

**SR 500 I-205 Interchange Improvements (Burnt Bridge East)  
Mitigation Site**

**USACE NWP (14) NWS-2007-806**

**Southwest Region**

**2014 MONITORING REPORT**

**Wetlands Program**

*Issued March 2015*



**Washington State  
Department of Transportation**

Environmental Services Office

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# SR 500 I-205 Interchange Improvements (Burnt Bridge East) Mitigation Site

## USACE NWP (14) NWS-2007-806



General Site Information	
<b>USACE NWP (14) Number</b>	NWS-2007-806
<b>Mitigation Location</b>	Junction of I-205 southbound off-ramp and SR-500 westbound
<b>LLID Number</b>	1225678456548
<b>Construction Date</b>	2008-2009
<b>Monitoring Period</b>	2010-2019
<b>Year of Monitoring</b>	5 of 10
<b>Area of Project Impact<sup>1</sup></b>	0.022 acre
<b>Type of Mitigation</b>	Wetland/Riparian Enhancement
<b>Planned Area of Mitigation<sup>1</sup></b>	0.25 acre

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<sup>1</sup> (WSDOT 2007)

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## Summary of Monitoring Results and Management Activities (2014)

Performance Standards	2014 Results <sup>2</sup>	Management Activities
Wetlands and riparian areas will be delineated [0.25 acre intended]	0.21 acre of enhancement (0.04 acre wetland; 0.17 acre riparian)	
Minimum density of 400 living native trees per acre in the forested areas	112 trees/acre (CI <sub>80%</sub> = 18-206) in the riparian buffer	
Minimum density of 4,000 living native shrubs per acre in the forested areas	6,689 shrubs/acre (CI <sub>80%</sub> = 5,510-7,867) in the riparian buffer	
At least 2 species of native trees and 4 species of native shrubs will be present in the forested area. No single species will provide more than 60% total aerial cover.	3 native tree species and 4 native shrub species present in the riparian buffer; No single species >60% cover	
Minimum density of 4,000 living native shrubs per acre in the Scrub Shrub areas	4,153 shrubs/acre (CI <sub>80%</sub> = 3,773-4,534)	
At least 4 species of native shrubs will be present in the Scrub Shrub area. No single species will provide more than 60% total aerial cover.	2 native shrubs (and one native tree) present; No single species estimated at >60% cover	
60% cover of native facultative wet and wetter species within the emergent zone	N/A; No emergent zone on-site	
At least 5 species of native herbaceous facultative wet and wetter species will be present in the emergent area. No single species will provide more than 70% total aerial cover.	N/A; No emergent zone on-site	
No more than 15% cover of blackberry ( <i>Rubus</i> species) and Class A noxious weeds	1% cover (CI <sub>80%</sub> = 0-1%)	Manual weed control performed during one visit in August of 2014
Reed canarygrass ( <i>Phalaris arundinacea</i> ) will be managed at a threshold 10% below baseline conditions	No baseline condition established; Total cover on-site is 18% (CI <sub>80%</sub> = 11-25%)	
Japanese knotweed ( <i>Reynoutria japonica</i> ) shall not be present within the mitigation site	None present	

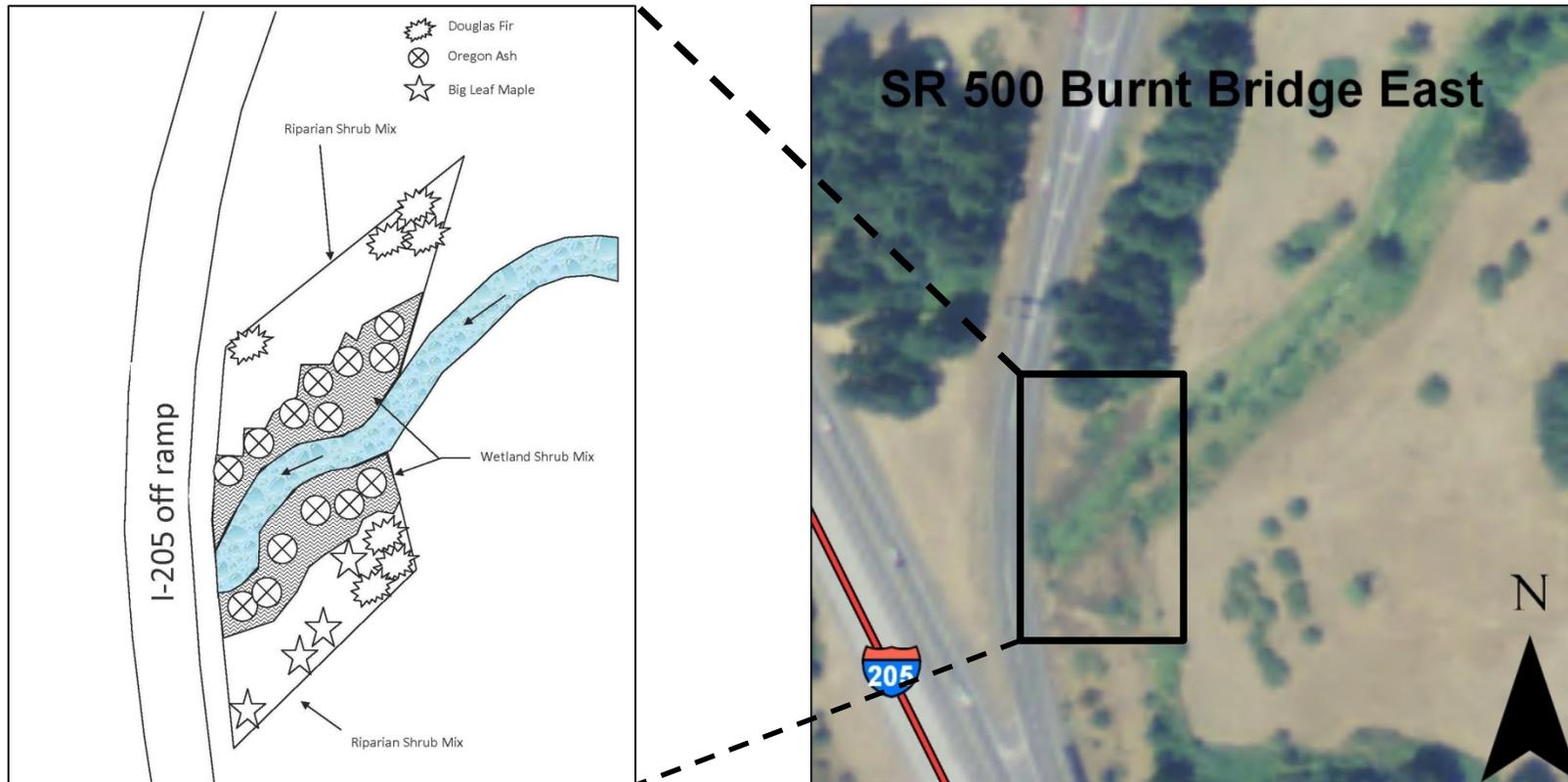
<sup>2</sup> Estimated values are presented with their corresponding statistical confidence interval. For example, 112 plants/acre (CI<sub>80%</sub> = 18-206) means we are 80% confident that the true density value is between 18 and 206 plants per acre.

