

Chapter 1. Introduction

Washington State Department of Transportation (WSDOT) proposes to perform a highway widening and safety project on SR 14 from MP 22.65 to 23.59 and MP 24.04 to 26.63. The purpose of the report is to identify and describe wetlands that may occur throughout the project corridor. This report helps WSDOT to:

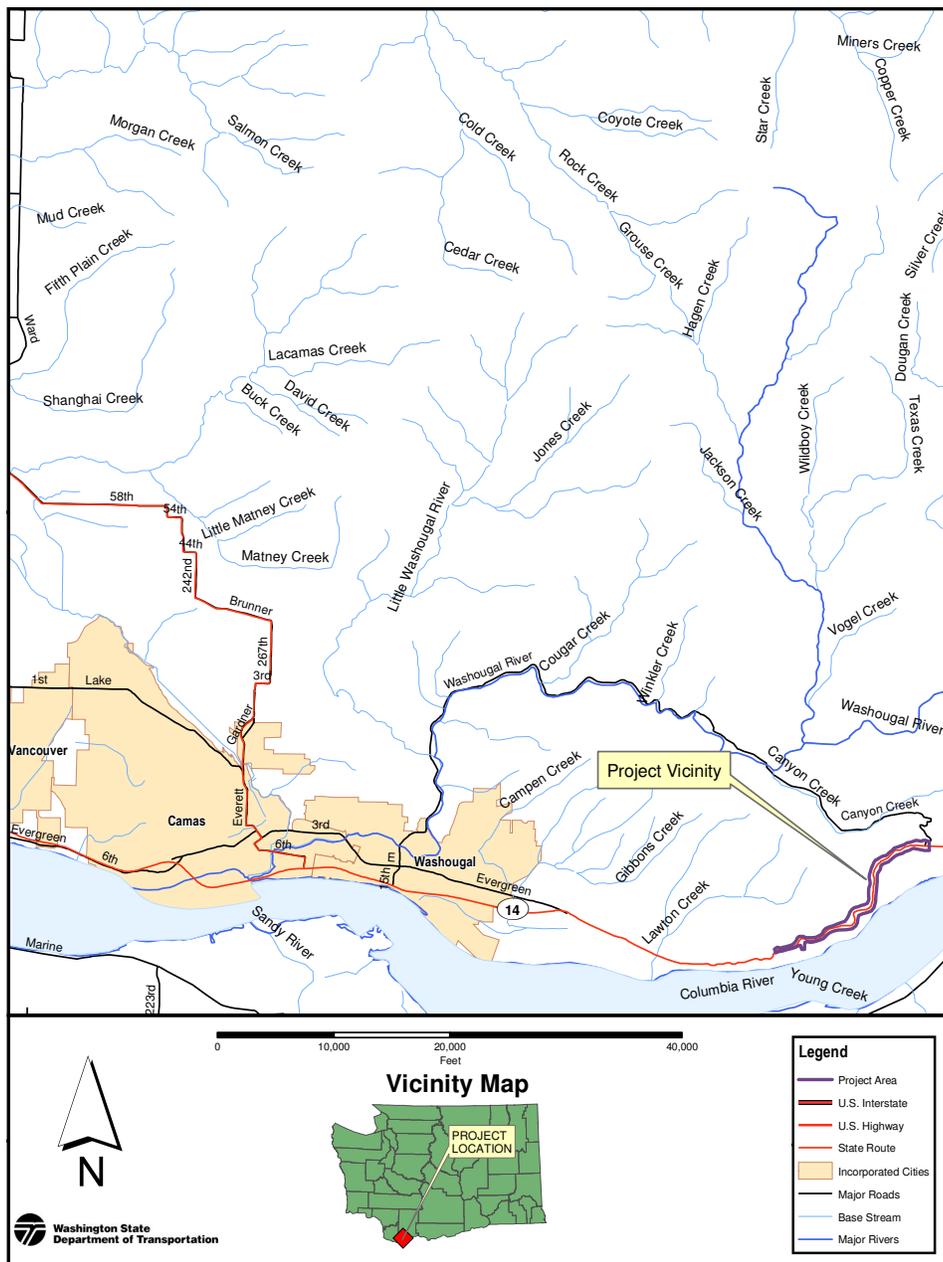
1. avoid or minimize impacts to wetlands and streams during the design process
2. document wetland boundary determinations for review by regulatory authorities
3. provide background information for wetland mitigation reports

Chapter 2. Proposed Project

2.1 Location

The project occurs along SR-14 from MP 22.65 to 23.59 and MP 24.04 to 26.63 within the limits of the Columbia River Gorge National Scenic Area (CRGNSA) in Skamania County, Washington. The project is located in Township 1 North, Range 5 East, Sections 9, 10, 15, 16, 17, 19, and 20. The project is located within the sixth field hydrologic unit codes 170800010703 and 170800010704 in Water Resource Inventory Area 28. Figure 1 is a map showing the project vicinity.

Figure 1. Project Vicinity Map.



Vicinity.mxd Printed: 01/22/2008

1 **2.2 Purpose**

2 The intent of this project is to provide:

- 3 • **Improved Safety:** The project is designed to reduce accidents on SR 14 by realigning
4 and flattening several curves, shoulder widening, intersection improvements, and
5 highway widening.

6 **2.3 Description**

7 This project description includes a discussion of erosion control best management practices;
8 clearing and grubbing; existing/new impervious surface area; culvert extensions/installations;
9 utility relocation; excavation and fill placement; access, detours, and staging; construction
10 equipment; and project timeline for the Marble Road to Cape Horn Road Safety Project.

11 **Project Overview**

12 Work will occur within existing pavement or gravel shoulders for repaving and reversion.
13 Additional work will occur outside of existing pavement for realigning and widening.
14 Construction activities include: realigning roadway, widening shoulders to four feet, improving
15 intersection safety, removing abandoned roadway, incorporating safety features, grading, and
16 integrating traffic control features. Guardrails will be installed or upgraded where necessary.
17 Design for the project is in preliminary phases and detailed project plans are not available at this
18 time.

19 Due to available funding, this project is split into two phases, the Marble Road to Belle Center
20 phase and SR 14 Cape Horn Bridge Vicinity to Cape Horn Road phase. In order to facilitate the
21 discussion in this report, the sections are further divided into smaller segments. The Marble Road
22 to Belle Center phase is divided into three segments: Marble Road Vicinity, Belle Center Road,
23 and Big ‘S’ Curves. The Cape Horn Bridge Vicinity phase is divided into two segments: Quarry
24 Vicinity and Salmon Falls Road.

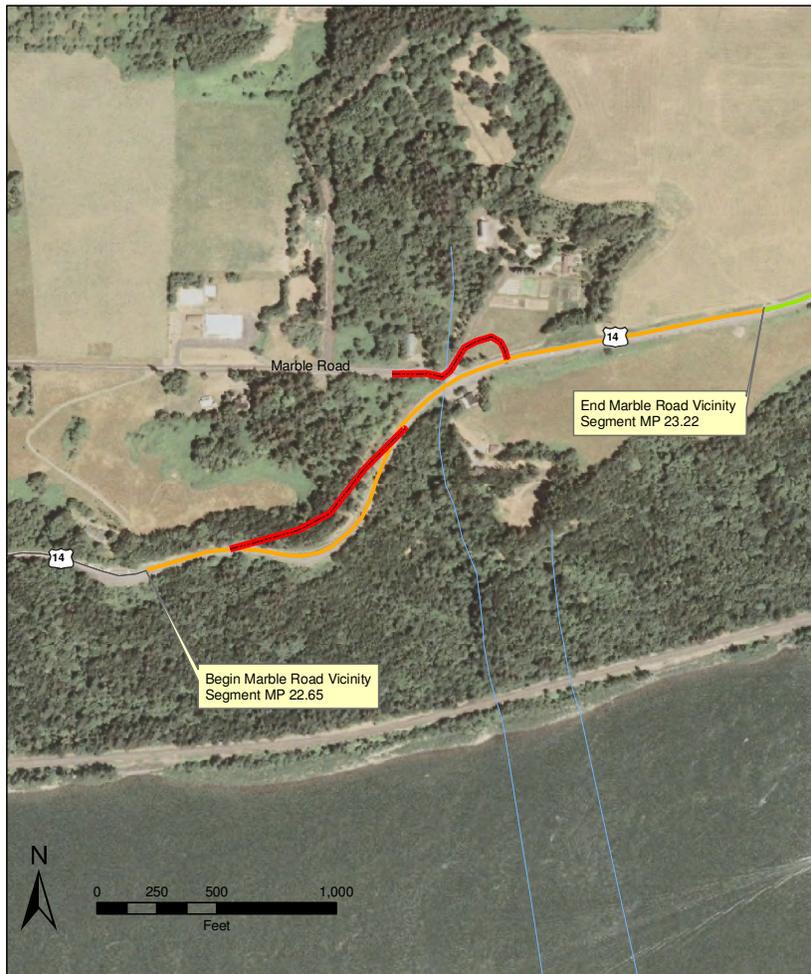
25 Currently the project area has no constructed water quality treatment or flow control facilities.
26 The project proposes to construct and provide stormwater treatment consistent with the current
27 WSDOT Highway Runoff Manual (HRM). Each Threshold Discharge Area (TDA) will have
28 different water quality and flow control treatment options.

29 **Marble Road to Belle Center**

30 The Marble Road Vicinity segment (MP 22.65 to 23.22) includes realignment of the roadway to
31 the north and improvements to the intersection of Marble Road and SR 14 (Figure 2).

