Resources Assessment for the Senn MP 0.89 Bridge
Scour Repair Project, Lewis County, Washington

Date of Report: June 26, 2025

County(ies): Lewis Section: 02 Township: 13 N Range: 01 W

Quad: Logan Hill, WA Acres: 2.6 acres

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☐ Yes ☒ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☐ Yes ☒ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.



Cultural Resource Consultants

Cultural Resources Assessment for the Senn MP 0.89 Bridge Scour Repair Project, Lewis County, Washington

Report Prepared by
Emily Boutain and Jessica Gardner

Principal Investigator
Margaret Berger

June 26, 2025

Technical Memo 2403F-1
DAHP PROJECT: 2025-04-02252

Report Submitted to
Jeff Gray
Otak, Inc.

Cultural Resource Consultants, LLC
P.O. Box 4159
Seattle, Washington 98194

**Cultural Resources Assessment for the
Senn MP 0.89 Bridge Scour Repair Project,
Lewis County, Washington**

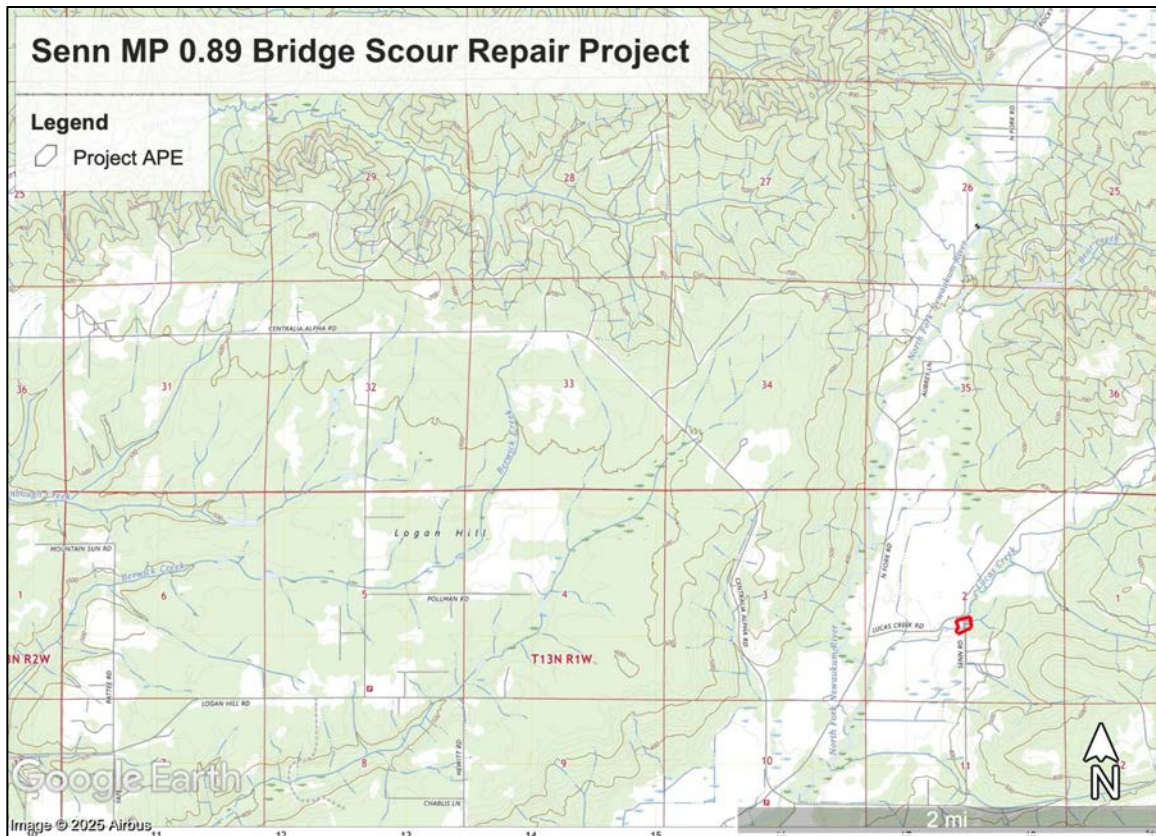
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I. Management Summary

This report provides a cultural resources assessment for the Senn MP 0.89 Bridge Scour Repair Project, Lewis County, Washington. Otak, Inc., on behalf of Lewis County, requested that Cultural Resource Consultants, LLC (CRC) complete a cultural resources assessment prior to proposed excavation and filling along the banks of Lucas Creek to provide scour protection and bank stability. The Senn Bridge is classified as scour critical due to abutment/interior pile tip elevations within 10 feet of the stream's thalweg. Lewis County proposes to conduct scour analysis, including geomorphic, geotechnical, hydrologic, and hydraulic analyses, and develop three mitigation alternatives. Ground disturbance at the project's Area of Potential Effects (APE) will likely include excavation in the channel and along the banks of Lucas Creek and tracking from movement of machinery. Staging areas will be located within the boundaries of the project APE.

This assessment was developed to document recorded and unrecorded archaeological sites, historic built environment resources, and other cultural resources and to evaluate the potential for project activities to affect cultural resources. Background research and field investigation conducted by CRC did not result in the identification of archaeological sites, historic built environment resources, or other cultural resources at the project location. The existing three-span bridge, supported by concrete piles, Senn Bridge was built in 1966 and meets the Advisory Council on Historic Preservation's Program Comment on Common Post-1945 Concrete and Steel Bridges; it is therefore exempt from Section 106 review.

Ten shovel probes were excavated to an average depth of 115.5 cm (3.7 ft) below surface, with eight of the probes reaching depths of 105 to 162 cm (3.4 to 5.3 feet) below surface. Probes generally contained alluvial sediments consistent with locally mapped soils and surface geology. None of the probes contained archaeological material. Most ground disturbance is anticipated to be within 3 to 5 ft below surface, comparable to the depths reached by the shovel probes, and the maximum depth of ground disturbance will be up to 8 feet below surface. No additional cultural resources investigation is recommended at this time. CRC recommends a finding of "no historic properties affected." If project activities result in the discovery of archaeological materials or human skeletal remains, CRC recommends project staff follow the inadvertent discovery protocol outlined in Appendix D.



1.1 Regulatory Context

This cultural resources assessment was developed as a component of preconstruction environmental review for the Senn MP 0.89 Bridge Scour Repair Project. It sought to prevent adverse impacts to cultural resources during ground disturbing activities by evaluating whether archaeological sites, historic built environment resources (i.e., buildings or structures at least 50 years old), or other cultural resources exist within the boundaries of the project. CRC's work was intended, in part, to assist in addressing state regulations pertaining to the identification and protection of cultural resources. The Archaeological Sites and Resources Act (RCW 27.53) prohibits knowingly disturbing archaeological sites without a permit from the Washington State Department of Archaeology and Historic Preservation (DAHP); the Indian Graves and Records Act (RCW 27.44) prohibits knowingly disturbing Native American or historic graves; and the Abandoned and Historic Cemeteries and Historic Graves Act (RCW 68.60) calls for the protection and preservation of historic era cemeteries and graves.

The project will make use of federal funds awarded by the Federal Highway Administration (FHWA)—through the Washington State Department of Transportation (WSDOT)—and will require involvement by the United States Army Corps of Engineers (USACE). The project therefore qualifies as a federal undertaking subject to Section 106 of the National Historic Preservation Act (NHPA). Agencies involved in a federal undertaking must consider the undertaking's potential effects to historic properties within a defined APE (36 CFR 800.16(l)(1)). Historic properties are defined as buildings, districts, sites, structures or objects, typically more than 50 years old, that are deemed eligible for listing on the National Register of Historic Places (NRHP). The Section 106 process involves identifying and inventorying historic properties within the APE and evaluating whether those properties satisfy NRHP eligibility criteria and integrity considerations. If NRHP-eligible historic properties are identified within the APE, potential adverse effects to historic properties must be assessed and a resolution of adverse effects recommended. WSDOT is acting on behalf of FHWA in processing the federal environmental compliance documentation and has been delegated the authority from FHWA to manage the cultural resources studies as part of the Section 106 compliance.

1.2 Research Design

CRC's investigation consisted of (1) review of available project information and correspondence provided by the project proponent; (2) examination of local environmental, historical, and archaeological datasets; and (3) field investigation. On April 14, 2025, CRC contacted cultural resources personnel at Confederated Tribes of the Chehalis Reservation, Cowlitz Indian Tribe, Nisqually Indian Tribe, and Quinault Indian Nation on a technical staff to technical staff basis to inquire about project-related cultural information or concerns (Appendix A). This correspondence was not intended to be or replace formal government-

to-government consultation. Information provided by Tribes' cultural resources personnel subsequent to the submission of this report will be included in a revised version. This assessment considered comments provided by Tribes, previous studies in the project vicinity, the magnitude and nature of the undertaking, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties at the project location, as well as other applicable laws, standards, and guidelines (per 36 CFR 800.4 (b)(1)) (DAHP 2023).

1.3 Project Information

1.3.1 Project Location

The project encompasses approximately 2.6 acres in unincorporated Lewis County, located 6.5 miles northeast of City of Napavine and 7.5 miles east of the City of Chehalis. It encompasses the right-of-way of Senn Road and portions of Lewis County parcel numbers 016829000000 and 016834001002. The project is located in the NE¹/₄ of the SW¹/₄ and the NW¹/₄ of the SE¹/₄ of Section 2 in Township 13 North, Range 01 West, Willamette Meridian (Figure 1).

1.3.2 Project Description

As part of the Senn MP 0.89 Bridge Scour Repair Project, Lewis County proposes to excavate and fill along the banks of Lucas Creek to provide scour protection and bank stability. Lewis County proposes to conduct scour analysis, including geomorphic, geotechnical, hydrologic, and hydraulic analyses, and develop three mitigation alternatives. Ground disturbance at the project APE will likely include excavation in the channel and along the banks of Lucas Creek and tracking from movement of machinery. Most ground disturbance is anticipated to be within 3 to 5 ft below surface, and the maximum depth of ground disturbance will be up to 8 feet below surface. Staging areas will be located within the boundaries of the project APE.

For the purposes of this assessment, the area of interest for cultural resources (hereafter, “the project” or “the project location”) is understood to be the 2.6-acre APE described above and depicted in Figures 1 – 2. The APE was defined on December 12, 2024, through consultation with Washington State Department of Transportation (WSDOT) on behalf of FHWA. DAHP concurred with the APE on April 9, 2025 (Appendix B).



Figure 2. Satellite imagery of the project location (Google, Inc. 2025).

2. Background Research

2.1 Overview

Background research was conducted in May 2025.

Recorded Cultural Resources Present: Yes ☐ No ☒

According to the Washington Information System for Architectural and Archaeological Records Data (WISAARD), no archaeological sites, register-listed historic properties, or other cultural resources have been recorded at the project location (DAHP 2025).

The following context overview summarizes environmental, historical, and archaeological information contained in local cultural resource reports; archaeological and historical data from DAHP and the Washington Information System for Architectural and Archaeological Records Data (WISAARD); ethnographic resources; geological and soils surveys; historical maps and documents from the United States Bureau of Land Management (BLM) and United States Surveyor General (USSG) Land Status & Cadastral Survey Records database; HistoryLink; Historic Map Works; HistoricAerials; University of Washington's Digital Collection; Washington State University's Early Washington Maps Collection; and CRC's library. This report's discussion of geology, archaeology, and history at the project location

incorporates context information from CRC's previous work in Lewis County (e.g., Carlson 2025; Oreste and Berger 2024).

In this report, dates are presented in calendar years ago. Dates based on radiocarbon data that have been calibrated to yield a calendrical age are represented as "cal BP" (before present); those that have not been calibrated are represented as "uncal BP."

2.2 Environmental Context

The Senn MP 0.89 Bridge Scour Repair Project encompasses approximately 2.6 acres in unincorporated Lewis County between Napavine and Chehalis. It is situated along Lucas Creek and located approximately 8.3 miles east of Interstate 5 (I-5), 6.8 miles north of U.S. Highway 12, 10.03 miles east of State Route (SR) 6, and 2.65 miles north of the Middle Fork Newaukum River. Lucas Creek flows into the Cowlitz River approximately 9.7 miles southeast of the project. Surface elevation at the project ranges from 350 to 360 feet above sea level, with the highest point in the northwestern corner of the project.

The project is situated within the Cowlitz/Newaukum Prairie and Logan Hill Floodplains (Pater et al. 1998). The region is a transitional zone between the Puget Lowland and Willamette Valley ecoregions, and consists of well-drained soils with forests, prairies, cropland, floodplains, and pastureland. The area did not experience continental glaciation.

2.2.1 Geomorphology

The landscape of western Washington is a product of crustal deformation initiated by the Cascadia subduction zone; repeated glacial scouring and deposition; landslides, erosion, and deposition; and Holocene human activity. The project is located within the Puget Trough physiographic province, which extends from the Canadian border to the Willamette Valley in Oregon. The central and southern Puget Trough encompasses the drainage of the upper Chehalis River and the Cowlitz River (Franklin and Dyrness 1988). During the late Pleistocene (110,000 to 12,000 years cal BP), much of the northern Pacific Northwest was scoured by repeated advances and retreats of the Cordilleran Ice Sheet, and alpine glaciers from the Cascade range extended into and shaped the central Puget Trough (Kopperl 2004; Kruckeberg 1991; Thorson 1980; Troost and Booth 2008). The Puget Trough was formed by these glacial events, as moving ice up to thousands of feet thick sculpted a series of north-south trending valleys within a wide basin between the Coast and Cascade Ranges (McKee 1972).