## **Report Introduction**

This report summarizes fifth-year (Year-5) monitoring activities at the State Route (SR) 500 Burnt Bridge East Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities included vegetation surveys, photo-documentation, and a wetland delineation. The wetland delineation was conducted on May 14, 2014 and a delineation of the riparian enhancement areas occurred on February 11, 2015. Vegetation monitoring occurred on July 28, 2014.

## What is the SR 500 Burnt Bridge East Mitigation Site?

This 0.25-acre mitigation site (Figure 1) comprises wetland/riparian enhancement on the Kevanna Reach section of Burnt Bridge Creek at the junction of the SR-500 eastbound off-ramp and I-205 northbound. This site was created to compensate for the loss of 0.022 acre of wetlands due to road improvements at the SR 500/I-205 interchange. The wetland/riparian enhancement is designed to provide mitigation for lost wetland functions including wildlife habitat, biological support, improved floodplain function, and nutrient and sediment removal.



**Figure 1 Site Sketch**

The SR 500 Burnt Bridge East Mitigation Site contains two enhanced wetland benches and two riparian buffer enhancement areas flanking both sides of Burnt Bridge Creek. Appendix 2 includes site directions.

## What are the performance standards for this site?

### Performance Standard 1

Wetlands and riparian areas will be delineated at monitoring year 5 to assess the development of estimated conditions noted in Table 2.

**Table 2. Proposed mitigation acreage (WSDOT 2007, 8)**

Mitigation Type	Burnt Bridge Creek (Kevanna Reach) site
<i>Wetland/riparian enhancement</i>	0.25 acres
Total Areas	0.25 acres

### Performance Standard 2

At monitoring year 5, there will be a minimum density of 400 living native trees per acre in the forested areas.

### Performance Standard 3

At monitoring year 5, there will be a minimum density of 4,000 living native shrubs per acre in the forested areas.

### Performance Standard 4

At monitoring year 5, at least two species of native trees and four species of native shrubs will be present in the forested area. No single species will provide more than 60 percent total aerial cover.

### Performance Standard 5

At monitoring year 5, there will be a minimum density of 4,000 living native shrubs per acre in the Scrub Shrub areas.

### Performance Standard 6

At monitoring year 5, at least four species of native shrubs will be present in the Scrub Shrub area. No single species will provide more than 60 percent total aerial cover.

### Performance Standard 7

At monitoring year 5, there will be a minimum of 60 percent aerial cover of native facultative wet and wetter species within the emergent zone.

Performance Standard 8

At monitoring year 5, at least five species of native herbaceous facultative wet and wetter species will be present in the emergent area. No single species will provide more than 70 percent total aerial cover.

Performance Standard 9

The aerial extent of blackberry species and Class A noxious weeds will not exceed 15 percent in the combined emergent, scrub shrub, forest, and buffer planting areas of the mitigation site.

Performance Standard 10

The aerial extent of reed canarygrass in the mitigation site will be managed at a threshold 10 percent below the existing baseline conditions established in Performance Standard 6A.

Performance Standard 11

Japanese knotweed shall not be present in any amount within the mitigation site.

Appendix 1 shows the planting plan (WSDOT 2010).

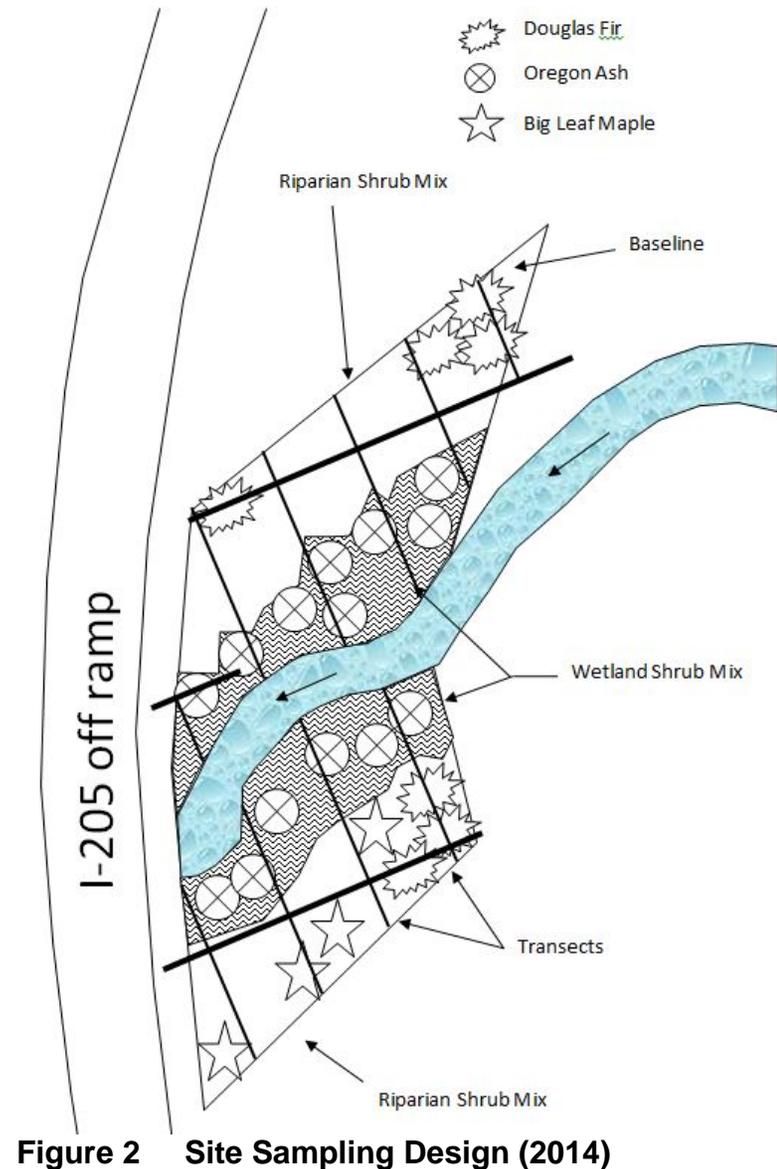
## How were the performance standards evaluated?