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1 **Figure 2. Marble Road Segment Vicinity Map**



Marble Road Vicinity Segment

— Proposed Realignment

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3 This segment consists of WSDOT right of way and private lands. Realignment to the north from
4 milepost 22.73 to 22.99 includes excavation of the adjacent embankment. The abandoned
5 roadway will be reverted to pervious surface. The intersection of Marble Road and SR 14 is
6 unsafe. The proposed angle of the new intersection at Marble Road is designed to comply with
7 roadway safety standards. The existing auxiliary lane from MP 23.06 to MP 23.22 will be rebuilt.
8 SR 14 at MP 22.97 crosses an unnamed tributary to the Columbia River. This MP 22.97 tributary
9 is non-fish bearing. The culvert (Fish Passage ID # 996895) at this crossing will be extended.
10 Two stormwater ponds are proposed near MP 22.75 (32' x 112') and 22.98 (48' x 167').

11 The Belle Center Road segment (MP 23.22 to 23.59) includes rebuilding the auxiliary lane,
12 realignment of the highway to the south, and shifting the intersection of SR 14 and Belle Center
13 Road also to the south (Figure 3). This segment consists of WSDOT right of way and private
14 lands. The rebuilding of the auxiliary lane will be from MP 23.22 to 23.29, which is contiguous
15 with the Marble Road Vicinity Segment. The SR 14 roadway at the Belle Center Road is tight
16 curve. The proposed design includes flattening and realigning SR 14 and moving the intersection

1 at Belle Center Road to the south. The abandoned roadway will be reverted to pervious surface.
2 In this segment SR 14 near MP 23.44 crosses a tributary to the Columbia River. This MP 23.44
3 tributary is non-fish bearing. The culvert (Fish Passage ID # 996896) at this crossing will be
4 extended. A stormwater pond (52'x180') is proposed near MP 23.36.

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6 **Figure 3. Belle Center Road Segment Vicinity Map**



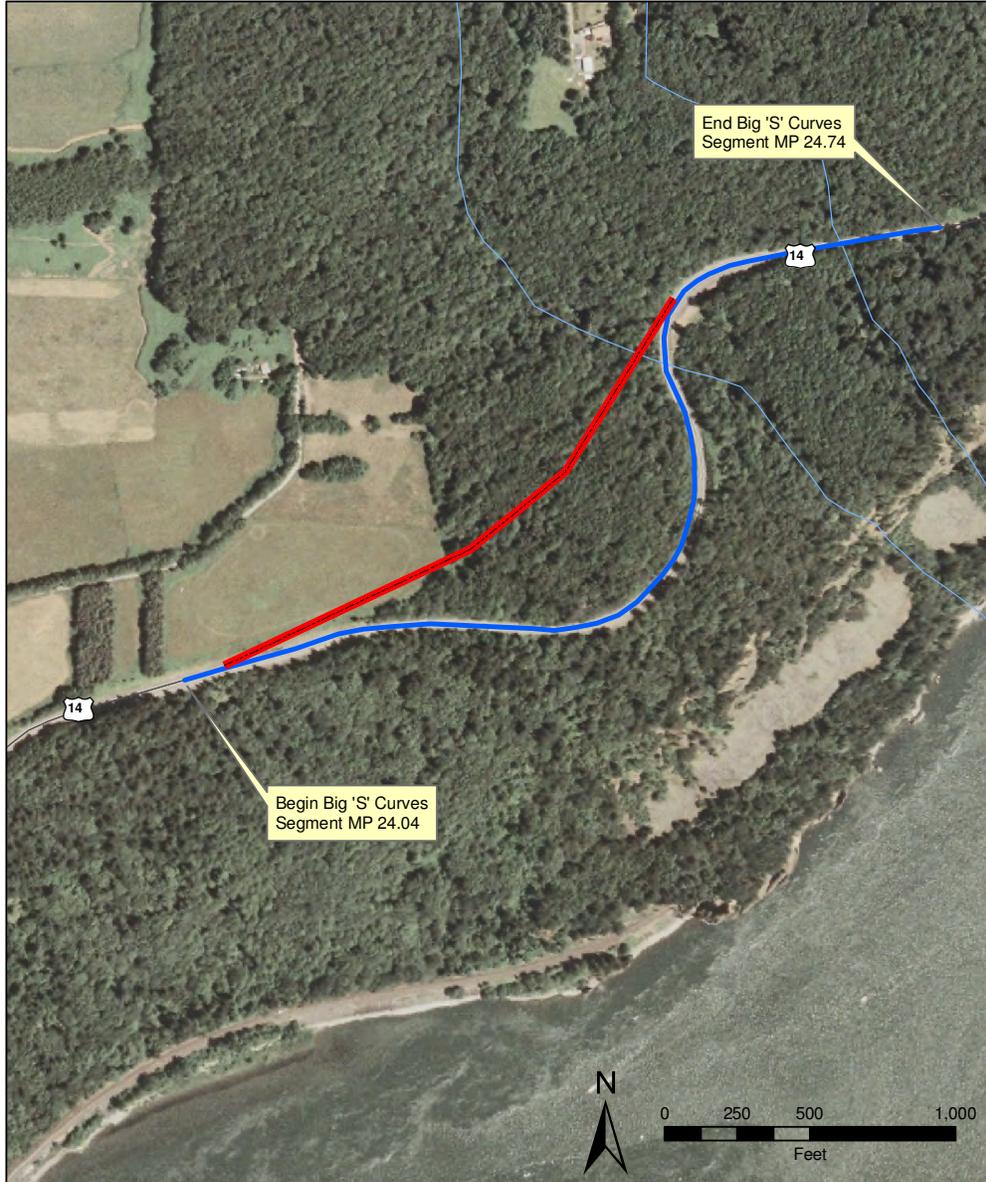
Belle Center Road Vicinity Segment

Proposed Realignment

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8 The Big 'S' Curves segment (MP 24.04 to 24.74) includes realignment to the north and an
9 additional westbound truck passing lane (Figure 4). This segment consists of WSDOT right of
10 way, private lands, and US Forest Service lands. The realignment will shift SR 14 from MP
11 24.50 to MP 24.57. The abandoned roadway will be reverted to pervious surface. In this segment
12 the existing SR 14 alignment near MP 24.55 (needs to be fish passable) and 24.71 (non-fish
13 bearing) crosses two unnamed tributary to the Columbia River. The existing culvert (Fish
14 Passage ID # 996897) at MP 24.55 will be replaced with two new fish passable culverts where
15 the proposed roadway alignment will be shifted to the north. The culvert (Fish Passage ID #
16 996898) at MP 24.71 will be extended. Two stormwater ponds are proposed to be constructed
17 near MP 24.51 (53'x185' and 34'x120').

1 **Figure 4. Big "Ess" Segment Vicinity Map.**



Big 'S' Curves Segment

— Proposed Realignment

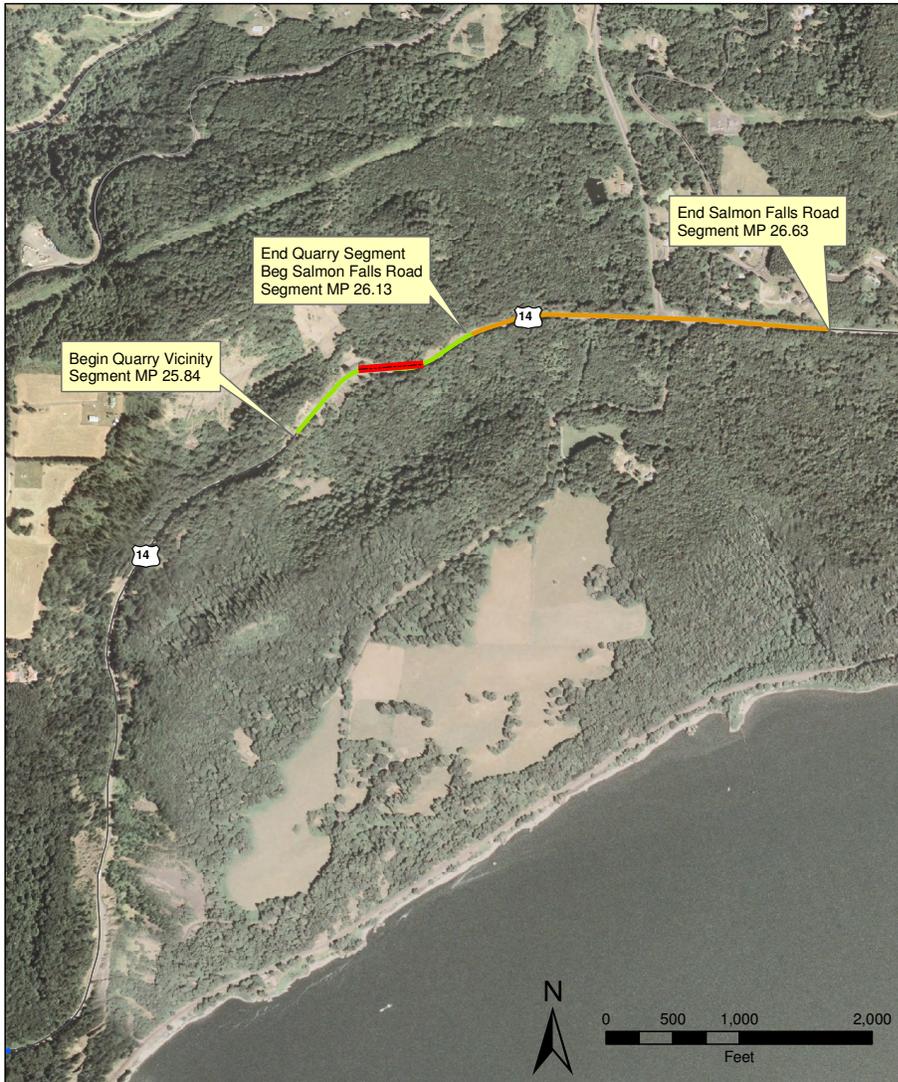
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3 **Cape Horn Bridge Vicinity to Cape Horn Road**

4 The Quarry Vicinity segment (MP 25.84 to 26.13) includes realignment to the north and project
5 staging (Figure 5). This segment consists of WSDOT right of way and private lands. The
6 highway will be realigned to the north of the existing alignment from MP 25.84 to MP 26.13.
7 The proposed staging area has been previously disturbed and part of access to a quarry. Blasting
8 may occur in cut sections from MP 25.97 to 26.13. A stormwater pond (25' x86') is proposed
9 near MP 26.06.