The ice sheet's Puget Lobe most recently advanced during the Vashon Stade of the Fraser glaciation, the latter of which began approximately 25,000 years ago. The Puget Lobe reached Seattle 17,590 years cal BP, and achieved its maximum extent near Tenino 16,950 years cal BP. The onset of climatic warming caused the ice sheet to rapidly retreat to the

north (Booth et al. 2004; Borden and Troost 2001; Porter and Swanson 1998). As the glacier receded, meltwater became impounded behind the ice, forming a series of meltwater channels that flowed across a broad outwash plain. Glacial meltwater ponded to form a series of proglacial lakes (Collins and Montgomery 2011). Many of these lakes later merged into glacial Lake Russell, which drained via the Black Lake spillway into the Chehalis River. As glacial retreat continued, meltwater coalesced into glacial Lake Bretz, which at its maximum extended from the southern margin of Whidbey Island to Olympia. As the ice sheet retreated north, new spillways emerged, carrying meltwater into the Strait of Juan de Fuca (Bretz 1913; Thorson 1989; Waitt and Thorson 1983). Till, outwash, and ice-contact sediments were deposited throughout the region during glacial retreat and meltwater recession (Booth 1994).

Though not glaciated, the central Puget Trough and Willapa Hills were shaped by the flow of glacial meltwater and outwash, large volumes of which entered the Chehalis River via the Skookumchuck River and the Cowlitz River via the Cowlitz Glacier on Mount Rainier (Bretz 1913; Kruckeberg 1991; McKee 1972). Active deposition during the Holocene has been confined to river valleys and the base of steep slopes (Booth et al. 2003:20-21). River processes such as flooding, erosion, transportation, and deposition of sediments have shaped the postglacial geomorphology of the Chehalis and Cowlitz River areas and have introduced and increased alluvial deposition in the area (Foutch et al. 2012; Kopperl 2004). An alluvial fan developed at the confluence of the Chehalis and Skookumchuck Rivers near present-day Centralia. As the fan expanded, it forced the Chehalis River channel to the west. During high water flows, the fan partially dammed the Chehalis, which raised and flattened the Chehalis River Valley (Bretz 1913; Kopperl et al. 2011:5-6)

In subsequent centuries, changes in global sea levels and climate altered the character and course of the Chehalis River. As sea levels rose, the gradient of the river decreased, leading to aggradation, or the deposition of fine-grained sediments, in adjacent lowlands. Shifts toward warmer and wetter climate conditions further increased the volume of sediment introduced into the river. After sea levels stabilized, the river began to move laterally across the valley floor, creating point bars and eroding meander bends. Today, the relatively flat, slightly rolling surface of the Chehalis River floodplain consists of previous channel meanders, abandoned channels, oxbow lakes, point bars, and alluvial fans that developed over the course of the middle and late Holocene. Many of these landforms are currently covered by recent alluvium. Kopperl et al. (2011:6) identified three geomorphic surfaces in the Chehalis River floodplain. From oldest to youngest, the floodplain consists of (1) flat, open portions, (2) gently sloping surfaces, and (3) undulating surfaces along the current river channel.

Flooding has affected low-lying areas along the Chehalis and Newaukum Rivers throughout the Holocene. Flood events eroded some surfaces and buried others, creating a mosaic of buried and truncated landforms in the Chehalis River Basin (Foutch et al. 2012:9). Soils developed on stable surfaces between flood events. Today, as during the terminal Pleistocene, sediments deposited at the mouth of the Skookumchuck River during high water flows can block the main channel of the Chehalis River, leading to increased water elevations upstream. Urban development and agricultural operations, which have removed surface vegetation and reduced riparian areas, have exacerbated the severity of recent flood events by increasing surface runoff (Kopperl et al. 2011:6).

Stratigraphic markers of subduction-thrust earthquakes and associated uplift, subsidence, and deformation have been observed at multiple locations on the Washington coast and around Puget Sound. Southwestern Washington has been affected by several seismic events and coastal tsunamis, including a large earthquake approximately 250 years cal BP (Atwater 1987; Atwater et al. 2004; Losey 2005). Accounts of this and other seismic events, such as those along the Seattle Fault, are preserved in Tribes' oral histories (Losey 2007; Ludwin et al. 2005).

While oral storytelling traditions vary across Tribes, among the Cowlitz people there is a notable account involving Mount St. Helens (Lawelatla), Mount Rainier (Takhoma), and Mount Adams (Patu), which explains the origins of the mountains and the eruption of Lawelatla (Wilson 1998). These stories emphasize the dynamic relationship between people and the land, illustrating how natural events—such as the 1980 eruption of Mount St. Helens and previous eruptions—transform the landscape. Through such transformations, new life and environmental variation emerge, reinforcing a deep respect and enduring connection to the land.

2.2.2 Surface Geology

At 1:100,000-scale, one surface geologic unit—Qal, Holocene alluvium—is mapped at the project location. This consists of silt, sand, and gravel deposited in stream beds and fans. Low-level terraces and lacustrine deposits can be present, as well (Schasse 1987; Washington State Department of Natural Resources [WA DNR] 2025).

2.2.3 Soils

One soil unit is mapped at the project location: Chehalis silty clay (United States Department of Agriculture Natural Resources Conservation Service [USDA NRCS] 2025). This soil develops from alluvium parent material and forms on floodplains and terraces. It is moderately well drained, with the water table present more than 80 inches below surface, though flooding has been occasionally recorded. A typical profile consists of one A horizon of dark brown silty clay from 0 to 17 inches (0 to 43 centimeters [cm]) below surface; one B

horizon of dark yellowish brown silty clay loam from 17 to 44 inches (43 to 112 cm) below surface; and one C horizon of dark yellowish brown to pale gray stratified fine sandy loam to silty clay loam from 44 to 60 inches (112 to 152 cm) below surface (USDA NRCS 2025).

2.3 Climate and Vegetation

The paleoclimate of the Pacific Northwest during the late Pleistocene and Holocene is defined by four periods, which exhibit general trends based on variations in temperature and moisture (Kopperl et al. 2016:37-38).

- o 17,000 to 13,000 years cal BP: the region was much cooler and drier compared to the present.
- o 13,000 to 7000 years cal BP: the retreat of glacial ice and increased solar radiation led to higher temperatures, less precipitation, colder winters, and more severe summer droughts compared to the present.
- o 7000 to 5000 years cal BP: cooler, moister conditions returned to the region, with temperature ranges similar to the present. The current maritime climate regime of the Puget Sound region was fully established by the end of this period.
- o 5000 years cal BP to present: climatic conditions have undergone short-term fluctuations such as the Little Ice Age (500 to 100 years ago) and the Medieval Climatic Anomaly (1100 to 700 years ago).

In southwestern Washington, changes in temperature and moisture have supported different plant communities through time (Herbel and Schalk 2002:2.6-2.8; Kopperl et al. 2016:37-38; Kopperl et al. 2014:9-12). Following glacial recession and meltwater subsidence, landforms stabilized and vegetation began to return. Lodgepole pine (*Pinus contorta*) colonized newly exposed soils. These trees thrived in the gravelly, outwash soils south of Puget Sound and benefited from the lack of competition with other tree taxa. Around 12,000 years ago, Douglas fir and western Hemlock emerged as the dominant tree species of lowland forests. Prairies also developed during this period. They consisted of stands of grasses, beaked hazelnut (*Corylus cornuta*), and scattered Oregon white oaks (*Quercus garryana*). The warmer, drier climate conditions of the early to middle Holocene prevented the further spread of Douglas fir and resulted in the expansion of prairies. As noted by Herbel and Schalk (2002:2.7), shifting climate conditions benefited oaks, which are tap-rooted species and are thus able to survive droughts better than Douglas fir. Present-day vegetation communities emerged after 6000 years ago. Western redcedar (*Thuja plicata*) joined western hemlock and Douglas fir as primary components of lowland forests, although the spread of these trees appears to have been more prominent around Puget Sound than in southwestern Washington. The persistence of prairie ecosystems in the Chehalis River Basin in recent

millennia likely stems from the use of controlled burns by Native peoples (see below) (Herbel and Schalk 2002:2.9-2.11).

Today, the project location is situated within western Washington's western hemlock vegetation zone, which extends south from British Columbia through the Olympic Peninsula, Coast Ranges, Puget Trough, and Cascade physiographic provinces (Franklin and Dyrness 1988). The zone's wet, mild, maritime climate supports diverse plant taxa. In the Chehalis River Basin, vegetation communities commonly consist of western hemlock, Douglas fir, and western redcedar, red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), Oregon White Oak, camas (*Camassia* sp.), bracken fern, and various species of berries (especially *Rubus* sp.), grasses, rushes (especially *Juncus* sp.), and sedges (especially *Carex* sp.) (Herbel and Schalk 2002:2.8).

Before the arrival of Euro-American settlers, prairies were an ecologically and culturally significant part of the landscape in southwestern Washington. Prairies were dominated by Idaho fescue (*Festuca idahoensis*) and a thick layer of moss (especially *Racomitrium canescens*), with smaller quantities of sedge (*Carex pensylvanica*), camas, saxifrage (*Micranthes integrifolia*), and other plants (Franklin and Dyrness 1988:89). Prairies supported dozens of food plants utilized by local Native groups (Storm and Shebitz 2006:262). These included wild celery (*Lomatium* sp.), camas, wild carrot (*Perideridia gairdneri*), wild onion (*Allium* sp.), bracken fern (*Pteridium aquilinum*), oak acorns, hazelnuts (*Corylus cornuta*), prairie huckleberry (*Vaccinium caespitosum*), several species of *Rubus*, and wild strawberry (*Fragaria virginiana*). Prairies' specific vegetation composition depended on drainage. Wet prairies in low-lying areas with seasonally high water tables offered more suitable habitat for some plants compared to dry prairies in well-drained, higher elevation areas (Kopperl et al. 2011:12; Norton et al. 1983:125-126). The historical prairies in the Chehalis vicinity were likely wet prairies given their elevation and the presence of poorly drained soils.

2.4 Archaeological Context

Thousands of years of human occupation in western Washington have been summarized in a number of archaeological, ethnographic, and historical investigations over the past several decades. These studies provide regional context for evaluating the potential of archaeological deposits at the project location (e.g., Ames and Maschner 1999; Carlson 1990; Greengo 1983; Kopperl et al. 2016; Larson and Lewarch 1995; Nelson 1990).

Human history in western Washington extends to at least 14,000 years ago, a period corresponding with the most recent retreat of glacial ice in the region. Over the next six millennia, Native peoples lived in small, mobile groups that moved seasonally between productive hunting, fishing, and gathering locations. Archaeological evidence dating to immediate postglacial periods is limited to isolated projectile points (Meltzer and Dunnell

1987). Sites dated to the early Holocene generally consist of small resource processing camps. Late Pleistocene and early Holocene sites have been identified on upland drift plains, landforms that experienced little deposition in subsequent millennia. Habitation sites and other site types may have existed in lowland areas and along marine shorelines, but they have likely been destroyed by alluvial erosion and inundated by sea level rise, respectively (Kopperl et al. 2016:114-115). One exception is the Bear Creek Site (45KI839) near Lake Sammamish, which contained concave-based and stemmed projectile points situated below peat deposits dated to approximately 11,000 years cal BP (Kopperl et al. 2015).

Middle and late Holocene sites are better represented in Washington's archaeological record due to the stabilization of sea levels and, in recent millennia, regional population increases. During the middle Holocene, roughly 8000 to 3000 years ago, Native peoples established a broader range of residential and resource procurement site types and sizes. Middle Holocene sites have been identified on upland glacial landforms, in lowland river valleys, and along marine shorelines. Lithic assemblages consisting of chipped flake tools and large, leaf-shaped and stemmed points fashioned from coarse-grained raw materials are present at sites predating approximately 5000 years ago. After this period, lithic assemblages exhibit greater variation in form and raw material. Harvest of and occupation near littoral resources—activities that often produced sizable shell middens—emerged approximately 4500 years ago. The expansion in site type and size during the middle Holocene coincided with decreased mobility as Native groups developed specialized adaptations to local environments. Middle Holocene archaeological deposits were identified at the West Point Site (45KI428/429) near Discovery Park in Seattle. The site contained large quantities of faunal remains, stone projectile points, and shell and stone beads. The presence of fish, shellfish, bird, and mammal remains pointed to year-round utilization as Native peoples took advantage of the site's sheltered bluff and abundant nearby resources (Larson and Lewarch 1995). Other notable middle Holocene sites include the Marymoor Site (45KI9) near the confluence of Bear Creek and the Sammamish River (Greengo and Houston 1970) and the DuPont Southwest Site (45PI72) along the Puget Sound shoreline in DuPont (Wessen 1989).

Middle Holocene patterns intensified during the late Holocene. After around 3000 years ago, the archaeological record is characterized by diverse site and artifact types located in a range of environments. Semi-permanent winter village sites appear for the first time. Villages contained large shed- or gable-roofed plank houses built along marine shorelines and major waterways. During the non-winter months, Native peoples established single- and multiple-resource acquisition camps in lowland and upland areas. They harvested an array of plant and animal foods, and some sites, especially large coastal shell middens, exhibit evidence of intensive collection of resources such as salmon and shellfish. Lithic assemblages are characterized by local and imported raw material fashioned into chipped and ground tools, ground slate knives, and generally small, triangular projectile points. Organic materials such

as basketry, wood and bone tools, and structural elements from this period are more likely to be preserved, both in sealed storage pits and in submerged anaerobic sites. Notable late Holocene archaeological sites in western Washington include the Mellen Site (45LE125) near Centralia (Kennedy 1978; Kopperl et al. 2014), Ozette (45CA24) on the Olympic Peninsula (Samuels 1994), Cathlapotle (45CL1) along the Columbia River near Ridgefield (Ames et al. 1999), late components of the West Point Site (45KI428/429) (Larson and Lewarch 1995), and Old Man House (45KP2) near Suquamish (Schalk and Rhode 1985).

The arrival of Euro-Americans and other newcomers in the late eighteenth century marked the beginning of the colonial period. The establishment of the Pacific fur trade and later the transformation of Washington and Oregon into U.S. settler colonies upended regional demography and ecology. Beginning around 1850, Native people and non-Native newcomers established new archaeological site types, including forts, logging camps, industrial areas, and urban centers. Materials and structures associated with these sites dominate the archaeological record of the late nineteenth and twentieth centuries. Notable sites dating to the colonial period include Fort Vancouver (45CL163) along the Columbia River (Wilson 2018) and the Dearborn South Tideland Site (45KI924) in downtown Seattle (Schneyder et al. 2011).