To evaluate vegetative performance standards, a 76-meter baseline was established along both sides of Burnt Bridge Creek (Figure 2). Ten sampling transects were placed perpendicular to the baseline using a systematic random sampling method. The unequal-area belt transect method was used to determine the density of native woody species (Performance Standards 2, 3, and 5). One-meter-wide sample units were positioned along the entire length of each transect. The point-line method was used to determine the cover of invasive species (Performance Standards 9 and 10). Ten five-meter-long point-line sample units (20 points each) were randomly positioned along the transects.

The performance standards referring to the “forested areas” (Performance Standards 2, 3, and 4) were interpreted as applying to the riparian buffer area (referred to as “riparian shrub mix” on the planting plan).

WSDOT staff performed a wetland delineation using methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE 2010) and a Global Positioning System (Trimble Mapping Grade) (Performance Standard 1).

For additional details on the methods, see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).



## How is the site developing?

This site is developing well, despite not quite meeting all of its performance standards. The woody plantings have developed well in both zones of the site. In the scrub-shrub wetland, native woody cover was visually estimated at 99 percent. There are only two native shrub species and one native tree species in this zone. It is such a small area, however, that even three woody species seems relatively diverse when compared to a similar, naturally colonized riparian wetland. The riparian buffer area is also developing well, with a visually estimated 50 percent cover of native woody species. The plantings and conditions in this zone make it naturally slower to develop cover, but the plantings have become well established. Interestingly, neither of the rose species listed on the planting plan were observed on-site, but two non-native rose species, sweetbriar rose (*Rosa rubiginosa*) and rambler rose (*Rosa multiflora*), are present in the riparian buffer. They did not appear to have been planted by mistake, however, but rather colonized the site from nearby naturalized populations. Invasive species are somewhat prevalent on-site, but do not appear to be interfering with the establishment of the native woody plantings.

Results for Performance Standard 1

(Wetlands and riparian areas will be delineated to assess the development of estimated conditions noted in Table 2 [0.25 acres of wetland/riparian enhancement]):

WSDOT Wetlands Program staff conducted a wetland delineation on May 14, 2014 (see Appendix 3 for the full delineation report) and a delineation of the riparian enhancement areas on February 11, 2015. The wetland delineation identified 0.04 acre of wetland within the mitigation site boundaries. Delineation of the riparian enhancement areas identified 0.17 acre of non-wetland enhancement, for a combined total of 0.21 acre of wetland/riparian enhancement.



**Photo 1**  
**Woody density in the riparian buffer (July 2014)**

Results for Performance Standard 2

(400 native trees per acre in the forested areas):

The density of native trees in the riparian buffer is estimated at 112 trees per acre ( $CI_{80\%} = 18-206$ ). This is well short of meeting the performance standard, however, it is not entirely clear that this performance standard was written with this zone in mind, and the overall native woody density (including shrubs) is quite high (see results for Performance Standard 3 below).

Results for Performance Standard 3

(4,000 native shrubs per acre in the forested areas):

The density of native shrubs in the riparian buffer (Photo 1) is estimated at 6,689 shrubs per acre ( $CI_{80\%} = 5,510-7,867$ ). This easily exceeds the performance standard threshold.

Results for Performance Standard 4

(At least 2 species of native trees and 4 species of native shrubs will be present in the forested area; No single species will provide more than 60% total aerial cover):

Three native tree species and four native shrub species are present in the riparian buffer. No single species is providing more than 60 percent cover. The native tree species present are bigleaf maple (*Acer macrophyllum*), Oregon white oak (*Quercus garryana*), and western red cedar (*Thuja plicata*). The native shrub species present in this zone are tall oregongrape (*Mahonia aquifolium*), snowberry (*Symphoricarpos albus*), Indian plum (*Oemleria cerasiformis*), and western serviceberry (*Amelanchier alnifolia*).



**Photo 2**  
**Woody density in the scrub-shrub wetland (July 2014)**

Results for Performance Standard 5

(4,000 native shrubs per acre in the Scrub Shrub areas):

The density of native shrubs in the scrub-shrub wetland is estimated at 4,153 shrubs/acre ( $CI_{80\%} = 3,773-4,534$ ) (Photo 2). This is likely meeting (or at least very close to meeting) the performance standard. There are also Oregon ash (*Fraxinus latifolia*) planted in this zone. Including this tree species, the native woody density is estimated at 4,579 plants/acre ( $CI_{80\%} = 4,160-4,999$ ). Regardless, the density in this zone is clearly adequate, as the native woody cover is visually estimated at 99 percent.