1 The Salmon Falls Road Segment (MP 26.13 to 26.63) includes widening to the north, shoulder
2 widening, incorporating turning pockets and channelization (Figure 5). This segment consists of
3 WSDOT right of way, private lands, and US Forest Service lands. This segment of SR 14 at MP
4 26.33 and 26.49 crosses two unnamed, non-fish bearing tributaries to the Columbia River. The
5 culverts at MP 26.33 (Fish Passage ID # 996900) and MP 26.49 (Fish Passage ID # 996901) will
6 be extended.

7 **Figure 5. Salmon Falls Road Segment Vicinity**



Quarry Vicinity and Salmon Falls Road Segments

Proposed Realignment

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1 **Erosion Control Best Management Practices**

2 During construction, Best Management Practices (BMPs), including a Temporary Erosion and
3 Soil Control (TESC) plan and Spill Prevention, Control, and Countermeasures Plan (SPCCP),
4 will be used to contain sediments or pollutants that could potentially enter tributaries and non-
5 impacted wetlands. Approved BMPs will be used during construction around tributaries and
6 non-impacted wetlands to keep sediments and pollutants from entering sensitive areas.

7 **Clearing and Grubbing**

8 Approximately 6.5 acres of vegetation will be cleared and grubbed in the project footprint for the
9 realignment and widening. Tree removal will occur in the realignment sections and mitigation
10 will be provided. The type, size, and number of trees that will be removed have not been
11 determined yet. A restoration and mitigation plan is being developed as part of requirements set
12 forth by the Skamania County and the Columbia Gorge National Scenic Area Commission.
13 Roadside areas that will not be permanently impacted will be seeded with an appropriate grass
14 seed mixture and mulched.

15 **Culvert Extensions/Installations**

16 Work will occur on seven culverts carrying tributary flow under SR 14 within the project
17 footprint. Four culverts will be extended on both the inlet and outlet ends, one culvert will be
18 extended on the outlet end, and one new culvert will be constructed that is fish passable. The
19 new culvert will be located near MP 24.42 across the proposed Big ‘S’ Curves segment just north
20 of the existing structure location. The old culvert will be removed. Specific construction details
21 about the culvert improvements are available upon request.

22 **Existing and New Impervious Surface Area**

23 The project contains approximately 11.66 acres of existing impervious surface, none of which is
24 currently treated for water quality or flow control from stormwater runoff. The project will result
25 in approximately 14.33 acres of impervious surface. Net new impervious surface is
26 approximately 2.67 acres.

27 **Utility Relocation**

28 Above ground utilities (power poles, above ground power, and telephone boxes) at the
29 intersection of Marble Road and SR 14, Belle Center Road and SR 14, and at Salmon Falls Road
30 and SR 14 will have to be relocated. Underground utilities have not been identified at the time of
31 report publication.

32 **Excavation and Fill Placement**

33 Excavation at the sites will be necessary to flatten curves and widen the roadway. Fill at the sites
34 will be necessary to flatten roadway. The project will excavate approximately 417,100 cubic
35 yards and fill approximately 137,500 cubic yards. Excavated material from the project site will
36 be used for fill material at the project site and the remainder will be disposed of by the contractor
37 at a permitted disposal site.

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1 **Access, Detours, and Staging**

2 During construction, the project will use alternate lane closures on SR 14. The contractor will
3 determine staging area locations with approval by the WSDOT Project Engineer. Staging areas
4 will be sited to avoid sensitive areas. No detours are required. One staging area is proposed in the
5 Quarry Vicinity segment near MP 25.85.

6 Long-term changes to traffic conveyance will result when construction is complete, because
7 traffic will be able to flow easier through the SR 14 corridor. The safety upgrades from the curve
8 flattening, shoulder and auxiliary lane widening, intersection improvements, and truck passing
9 lane are likely to reduce accidents along the project section of SR 14.

10 **Construction Equipment and Project Noise**

11 Project equipment will include earth movers, excavators, grinders, paver, vibratory and
12 pneumatic rollers, pavers, water truck, brooms, tack distributor truck, loaders, backhoes, graders,
13 concrete mixers, stripping truck, cranes, air compressors, jack hammers, and saw cutters.

14 Construction noise, other than blasting, was estimated to extend between 0.6 and 1.2 miles from
15 project activities (based on an ambient noise level of 71 dBA and the loudest three pieces of
16 construction equipment operating simultaneously at 91 dBA [FHWA 2006]). Actual noise levels
17 at the project site may be less because site-specific variables, which include the surrounding
18 topography, condition of the roadway, road grade, truck use, and actual vehicle speeds, may
19 increase ambient noise levels. Blasting, if used, would extend noise intermittently during project
20 construction from the vicinity of MP 25.97 to 26.13. The extent of blasting noise is described in
21 Section 2.

22 **Project Timeline**

23 The project is scheduled to start construction in spring of 2010 (Ad date April 24, 2010) and be
24 completed by the end of 2011. [Note: at present, construction of the proposed project is not fully
25 funded]. Additional re-vegetation, restoration and wetland mitigation work may occur after this
26 date. All in-stream work will be conducted during the in-water work window from the
27 Washington Department of Fish and Wildlife (WDFW) (between June 30 and September 15).
28 All in-stream work is expected to be conducted during one in-water work window per stream. A
29 total of 265 working days are estimated to complete construction. Some project work may be
30 conducted at night, but most activities will occur during daylight hours.

31 The project consists of the following elements for each project segment (exact sequencing may
32 vary):

33 Install high visibility fence

34 Install erosion control BMPs and mark clearing limits

35 Clear and grub vegetation

36 Install stormwater ponds

37 Route traffic during construction using alternate lane closures

38 Conduct excavation

- 1 Dewater the areas
- 2 Fish Exclusion
- 3 Extend culverts at MP 22.97, 23.44, 24.71, 26.33, and 26.49
- 4 Place fill and widen roadway
- 5 Install new culvert near MP 24.55
- 6 Remove existing culvert structure at MP 24.55
- 7 Restore streambed at MP 24.55
- 8 Update and replace flexible guide posts and signing
- 9 Pave and stripe roadways
- 10 Replant temporarily impacted vegetation with native vegetation and seed remaining disturbed
- 11 areas
- 12 Restore riparian and upland vegetation in areas converted back to pervious surface
- 13 Final cleanup
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Chapter 3. Methods

This section describes the methodology used for preparing this Wetland Delineation Report, including the review of existing information and field investigation procedures. These methods are consistent with current Federal, WSDOT, and other state agency requirements.

Wetland Identification, Delineation, and Classification

WSDOT Southwest Region wetland staff performed field reconnaissance and wetland delineations on September 7th and 11th, and October 24th and 25th of 2007 using the Routine Determination Method outlined in the *Washington State Wetland Identification and Delineation Manual* (Ecology, 1997). In general, wetland delineation consisted of three main tasks: (1) assessing vegetation, soil, and hydrologic characteristics to identify areas meeting the wetland identification criteria and recording the observations on field dataforms (Appendix D), (2) evaluating constructed drainage features to determine if they would be regulated as wetlands, and (3) marking wetland boundaries. The surveyed wetland boundaries can be found in Appendix B.

Wetlands were classified according to the U.S. Fish and Wildlife Service (USFWS) system (Cowardin et al., 1979) and rated, by categories, according to the *Washington State Wetland Rating System for Western Washington – Revised* (Hruby, 2004). The rating system also served to assess wetland functions. Completed rating forms can be found in Appendix C.