2.5 Native Peoples

The project is located within the ancestral homelands of the Cowlitz-speaking Newaukum and Cowlitz peoples, whose territory spanned from just south of Chehalis to just north of the confluence of the Cowlitz River with the Columbia River. It is likely that the Cowlitz jointly inhabited their villages with their neighbors, including the Chinook-speaking peoples to the south and Upper Chehalis-speaking peoples to the north (Hajda 1990; Ruby et al. 2010).

The Upper Chehalis were five bands who spoke three dialects known as Satsop, Downriver Oakville, and Upriver Tenino (Miller 2012:168). Ethnographers identified these five bands as the stacawams, on the Chehalis River from Cloquallum Creek to the mouth of Black River, the sq ayayiq on the Black River and north to Eld Inlet; the Imzsluwa, near Tenino; the ?ilawiqs, near the city of Chehalis, and caxasn⁷ on the Upper Chehalis River around Pe Ell (Hajda 1990:503). The Cowlitz Indian Tribe were four distinct bands that have now come together as one (Wilson 1998). The land that Cowlitz people originally cared for ranges from the Columbia River to the Puget Sound to the Cascades for one group (Dupres 2014:15). Another group could be found from the Lewis River to Mount Saint Helens or Mount Adams. A third group could be found from Sauvie Island to a town, now known as Battle Ground, which honors the place where Cowlitz Chief Umtuch was murdered. The Lower Cowlitz lived along the lower Cowlitz River drainage along its tributaries and the Newaukum River Valley (Williams et al. 2014:4). The Lower Cowlitz spoke a Salishan dialect.

For millennia, the Chehalis River Basin, including the project location, has been a place of travel and exchange. The Cowlitz Trail extended north-south through the Cowlitz and Chehalis River Valleys, linking Puget Sound and the Columbia River. The Chehalis and Black Rivers enabled travel between Grays Harbor and southern Puget Sound. Willapa Bay was accessible via the upper Chehalis River and the Willapa Hills, and passes across the Cascade Range were present in the upper Newaukum River Valley. Native peoples journeyed through these corridors. They harvested resources from a range of environments and formalized social and economic relationships with neighboring groups. Relationships were established and strengthened via intermarriage, gifting, and trade, especially of localized resources such as shellfish from southern Puget Sound, sea mammal pelts from the coast, and (beginning in the eighteenth century) horses from the Columbia Plateau. The Chehalis River Basin was also an important highway connecting people with regional gathering, festivity, and trading centers such as Celilo Falls (Hajda 1990:508; James and Chubby 2015:106; Miller 2012).

During the nineteenth century, and for centuries prior, the lifeways of Cowlitz peoples and their neighbors featured seasonal movements to different settlements and resource gathering locations. During the spring, summer, and fall, families travelled across the landscape, primarily via canoe, to seasonal camps situated in a variety of environmental zones. From these camps, they built fish weirs to catch salmon, trout, and small fish; hunted birds and terrestrial mammals such as elk and deer; and collected berries, roots and other plants (Hajda 1990:507). Many important plant and animals would have been present along the Chehalis, Newaukum, and Cowlitz Rivers and their tributaries. The inland prairies in Upper Chehalis and Cowlitz lands also supported large quantities of camas, which were harvested for consumption and exchange. The prairies were actively managed, with periodic burns conducted to enhance the productivity of camas and other plants and provide forage for animals (Leopold and Boyd 1999). Camas, fish, and other harvested resources were roasted, dried, and stored for consumption during the leaner winter months or processed for manufacture of clothing, medicines, baskets, and tools.

As fall turned to winter, families relocated to large gable-roofed, cedar plank houses in villages situated along waterways. Plank houses measured up to several hundred feet in length and were fashioned from split cedar planks and carved house posts, with mats used for insulation. They contained multiple interior hearths, sleeping platforms, and extensive storage facilities, and could house more than one family. Winter was a time for ceremonial activities and strengthening relations within and between village communities (Haeberlin and Gunther 1930). Kinkade (1997) compiled a list of Cowlitz place names and identified several villages along the Cowlitz River. The closest listed village is łəkwəl, located approximately 14.11 miles southeast of the project near the present-day town of Toledo.

The project location is part of a storied landscape. The names given to rivers, mountains, food gathering areas, and other geographic markers encapsulate the creation and ordering of the world, stories for proper behavior toward human and nonhuman relations, and Native peoples' millennia-old and ongoing histories. During the early twentieth century, ethnographers recorded hundreds of named places around western Washington. This collection is far from complete—the lands and waters of western Washington have been known by many thousands of names through time—and many of the translations offered by ethnographers do not capture the full significance of these places to local Native peoples (Thrush 2017:209-214). Even so, recorded place names speak to the connections between Native peoples and their ancestral homelands as well as the nature of cultural resources that may be encountered during this assessment.

Kinkade (1997) also recorded several place names along the Cowlitz River and its tributaries:

- o kulu'ln for Jackson Prairie, located approximately 5.74 miles southwest of the project.
- o lapa'ləm for a creek near Newaukum Prairie, located approximately 5.88 miles southwest of the project.
- o Náwaqwm meaning “big prairie,” for Newaukum Prairie, located approximately 6.03 miles southwest of the project.
- o məxkan'ł for Lacamas Creek, located approximately 7.06 miles south of the project.
- o nixk'wâxnxxt'xn meaning “stretching a hide,” or ləxəmas, for Lacamas Prairie, which has lots of camas, located approximately 7.96 miles south of the project.
- o Now-ok for Cowlitz Prairie, located approximately 10.98 miles southwest of the project.
- o q'ápn'ł meaning “blueberry plant,” for the area near the present-day town of Winlock, located approximately 12.70 miles southwest of the project.

Knowledge about gathering areas, place names, and other lifeways continues to be passed down among contemporary Native peoples. Today, descendants of the those that lived, utilized, and travelled through the Chehalis River Basin are members of the Confederated Tribes of the Chehalis Reservation, Cowlitz Indian Tribe, Squaxin Island Tribe, Confederated Tribes and Bands of the Yakama Nation, Quinault Indian Nation, Nisqually Indian Tribe, and other Tribes. To learn more about the Chehalis and Cowlitz Tribes, visit the Tribal websites (e.g., Confederated Tribes of Chehalis Reservation 2025; Cowlitz Indian Tribe 2025).

2.6 Recent History

2.6.1 Colonization of Oregon Country

During the late eighteenth and early nineteenth centuries, Oregon Country, which encompassed the present-day Pacific Northwest, emerged as an epicenter of British and U.S. imperial activities. In May 1792, the Vancouver Expedition, led by George Vancouver, entered Puget Sound. The expedition was tasked with exploring whether the Strait of Juan de Fuca represented the western extent of the fabled Northwest Passage, which would facilitate water transport across North America. After dropping anchor between Bainbridge and Blake Islands, Vancouver dispatched a small crew led by Lieutenant Peter Puget to survey the southern sound. The expedition named several geographical features—including Mount Rainier, Hood Canal, and Whidbey Island—after crew members and British naval officers (Crowley 2003; Morgan 2018:3-23).

In 1833, Britain's Hudson's Bay Company (HBC) established Puget Sound's first Euro-American trading post, Fort Nisqually. The fort was situated halfway between HBC's Fort Vancouver to the south and Fort Langley to the north, and the local prairie was seen as a promising fur-gathering and agricultural area (Bagley 1915; Carpenter 1986:24-25, 36). In addition to economic aims, the fort was intended to strengthen British claims to the region and discourage U.S. settlement. The fort became home to a diverse population of HBC employees who established trading relationships with local Native groups. As the number of furbearing animals dwindled, the fort's economic emphasis shifted to agriculture and husbandry. The Puget Sound Agricultural Company (PSAC) was established in 1838 as an HBC subsidiary to oversee cattle ranching at the fort and raise wheat, barley, oat, potato, and peas at the 4,000-acre Cowlitz Farm near present-day Toledo (Morgan 2018:50-53; Wilma 2005).

In May 1841, the United States Exploring Expedition entered Puget Sound. Led by Charles Wilkes, the expedition spent four years producing detailed surveys of the Antarctic coast, islands in the south and central Pacific, and the Pacific Northwest. The expedition's naturalists also collected zoological, botanical, and geological specimens and material culture from numerous Indigenous peoples. In the Pacific Northwest, these scientific aims were pursued alongside a larger geopolitical goal: assess the region's economic potential in the hopes of tilting imperial control toward the United States (Walker 2020). After meeting with HBC personnel at Fort Nisqually, the expedition set out to map the islands, harbor, and inlets of Puget Sound. In order to emphasize U.S. connection to the region, Wilkes named dozens of Puget Sound inlets, islands, and other areas after expedition officers and crewmembers. Many of these names, such as Elliott Bay, remain in use today (Crowley 2003).

The Oregon Treaty of 1846 resolved the United Kingdom and United States' competing imperial claims in the Pacific Northwest. The treaty ceded land south of the 49th parallel to the United States. Oregon Territory (which included present-day Washington State) soon attracted interest as a site of economic potential, religious proselytization, and territorial expansion. In 1850, the federal government passed the Donation Land Act, which attracted settlers to the region with the promise of free land. The act allowed individuals to claim 320 acres and married couples to claim 640 acres provided they arrived before December 1850 and occupied the land for four consecutive years. The act was later extended so that settlers who arrived as late as 1855 could claim 160 acres (Boswell 2017:33). The act passed despite the fact that, in the absence of ratified treaties, the federal government did not hold title to the land it offered. The Donation Land Act transformed Oregon Territory into a settler colony, a form of territorial control that relies on the appropriation of Native land and the removal of Native peoples (Veracini 2011). As the Euro-American population grew, settlers came to see the continued presence of Native peoples as antithetical to the region's future.

During the first half of the nineteenth century, Native peoples across western Washington grappled with the impacts of foreign diseases, introduced plants and animals, land seizure, and other outcomes of Euro-American colonization. From the late 1820s to 1850s, disease devastated Native communities in the Pacific Northwest. Cowlitz groups lost over 80 percent of their people due to diseases that had not been encountered before settlers (Dupres 2014:16). It was against this backdrop that Washington territorial governor and ex officio superintendent of Indian affairs Isaac Stevens negotiated treaties with Native groups. In February 1855, Stevens met with leaders representing Chinook, Chehalis, Cowlitz, Quinault and other groups on the Chehalis River near Grays Harbor. Native leaders resisted Stevens' push to consolidate all southwestern Washington Native groups onto a single reservation. Negotiations broke down, and Stevens left the treaty council. In July, leaders representing Quinault, Queets, Hoh, and Quileute groups signed the Quinault River Treaty (later known as the Treaty of Olympia), which established the Quinault Reservation in exchange for title to 1.2 million acres of the western Olympic Peninsula.

In subsequent decades, many Native people in southwestern Washington were compelled to relocate to the Quinault Reservation, Chehalis Reservation, and Shoalwater Bay Reservation, the latter two of which were created via executive orders in 1864 and 1866. Many others remained in their ancestral homelands, living and working in urban and rural settings (Fisher and Jetté 2013; Harmon 1998; Marino 1990; Ott 2008, 2010; Wilma 2006). They also maintained (and continue to maintain) ties to gathering, hunting, and fishing locations and other significant places across their ancestral homelands. The Cowlitz Indian Tribe secured federal recognition in 2000.

2.6.2 History of Lewis County

The federal government's appropriation of Native land through treaties, combined with legislation such as the Donation Land Act of 1850, Land Act of 1820, and Homestead Act of 1862, paved the way for Euro-American settlement. Early Euro-American settlement activity, like that of Native communities, focused on easily accessed and resource rich areas such as shorelines and river valleys. There had already been a long history of the movement of people and goods through the area, as the Cowlitz Trail ran north-to-south through the county, connecting the Columbia River and Puget Sound. The first Euro-American settler in the county was Simon Plamandon, a French-Canadian farmer who claimed 640 acres along the Cowlitz River in 1927 and later operated the PSAC's Cowlitz Farm near present-day Toledo. Cowlitz Farm became a stop along the Cowlitz Trail, which the PSAC used to travel between Fort Vancouver and Fort Nisqually. The first settler in the Chehalis (then Saundersville) area was John Jackson, who settled at Jackson Prairie near present-day Mary's Corner in 1845 (Wilma 2005).

Lewis County was created on December 21, 1845, by the Provisional Legislature of Oregon, in honor of Meriwether Lewis. However, this Lewis County was far larger than today, spanning the entirety of western Washington and north into British Columbia. There was no official county seat, but the county commissioners first met at John Jackson's cabin in 1847. When Congress separated Washington Territory from Oregon in 1853, smaller counties were created in southwestern Washington, including Lewis County, which was cemented in its present-day shape by 1854 (Wilma 2005).

More settlers continued to arrive in the area, including the Saunder family who claimed land at the confluence of the Chehalis and Newaukum Rivers in 1851, John Cutting who filed the first claim in the Napavine area soon after, and Christopher Pagget and John Samuel Nealy who claimed land in the Winlock area in the following years. However, limited transportation routes stymied early development. People and goods could be shipped north up the Chehalis and Cowlitz Rivers, but transport to Olympia and Puget Sound required overland journeys on muddy trails. In 1873, the Northern Pacific Railroad began offering service from Kalama to Puget Sound via Chehalis. The rail connection created new opportunities for the town. The railroad, combined with the dredging of the Chehalis River in the 1880s, led to a boom in the timber industry, as it opened a new connection to the towns on Washington's coast and a faster way to ship people and goods. By the early twentieth century, lumber, dairying, and other farms dominated the local economy (Cipalla 2021; Crowell 2007; Ott 2008; Wilma 2005).