Results for Performance Standard 6

(At least 4 species of native shrubs will be present in the Scrub Shrub area; No single species will provide more than 60% total aerial cover):

Two native shrub species are present in the scrub-shrub wetland. These species are redosier dogwood (*Cornus alba*) and twinberry honeysuckle (*Lonicera involucrata*). One native tree species, Oregon ash (*Fraxinus latifolia*), was also present in this zone. Based on visual estimates, no single species is exceeding 60 percent cover in this zone. Redosier dogwood, however, is likely close to this threshold.

Results for Performance Standard 7

(60% cover of native facultative wet and wetter species within the emergent zone):

This site does not contain an emergent wetland zone. This performance standard is, therefore, not applicable.

Results for Performance Standard 8

(At least 5 species of native herbaceous facultative wet and wetter species will be present in the emergent area; No single species will provide more than 70% total aerial cover):

This site does not contain an emergent wetland zone. This performance standard is, therefore, not applicable.

Results for Performance Standard 9

(No more than 15% cover of blackberry species and Class A noxious weeds):

No Class A noxious weeds were observed on-site. The cover of blackberry species on-site is estimated at 1% ( $CI_{80\%} = 0-1\%$ ).

Results for Performance Standard 10

(Reed canarygrass will be managed at a threshold 10% below baseline conditions):

The baseline conditions of reed canarygrass on-site are unknown. The current cover of reed canarygrass is estimated at 18% ( $CI_{80\%} = 11-25\%$ ). This cover is primarily along the immediate banks of the creek with small scattered patches also present in the riparian buffer.

Results for Performance Standard 11

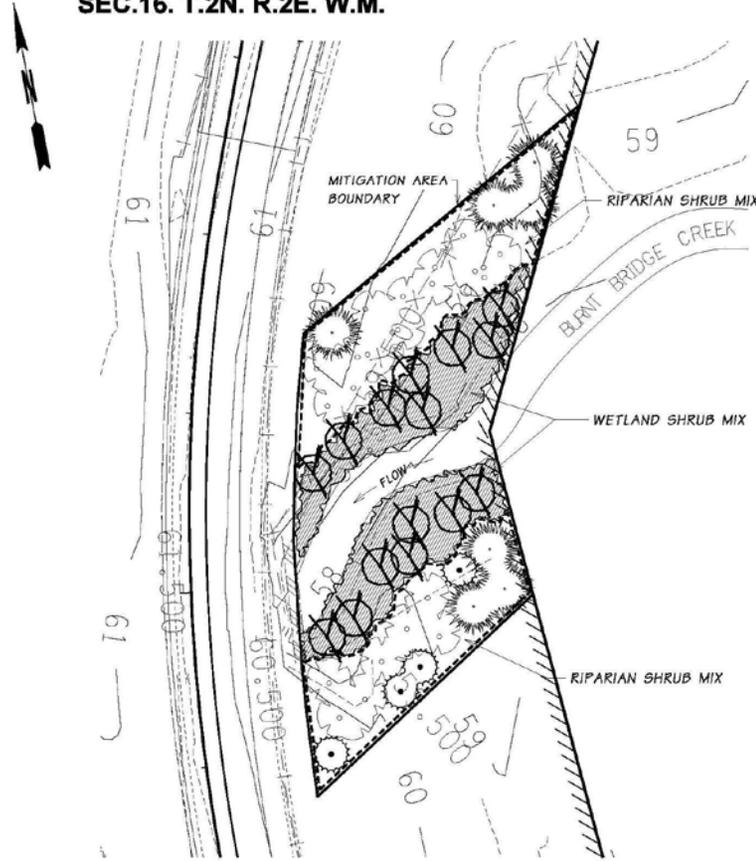
(Japanese knotweed shall not be present within the mitigation site):

Japanese knotweed was not present on-site at the time of monitoring.

# Appendix 1 – Planting Plan

(from WSDOT 2010)

SEC.16. T.2N. R.2E. W.M.



WETLAND MITIGATION AREA

0 20 40  
SCALE IN FEET

### CONCEPTUAL PLANT MATERIAL SCHEDULE

Plant Code	Common Name	Botanical Name	Height	Root Type
	Big Leaf Maple	Acer macrophyllum	1" cal	Cont.
	Douglas Fir	Pseudotsuga mezesii	4'	Cont.
	Oregon Ash	Fraxinus latifolia	5'	Cont.
	Oregon White Oak	Quercus garryana	4'	Cont.
RIPARIAN SHRUB MIX	Common Snowberry	Symphoricarpos albus	18" - 24"	B.R.
	Nootka Rose	Rosa nutkana	18" - 24"	B.R.
	Indian Plum	Oemleria cerasiformis	18" - 24"	B.R.
	Tall Oregon Grape	Mahonia aquifolium	#1	Cont.
WETLAND SHRUB MIX	Pea-fruit Rose	Rosa pisocarpa	18" - 24"	B.R.
	Red-Osier Dogwood	Comus sibirica	18" - 24"	B.R.
	Sitka Willow	Salix sitchensis	18" - 24"	B.R.
	Small-Flowering Bulrush	Scirpus microcarpus	18" - 24"	B.R.
	Slough Sedge	Carex obruata	18" - 24"	B.R.