Pre-Field Review of Information

The following data sources were reviewed for information on vegetation patterns, topography, drainage, and potential or known wetlands in the project vicinity, and can be found in Appendix A:

- **Aerial photographs (2005)**
- **U.S. Geologic Survey (USGS) 7.5 minute topographic maps**
- **Natural Resources Conservation Service (NRCS) soils surveys and county hydric soils lists; (respectively available online at):**
 - http://www.or.nrcs.usda.gov/pnw_soil/wa_reports.html
 - http://www.wa.nrcs.usda.gov/technical/soils/county_hydric_lists.html
- **National Wetland Inventory (NWI) maps**

1 **Table 1. Methods and Tools Used to Prepare Report**

Parameter	Method or Tool	Website	Reference
Wetland Delineation	Washington State Wetland Delineation Manual.	http://www.ecy.wa.gov/biblio/9694.html	Ecology. 1997. Washington state wetland identification and delineation manual. Publication #96-94. Washington Department of Ecology, Olympia, WA.
Wetland Delineation	WSDOT Delineation Guidance	http://www.wsdot.wa.gov/environment/biology/wet_delineation.htm	Website
Wetland Classification	USFWS / Cowardin Classification System	http://www.fws.gov/nwi/Pubs/Reports/Class_Manual/class_titlepg.htm	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.
Wetland Classification	Hydrogeomorphic Classification (HGM) System	http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde4.pdf	Brinson, M. M. (1993). "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
Wetland Classification and Functions	Washington Rating System	http://www.ecy.wa.gov/biblio/0406025.html (western Washington)	Ecology. 2004. Washington State wetland rating system for western Washington. Publication # 04-06-025.
Stream Delineation	OHWM	http://www.usace.army.mil/inet/functions/cw/cecwo/reg/33cfr328.htm	Congressional Federal Register 33 Part 328 Definition of Waters of the United States.
Wetland Indicator Status	Northwest (Region 9) (Reed, 1988) and Northwest (Region 9) Supplement (Reed et al., 1993)	http://www.fws.gov/nwi/bha/list88.html	Reed, P.B. Jr. 1988. National list of plant species that occur in wetlands: Washington. Biological Report NERC-88/18.47 for National Wetlands Inventory, Washington, D.C. Reed, P.B. Jr. 1993. Northwest supplement (Region 9) species with a change in indicator status or added to the Northwest 1988 list, wetland plants of the state of Washington 1988. U.S. Department of Interior Fish and Wildlife Service WELUT - 88 (26.9), Washington, D.C.
Plant Names	USDA Plant Database	http://plants.usda.gov/	Website
Soil Data	Soil Survey	http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx	Website
Hydric Soils Data	Skamania County Hydric Soils Lists	http://www.wa.nrcs.usda.gov/technical/soils/county_hydric_lists.html	Website

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Also, the condition of wetland buffers was qualitatively assessed using the following criteria:

- Dominant buffer vegetation type (tree, shrub, herb, vine, un-vegetated).
- Dominant land use (e.g., agriculture, residential, commercial, industrial).

Chapter 4. Existing Conditions

4.1 Landscape Setting

The project is located on SR 14, just east of the Clark County line, in rural Skamania County between the towns of Washougal and Skamania, from MP 22.65 to MP 26.63. State Route 14 is a major road, and the only road, linking towns along the north shore of the Columbia River. This area experiences moderate amounts of automobile traffic, high levels of truck traffic, as well as significant amounts of rail and barge traffic.

The roadway in the project areas contains several sharp curves, and ranges in elevation from approximately 480 to 800 ft. The south side of the road is primarily comprised of relatively steep sloping terrain descending southward in elevation to the Columbia River. The north side terrain is more varied, ranging from rolling, grassy slopes, to more steeply forested slopes. Marble Road, Belle Center Road, Salmon Falls Road, and Canyon Creek Road intersect SR 14 from the north, while Cape Horn Road intersects SR 14 on the southern side. Additionally, there is an abandoned quarry located near MP 25.7 just east of Cape Horn Bridge and a Park and Ride facility just east of Salmon Falls Road.

Land uses within the project vicinity include transportation (highway, rail, and barge), managed mixed-use timberlands, agriculture, recreation, and rural residential. The project lies within the boundaries of the Columbia River Gorge National Scenic Area (CRGNSA). Skamania County has a comprehensive plan that incorporates a subarea management plan and zoning for the CRGNSA in compliance with the Columbia River Gorge National Scenic Area Act. All land uses must comply with regulations administered under the CRGNSA to protect scenic, cultural, natural, and recreation values.

Annual rainfall along the Columbia River is 50 inches increasing to 60 inches in the eastern portion of the county (Skamania County 2007). Over the Cascade crest, in the southeast corner of the county, annual rainfall averages 35 inches (Skamania County 2007).

TERRESTRIAL ENVIRONMENT

Vegetation in the project vicinity is typical of plant assemblages found in the west end of the Columbia Gorge; however, there are several different vegetative communities. Throughout the more developed portions of the project area, much of the landscape is open grasslands. This area has been cleared of mature vegetation and portions are mowed on a regular basis. The grasslands are dominated by a variety of grasses including meadow foxtail (*Alopecurus pratensis*), orchard grass (*Dactylis glomerata*), redbud (*Agrostis gigantea*), tall fescue (*Schedonorus phoenix*), and common velvet grass (*Holcus lanatus*). Some presence of Himalayan blackberry (*Rubus armeniacus*) was also observed.

Additional portions of the project area are forested. Big-leaf maple (*Acer macrophyllum*) comprises the dominant overstory tree over much of the landscape, with lesser occurrence by Douglas fir (*Pseudotsuga menziesii*) and red alder (*Alnus rubra*). Understory vegetation consists of vine maple (*Acer circinatum*), red elderberry (*Sambucus racemosa*), Pacific ninebark (*Physocarpus capitatus*), stinging nettle (*Urtica dioica*), delphinium (*Delphinium* spp.), and miner's lettuce (*Claytonia perfoliata*).

1 **AQUATIC ENVIRONMENT**

2 The project is located in water resource inventory area (WRIA) 28, which encompasses the
3 southwestern half of Clark County and the southwest corner of Skamania County, an area of
4 approximately 494 square miles. The eastern portion of the WRIA where the project is located is
5 the Bonneville Tributaries Subbasin. This Bonneville Tributaries Subbasin includes all of the
6 Washington tributaries that enter the Columbia River upstream of the Washougal River to
7 Bonneville Dam. The tributaries in this subbasin flow down the steep walls of the Columbia
8 River Gorge at moderate to high stream gradients before entering the Columbia River floodplain.
9 Stream flow is derived chiefly by rain-produced surface and ground water runoff (Wade 2001).
10 Average annual precipitation is 60 to 70 inches (Wade 2001). Compilation of existing data and
11 professional knowledge of fish distribution by the WRIA 28 Technical Advisory Group did not
12 identify known, presumed, or potential stocks of anadromous species in the tributaries within the
13 project footprint (Wade 2001).

14 The Columbia River flows south of SR 14 through the action area (Figure 1). The Columbia
15 River is the fourth largest watershed in the United States, draining 259,000 square miles. It has
16 the second largest volume of any river in the United States (LCREP 1999). The lower Columbia
17 River runs 146 river miles from Bonneville Dam to the Pacific Ocean. Within the action area,
18 the river flows downstream from Bonneville Dam through the Columbia Gorge emerging 20
19 miles east of Portland. The river is relatively narrow in this segment with areas as narrow as 925
20 ft. Past Washougal, just outside the action area, the river flows through a valley with a broad
21 floodplain to the Pacific Ocean.

22 **4.2 Wetlands**

23 WSDOT wetland specialists delineated nine wetlands within the proposed project area, all of
24 which would be considered jurisdictional by the U.S. Army Corps of Engineers (USACE), the
25 Washington State Department of Ecology (Ecology), and Skamania County Code. Some of the
26 wetlands extend beyond the project boundaries and are components of larger wetland complexes.
27 The project area contains 2 Category II wetland and 7 Category III wetlands, according to the
28 *Washington State Wetland Rating System for Western Washington* (Hruby 2004). Figures 6 and 7
29 depict the locations of the surveyed wetlands. Sheets containing more detailed depictions of the
30 surveyed wetland boundaries and associated datapoint locations can be found in Appendix B.

31 The wetlands consist of three Cowardin Classes: palustrine scrub-shrub (PSS), palustrine,
32 emergent, (PEM), and palustrine, forested (PFO). The biological, chemical, and physical
33 functions provided by these wetlands range from low to moderate. The majority of the wetlands
34 provide a low to moderate level of water quality, hydrologic functions, and habitat functions,
35 although one of the wetlands (Wetland C) does provide high hydrologic function. Complete
36 descriptions of each wetland are provided in this section, and Table 2 provides a summary of the
37 wetlands occurring within the project corridor. Table 3 contains a summary of the primary
38 functions each wetland provides. A more complete discussion of wetland functions is included in
39 the Ratings/Functions portion of the wetland summaries.

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1 **Table 2. Wetlands within the Project Corridor.**