However, development in the early years of the twentieth century was relatively slow, and the county focused internally, building roads and improving infrastructure. The 1920s saw a drop in the timber industry, which was furthered by the Great Depression. In Winlock, egg and

poultry production surpassed lumber during this time. During World War II, the demand for agricultural products and wood increased, revitalizing the community. Boeing operated a manufacturing plant in Chehalis that focused building on B-17 and B-29 bombers for the war effort. I-5 opened in 1955, further linking the area with Puget Sound and the Willamette Valley. In recent decades, a number of distribution facilities have been built in Chehalis and Centralia, taking advantage of the area's position midway between the Seattle and Portland metropolitan areas, but much of Lewis County remains rather rural and focused on farming. Today, over 85,000 call Lewis County home, 2,000 of which live in Napavine (Cipalla 2021; Crowell 2007; Ott 2008; Wilma 2005).

2.7 Historical Records Search

Information about landscape change, land use, and property ownership at the project location during the nineteenth and twentieth centuries is preserved in historical county atlases, topographic maps, census records, and aerial photographs. The United States General Land Office (GLO) conducted early cadastral surveys to define or re-establish the boundaries and subdivisions of federal lands so that land patents could be issued to settlers. The GLO produced maps of the project vicinity in 1858 (Figure 3) (BLM 2025; United States Surveyor General [USSG] 1858). The project is located in a broad alluvial plain with the Lucas Creek flowing east-to-west and through the project. A large prairie was recorded with the project lying in the northeast. A number of other prairies were recorded, including 5.3 miles to the northeast, 3 miles to the south, and 4 miles to the southeast. The Newaukum River was recorded 4.8 miles to the southwest and 4.6 miles to the south. Local homesteads included the Laramies homestead (5.2 miles to the southeast) and the Bernier homestead (5.02 miles to the southeast). Surveyor notes indicated that the Newaukum Valley had good, first-rate soil and was formerly the site of second-rate timber. The project area and lands in Section 2 of Township 13 North, Range 01 West had second-rate soil and strands of timber that included fir, hemlock, cedar, and maple (USSG 1858). Records indicate that the western half of the project rests on land which was first patented by Margaret R. Williams in 1872 under the Land Act of 1820 (3 Stat. 566), while Jacob L. Myers received land (the eastern portion of the project) under a state grant, also in 1872 (BLM 2025). The patents and Senn Road are featured in an 1890s historic right-of-way map (Figure 4) (Lewis County Assessor 2025).

Historical records indicate that the project vicinity has been the site of moderate development and farming during the twentieth century. By 1916, Lucas Creek followed its current course and the precursor to Senn Road was present (Figure 5) (USGS 1916). Several roads were present in the vicinity of the project. The Chehalis and Cowlitz Railroad line ran 4.6 miles to the southwest and Highway 299 ran 4.62 miles to the southwest of the project. Additional railroad lines were located in the Newaukum Valley, and some areas along the valley's northern edge were marked "Coal," presumably indicating where coal deposits were

(USGS 1916). According to a series of Metsker Maps from 1948 to 1962, the parcel on the eastern portion of the project was owned by A. Zandeckli (Metsker Map Company 1948, 1960, 1962). In 1953, Napavine (7.48 miles to the southwest), Chehalis (8.8 miles to the northwest) and Centralia (9.3 miles to the northwest) are mapped to the west of the project (Figure 6) (USGS 1953). By 1990, little had changed, though Lucas Creek Road was titled on the topographic map (Figure 7) (USGS 1990).

No major changes in land use or development occurred throughout most of the late twentieth century (Figure 8) (Google Inc. 2025; NETR 2025; USGS 1990). However, the nearby Centralia Power Plant was under construction by 1971; between 1990 and 2005, additional residences were constructed to the north and east. The area lost some of its rural character, but it has consisted primarily of farmlands into the present day, with few changes having occurred since 2005.

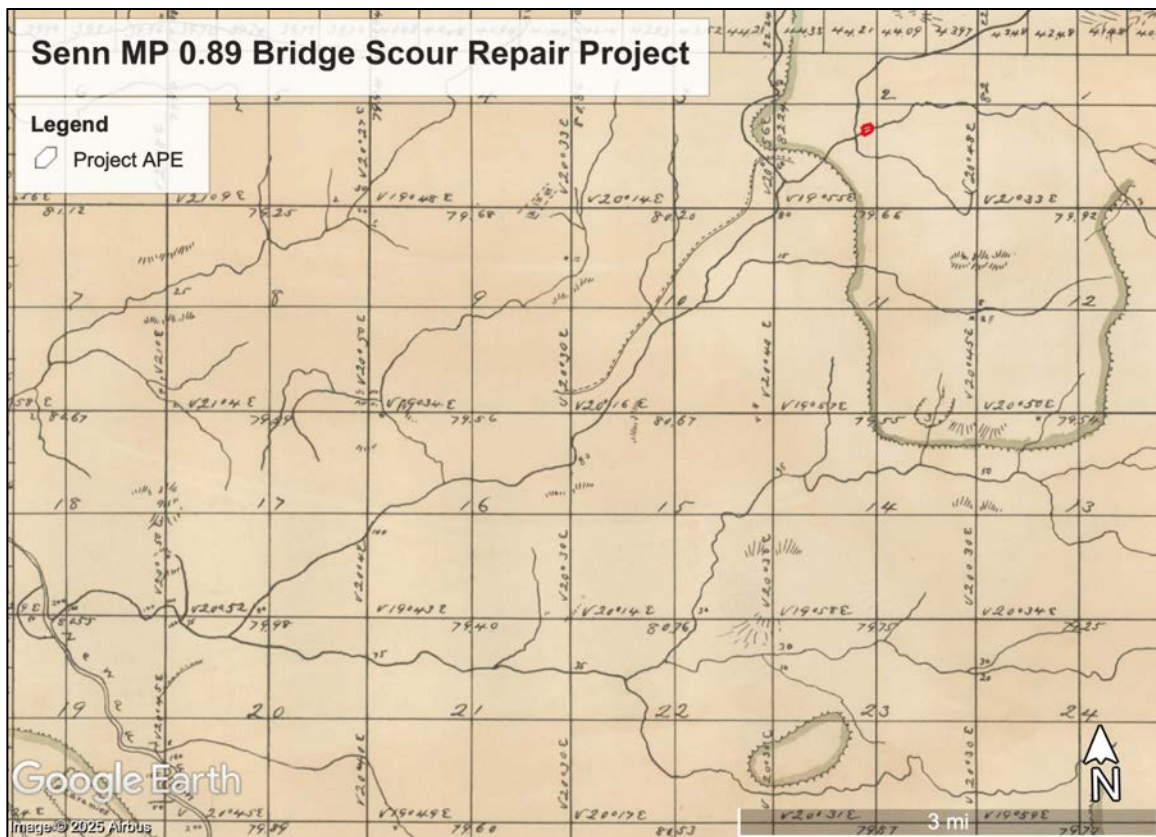


Figure 3. 1858 GLO survey plat of the project vicinity (USSG 1858).

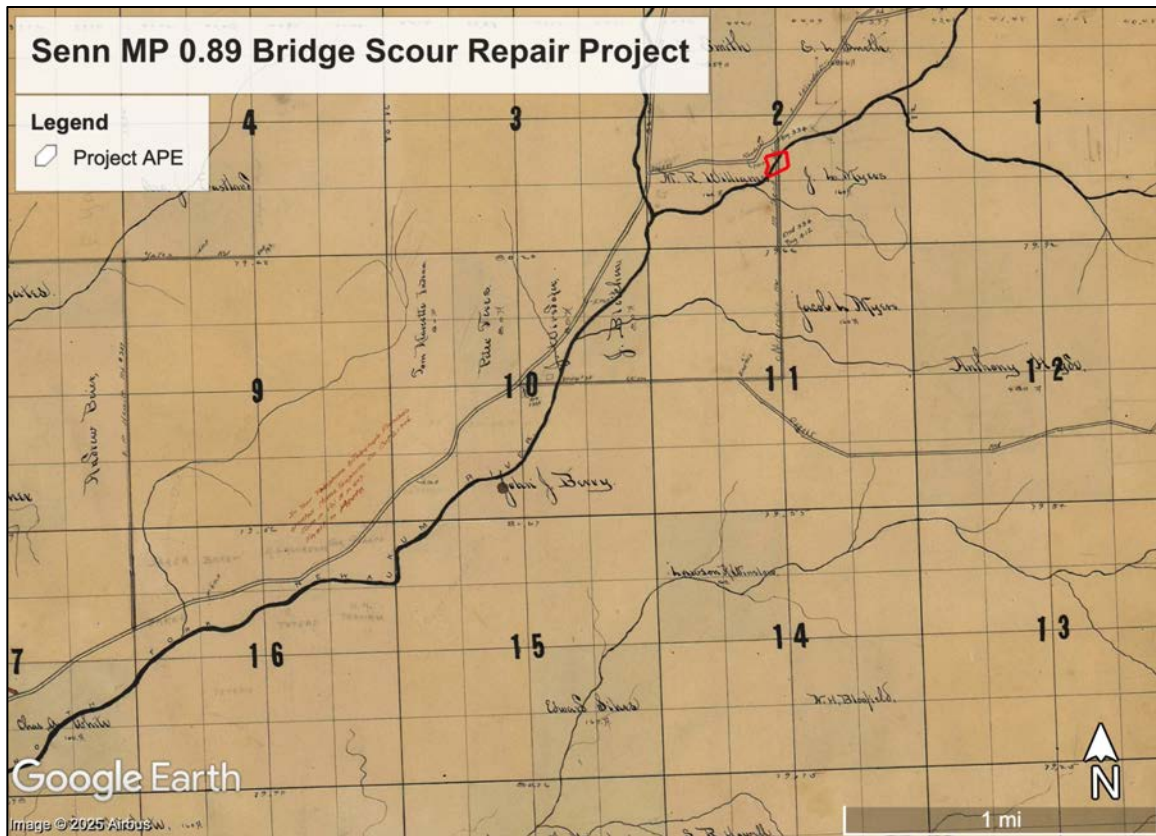


Figure 4. 1890s Lewis County GIS Historic ROW Map of the project vicinity (Lewis County Assessor 2025).

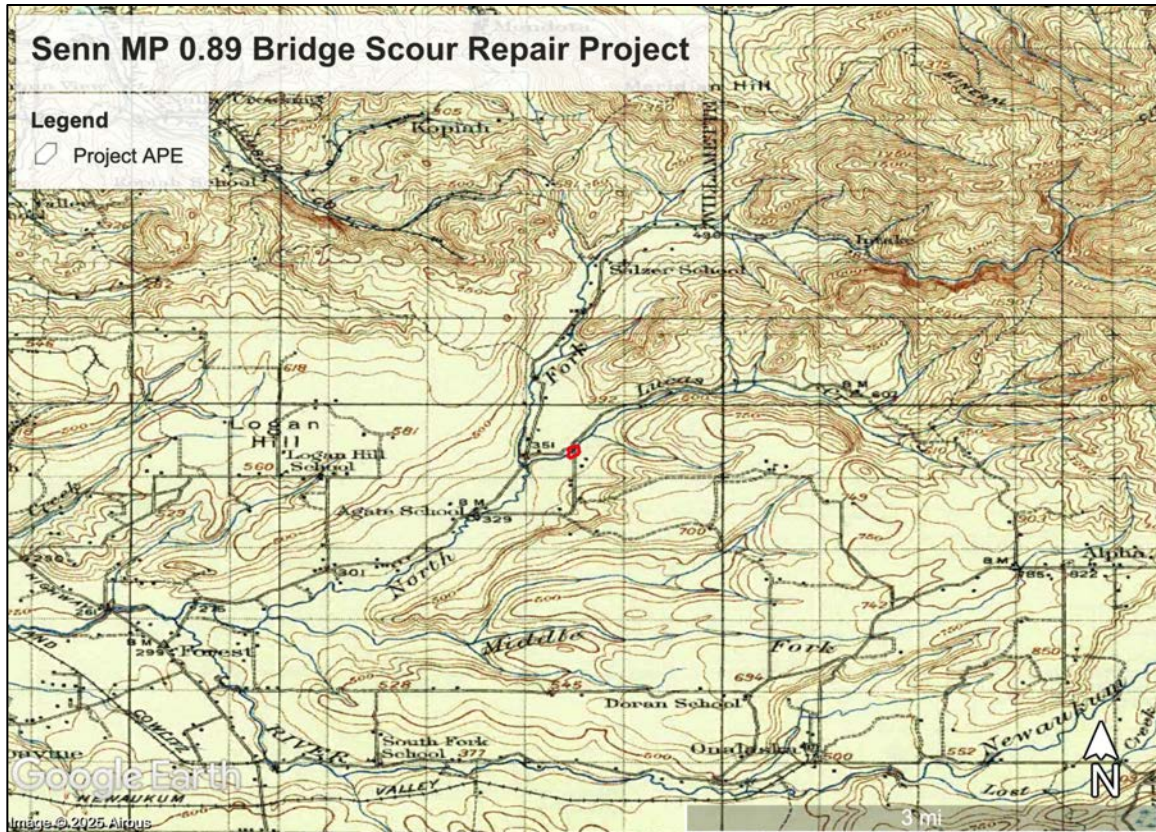


Figure 5. 1916 topographic map of the project vicinity (USGS 1916).