### ABBREVIATION TABLE

B.E. Bare Root  
Cont. Container  
W.S. Where Stocked  
O.C. On Center  
A.S.N.S. American Standard for Nursery Stock

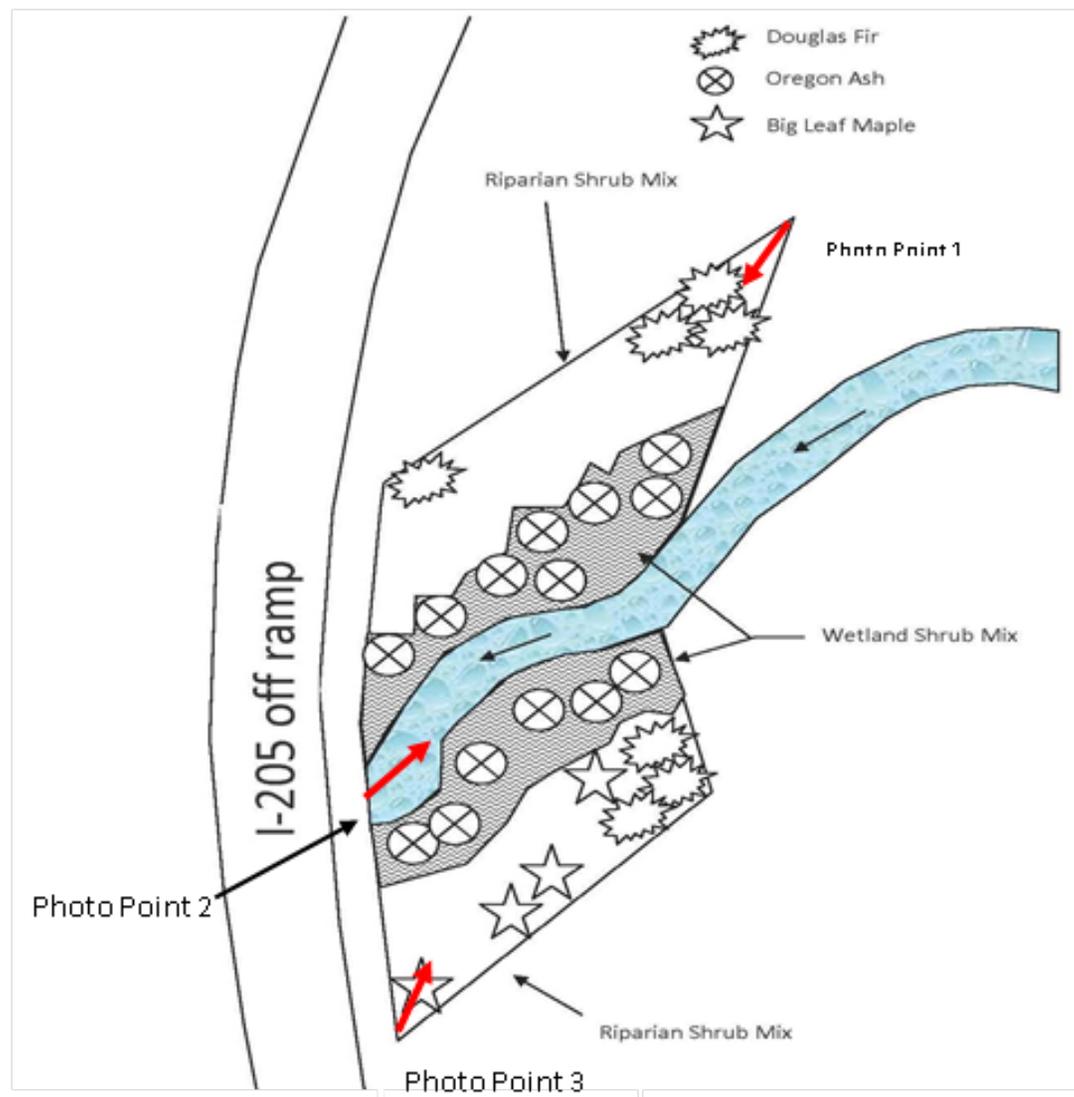
### NOTES:

- All material shall meet the requirements of the American Standard for Nursery Stock, November 6, 1996.
- Plants to be randomly mixed within designated plant groups as approved by the Engineer unless specified otherwise.
- All plant crowns to be free of bark mulch where applicable.
- See planting details and Special Provisions.

FILE NAME G:\Roads\del01_projects\500112_205 Interchange\SR-500-205 Merge Lanes\CAD\Wetland CADL2024 PS Mitigation.dgn	PROJECT NO. 10	STATE WASH	FED.AID PROJ.NO.		Washington State Department of Transportation	205 INTERCHANGE SR 500 / I-205 MERGE LANES WETLAND MITIGATION AREA	CONCEPTUAL PLANTING PLAN	Plot 1
TIME 10:37:55 AM	DESIGNED BY D.R. CORLETT, RLA	CHECKED BY D.R. CORLETT, RLA	PROJ. ENGR. K. MILLER, PE					REGIONAL ADM. D. WAGNER, PE

# Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on July 28, 2014 and document current site development.





**Photo Point 1**



**Photo Point 2**



**Photo Point 3**

**Driving Directions:**

Take I-5 south to I-205 south. Take exit 30 to merge onto WA 500 east. Exit on NE 112th. Turn right at NE 51st Circle. Follow this to the cul-de-sac at Kevanna Park. Follow Burnt Bridge Creek to the mitigation site.

# Appendix 3 – Wetland Delineation Report

# **WETLAND DELINEATION REPORT**

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## **SR 500 Burnt Bridge East Mitigation Site**

**SR 500/I-205 Interchange Improvements  
USACE NWS 2007-806-SOD**

**Clark County, Washington**

**Prepared by:  
Tatiana Dreisbach  
WSDOT Environmental Services Office  
Olympia, Washington**

**November 2014**



**Washington State  
Department of Transportation**

# Introduction

This report was prepared by the Washington State Department of Transportation (WSDOT) to describe the wetland boundary delineation for the SR 500 Burnt Bridge East mitigation site. Field work was conducted by WSDOT wetland biologists Doug Littauer and Sean Patrick, on May 14, 2014. The delineation identifies 0.04 acre of wetland within the mitigation site boundaries.

General Information for the SR 500 Burnt Bridge East mitigation site		
<b>Location:</b>	DCL 56, T2N, R2E. Clark County. (Vicinity map, Figure 1)	
	<b>USACE NWP 14 Number</b>	NWS-2007-806-SOD
	<b>Long./Lat. ID Number</b>	1225678456548
	<b>Land Resource Region (LRR)</b>	A
	<b>Major Land Resource Area (MLRA)</b>	2
	<b>Construction Date</b>	2008 - 2009
	<b>Monitoring Period</b>	2010 - 2019
	<b>Year of Monitoring</b>	5 of 10 (in 2014)
<b>Area of Project Impact<sup>1</sup></b>	0.022 acre	
<b>Total Delineated Wetland Area</b>	0.04 acres	

<sup>1</sup> Project impact numbers from USACE Nationwide 14 Permit Number NWS-2007-806-SOD (USACE 2007).