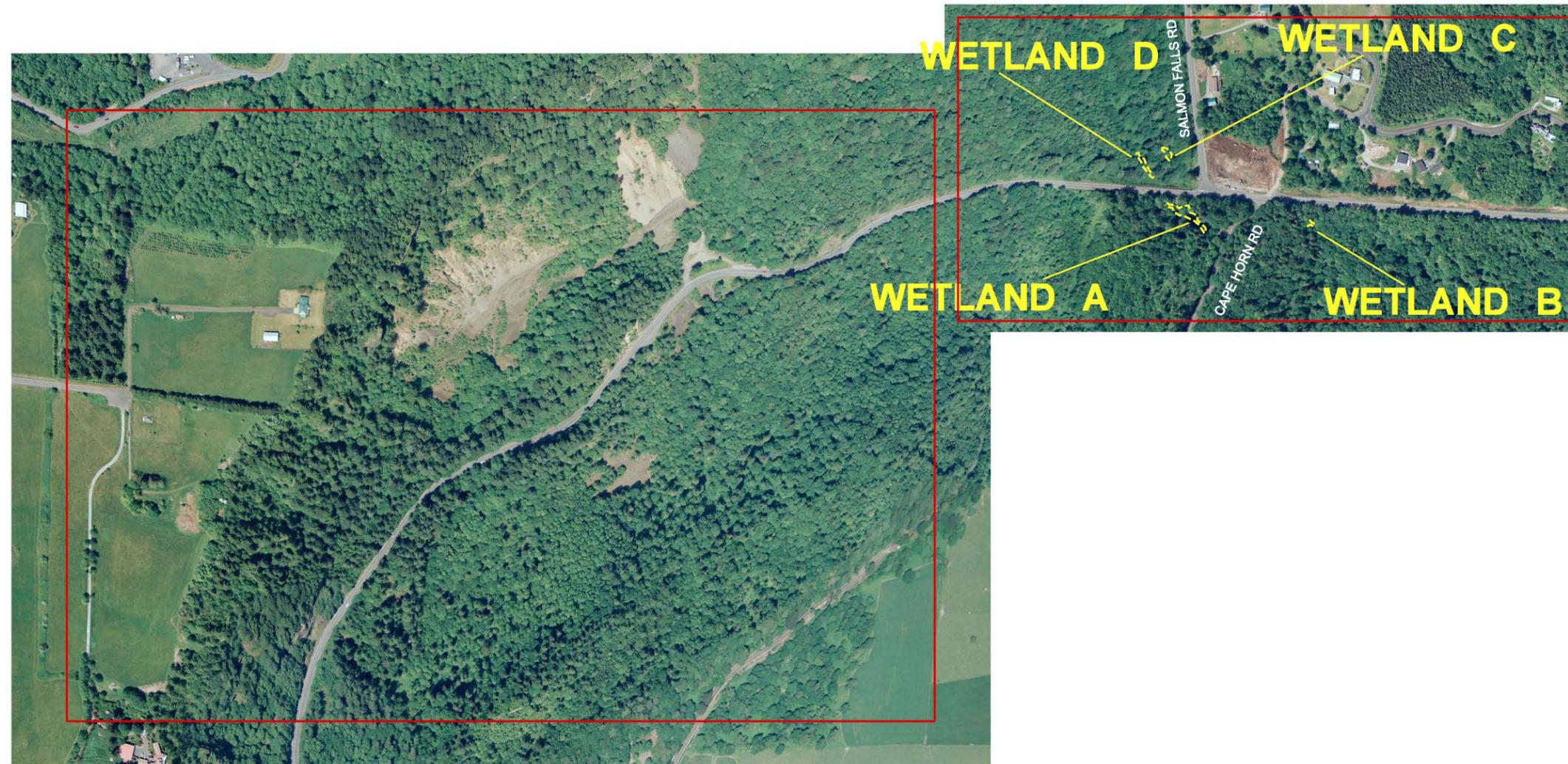
Wetland	Wetland Classification		Wetland Rating				Buffer Width (feet)
	Cowardin ^A	HGM	Water ^B Quality Score	Hydrologic ^B Score	Habitat ^B Score	Ecology ^B	
A	PSS	Riverine	16	18	18	II	200
B	PSS	Riverine	6	5	19	III	200
C	PSS	Depressional	12	24	17	II	150
D	PSS	Riverine	6	16	19	III	150
E	PSS	Riverine	5	10	21	III	200
F	PEM	Riverine	5	10	21	III	200
G	PFO	Slope	6	5	23	III	200
H	PEM	Slope	16	12	8	III	200
I	PEM	Depressional	20	12	16	III	200

2 **Notes:**

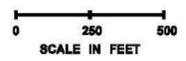
- 3 A. Cowardin et al. (1979) or National Wetland Inventory (NWI) Class based on vegetation: PEM = Palustrine
 4 Unconsolidated Shore; PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested.
 5 B. Ecology rating according to Hruby (2004).
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2 Figure 6. Surveyed Wetland Boundaries

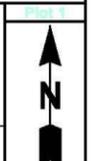
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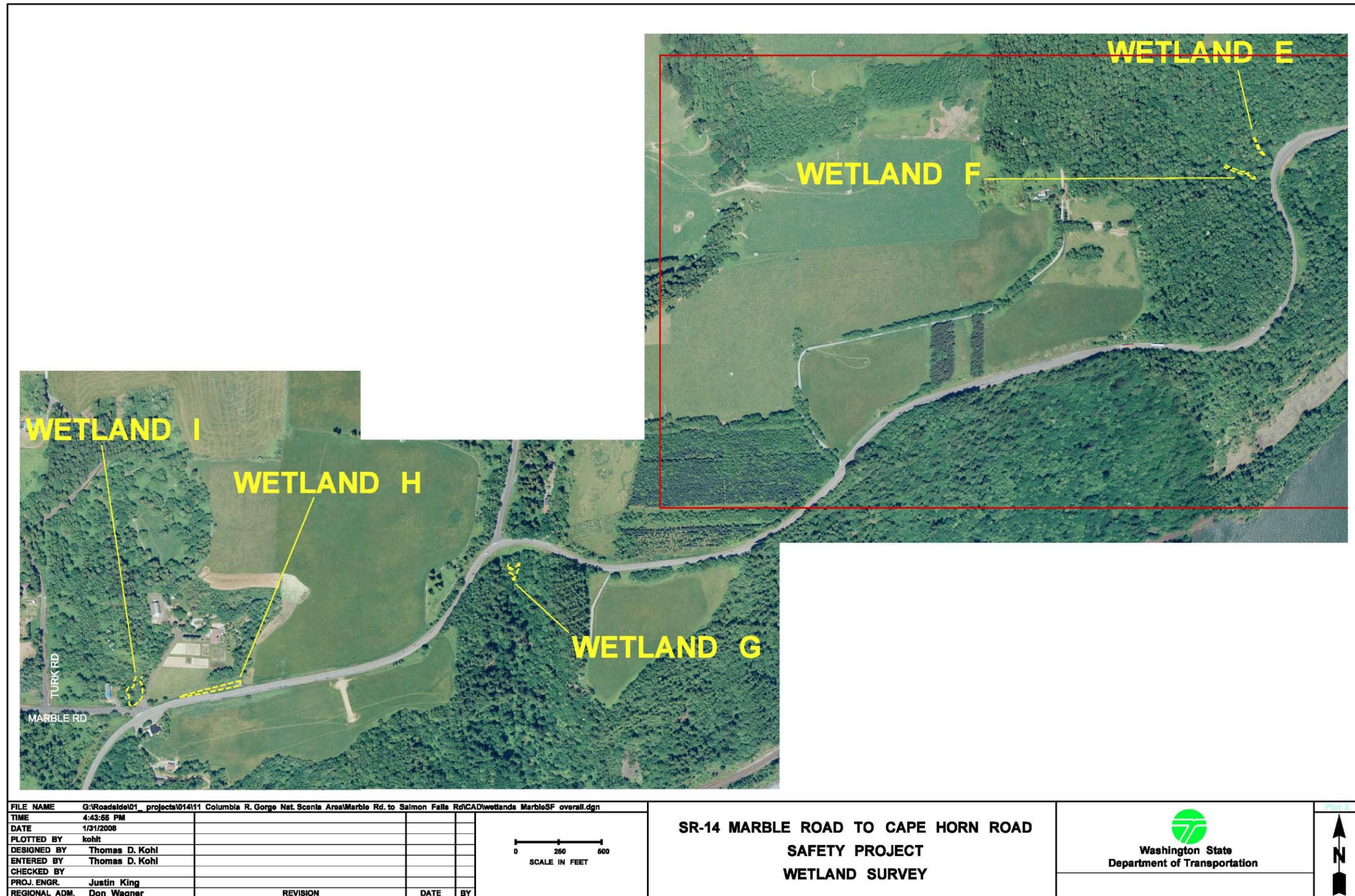
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TIME	4:44:32 PM		
DATE	1/31/2008		
PLOTTED BY	kohit		
DESIGNED BY	Thomas D. Kohl		
ENTERED BY	Thomas D. Kohl		
CHECKED BY			
PROJ. ENGR.	Justin King		
REGIONAL ADM.	Don Wagner		
	REVISION	DATE	BY