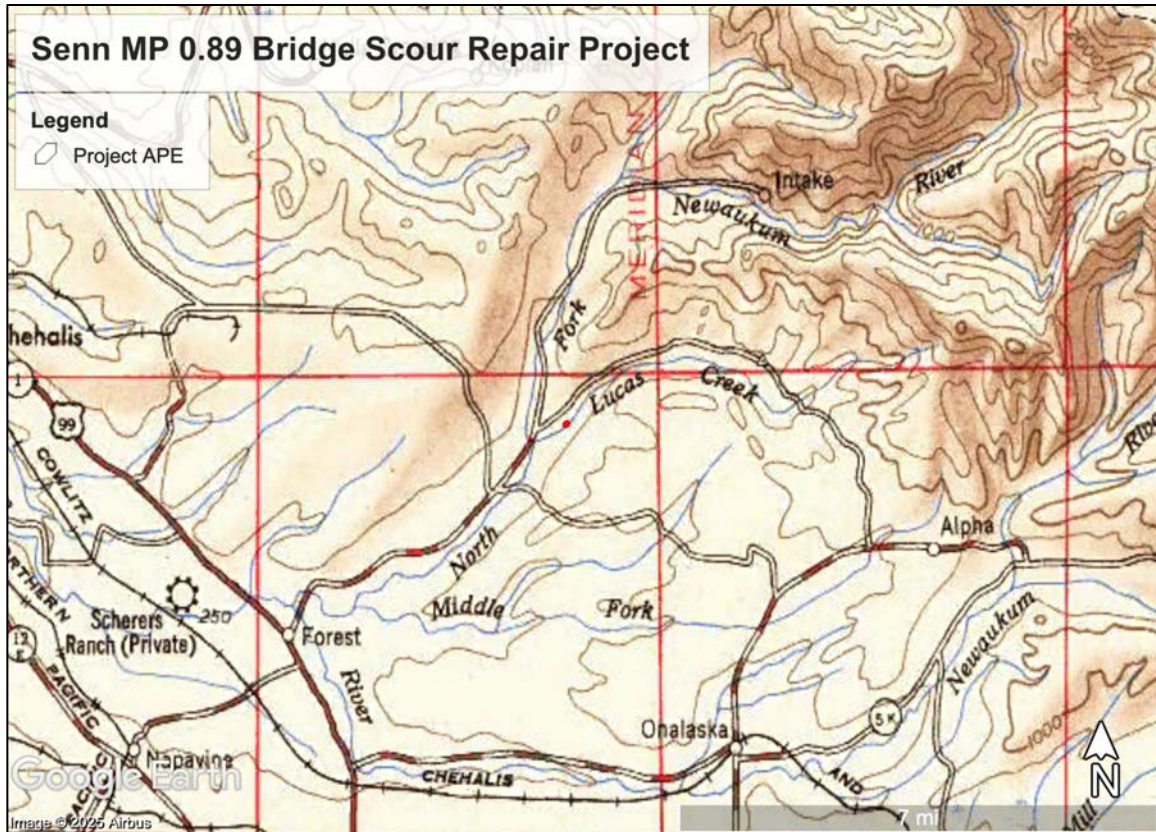


Figure 6. 1953 topographic map of the project vicinity (USGS 1953).

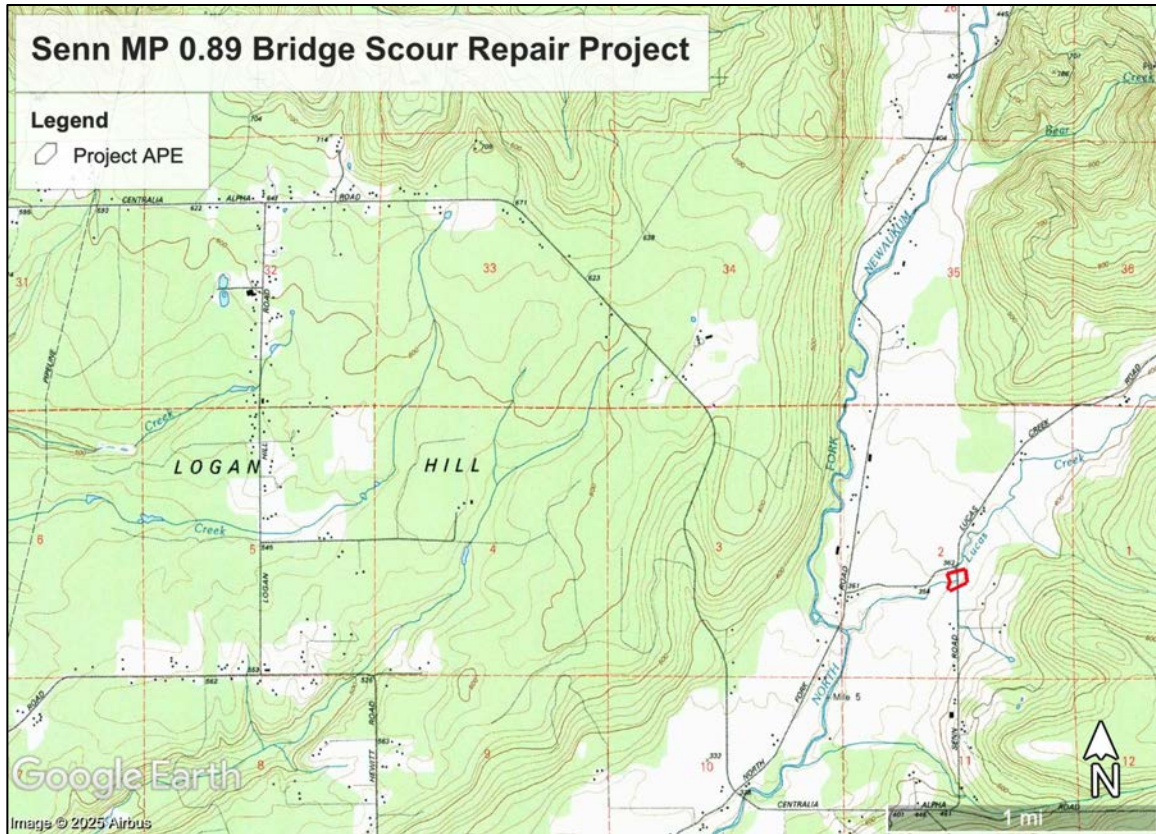


Figure 7. 1990 topographic map of the project vicinity (USGS 1990).



Figure 8. 1990 aerial imagery of the project vicinity (Google Inc. 2025).

2.8 Cultural Resources Database Review

A review of the WISAARD database identified cultural resource investigations, precontact and postcontact archaeological sites, register-listed historic properties, and historic built environment resources in the vicinity of the project. This review provides information about the nature and likelihood of cultural resources at the project location (DAHP 2025).

2.8.1 Cultural Resources Investigations

Seven cultural resources investigations listed on WISAARD have been completed within three miles of the project (Table 1). Of these, two cultural resources assessments have been completed within one mile of the project.

One previous cultural resources investigation overlaps with the project's location. Parvey and Donald (2022) conducted surface pedestrian survey and excavated 50 shovel test probes ahead of proposed safety improvements along Centralia Alpha Road and nearby roads. Surface pedestrian survey was conducted along the eastern side of Senn Road within the boundaries of the current project APE; no shovel probes were excavated in this area. The eastern side of Senn Road exhibited evidence of past disturbance associated with residential development, excavation of drainage ditches, and road construction. No archaeological sites or other cultural resources were identified.

Berger (2016) conducted a cultural resources survey for a culvert replacement project approximately 0.9 miles southwest of the project location. A pedestrian survey and two shovel probes were completed. The pedestrian survey did not identify any aboveground archaeological or historic features. The subsurface testing noted soft sandy loam to wet gleyed blue-gray sand and did not identify any artifacts, potentially anthropogenic strata, or other evidence of archaeological sites.

Table 1. Cultural resources investigations completed within three miles of the project.

Reference (NADB)	Report Title	Field Methodology	Distance from Project	Results
Parvey and Donald 2022 (1696466)	Cultural Resources Assessment for the Centralia Alpha Road Improvements Project, Lewis County, Washington Cultural Resources Assessment	Surface survey, 50 shovel test probes	Overlaps with project APE	No cultural resources recorded

Berger 2016 (1688423)	Cultural Resources Survey, Leahy FFFPP, Lewis County, WA	Surface survey, 2 shovel test probes	0.9 miles southwest	No cultural resources recorded
Thomas and Frazier 2024 (1698323)	Archaeological Inventory Survey for Martin Roy's Proposed Pole Barn, TP#:016919005004, Chehalis, Lewis County, Washington	Surface survey, 3 shovel test probes	1.45 miles southwest	No cultural resources recorded
Lancaster and Amara 2024 (1698379)	Cultural Resources Inventory for the Sharon Ernst Wetland Enhancement Project, Lewis County, Washington	Surface survey, 2 shovel test probes	1.9 miles northeast	No cultural resources recorded
Mathews et al. 2024a (1698324)	Cultural Resource Assessment for the 603 North Fork Rd Addition, Chehalis, Lewis County, WA	Surface survey, 10 shovel test probes	2.63 miles southwest	Precontact site 45LE1105, lithic scatter
Mathews et al. 2024b (1698890)	Cultural Resource Assessment for 589 North Fork Rd, Chehalis, Lewis County, WA	Surface survey, 15 shovel test probes	2.66 miles southwest	Precontact site 45LE1107, lithic scatter
Williams-Larson et al. 2020 (1694885)	Cultural Resource Survey of the Kruger Road Project, Lewis County, Washington	Surface survey, 10 shovel test probes	2.72 miles southeast	No cultural resources recorded

2.8.2 Archaeological Sites

No previously recorded archaeological sites are located within one mile of the project location.

Pedestrian survey and subsurface testing along North Fork Road approximately 1.45 miles southwest of the project location identified several archaeological resources, including three precontact lithic scatters (45LE964, 45LE968, and 45LE970), two dual component sites

(45LE966 and 45LE969), and two precontact lithic isolates (45LE965 and 45LE967). The archaeological site recorded closest to the project location is 45LE967, which is located 1.44 miles southwest along North Fork Road (Williams-Larson 2018). The site consists of a cryptocrystalline silicate (CCS) flake identified in the upper 10 cm (4 inches) of a shovel test probe. Four radial probes excavated around the find were negative for archaeological materials. The site has been determined not eligible for listing on the NRHP.

2.8.3 Historic Properties

No register-listed historic properties are located within one mile of the project location. The historic property closest to the project is the Feldman Ranch Barn (45LE858) 2.85 miles to the north-northeast. The Feldman Ranch Barn was built in 1908 with a wrap-around porch. The barn is listed on the Washington State Heritage Barn Register (WHBR) (DAHP 2011).

2.8.4 Historic Built Environment Resources

The closest historic built environment resource is the 243 Senn Road building (DAHP Property # 604993), located 0.21 miles southwest. The one-story building has an unknown roof clad in asphalt composition shingles. The walls of the building are clad principally in wood. The single-family house sits on a post & pier foundation. A Historic Property Inventory (HPI) form for the building was created as part of DAHP's 2011 HPI Upload Project, which involved the addition of available information from county assessor building records to WISAARD (ACI et al. 2011). These data were not field verified at the time, nor were eligibility assessments conducted.

2.8.5 Cemeteries

No cemeteries are located within one mile of the project location. The closest cemetery is the Deskins Family Cemetery (45LE626) 3.46 miles north-northeast.

2.8.6 Traditional Cultural Properties

No Traditional Cultural Properties (TCPs) listed on WISAARD are located within one mile of the project.

3. DAHP Statewide Predictive Model

The DAHP statewide predictive model uses environmental data associated with documented archaeological sites to identify areas at which unknown sites may be found (Kauhi and Markert 2009). Environmental categories included in the model are elevation, slope, aspect, distance to water, geology, soils, and landforms. The model contains five probability ranks: (1) very high risk, (2) high risk, (3) moderate risk, (4) moderately low risk, and (5) low risk. The model ranks the project location as very high risk for archaeological sites.

4. Archaeological Expectations

This assessment combines the above background research, cultural resources database review, and predictive modeling results to evaluate the possibility that archaeological deposits will be encountered at the project location. The Senn MP 0.89 Bridge Scour Repair Project encompasses approximately 2.6 acres of Senn Road right-of-way, the Lucas Creek channel, and a floodplain terrace between them. The project landscape was formed by fluvial processes, leaving alluvial deposits in the project vicinity from creek flooding and channel migration. The soil unit mapped at the project is Chehalis silty clay, which is formed out of alluvium. Additionally, the project location has been used for agriculture and ranching and may have been disturbed by plowing, harvesting, and other associated landscape modifications.

The project location has also been shaped by human activity. For millennia, Lewis has supported settlements, resource management and gathering, and travel by the Newaukum and Cowlitz peoples and their neighbors. These long-term connections are reflected in the presence of recorded place names, village locations, and archaeological sites in the project vicinity. Physical evidence of historic Native lifeways may exist at the project in the form of archaeological sites. Given the geomorphological setting of the project, archaeological sites created between the terminal Pleistocene and twentieth century, if present, may be situated near the surface or deeply buried in alluvial deposits. Fine-grained sediments may preserve organic and cultural materials deep below the surface due to the low-energy depositional setting along Lucas Creek. Archaeological sites associated with Native peoples' long-term history on and around the project may include but are not limited to lithic tools, fire-modified rock, hearth features, bone tools or implements, processed faunal remains, or structural elements.

The arrival of Euro-American settlers in the middle decades of the nineteenth century led to major changes in the landscape of the project vicinity. Landscape modification and occupation during the nineteenth and twentieth centuries may have also resulted in the creation of new archaeological sites. These more recent sites may include debris from road and bridge construction, and possibly various residential debris such as brick, concrete, and milled lumber, and domestic and agricultural objects such as glass vessel and metal implements, among others. Nineteenth- and twentieth-century archaeological sites, if present, will be encountered near the surface in fill deposits and/or near-surface horizons of intact alluvial derived soils. Isolated finds associated with recent sites and concentrations of temporally nondiagnostic materials generally do not satisfy eligibility criteria for the NRHP. Exceptions may include intact floors or structural elements or objects associated with particular individuals or events.

5. Field Investigation

5.1 Survey Data

Total area examined: The entire project area (2.6 acres).

Areas not examined: None.

Date of survey: May 23 and June 20, 2025.

Fieldwork conducted by: Emily Boutain, Lane Larson, and Gina Nipert. Field notes are on file with CRC.

Weather and surface visibility: On May 23, 2025, the weather conditions ranged from clear and sunny to overcast and raining with temperatures between 60 and 72 degrees Fahrenheit. Surface visibility was less than five percent in the northeastern half of the project due to dense vegetation ground cover. The southeastern half of the project contained some cleared areas and dense vegetation; surface visibility was about 10 percent. On June 20, 2025, the weather conditions ranged from overcast to heavy rain with temperatures between 60 and 70 degrees Fahrenheit. The northwestern half of the project contained some cleared areas and dense vegetation; surface visibility was about 10 percent. Surface visibility was less than five percent in the southwestern half of the project due to the heavy rainstorm.