# Location

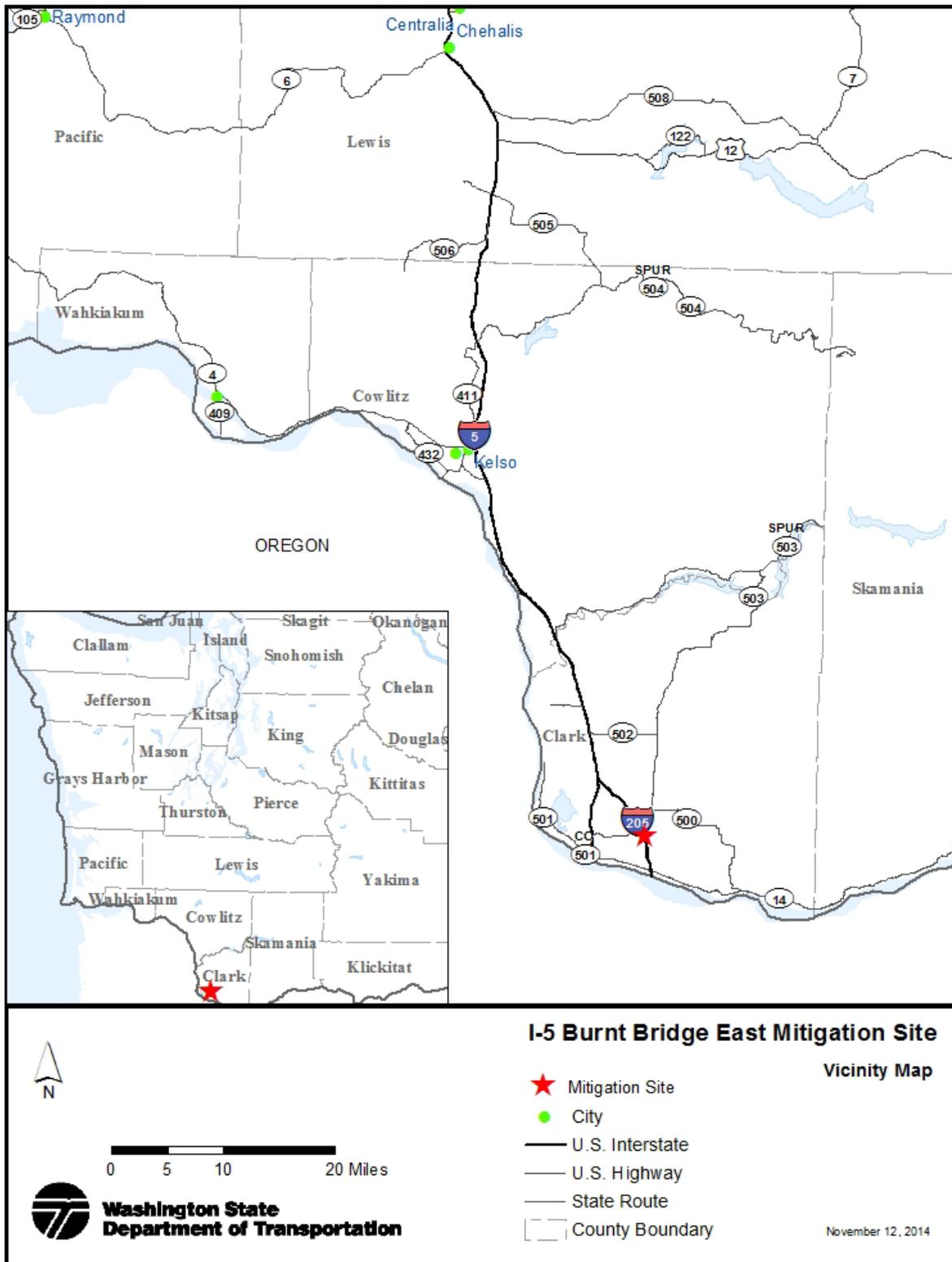


Figure 1. Vicinity Map

# Methods

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Wetland boundaries within the SR 500 Burnt Bridge East mitigation site were delineated using routine methods described in the:

- Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987),
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010)

Wetland boundaries were delineated based on on-site observations of hydrology, soils, and plant communities, in conjunction with background information.

A Global Positioning System (GPS) Trimble GeoXT mapping grade unit was used to record the wetland boundaries and sampling point locations (Figure 2). Wetland boundary points were recorded at regular intervals and at any change in direction along the boundary.

## Wetland Delineation and Study Area

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### Study Area

Wetlands described in this report were assessed only within the wetland mitigation site boundary (Figure 2).

### Wetlands

The SR 500 Burnt Bridge East mitigation site is a small riverine wetland area with palustrine scrub-shrub (PSS) vegetation on both sides of Burnt Bridge Creek. The PSS community has some herbaceous vegetation established in the understory.

The delineation determined 0.04 acre of wetland were present within the SR 500 Burnt Bridge East mitigation site. Delineation data were collected at four sampling points and recorded on wetland determination data forms (Appendix A). Paired wetland and upland sample points were used to define the wetland edge. Data recorded on wetland determination data forms characterize typical wetland and upland conditions observed on site. Vegetation, soils, and hydrology were examined in many additional sampling locations to determine the wetland boundary.

### Precipitation

The Regional Delineation Supplement Version 2.0 (USACE 2010) recommends using methods described in Chapter 19 in *Engineering Field Handbook* (NRCS 1997) to determine if precipitation occurring in the three full months prior to the site visit was normal, drier than normal, or wetter than normal. Actual rainfall is compared to the normal range of the 30-year average. When considering the three prior months as whole, normal precipitation conditions were present prior to field work. Two of the three months prior to field work were within the normal range with the second prior month wetter than normal (Appendix B-1).