**SR-14 MARBLE ROAD TO CAPE HORN ROAD
SAFETY PROJECT
WETLAND SURVEY**



2 Figure 7. Surveyed Wetland Boundaries



1 Wetland A

WSDOT WETLAND INFORMATION SHEET			
Wetland Name:	Wetland A		
Location:	The wetland is located approximately 40 feet south of SR-14 and is carried under Cape Horn Road by a culvert (Appendix B).		
	Local Jurisdiction	Skamania County	
	WRIA	28	
	Ecology Rating (Hruby, 2004)	II	
	Local Jurisdiction Rating	II	
	Local Jurisdiction Buffer Width	200 feet	
	Cowardin Classification	PSS	
	HGM Classification	Riverine	
	Wetland Data Sheet(s)	WDP-A	
	Upland Data Sheet (s)	UDP-A	
	Flag color	Pink	
Description	The wetland consists of a swale/ravine system and associated floodplain that is characteristic of many of the wetland systems occurring throughout the Columbia River Gorge. As the wetland complex approaches the steeper walls of the Columbia River Gorge it turns into a cascading, rock-lined creek devoid of wetland characteristics.		
Dominant Vegetation	Wetland A is a palustrine, scrub shrub wetland dominated by <i>Acer circinatum</i> (vine maple) FAC-, <i>Stachys mexicana</i> (Mexican hedgenettle) FACW, <i>Oenanthe sarmentosa</i> (water parsley) OBL, <i>Tolmeia menziesii</i> (youth on age) FAC+.		
Soils	The soil sampled meet one of the Field Indicators of Hydric Soil, specifically, A11. Depleted Below Dark Surface. (see datasheet in Appendix D)		
Hydrology	Wetland hydrology is provided by discharge from a culvert, runoff from adjacent uplands, direct precipitation, seasonal flooding events of the associated stream, and a seasonally shallow water table.		
Functions of Entire Wetland	Score for Water Quality Functions:	16	(moderate function)
	Score for Hydrologic Functions:	18	(moderate function)
	Score for Habitat Functions:	18	(low function)
	Total Score:	44	
Summary of Ratings Functions	<p>Wetland A provides moderate water quality function due to the fact that the high cover of persistent vegetation acts as a filter to trap sediments and pollutants during high flow events, and that a culvert carrying roadside runoff discharges into the wetland.</p> <p>Wetland A provides moderate hydrologic function because of the high cover of herbaceous vegetation, which has the ability to slow water velocities and reduce erosive flows, thereby protecting resources downstream (Cape Horn Rd.)</p> <p>Wetland A provides low habitat function because of its lack of structural diversity, lack of numerous hydrologic regimes, and it's proximity to SR-14.</p>		
Buffer Condition	The buffer consisted of a mixed coniferous/deciduous forest complex dominated by <i>Acer macrophyllum</i> (big-leaf maple) FACU, <i>Corylus cornuta</i> (beaked hazelnut) FACU, <i>Oemleria cerasiformis</i> (Indian plum) FACU, <i>Mahonia aquifolium</i> (short Oregon grape) NL, <i>Polystichum munitum</i> (western swordfern) FACU, <i>Symphoricarpos albus</i> (snowberry) FACU, and <i>Rubus ursinus</i> (California blackberry) FACU. SR-14 was located within 50 feet of the northern wetland boundary, and was considered to be the limit of the effective buffer.		

1 Wetland B

WSDOT WETLAND INFORMATION SHEET			
Wetland Name:	Wetland B		
Location:	The wetland is located approximately 76 feet south of SR-14 and 280 feet east of Cape Horn Rd (Appendix B).		
	Local Jurisdiction	Skamania County	
	WRIA	28	
	Ecology Rating (Hruby, 2004)	III	
	Local Jurisdiction Rating	III	
	Local Jurisdiction Buffer Width	200 feet	
	Cowardin Classification	PSS	
	HGM Classification	Riverine	
	Wetland Data Sheet(s)	WDP-B	
	Upland Data Sheet (s)	UDP-B	
	Flag color	Pink	
Description	The wetland is located within a moderately sloping stretch of a steep ravine that cascades down the Columbia Gorge walls towards the Columbia. The steeper stretches of the ravine are characterized by a rock-lined channel devoid of wetland characteristics.		
Dominant Vegetation	Wetland B is a palustrine, scrub shrub wetland dominated by <i>Oenanthe sarmentosa</i> (water parsley) OBL, <i>Athyrium filix-femina</i> (ladyfern) FAC, <i>Oplopanax horridus</i> (Devil's club) FAC, <i>Tolmeia menziesii</i> (youth on age) FAC+, and <i>Thuja plicata</i> (western red cedar) FAC.		
Soils	The extremely coarse nature of the substrate limited subsurface investigation, although it was assumed that the soil was inundated for a duration sufficient to promote anaerobic conditions. (see datasheet in Appendix D)		
Hydrology	Wetland hydrology was provided by high flow events of the permanently flowing stream that bisected the wetland, overland flow from adjacent wetlands, direct precipitation, and a seasonally shallow water table. A large box culvert was located north of the wetland and was discharging a significant volume of water.		
Functions of Entire Wetland	Score for Water Quality Functions:	6	(low function)
	Score for Hydrologic Functions:	5	(low function)
	Score for Habitat Functions:	19	(low function)
	Total Score:	30	
Summary of Ratings Functions	<p>Wetland B provides low water quality function due to the fact that there are no depressions present within the wetland that could trap pollutants and the low cover of herbaceous vegetation.</p> <p>Wetland B provides low hydrologic function because it does not have the opportunity to reduce erosive flows and flooding in the watershed. This lack of opportunity is due to the proximity of the wetland to the Columbia River, which easily dissipates the energy of any flow contributed from an area of this size.</p> <p>Wetland B provides low habitat function because of its lack of structural diversity, lack of numerous hydrologic regimes, and low vegetative diversity.</p>		
Buffer Condition	The buffer consisted of a mixed coniferous/deciduous forest complex dominated by <i>Acer macrophyllum</i> (big-leaf maple) FACU, <i>Oplopanax horridus</i> (Devil's club) FAC, <i>Polystichum munitum</i> (western swordfern) FACU, and <i>Symphoricarpos albus</i> (snowberry) FACU.		

1 **Wetland C**

WSDOT WETLAND INFORMATION SHEET			
Wetland Name:	Wetland C		
Location:	The wetland begins approximately 125 feet north of SR-14 and 110 feet west of Salmon Falls Rd (Appendix B).		
	Local Jurisdiction	Skamania County	
	WRIA	28	
	Ecology Rating (Hruby, 2004)	II	
	Local Jurisdiction Rating	II	
	Local Jurisdiction Buffer Width	150 feet	
	Cowardin Classification	PSS	
	HGM Classification	Depressional	
	Wetland Data Sheet(s)	WDP-C	
	Upland Data Sheet (s)	UDP-C/D	
	Flag color	Pink	
Description	The wetland occupies an obvious topographical depression with no apparent outlet, although it was assumed that water could sheet flow into an adjacent ravine during extreme high flow events, establishing a jurisdictional connection.		
Dominant Vegetation	Wetland C is a palustrine, scrub-shrub wetland dominated by <i>Rubus spectabilis</i> (salmonberry) FAC+, <i>Acer circinatum</i> (vine maple) FAC-, <i>Oenanthe sarmentosa</i> (water parsley) OBL, and <i>Solanum dulcamara</i> (climbing nightshade) FAC+.		
Soils	The soil sampled meet one of the Field Indicators of Hydric Soil, specifically, A11. Depleted Below Dark Surface. (see datasheet in Appendix D)		
Hydrology	Wetland hydrology is provided by overland flow from adjacent wetlands, a seasonally shallow water table, and direct precipitation. Water marks were observed within the wetland and indicated periods of inundation up tot 3 feet deep.		
Functions of Entire Wetland	Score for Water Quality Functions:	12	(low function)
	Score for Hydrologic Functions:	24	(high function)
	Score for Habitat Functions:	17	(low function)
	Total Score:	53	
Summary of Ratings Functions	<p>Wetland C provides low water quality function due to the fact that the no pollutants are being discharged into the wetland.</p> <p>Wetland C provides high hydrologic function because it has no functioning outlet, which allows it to store a significant amount of water and reduce flooding. The ability of the wetland to reduce flooding in the watershed protects SR-14, which is located directly south of the wetland.</p> <p>Wetland B provides low habitat function because of its lack of structural diversity, lack of numerous hydrologic regimes, and low vegetative diversity.</p>		
Buffer Condition	The buffer consisted of a previously logged mixed coniferous/deciduous forest complex dominated by <i>Acer macrophyllum</i> (big-leaf maple) FACU, <i>Corylus cornuta</i> (beaked hazelnut) FACU, <i>Holodiscus discolor</i> (oceanspray) NL, <i>Acer circinatum</i> (vine maple) FAC-, <i>Vaccinium parviflorum</i> (red huckleberry) NL, <i>Polystichum munitum</i> (western swordfern) FACU, and <i>Symphoricarpos albus</i> (snowberry) FACU.		

1 **Wetland D**

WSDOT WETLAND INFORMATION SHEET		
Wetland Name:	Wetland D	
Location:	The wetland is located approximately 230 feet west of Salmon Falls Rd and is carried under SR-14 by a culvert that discharges into Wetland A (Appendix B).	
	Local Jurisdiction	City of Camas
	WRIA	28
	Ecology Rating (Hruby, 2004)	III
	Local Jurisdiction Rating	III
	Local Jurisdiction Buffer Width	150 feet
	Cowardin Classification	PSS
	HGM Classification	Riverine
	Wetland Data Sheet(s)	WDP-D
	Upland Data Sheet (s)	UDP-C/D
	Flag color	Pink
Description	Wetland D is a riverine wetland that is located within a moderately sloping stretch of a steep ravine that cascades down the Columbia Gorge walls towards the Columbia. The steeper stretches of the ravine are characterized by a rock-lined channel devoid of wetland characteristics.	
Dominant Vegetation	Wetland D is a palustrine, scrub shrub wetland that is dominated by <i>Rubus spectabilis</i> (salmonberry) FAC+, <i>Tolmeia menziesii</i> (youth on age) FAC+, <i>Oenanthe sarmentosa</i> (water parsley) OBL, and <i>Lysichiton americanus</i> (skunk cabbage) OBL.	
Soils	The soil sampled met at least one of the Field Indicators of Hydric Soil, specifically, A11. Depleted Below Dark Surface. (see datasheet in Appendix D)	
Hydrology	Wetland hydrology is provided by seasonal flooding events of the stream, overland flow from adjacent uplands, and direct precipitation.	
Functions of Entire Wetland	Score for Water Quality Functions: Score for Hydrologic Functions: Score for Habitat Functions: Total Score:	6 16 19 <hr/> 41 (low function) (moderate function) (low function)
Summary of Ratings Functions	Wetland D provides low water quality function due to the fact that no pollutants are being discharged into the wetland. Wetland D provides moderate hydrologic function because the high cover of vegetation that slows water velocities during high flow events, which reduces the force of erosive flows. Wetland D provides low habitat function because of its lack of structural diversity, lack of numerous hydrologic regimes, and low vegetative diversity.	
Buffer Condition	The buffer consisted of a previously logged, steeply sloping mixed coniferous/deciduous forest complex dominated by <i>Acer macrophyllum</i> (big-leaf maple) FACU, <i>Corylus cornuta</i> (beaked hazelnut) FACU, <i>Rubus spectabilis</i> (salmonberry) FAC+, <i>Acer circinatum</i> (vine maple) FAC-, <i>Vaccinium parviflorum</i> (red huckleberry) NL, <i>Polystichum munitum</i> (western swordfern) FACU, and <i>Symphoricarpos albus</i> (snowberry) FACU.	