5.2 Survey Methodology

Field investigation consisted of surface and subsurface survey. Surface and subsurface investigations were restricted to the eastern portion of the APE (Senn Road right-of-way and eastwards). Right-of-entry was not granted for the portion of the APE on private property west of Senn Road on May 23, 2025. CRC returned on June 20, 2025, to complete surface and subsurface survey when right-of-entry was granted. Surface survey was conducted via pedestrian transects spaced 20 meters (66 feet) apart. Subsurface survey was achieved via excavation of four cylindrical shovel test probes. Probes were excavated at 20-meter (66-foot) intervals. They measured 50 cm (1.6 feet) in diameter and were excavated with a shovel and a 10-cm (4-inch) diameter bucket auger to a target depth of 150 cm (4.9 feet) below surface. Excavated sediments were passed through 1/8-inch mesh to screen for artifacts. If identified, artifacts would be documented in the field, placed in a bag with a detectable metal tag, and reburied in the probe in which they were found. Probe locations were recorded using a handheld GPS unit (WGS84 Zone 10 UTM coordinates, ± 3 meters [9.8 feet]).

5.3 Survey Results

5.3.1 Surface Survey

Surface survey was conducted to assess project conditions, document archaeological materials, and identify areas suitable for subsurface testing. The project location consists of the Senn Road roadway and Senn Bridge, the area east of Senn Road, and the area west of Senn Road (Figure 9). Lucas Creek runs under Senn Bridge and through the areas both east and west of the bridge. The area west of Senn Road consists of farmland and the heavily vegetated Lucas Creek channel (Figures 10 – 13). Fences separated the entire western property from the road.

The eastern part of the project consists primarily of vacant, moderately vegetated land surrounding the Lucas Creek channel, while the western area consists of farmland and moderately vegetated land surrounding the Lucas Creek channel (Figure 14 – 18). The creek bed is significantly lower than the surrounding land, with steep slopes descending into the channel. Senn Bridge sits approximately 15 feet above the creek bed. Many wetland plants surround the creek, while more upland vegetation exists above the creek, such as western sword fern (*Polystichum munitum*), Oregon grape (*Mahonia aquifolium*), Himalayan blackberry (*Rubus armeniacus*), western redcedar (*Thuja plicata*), and Douglas fir (*Pseudotsuga menziesii*), among others. The creek bed itself is covered with cobbles, and the water was between 0.5 and 2 feet deep at the time of the survey.

The portion of Senn Road within the project consists of a two-lane paved road with wide gravel shoulders to the north and south of Senn Bridge but with very narrow shoulders with guard rails on the bridge itself. Constructed in 1966, the structure is a 60-foot-long, three-span bridge supported by concrete piles (Figure 19 – 20). As the bridge was constructed after 1945 and is of a simple girder and slab design, it meets the Advisory Council on Historic Preservation's Program Comment on Common Post-1945 Concrete and Steel Bridges (ACHP 2012:Section V) and is therefore exempt from Section 106 review (FHWA 2025).

Small amounts of modern trash were observed scattered throughout the project location during surface survey, primarily consisting of plastic wrappers and bottles, and aluminum cans. No cultural resources were observed during the surface survey.

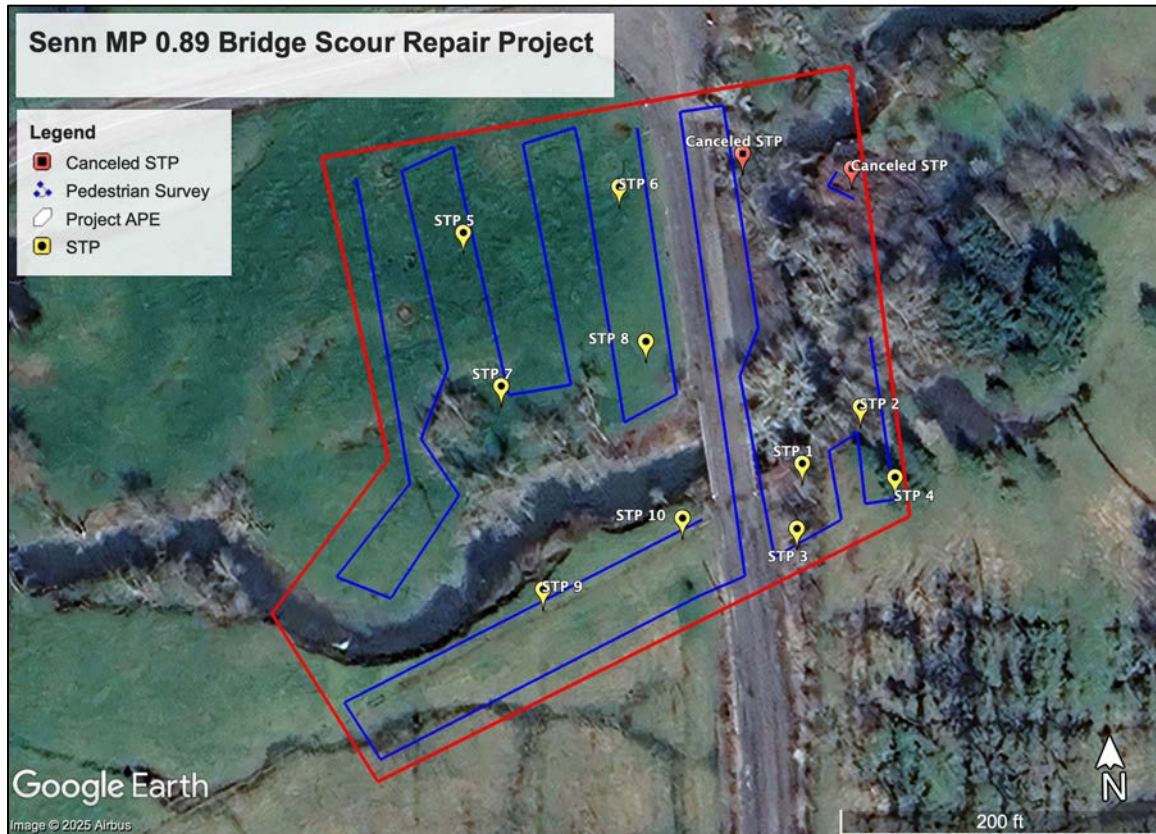


Figure 9. Locations of pedestrian survey transects and shovel test probes excavated at the project location.



Figure 10. Overview of the western half of the project.
View to the west.



Figure 11. Overview of the northwestern half of the project.
View to the west.



Figure 12. Overview of the southwestern part of the project.
View to the west.



Figure 13. Overview of the western half of the project and Lucas Creek.
View to the west.



Figure 14. Overview of the northeastern part of the project in the vicinity of a canceled probe.
View to the east.



Figure 15. Overview of the northeastern part of the project. View to the east.



Figure 16. Overview of the eastern half of the project and Senn Bridge. View to the east.



Figure 17. Overview of the southeastern part of the project in the vicinity of probes #1 and 3.
View to the northeast.



Figure 18. Overview of the southeastern part of the project in the vicinity of probes #1, 2, 3, and 4.
View to the north.



Figure 19. Overview of the Senn Road and Senn Bridge.
View to the south.



Figure 20. Overview of the Senn Road, Senn Bridge, and Lucas Creek. View to the southwest.

5.3.2 *Subsurface Survey*

Subsurface survey was achieved via excavation of ten shovel test probes (Figure 9, Appendix C). Probes were excavated at 20-meter (66-foot) intervals. They reached an average depth of 115.5 cm (3.7 feet). The most common reason for probe termination was encounter of dense clay deposits unamenable to hand excavation.

Across the project location, shovel test probes encountered well-developed soil horizons and alluvial sediments that were largely intact and undisturbed (Figure 21). The A horizon consisted of pale brown silty clay and extended to a depth of 21 cm (0.6 feet). The B horizon consisted of pale brown to yellowish brown sandy silty clay and extended to depths ranging from 46 to 140 cm (1.5 to 4.6 feet). The C horizon consisted of moderately to highly compact, very pale brown to pale gray sandy clay with some oxidation and charcoal flecking. However, no charcoal concentrations or potential burned earth features were observed.

Small quantities of modern or temporally non-diagnostic refuse were observed in select probes. No archaeological sites were identified during subsurface survey.



Figure 21. Representative images of subsurface deposits identified at the project location. Clockwise from upper left, images are of intact soil horizons (probes #1, #2, #6, and #8).

6. Findings and Recommendations

The Senn MP 0.89 Bridge Scour Repair Project proposes to excavate and fill along the banks of Lucas Creek to provide scour protection and bank stability. Background research conducted by CRC did not result in the identification of any previously recorded archaeological sites, historic properties, or other cultural resources at the project location. Lewis County Bridge No. 77 is a three-span concrete slab bridge constructed in 1966 to carry Senn Road over Lucas Creek. While the bridge is over 50 years old, the bridge is of a ubiquitous design common to twentieth-century bridge construction (Parsons Brinckerhoff and Engineering and Industrial Heritage 2005:3-85). In 2012, these types of bridges were included in an exception to Section 106 requirements for inventory and evaluation for listing on the NRHP under the Program Comment for Common Post-1945 Concrete and Steel Bridges (ACHP 2012; FHWA 2025). As such, the bridge is excluded from evaluation.

The DAHP Statewide Predictive Model ranks the project location as very high risk for archaeological sites. For millennia, the Newaukum and Chehalis Rivers and their tributaries have supported habitation, travel, and resource gathering by Cowlitz-speakers such as the

Cowlitz and Newaukum groups and their neighbors. This long-term history is reflected in the presence of recorded villages, place names, and archaeological sites in the greater project vicinity. Beginning in the mid-nineteenth century, Native peoples and Euro-American settlers and other newcomers established logging activities, transportation networks, residences, and agricultural operations around the Chehalis and Lucas Creek areas.

Given the geomorphological setting of the project, archaeological sites created between the terminal Pleistocene and twentieth century, if present, may be situated near the surface or deeply buried within alluvial deposits. Fine-grained sediments may preserve organic and cultural materials deep below the surface due to the low-energy depositional setting along Lucas Creek. Archaeological sites associated with Native peoples' long-term history on and around the project may include but are not limited to lithic tools, fire-modified rock, hearth features, bone tools or implements, processed faunal remains, or structural elements.

During field investigation, no archaeological sites or other cultural resources were identified. Ten shovel test probes were excavated across the project to an average depth of 115.5 cm (3.7 feet). None of the probes contained archaeological material. The fine-grained sediment profile in the shovel probes is consistent with the mapped Chehalis silty clay soil. The absence of coarse alluvium indicates the area represents a historically low-energy, poorly drained, environment where silt and clay have accumulated over long periods around Lucas Creek. However, the bridge scour proposed for repair suggests that there have been more recent higher-energy events. Most ground disturbance is anticipated to be within 3 to 5 ft below surface, comparable to the depths reached by the shovel probes, and the maximum depth of ground disturbance will be up to 8 feet below surface. No additional cultural resources investigation is recommended at this time. CRC recommends a finding of "no historic properties affected." If project activities result in the discovery of archaeological materials or human skeletal remains, CRC recommends project staff follow the inadvertent discovery protocol outlined in Appendix D. Work should be stopped until further investigation and appropriate consultation have concluded. If human skeletal remains are inadvertently revealed, project staff should immediately stop work, cover, and secure the remains against further disturbance, and contact law enforcement personnel, consistent with the provisions set forth in RCW 27.44.055 and RCW 68.60.055.

7. Limitations of this Assessment

No cultural resources study can assess with complete certainty whether archaeological sites, historic properties, or traditional cultural properties exist at a project location. The information presented in this report is based on professional opinions derived from CRC's analysis and interpretation of available documents, records, literature, and information identified in this report and on field investigation and observations. The conclusions and recommendations presented apply to current and reasonably foreseeable project conditions.

The data, conclusions, and interpretations in this report should not be construed as a warranty of subsurface conditions. They do not apply to site changes of which CRC is not aware and has not had the opportunity to evaluate.

8. References

Advisory Council on Historic Preservation (ACHP)

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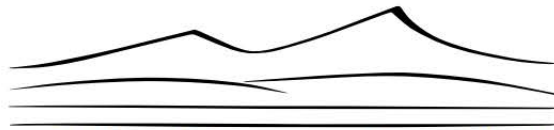
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Appendix A. Correspondence



Cultural Resource Consultants

Confederated Tribes of the Chehalis Reservation
Dan Penn, Tribal Historic Preservation Officer
PO Box 536
Oakville, WA 98568

April 14, 2025

Re: Cultural Resources Assessment for the Senn MP 0.89 Bridge Scour Repair Project, Lewis County, Washington

Dear Dan:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may be willing to share that is not readily available in other sources. This letter is sent on a technical staff-to-technical staff basis to inquire about project-related cultural information or concerns. It is not intended as formal government-to-government consultation to be initiated by the appropriate regulatory agency.

The project APE totals 2.6 acres. It encompasses the right-of-way of Senn Road over Lucas Creek and portions of adjacent parcels in the NE $\frac{1}{4}$ of the SW $\frac{1}{4}$ and the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 02 in Township 13 North, Range 01 West, Willamette Meridian. The bridge is classified as scour critical due to abutment/interior pile tip elevations within 10 feet of the stream's thalweg. The project proposes to conduct scour analysis and develop three mitigation alternatives. Ground disturbance will likely include excavation along the channel and banks of Lucas Creek and tracking from movement of machinery.

We are currently conducting background research for this project. Background research will include a review of site forms maintained by the Washington State Department of Archaeology and Historic Preservation, previously completed cultural resource reports, and relevant environmental, historical, and cultural publications. Field investigation will consist of pedestrian survey, excavation of shovel test probes, and built environment survey. Results will be presented in a technical memo.