Light precipitation was recorded in the ten days preceding field work (Appendix B-2).

### Growing Season

The following evidence of the growing season was observed at the time of the delineation:

- New growth on vegetative portions of herbaceous vegetation
- Leaves on woody species were fully emerged.

# GPS Data - SR 500 Burnt Bridge East, 5/14/2014



**Figure 2. Study area in blue, wetland boundary in red, and sampling point locations in black.**

SR 500 Burnt Bridge East Mitigation Site – Wetland Delineation Summary		
<b>Total Delineated Wetland Area</b>	0.04 acre	
	<b>Wetland Determination Data Form(s)</b>	Appendix A; Sampling Point W1-SP1 and W2-SP1
	<b>Upland Determination Data Form(s)</b>	Appendix A; Sampling Point W1-SP2 and W2-SP2
	<b>Delineator(s)</b>	Doug Littauer Sean Patrick
	<b>Delineation Date</b>	May 14, 2014
<b>Vegetation</b>	Trees – none Shrubs – redosier dogwood ( <i>Cornus alba</i> ), sweetbriar rose ( <i>Rosa eglanteria</i> ), twinberry honeysuckle ( <i>Lonicera involucrata</i> ), Oregon ash ( <i>Fraxinus latifolia</i> ) Herbs – jewelweed ( <i>Impatiens capensis</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ), fringed willowherb ( <i>Epilobium ciliatum</i> )	
<b>Soils</b>	Soils examined to a depth of 18 inches exhibited hydric characteristics. Matrix colors of 10YR 2/1 with redoximorphic concentrations observed in the second layer starting between 6 to 8 inches below the surface. Indicator Redox Dark Surface (F6) met.	
<b>Hydrology</b>	Flows associated with Burnt Bridge Creek appear to be the main source of hydrology, providing both seasonal flood water as sheet flow, and sub-surface hyporheic flows. Drift deposits and oxidized rhizospheres were observed. Direct observation of water was not present during the time of the investigation in mid-May. Water was flowing in Burnt Bridge Creek.	
<b>Rationale for Delineation</b>	Positive indicators of all three wetland criteria are present. Placement of boundary determined mostly by presence/absence of hydric soil indicators. Topography was also informative in the wetland boundary placement.	

## Limitations

This wetland delineation report documents the investigation, best professional judgment and conclusions of WSDOT based on the site conditions encountered at the time of this study. The wetland delineation was performed in compliance with accepted standards for professional wetland biologists and applicable federal, state, and local ordinances. It is correct and complete to the best of our knowledge. It should be considered a preliminary jurisdictional determination of wetlands and other waters until it has been reviewed and approved in writing by the appropriate jurisdictional authorities.

# References

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1. Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Vicksburg (MS): US Army Engineer Waterways Experiment Station. Technical Report Y-87-1. Available from: <http://el.ercd.usace.army.mil/elpubs/pdf/wlman87.pdf>
2. Lichvar RW, Kartesz JT. 2013. North American Digital Flora: National Wetland Plant List (US), version 3.1 [Internet]. Hanover (NH): US Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory and Chapel Hill (NC): BONAP. [cited 2014 Nov 12]. Available from: [http://wetland\\_plants.usace.army.mil](http://wetland_plants.usace.army.mil)
3. [NRCS] Natural Resource Conservation Service. 1997. Hydrology Tools for wetland determination. Chapter 19 in Engineering Field Handbook. Fort Worth (TX): US. Department of Agriculture, NRCS. <http://www.wsdot.wa.gov/NR/rdonlyres/0685A8C8-0512-4568-BE7F-6FF6D75C15ED/0/WetDelinCh19.pdf>
4. [NRCS] Natural Resources Conservation Service [Internet]. 2014. Field Office Technical Guide. US Department of Agriculture. Climate Data for Clark County, Station Vancouver, Washington 458773. [cited 2014 Nov 12]. Available at: [http://efotg.sc.egov.usda.gov/efotg\\_locator.aspx](http://efotg.sc.egov.usda.gov/efotg_locator.aspx)
5. [NRCS] Natural Resource Conservation Service [Internet]. 2014. Web Soil Survey for Clark County, Washington. US Department of Agriculture. [cited 2014 Feb 3]. Available at: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>
6. [USACE] US Army Corps of Engineers. 2007. Department of the Army Nationwide 14 Permit Number NWS-2007-806-SOD. Sheet 2 of 3.
7. [USACE] US 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. Wakeley JS, Lichvar RW, Noble CV, editors. Vicksburg (MS): US Army Engineer Research and Development Center. ERDC/EL TR-10-3. Available at: [http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg\\_supp/west\\_mt\\_finals\\_upp.pdf](http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/west_mt_finals_upp.pdf)
8. [WSDOT] Washington State Department of Transportation. 2007. SR 500/I-205 Interchange Improvements Project Mitigation Plan. Vancouver (WA): Washington State Department of Transportation, Southwest Region.
9. [WSDOT] Washington State Department of Transportation. 2014. Wetland Delineation and Assessment [Internet]. Olympia (WA): Environmental Services Office. [cited 2014 Nov 12]. Available at: <http://www.wsdot.wa.gov/Environment/Wetlands/Delineation.htm>

# **Appendix A —Wetland Determination Data Forms**

Wetland Delineation Data Forms for:

W1-SP1

W1-SP2

W2-SP1

W2-SP2

Wetland polygons, sampling point locations, and wetland names shown in Figure 2.