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1 **Wetland E**

WSDOT WETLAND INFORMATION SHEET			
Wetland Name:	Wetland E		
Location:	Wetland E is located approximately 1 mile east of Belle Center Rd and approximately 60 feet northwest of SR-14 (Appendix B).		
	Local Jurisdiction	Skamania County	
	WRIA	28	
	Ecology Rating (Hruby, 2004)	III	
	Local Jurisdiction Rating	III	
	Local Jurisdiction Buffer Width	200 feet	
	Cowardin Classification	PSS	
	HGM Classification	Riverine	
	Wetland Data Sheet(s)	WDP-E	
	Upland Data Sheet (s)	UDP-E/F	
	Flag color	Pink	
	Description	The wetland consists of a swale/ravine system and associated floodplain that is carried under SR-14 in a culvert. On the southern side of SR-14 the wetland complex turns into a steep rock lined ravine with no apparent wetland characteristics.	
Dominant Vegetation	Wetland E is a palustrine, scrub shrub wetland dominated by <i>Lysichiton americanus</i> (skunk cabbage) OBL, <i>Rubus spectabilis</i> (salmonberry) FAC+, and <i>Tolmeia menziesii</i> (youth on age) FAC+.		
Soils	The soil sampled at the datapoint met at least one of the Field Indicators of Hydric Soil, specifically, F6. Redox Dark Surface. (see datasheet in Appendix D)		
Hydrology	Wetland hydrology is provided by seasonal flooding events of the stream, overland flow from adjacent uplands, a seasonally shallow water table, and direct precipitation.		
Functions of Entire Wetland	Score for Water Quality Functions:	5	(low function)
	Score for Hydrologic Functions:	10	(low function)
	Score for Habitat Functions:	21	(moderate function)
	Total Score:	36	
Summary of Ratings Functions	<p>Wetland E provides low water quality function due to the fact that no pollutants are being discharged into the wetland.</p> <p>Wetland E provides low hydrologic function because it has a relatively small overbank storage capacity during flooding events. This is evident by the narrow width of the wetland in relation to the stream.</p> <p>Wetland E provides moderate habitat function because of the relatively undisturbed nature of the buffers and the connectivity of the wetland to other undisturbed areas.</p>		
Buffer Condition	The buffer consisted of a previously logged, steeply sloping mixed coniferous/deciduous forest complex dominated by <i>Acer macrophyllum</i> (big-leaf maple) FACU, <i>Rubus spectabilis</i> (salmonberry) FAC+, <i>Alnus rubra</i> (red alder) FAC, and <i>Pseudotsuga menziesii</i> (Douglas-fir) FACU.		

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1 **Wetland F**

WSDOT WETLAND INFORMATION SHEET			
Wetland Name:	Wetland F		
Location:	Wetland F is located approximately 1 mile east of Belle Center Rd and approximately 90 feet northwest of SR-14 (Appendix B).		
	Local Jurisdiction	Skamania County	
	WRIA	28	
	Ecology Rating (Hruby, 2004)	III	
	Local Jurisdiction Rating	III	
	Local Jurisdiction Buffer Width	200 feet	
	Cowardin Classification	PEM	
	HGM Classification	Riverine	
	Wetland Data Sheet(s)	WDP-F	
	Upland Data Sheet (s)	UDP-E/F	
	Flag color	Pink	
Description	Wetland F consists of a swale/ravine system and associated floodplain that is carried under SR-14 in a culvert. On the southern side of SR-14 the wetland complex turns into a steep rock lined ravine with no apparent wetland characteristics.		
Dominant Vegetation	Wetland F is a palustrine, emergent wetland dominated by <i>Oenanthe sarmentosa</i> (water parsley) OBL and <i>Tolmeia menziesii</i> (youth on age) FAC+.		
Soils	The composition of the stream bed prohibited subsurface investigation, but reducing conditions were assumed due to the fact that the area is seasonally saturated (see datasheet in Appendix D).		
Hydrology	Wetland hydrology is provided by seasonal flooding events of the stream, overland flow from adjacent uplands, a seasonally shallow water table, and direct precipitation.		
Functions of Entire Wetland	Score for Water Quality Functions:	5	(low function)
	Score for Hydrologic Functions:	10	(low function)
	Score for Habitat Functions:	21	(moderate function)
	Total Score:	36	
Summary of Ratings Functions	<p>Wetland F provides low water quality function due to the fact that no pollutants are being discharged into the wetland.</p> <p>Wetland F provides low hydrologic function because it has a relatively small overbank storage capacity during flooding events. This is evident by the narrow width of the wetland in relation to the stream.</p> <p>Wetland F provides moderate habitat function because of the relatively undisturbed nature of the buffers and the connectivity of the wetland to other undisturbed areas.</p>		
Buffer Condition	The buffer consisted of a previously logged, steeply sloping mixed coniferous/deciduous forest complex dominated by <i>Acer macrophyllum</i> (big-leaf maple) FACU, <i>Rubus spectabilis</i> (salmonberry) FAC+, <i>Alnus rubra</i> (red alder) FAC, and <i>Pseudotsuga menziesii</i> (Douglas-fir) FACU.		

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1 **Wetland G**

WSDOT WETLAND INFORMATION SHEET		
Wetland Name:	Wetland G	
Location:	Wetland G is located approximately 100 feet south of the intersection of SR-14 and Bell Center (Appendix B).	
	Local Jurisdiction	Skamania County
	WRIA	28
	Ecology Rating (Hruby, 2004)	III
	Local Jurisdiction Rating	III
	Local Jurisdiction Buffer Width	200 feet
	Cowardin Classification	PFO
	HGM Classification	Riverine
	Wetland Data Sheet(s)	WDP-G
	Upland Data Sheet (s)	UDP-G
	Flag color	Pink
Description	Wetland G consists of a series of seeps and a swale/ravine complex. The wetland complex turns into a steep rock lined ravine with no apparent wetland characteristics as it approaches the Columbia River.	
Dominant Vegetation	Wetland G is a palustrine, forested wetland dominated by <i>Alnus rubra</i> (red alder) FAC, <i>Rubus spectabilis</i> (salmonberry) FAC+, <i>Urtica dioica</i> (stinging nettle) FAC+, <i>Tolmeia menziesii</i> (youth on age) FAC+, and <i>Oenanthe sarmentosa</i> (water parsley) OBL.	
Soils	The composition of the stream bed prohibited subsurface investigation, but reducing conditions were assumed due to the fact that the area is seasonally saturated (see datasheet in Appendix D).	
Hydrology	Wetland hydrology is provided by a series of seeps, seasonal flooding events of the stream, overland flow from adjacent uplands, a seasonally shallow water table, discharge from a culvert located to the north, and direct precipitation.	
Functions of Entire Wetland	Score for Water Quality Functions: 6 Score for Hydrologic Functions: 5 Score for Habitat Functions: 23 Total Score: 34	(low function) (low function) (moderate function)
Summary of Ratings Functions	<p>Wetland G provides low water quality function because it has a slope steeper than 5%, which decreases the potential for retaining sediments and pollutants.</p> <p>Wetland G provides low hydrologic function because slope wetlands by nature do not provide flood storage. The wetland does provide some frictional resistance to surface flows, but this function is limited by the low cover of dense, uncut rigid vegetation.</p> <p>Wetland G provides moderate habitat function because of the complexity of its vegetative structure, the presence of numerous hydrologic regimes, large relatively undisturbed buffer, and its undisturbed connection to other undisturbed areas.</p>	
Buffer Condition	The buffer consisted of a steeply sloping mixed coniferous/deciduous forest complex dominated by <i>Acer macrophyllum</i> (big-leaf maple) FACU, <i>Alnus rubra</i> (red alder) FAC, <i>Rubus spectabilis</i> (salmonberry) FAC+, <i>Sambucus racemosa</i> (red elderberry), <i>Acer circinatum</i> (vine maple) FAC-, <i>Rubus spectabilis</i> (salmonberry) FAC+, <i>Alnus rubra</i> (red alder) FAC, and <i>Pseudotsuga menziesii</i> (Douglas-fir) FACU.	