We are aware that not all information is contained in published sources. Should the Tribe have additional information you would be willing to share to support our assessment, we would very much like to include it in our study. Please contact me at ian@crcwa.com or 360.431.3433 should you wish to provide any comments. I appreciate your assistance and look forward to hearing from you.

Sincerely,

Ian Kretzler
Projects Manager

CULTURAL RESOURCE CONSULTANTS, LLC. PO Box 4159, SEATTLE, WA 98194
PHONE 206.855.9020 - ian@crcwa.com



Cultural Resource Consultants

Cowlitz Indian Tribe
Irene Dunbar, Cultural Resources
PO Box 2547
Longview, WA 98632

April 14, 2025

Re: Cultural Resources Assessment for the Senn MP 0.89 Bridge Scour Repair Project, Lewis County, Washington

Dear Irene:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may be willing to share that is not readily available in other sources. This letter is sent on a technical staff-to-technical staff basis to inquire about project-related cultural information or concerns. It is not intended as formal government-to-government consultation to be initiated by the appropriate regulatory agency.

The project APE totals 2.6 acres. It encompasses the right-of-way of Senn Road over Lucas Creek and portions of adjacent parcels in the NE $\frac{1}{4}$ of the SW $\frac{1}{4}$ and the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 02 in Township 13 North, Range 01 West, Willamette Meridian. The bridge is classified as scour critical due to abutment/interior pile tip elevations within 10 feet of the stream's thalweg. The project proposes to conduct scour analysis and develop three mitigation alternatives. Ground disturbance will likely include excavation along the channel and banks of Lucas Creek and tracking from movement of machinery.

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We are aware that not all information is contained in published sources. Should the Tribe have additional information you would be willing to share to support our assessment, we would very much like to include it in our study. Please contact me at ian@crcwa.com or 360.431.3433 should you wish to provide any comments. I appreciate your assistance and look forward to hearing from you.

Sincerely,

Ian Kretzler
Projects Manager

CULTURAL RESOURCE CONSULTANTS, LLC. PO Box 4159, SEATTLE, WA 98194
PHONE 206.855.9020 - ian@crcwa.com



Cultural Resource Consultants

Nisqually Indian Tribe
Brad Beach, Tribal Historic Preservation Officer
4820 She-Nah-Num Drive SE
Olympia, WA 98513

April 14, 2025

Re: Cultural Resources Assessment for the Senn MP 0.89 Bridge Scour Repair Project, Lewis County, Washington

Dear Brad:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may be willing to share that is not readily available in other sources. This letter is sent on a technical staff-to-technical staff basis to inquire about project-related cultural information or concerns. It is not intended as formal government-to-government consultation to be initiated by the appropriate regulatory agency.

The project APE totals 2.6 acres. It encompasses the right-of-way of Senn Road over Lucas Creek and portions of adjacent parcels in the NE¼ of the SW¼ and the NW¼ of the SE¼ of Section 02 in Township 13 North, Range 01 West, Willamette Meridian. The bridge is classified as scour critical due to abutment/interior pile tip elevations within 10 feet of the stream's thalweg. The project proposes to conduct scour analysis and develop three mitigation alternatives. Ground disturbance will likely include excavation along the channel and banks of Lucas Creek and tracking from movement of machinery.

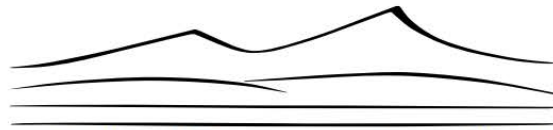
We are currently conducting background research for this project. Background research will include a review of site forms maintained by the Washington State Department of Archaeology and Historic Preservation, previously completed cultural resource reports, and relevant environmental, historical, and cultural publications. Field investigation will consist of pedestrian survey, excavation of shovel test probes, and built environment survey. Results will be presented in a technical memo.

We are aware that not all information is contained in published sources. Should the Tribe have additional information you would be willing to share to support our assessment, we would very much like to include it in our study. Please contact me at ian@crcwa.com or 360.431.3433 should you wish to provide any comments. I appreciate your assistance and look forward to hearing from you.

Sincerely,

Ian Kretzler
Projects Manager

CULTURAL RESOURCE CONSULTANTS, LLC. PO Box 4159, SEATTLE, WA 98194
PHONE 206.855.9020 - ian@crcwa.com



Cultural Resource Consultants

Quinault Indian Nation
Lia Frenchman, Tribal Historic Preservation Officer
PO Box 189
Taholah, WA 98587

April 14, 2025

Re: Cultural Resources Assessment for the Senn MP 0.89 Bridge Scour Repair Project, Lewis County, Washington

Dear Lia:

I am writing to inform you of a cultural resources assessment for the above referenced project and to seek additional information about the project area the Tribe may be willing to share that is not readily available in other sources. This letter is sent on a technical staff-to-technical staff basis to inquire about project-related cultural information or concerns. It is not intended as formal government-to-government consultation to be initiated by the appropriate regulatory agency.

The project APE totals 2.6 acres. It encompasses the right-of-way of Senn Road over Lucas Creek and portions of adjacent parcels in the NE¼ of the SW¼ and the NW¼ of the SE¼ of Section 02 in Township 13 North, Range 01 West, Willamette Meridian. The bridge is classified as scour critical due to abutment/interior pile tip elevations within 10 feet of the stream's thalweg. The project proposes to conduct scour analysis and develop three mitigation alternatives. Ground disturbance will likely include excavation along the channel and banks of Lucas Creek and tracking from movement of machinery.

We are currently conducting background research for this project. Background research will include a review of site forms maintained by the Washington State Department of Archaeology and Historic Preservation, previously completed cultural resource reports, and relevant environmental, historical, and cultural publications. Field investigation will consist of pedestrian survey, excavation of shovel test probes, and built environment survey. Results will be presented in a technical memo.

We are aware that not all information is contained in published sources. Should the Tribe have additional information you would be willing to share to support our assessment, we would very much like to include it in our study. Please contact me at ian@crcwa.com or 360.431.3433 should you wish to provide any comments. I appreciate your assistance and look forward to hearing from you.

Sincerely,

Ian Kretzler
Projects Manager

CULTURAL RESOURCE CONSULTANTS, LLC. PO Box 4159, SEATTLE, WA 98194
PHONE 206.855.9020 • ian@crcwa.com

Appendix B.APE Consultation

December 12, 2024

WSDOT Local Programs
Northwest Region
Attn: Trent de Boer
P.O. Box 47390
310 Maple Park Avenue
Olympia, WA 98504-7390

Re: Area of Potential Effects, Senn MP 0.89 Bridge Scour Repair Project, Lewis County,
Washington

Dear Mr. de Boer:

Lewis County seeks to initiate Section 106 consultation for the Senn MP 0.89 Bridge Scour Repair Project in accordance with Chapter 24.6 of WSDOT Local Agency Guidelines. The project will make use of federal funds awarded by the Federal Highway Administration (FHWA) and will require involvement by the United States Army Corps of Engineers (USACE). It therefore qualifies as a federal undertaking subject to Section 106 of the National Historic Preservation Act (NHPA). A description of the project's direct Area of Potential Effects (APE) is included below.

Project Location & Description

The Senn MP 0.89 Bridge (Lewis County Bridge No. 77) carries Senn Road over Lucas Creek in unincorporated Lewis County 6.5 miles northeast of City of Napavine. The project is located in the NE¼ of the SW¼ and the NW¼ of the SE¼ of Section 2 in Township 13 North, Range 01 West, Willamette Meridian (Figure 1).

Built in 1966, the 60-foot-long, three-span bridge is supported by concrete piles. It will be the sole access for Senn Road residents after 2024 road reconstruction/fish barrier removal work at the south end of Senn Road. The bridge is classified as scour critical due to abutment/interior pile tip elevations within 10 feet of the stream's thalweg. Lewis County proposes to conduct scour analysis, including geomorphic, geotechnical, hydrologic, and hydraulic analyses, and develop three mitigation alternatives. Ground disturbance at the project APE will likely include excavation in the channel and along the banks of Lucas Creek and tracking from movement of machinery. Staging areas will be located within the boundaries of the project APE.

Direct Area of Potential Effects (APE)

The APE totals approximately 2.6 acres. It encompasses the right-of-way of Senn Road and portions of Lewis County parcel numbers 016829000000 and 016834001002. Based on the scope and scale of proposed project activities, effects to historic properties outside of this APE are not anticipated.

Known Cultural Resources

According to the Washington Information System for Architectural and Archaeological Records Data (WISAARD) maintained by the Washington State Department of Archaeology and Historic Preservation (DAHP), no previously recorded archaeological sites, register-listed historic properties, or inventoried historic built environment resources are located at the project APE.

One previous cultural resources investigation overlaps with the project APE. Parvey and Donald (2022, NADB 1696466) conducted surface pedestrian survey and excavated 50 shovel test probes ahead of proposed safety improvements along Centralia Alpha Road and nearby roads. Surface pedestrian survey was conducted along the eastern side of Senn Road within the boundaries of the current project APE; no shovel probes were excavated in this area. The eastern side of Senn Road exhibited evidence of past disturbance associated with residential development, excavation of drainage ditches, and road construction. No archaeological sites or other cultural resources were identified.

The archaeological site recorded closest to the project APE is 45LE967, which is located 1.44 miles to the southwest along N Fork Road. The site consists of a cryptocrystalline silicate (CCS) flake identified in the upper 10 centimeters (cm) (4 inches) of a shovel test probe. Four radial probes excavated around the find were negative for archaeological materials. The site has been determined not eligible for listing on the National Register of Historic Places (NRHP).

The register-listed historic property closest to the project APE is the Feldman Ranch Barn (45LE858) 2.85 miles to the north-northeast. The cemetery closest to the project APE is the Deskins Family Cemetery (45LE626) 3.46 miles to the north-northeast. No inventoried historic built environment resources are located in the immediate project vicinity.

The DAHP Statewide Predictive Model ranks the project APE as very high risk for archaeological sites.

Field Investigation

Cultural Resource Consultants, LLC (CRC) will complete a cultural resources survey at the project APE in order to evaluate potential effects of the project on historic properties. Identification efforts will include background research, surface pedestrian survey, excavation of shovel test probes, and historic structure inventory (Figure 2). Field investigation will be conducted within the Senn Road right-of-way and Lewis County parcel numbers 016829000000 and 016834001002.

Surface pedestrian survey will be conducted via transects spaced 10 to 20 meters (33 to 66 feet) apart. Up to six cylindrical shovel test probes will be excavated at 30-meter (98-foot) intervals along the banks of Lucas Creek west of Senn Road. Probes will measure 50 cm (1.6 feet) in diameter and will extend to a minimum depth of 50 cm (1.6 feet). Excavated sediments will be screened through 1/8-inch hardware mesh. Artifacts, if identified, will be documented in the field, placed in a bag with a detectable metal tag, and reburied in the probe in which they were found. Archaeological sites will be recorded on Archaeological Site Inventory Forms. Because the existing Senn Bridge is more than 50 years old, it may be eligible for listing on the NRHP.

CRC will complete a Historic Property Inventory (HPI) Form for the bridge and evaluate it for listing on the NRHP.

CRC will present the results of background research and field investigation in a cultural resources assessment, which will support project permitting and design. The assessment will include an inadvertent discovery protocol (IDP) to be used during ground disturbance. We welcome any information you are able to provide that may assist with these identification efforts.

Should you have any questions or comments regarding the proposed project or APE, you may contact me by phone at 206-855-9020 or by email at margaret@crcwa.com.

Sincerely,



Margaret Berger, Principal Investigator
Cultural Resource Consultants

Enclosures: APE Figures

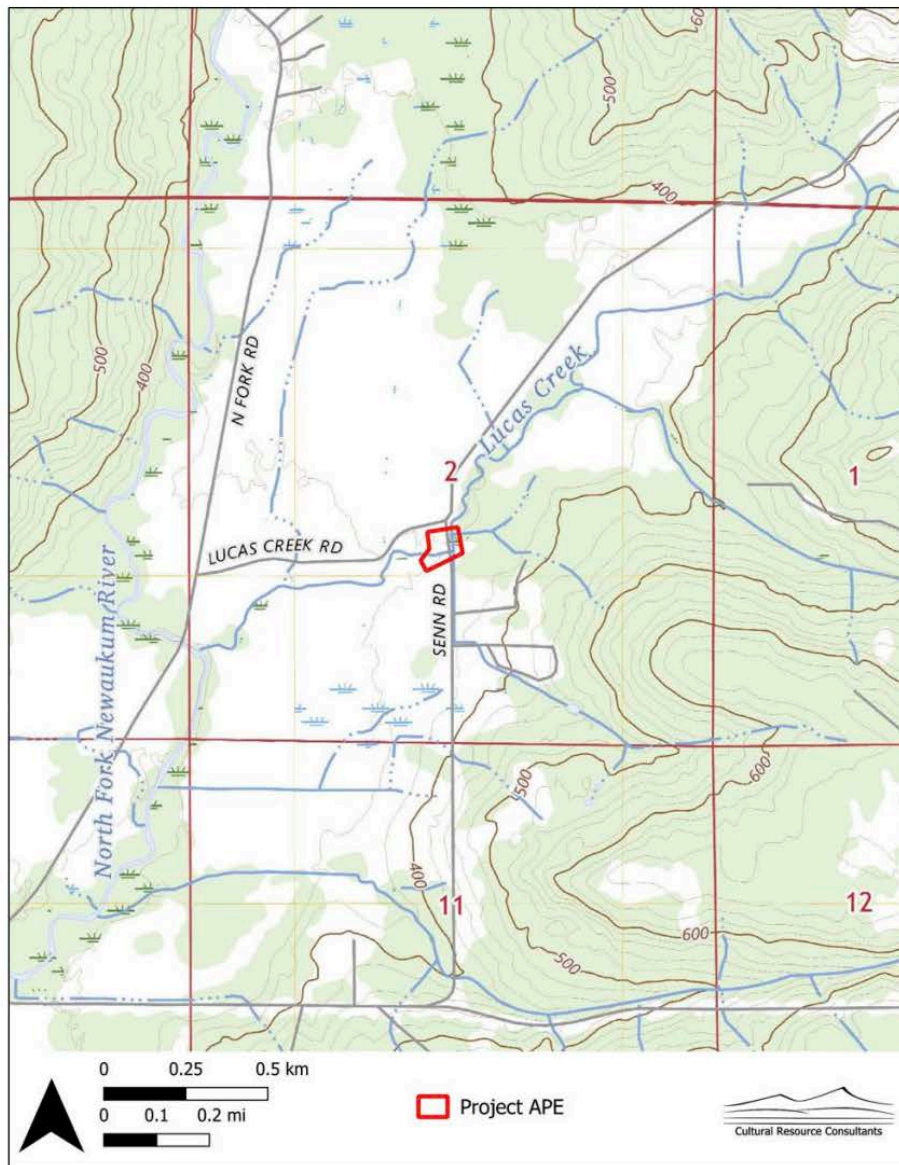


Figure 1. Project APE on the 2023 Logan Hill, Washington, USGS 7.5-minute topographic quadrangle.



Figure 2. Satellite imagery of the project APE and locations of proposed shovel test probes.



Allyson Brooks Ph.D., Director
State Historic Preservation Officer

April 9, 2025

Mr. Trent de Boer
Archaeologist
WA State Dept. of Transportation
PO Box 47390
Olympia, WA. 98504-7390

In future correspondence please refer to:
Project Tracking Code: 2025-04-02252
Property: Senn MP 0.89 Bridge Scour Repair
Re: APE Concur

Dear Mr. de Boer:

Thank you for contacting the State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) regarding the above referenced project. In response, we have reviewed your description and map of the area of potential effect (APE).

We concur with your definition of the APE. Along with the results of the inventory we will need to review your consultation with the concerned tribes, and other interested/affected parties. Please provide any correspondence or comments from concerned tribes and/or other parties that you receive as you consult under the requirements of 36 CFR 800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the SHPO in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR 800. Should additional information about the project become available, our assessment may be revised.

Thank you for the opportunity to review and comment. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports. If you have any questions, please feel free to contact me.

Sincerely,

Dennis Wardlaw
Transportation Archaeologist
(360) 485-5014
dennis.wardlaw@dahp.wa.gov

State of Washington • Department of Archaeology & Historic Preservation
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov



Appendix C. Subsurface Survey Results

Probe #	Probe Location (UTMs)	Stratigraphic Description (depths are centimeters below surface [cmbs])	Cultural Materials (cmbs)
1	517488 m E 5165081 m N	0-21: dark brown silty clay; <5% very small pebbles, sub-rounded to rounded; firm; gradual lower boundary; 20% roots and rootlets; burnt wood (A horizon) 21-69: yellowish brown silty clay; compact; gradual lower boundary; 10% roots/rootlets (B horizon) 69-105: pale gray fine clay with orange mottling; very compact (C horizon) Terminated due to clay density	None
2	517503 m E 5165090 m N	0-30: dark brown fine to medium to gravelly sandy silty clay; firm; gradual lower boundary; roots and rootlets (A horizon) 30-78: orangish brown fine to medium to gravelly loamy clay; firm; clear lower boundary; few roots/rootlets; some gray mottling (B horizon) 78-110: pale gray fine clay; compact (C horizon) Terminated due to clay density	0-10: aluminum pipe fastener “Murray All Stainless Towson MD”
3	517485 m E 5165056 m N	0-20: dark brown fine to medium to gravelly silty clay; friable; gradual lower boundary; 5% roots and rootlets (A horizon) 20-46: grayish brown fine to medium to gravelly silty clay; friable; gradual lower boundary; few roots/rootlets; some orange mottling; very dense (B horizon) 46-110: gray fine clay; compact; some orange mottling; dense (C horizon) Terminated due to clay density	None

Probe #	Probe Location (UTMs)	Stratigraphic Description (depths are centimeters below surface [cmbs])	Cultural Materials (cmbs)
4	517504 m E 5165066 m N	0-37: dark brown silty clay with orange mottling; <5% very small pebbles, sub-rounded to rounded; firm; gradual lower boundary; roots and rootlets (A horizon) 37-71: yellowish gray silty clay with orange mottling; compact; gradual lower boundary; (B horizon) 71-127: pale gray clay with orange mottling; very compact; speckles of charcoal from 97-105 cmbs (C horizon) Terminated due to clay density	None
5	517422 m E 5165114 m N	0-50: dark brown fine silty clay; <5% very small pebbles, sub-angular to sub-rounded; compact; gradual lower boundary; 1% rootlets (A horizon) 50-140: dark yellowish brown fine silty clay; <5% very small pebbles, sub-angular to sub-rounded; compact; clear lower boundary; occasional charcoal flakes; augured at 70 cmbs due to compaction (B horizon) 140-160: light grayish brown fine sandy clay; <5% very small pebbles, sub-angular to sub-rounded; compact; mottled oxidation; occasional charcoal flakes (C horizon) Terminated in C horizon	None

Probe #	Probe Location (UTMs)	Stratigraphic Description (depths are centimeters below surface [cmbs])	Cultural Materials (cmbs)
6	517452 m E 5165122 m N	0-54: grayish brown silty fine to medium sandy clay; 5-15% very small to small pebbles, sub-angular to sub-rounded; compact; gradual lower boundary; 30% roots/rootlets; grass on surface (A horizon) 54-92: yellowish brown medium to coarse sandy clay; <5% very small to medium pebbles, sub-angular to sub-rounded; compact; gradual lower boundary; augured at 65 cmbs due to density of clay/sand (B horizon) 92-162: dark yellowish brown coarse sand; 5-15% very small to medium pebbles, sub-angular to sub-rounded; weak; charcoal speckles; slightly moist (C horizon) Terminated in C horizon	None
7	517429 m E 5165084 m N	0-10: dark brown fine sandy clay; <5% very small to small pebbles, sub-angular to sub-rounded; compact; clear lower boundary; 5% roots/rootlets (A horizon) 10-140: yellowish brown fine sandy clay; <5% very small to small pebbles, sub-angular to sub-rounded; compact; clear lower boundary; occasional charcoal flakes; 1% roots/rootlets; augured at 90 cmbs due to root obstruction (B horizon) 140-150: dark gray fine sandy clay; <5% very small to small pebbles; sub-angular to rounded; firm; 1% roots; occasional charcoal flakes; mottled oxidation (C horizon) Terminated in C horizon	None

Probe #	Probe Location (UTMs)	Stratigraphic Description (depths are centimeters below surface [cmbs])	Cultural Materials (cmbs)
8	517457 m E 5165092 m N	0-42: dark brown fine to medium sandy clay; 5-15% very small to small pebbles, sub-angular to sub-rounded; compact; gradual lower boundary; 30% roots/rootlets ; grass on surface; likely graded (A horizon) 42-77: yellowish brown fine to medium sandy clay; 5-15% very small to small pebbles, sub-angular to sub-rounded; firm; clear lower boundary; occasional charcoal flakes; 10% roots/rootlets (B horizon) 77-84: yellowish gray fine to medium sand; <5% very small to small pebbles; sub-angular to rounded; loose; likely disturbed (B and C mixed horizon) 84-160: dark yellowish brown coarse sand; 5-15% very small to medium pebbles, sub-angular to sub-rounded; loose; slightly moist; charcoal flakes; augured at 108 cmbs due to loose sand (C horizon) Terminated in C horizon	None
9	517437 m E 5165051 m N	0-5: very dark brown fine silty sand; 5-15% very small to small pebbles, sub-angular to sub-rounded; very compact; clear lower boundary; occasional charcoal flakes (A horizon) 5-30: light yellowish brown fine to medium sandy clay; <5% very small to small pebbles, sub-angular to sub-rounded; very compact (B horizon) Terminated due to severe weather	None
10	517462 m E 5165064 m N	0-4: dark brown fine silty sand; 5-15% very small to small pebbles, sub-angular to sub-rounded; very compact; clear lower boundary (A horizon) 4-41: yellowish brown fine to medium sandy clay; <5% very small to small pebbles, sub-angular to sub-rounded; very compact (B horizon) Terminated due to severe weather	None

Appendix D. Inadvertent Discovery Protocol

In accordance with RCW 27.44 Indian Graves and Records Act, RCW 27.53 Archaeological Sites and Resources, RCW 68.50 Human Remains, and RCW 68.60 Abandoned and Historic Cemeteries and Historic Graves, the below procedures will be followed in the event that archaeological materials or human remains are discovered during ground disturbance.

D.1 Procedures for Discovery of Potential or Actual Cultural Resources

Upon discovery of a potential or actual archaeological site or cultural resources as defined by RCW 27.44 Indian Graves and Records Act and RCW 27.53 Archaeological Sites and Resources, the project proponent, its employees, contractors, and sub-contractors shall take the following steps.

- a) Immediately halt ground disturbing, construction, or other activities around the area of the discovery and secure the area with a perimeter of not less than 30 feet until all procedures are completed and the parties agree that activities can resume. If such a perimeter would materially impact agency functions mandated by law related to health, safety, or environmental concerns, then the secured area shall be of a size and extent practicable to provide maximum protection to the resource under the circumstances. Project activities may continue outside the secured perimeter. No one shall excavate the discovery, which will be left in place, undisturbed and without analysis, until consultation with DAHP and affected Tribes regarding a final disposition of the discovery has been completed. In accordance with RCW 27.53.060, no one shall knowingly remove or collect any archaeological objects without obtaining a permit.
- b) Notify WSDOT Local Programs, who will notify the State Archaeologist at DAHP and affected Tribes of the discovery as soon as possible and no later than 24 hours of the discovery. If human remains are found, the project proponent shall follow the notification procedures specified below.
- c) Arrange for the parties to conduct a joint viewing of the discovery within 48 hours of the notification or at the earliest possible time thereafter. After the joint viewing, WSDOT, DAHP, Tribes, and the project proponent shall discuss the significance, if any, of the discovery. If the discovery is deemed eligible or potentially eligible for listing on historic registers, additional investigation or mitigation may be necessary before ground disturbing activities may resume.
- d) Consult with WSDOT, Tribes, and DAHP on the transfer and final disposition of artifacts.

D.2 Procedures for Discovery of Human Skeletal Remains

Upon discovery of human skeletal remains on non-federal and non-tribal land and in accordance with RCWs 68.50.645, 27.44.055, and 68.60.055, the project proponent, its employees, contractors, and sub-contractors shall:

(a) If ground-disturbing activities encounter human skeletal remains during the course of construction, then all activity must cease that may cause further disturbance to those remains and the area of the find must be secured and protected from further disturbance. In addition, the finding of human skeletal remains must be reported to the Lewis County Coroner and Lewis County Sheriff's Office in the most expeditious manner possible. The remains should not be touched, moved, or further disturbed.

(b) The Lewis County Coroner will assume jurisdiction over the human skeletal remains and make a determination of whether those remains are forensic or non-forensic. If the county medical examiner determines the remains are non-forensic, then they will report that finding to DAHP who will then take jurisdiction over the remains and report them to the appropriate cemeteries and affected Tribes. The State Physical Anthropologist will make a determination of whether the remains are Indian or Non-Indian and report that finding to any appropriate cemeteries and the affected Tribes. DAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

(c) DAHP will handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains if no federal agency is involved.

Confidentiality of Information

The project proponent and their authorized representative recognizes that archaeological sites are sensitive cultural resources that can become targets of vandalism and illegal removal activities. The project proponent or their authorized representative shall keep and maintain as confidential all information regarding any discovered cultural resources, particularly the location of known or suspected archaeological property, and exempt all such information from public disclosure consistent with RCW 42.17.300.

Contact Information

The lead representatives and primary contacts of each party under this plan are as identified below. The parties may identify other specific personnel before the commencement of any particular project element as the contacts.

Confederated Tribes of the Chehalis Reservation

P.O. Box 536, Howanut Road, Oakville, WA 98568

Primary Contact: Dan Penn, Acting Tribal Historic Preservation Officer, 360-709-1747,
dpenn@chehalis-tribe.org

Cowlitz Indian Tribe

P.O. Box 2547, Longview, WA 98632

Primary Contact: James Gordon, Tribal Historic Preservation Officer, 360-957-3004,
jgordon@cowlitz.org

Nisqually Indian Tribe

4820 She-Nah-Num Drive SE, Olympia, WA 98513-9105

Primary Contact: Brad Beach, Tribal Historic Preservation Officer, 360-456-5221 ex. 1277,
cell: 360-528-0680, beach.brad@nisqually-nsn.gov

Secondary Contact: Annette Bullchild, Director, 360-456-5221 ex. 1106,
Bullchild.annette@nisqually-nsn.gov

Quinault Indian Nation

P.O. Box 189, Taholah, WA 98587-0189

Primary Contact: Lia Frenchman, Tribal Historic Preservation Officer, 360-276 8215 x7308,
cell: 360-590 0322, LFrenchman@quinault.org

Secondary Contact: Justine James, Cultural Resources, 360-276-8215 ext. 520,
jjames@quinault.org

Washington State Department of Transportation (WSDOT)

Acting as lead agency on behalf of the Federal Highway Administration (FHWA)

Local Programs

11018 NE 51st Cr, Vancouver, WA 98682-6686

Primary Contact: Trent DeBoer, Archaeologist – Statewide, 360-705-7879,
trent.deboer@wsdot.wa.gov

Washington Department of Archaeology and Historic Preservation (DAHP)

P.O. Box 48343, Olympia, WA 98504-8343

Primary Contact: Rob Whitlam, State Archaeologist, 360-586-3080,
Rob.Whitlam@dahp.wa.gov

Primary Contact for Human Remains: Guy Tasa, State Physical Anthropologist, 360-586-
3534 or 360-790-1633, Guy.Tasa@dahp.wa.gov

Lewis County Sheriff's Office

345 W Main Street, Chehalis, WA 98532

Primary Contact: Robert Snaza, Sheriff, 360-748-9286

Lewis County Coroner's Office

585 NW Center Street, Chehalis, WA 98532

Primary Contact: Warren McLeod, Coroner, 360-748-9121