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1 **Wetland H**

WSDOT WETLAND INFORMATION SHEET		
Wetland Name:	Wetland H	
Location:	Wetland H is located approximately 280 feet east of Marble Road and 15 feet north of SR-14 (Appendix B).	
	Local Jurisdiction	Skamania County
	WRIA	28
	Ecology Rating (Hruby, 2004)	III
	Local Jurisdiction Rating	III
	Local Jurisdiction Buffer Width	200 feet
	Cowardin Classification	PEM
	HGM Classification	Slope
	Wetland Data Sheet(s)	WDP-H
	Upland Data Sheet (s)	UDP-H
	Flag color	Pink
Description	Wetland H is a slope wetland partially located in a roadside swale adjacent to SR-14. The wetland appears to have a history of disturbance, possibly the result of residential development and maintenance activities to the north.	
Dominant Vegetation	Wetland H is a palustrine emergent wetland dominated by <i>Typha latifolia</i> (broadleaf cattail) OBL.	
Soils	The soil sampled met at least one of the Field Indicators of Hydric Soil, specifically, F6. Redox Dark Surface. (see datasheet in Appendix D)	
Hydrology	Wetland hydrology is provided by overland flow from adjacent uplands, a seasonally shallow water table, and direct precipitation. At the time of investigation areas of surface saturation were observed throughout the wetland.	
Functions of Entire Wetland	Score for Water Quality Functions: 16 Score for Hydrologic Functions: 12 Score for Habitat Functions: 8 Total Score: 36	(moderate function) (low function) (low function)
Summary of Ratings Functions	Wetland H provides moderate water quality function because of the high cover (>90%) of dense, uncut, herbaceous vegetation that enhances the sedimentation process by providing frictional resistance to surface water flows. Herbaceous species also sequester metals and remove oils and other organics. Wetland H provides low hydrologic function because slope wetlands by nature do not provide flood storage, although the wetland does provide some frictional resistance to surface flows. Wetland G provides low habitat function because of the lack of complexity of its vegetative structure, the lack of numerous hydrologic regimes, and close proximity to a heavily traveled transportation corridor (SR-14)	
Buffer Condition	The wetland buffer to the north mainly consists of a maintained residential yard and a small strip consisting of <i>Rubus armeniacus</i> (Himalayan blackberry) FACU, <i>Epilobium ciliatum</i> (fringed willowherb) FACW-, <i>Galium aparine</i> (cleavers) FACU, <i>Equistem arvense</i> (common horsetail) FAC, and planted <i>Alnus rubra</i> (red alder) FAC. The buffer to the south consist of the shoulder of SR-14.	

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1 Wetland I

WSDOT WETLAND INFORMATION SHEET			
Wetland Name:	Wetland I		
Location:	Wetland I is located approximately 10 feet north of Marble Road and 10 feet west of an unnamed residential driveway(Appendix B).		
	Local Jurisdiction	Skamania County	
	WRIA	28	
	Ecology Rating (Hruby, 2004)	III	
	Local Jurisdiction Rating	III	
	Local Jurisdiction Buffer Width	200 feet	
	Cowardin Classification	PEM	
	HGM Classification	Depressional	
	Wetland Data Sheet(s)	WDP-I	
	Upland Data Sheet (s)	UDP-I	
	Flag color	Pink	
Description	Wetland I is a depressional wetland that has been encroached upon by adjacent development activities. The driveway to the east, Marble Road, and the building to the west all appear to have impacted the wetland.		
Dominant Vegetation	Wetland I is a palustrine, emergent wetland dominated <i>Solanum dulcamara</i> (climbing nightshade) FAC+, <i>Juncus effusus</i> (soft rush) FACW, <i>Phalaris arundinacea</i> (reed canary grass) FACW, <i>Polygonum persicaria</i> (spotted lady's-thumb) FACW, <i>Veronica Americana</i> (American speedwell) OBL, and <i>Oenanthe sarmentosa</i> (water parsley) OBL.		
Soils	The soil sampled met at least one of the Field Indicators of Hydric Soil, specifically, F6. Redox Dark Surface. (see datasheet in Appendix B)		
Hydrology	Wetland hydrology is provided by overland flow from adjacent uplands, a seasonally shallow water table, and direct precipitation. Wetland drainage patterns and areas of inundation were observed throughout the wetland.		
Functions of Entire Wetland	Score for Water Quality Functions:	20	(moderate function)
	Score for Hydrologic Functions:	12	(low function)
	Score for Habitat Functions:	16	(low function)
	Total Score:	48	
Summary of Ratings Functions	<p>Wetland I provides moderate water quality function because of the high cover of persistent, ungrazed vegetation that enhances the sedimentation process by acting like a filter. Water quality functions are also provided by the large areas of seasonal ponding, which areas of nutrient transformation and removal.</p> <p>Wetland I provides low hydrologic function because it has a unconstricted permanently flowing outlet, which limits the ability of the wetland to store floodwaters.</p> <p>Wetland I provides low habitat functions due to its lack of complexity of vegetative structure, the lack of numerous hydrologic regimes, and close proximity to a heavily traveled transportation corridor (SR-14)</p>		
Buffer Condition	The western, southern, and eastern wetland buffers are all characterized by vegetated shoulders. The buffer to the north is a mixed coniferous/deciduous forest complex.		

5 **4.3 Wetland Buffers**

6 Two types of buffer were present within the project corridor: mixed deciduous/coniferous forest
7 and the vegetated shoulder of SR-14. The mixed deciduous/coniferous forest was characterized
8 by steep slopes that have a history of logging and was dominated by a range of species including
9 *Acer macrophyllum* (big-leaf maple) FACU, *Corylus cornuta* (beaked hazelnut) FACU,
10 *Oemleria cerasiformis* (Indian plum) FACU, *Mahonia aquifolium* (short Oregon grape) NL,
11 *Polystichum munitum* (western swordfern) FACU, *Symphoricarpos albus* (snowberry)
12 FACU, *Rubus ursinus* (California blackberry) FACU, *Oplopanax horridus* (Devil's club) FAC,
13 *Alnus rubra* (red alder) FAC, *Corylus cornuta* (beaked hazelnut) FACU, *Holodiscus discolor*
14 (oceanspray) NL, *Acer circinatum* (vine maple) FAC-, *Vaccinium parviflorum* (red huckleberry)
15 NL, *Rubus spectabilis* (salmonberry) FAC+, and *Pseudotsuga menziesii* (Douglas-fir) FACU.

16

17 The vegetated shoulders of SR-14 were characterized by steep to moderate slopes that were
18 dominated by a majority of the above listed species, or were roadside swales dominated by a mix
19 of herbaceous species (Figure 9).

20

21 The buffers ranged in condition from relatively undisturbed to heavily disturbed and are
22 classified in detail in the attached Rating Forms included in Appendix C.

23

24 **Figure 8. Photo of Typical Mixed Deciduous/Coniferous Forested Buffer**



25

1 **Figure 9. Photo of Typical SR-14 Shoulder Buffer**



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3 **4.4 Wetland Functions**

4 In general, most of the existing onsite wetlands provide low to moderate levels of water quality,
5 hydrologic, and habitat functions. Wetland C is the only wetland that provides high hydrologic
6 function, which is mainly attributed to the fact that the wetland has no outlet and stores water that
7 may otherwise be a source of erosive flows. The functions provided are discussed in more detail
8 in the wetland summaries, and are summarized in Table 3. In addition to the scores obtained
9 from the rating forms for each function, a qualitative functional level (high, moderate, low) is
10 also included in Table 3 (as defined in Table 4), and was based on the framework developed by
11 Ecology et al. (2006a).

12

13 Wetland functions were evaluated using the *Washington State Wetland Rating System for*
14 *Western Washington* (Hruby, 2004). The functions are divided into three major categories and
15 include water quality, hydrologic, and habitat functions. This method is not expected to address
16 all the complex biological or geochemical processes within a wetland system.

1 **Table 3. Functions of Wetlands within the Project Corridor.**

Wetland	Wetland Function Scores (qualitative functional level in parentheses*)				Ecology Rating (Hruby 2004)
	Water Quality (max score = 32)	Hydrologic (max score = 32)	Habitat (max score = 36)	Total (max score = 100)	
A	16 (moderate)	18 (moderate)	18 (low)	52	II
B	6 (low)	5 (low)	19 (low)	30	III
C	12 (low)	24 (high)	17 (low)	53	II
D	6 (low)	16 (moderate)	19 (low)	41	III
E	5 (low)	10 (low)	21 (moderate)	36	III
F	5 (low)	10 (low)	21 (moderate)	36	III
G	6 (low)	5 (low)	23 (moderate)	34	III
H	16 (moderate)	12 (low)	8 (low)	36	III
I	20 (moderate)	12 (low)	16 (low)	48	III
Average Score	9.3 (low)	11.6 (low)	18 (low)	37.4	III

2 *See Table 4 for definitions of qualitative functional levels.
3

4 **Table 4. Qualitative Level of Wetland Functions based on Scores from Ecology Rating Form.**

Qualitative Functional Level	Wetland Function		
	Water Quality	Hydrology	Habitat
High	24-32*	24-32	29-36*
Moderate	16-24	16-24	20-28*
Low	<16	<16	<20*

5 * Source: Ecology et al. (2006a, pages 83-87)
6
7
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10 **4.5 Recommendations**

11 Measures that will help minimize impacts to wetlands and other aquatic resources include the
12 following:

- 13 • Use standard erosion control techniques during construction, as outlined in Chapter 6 of
14 the WSDOT Highway Runoff Manual.
- 15 • Leave as much native vegetation as possible in the right of way to preserve wildlife
16 habitat and provide a buffer of vegetation.
- 17 • Minimize clearing of trees. Unavoidable clearing should be mitigated by planting
18 suitable native trees along nonforested sections of stream banks within or near the project

- 1 area.
- 2 • Avoid and minimize impacts to wetlands by slope steepening where feasible.
 - 3 • Mitigate where existing vegetation can help serve as a buffer or provide connectivity to
 - 4 wildlife habitat.
 - 5 • Replace highway ditches with new flat-bottom ditches adjacent to the widened highway.
 - 6 • Should changes to the proposed design and/or alignment occur, a reevaluation will be
 - 7 needed to ascertain whether or not additional wetlands are present.

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Chapter 5. References

- 1
2
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