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

Project/Site: SR 500 Burnt Bridge East City/County: Vancouver/Clark Sampling Date: 14-May-14  
 Applicant/Owner: WSDOT State: WA Sampling Point: w1-sp1  
 Investigator(s): Doug Littauer, Sean Patrick Section, Township, Range: S T 2N R 2E  
 Landform (hillslope, terrace, etc.): Bench Local relief (concave, convex, none): flat Slope: 3.0 % / 1.7 °  
 Subregion (LRR): MLRA 2 Lat.: 45.697 Long.: -122.566 Datum: NAD83HARN  
 Soil Map Unit Name: Lauren gravelly loam, 0 to 8 percent slopes NWI classification: PSS

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 <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
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Remarks:  
 section dlc56

**VEGETATION - Use scientific names of plants.**

	Absolute % Cover	Rel.Strat. Cover	Indicator Status		
<b>Tree Stratum</b> (Plot size: <u>5 by 15 feet</u> )					
1. _____	_____	<input type="checkbox"/> 0.0%	_____	<b>Dominance Test worksheet:</b> 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>100.0%</u> (A/B)	
2. _____	_____	<input type="checkbox"/> 0.0%	_____		
3. _____	_____	<input type="checkbox"/> 0.0%	_____		
4. _____	_____	<input type="checkbox"/> 0.0%	_____		
	0	<b>= Total Cover</b>			
<b>Sapling/Shrub Stratum</b> (Plot size: <u>5 by 15 feet</u> )					
1. <u>Cornus alba</u>	75	<input checked="" type="checkbox"/> 62.5%	FACW	<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>185</u> x 2 = <u>370</u> FAC species <u>20</u> x 3 = <u>60</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>205</u> (A) <u>430</u> (B)  Prevalence Index = B/A = <u>2.098</u>	
2. <u>Rosa rubiginosa</u>	20	<input type="checkbox"/> 16.7%	FACW		
3. <u>Lonicera involucrata</u>	20	<input type="checkbox"/> 16.7%	FAC		
4. <u>Fraxinus latifolia</u>	5	<input type="checkbox"/> 4.2%	FACW		
5. _____	0	<input type="checkbox"/> 0.0%	_____		
	120	<b>= Total Cover</b>			
<b>Herb Stratum</b> (Plot size: <u>5 by 5 feet</u> )					
1. <u>Impatiens capensis</u>	40	<input checked="" type="checkbox"/> 47.1%	FACW		
2. <u>Phalaris arundinacea</u>	45	<input checked="" type="checkbox"/> 52.9%	FACW		
3. _____	0	<input type="checkbox"/> 0.0%	_____		
4. _____	0	<input type="checkbox"/> 0.0%	_____		
5. _____	0	<input type="checkbox"/> 0.0%	_____		
6. _____	0	<input type="checkbox"/> 0.0%	_____		
7. _____	0	<input type="checkbox"/> 0.0%	_____		
8. _____	0	<input type="checkbox"/> 0.0%	_____		
9. _____	0	<input type="checkbox"/> 0.0%	_____		
10. _____	0	<input type="checkbox"/> 0.0%	_____		
11. _____	0	<input type="checkbox"/> 0.0%	_____		
	85	<b>= Total Cover</b>			
<b>Woody Vine Stratum</b> (Plot size: <u>5 by 5 feet</u> )					
1. _____	_____	<input type="checkbox"/> 0.0%	_____		
2. _____	_____	<input type="checkbox"/> 0.0%	_____		
	0	<b>= Total Cover</b>			
<b>% Bare Ground in Herb Stratum:</b> <u>15</u>					

**Hydrophytic Vegetation Indicators:**  
 1 - Rapid Test for Hydrologic Vegetation  
 2 - Dominance Test is > 50%  
 3 - Prevalence Index is ≤ 3.0<sup>1</sup>  
 4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)  
 5 - Wetland Non-Vascular Plants<sup>1</sup>  
 Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)  
<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes  No

Remarks:

**Soil**

Sampling Point: W1-SP1

**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 <sup>1</sup>	Loc <sup>2</sup>			
0-8	10YR	2/1	100						Silt Loam	
8-18	10YR	2/1	90%	10YR	5/6	5%	C	m/pl	Silt Loam	concentrations prominent

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

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

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

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?**    Yes     No

Remarks:

**Hydrology**

**Wetland Hydrology Indicators:**

<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (minimum of two required)</b>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input checked="" type="checkbox"/> Drift deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input checked="" type="checkbox"/> FAC-neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

**Field Observations:**

Surface Water Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches): <input type="text"/>	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Water Table Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches): <input type="text"/>	
Saturation Present? (includes capillary fringe)	Yes <input checked="" type="radio"/> No <input type="radio"/>	Depth (inches): <input type="text" value="15"/>	

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

Remarks:

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

Project/Site: SR 500 Burnt Bridge East City/County: Vancouver/Clark Sampling Date: 14-May-14  
 Applicant/Owner: WSDOT State: WA Sampling Point: w1-sp2  
 Investigator(s): Doug Littauer, Sean Patrick Section, Township, Range: S T 2N R 2E  
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): concave Slope: 5.0 % / 2.9 °  
 Subregion (LRR): LRR A Lat.: 45.697 Long.: -122.566 Datum: NAD83HARN  
 Soil Map Unit Name: Lauren gravelly loam, 0 to 8 percent slopes NWI classification: Upland

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 <input type="radio"/> No <input checked="" type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	Is the Sampled Area within a Wetland? Yes <input type="radio"/> No <input checked="" type="radio"/>
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Remarks:  
 section dlc56

**VEGETATION - Use scientific names of plants.**

	Absolute % Cover	Rel.Strat. Cover	Indicator Status	
<b>Tree Stratum</b> (Plot size: <u>5 by 15 feet</u> )				<b>Dominance Test worksheet:</b> Number of Dominant Species That are OBL, FACW, or FAC: <u>1</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>50.0%</u> (A/B)
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
<b>0 = Total Cover</b>				
<b>Sapling/Shrub Stratum</b> (Plot size: <u>5 by 15 feet</u> )				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>40</u> x 2 = <u>80</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>66</u> x 4 = <u>264</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>106</u> (A) <u>344</u> (B)  Prevalence Index = B/A = <u>3.245</u>
1. <u>Mahonia aquifolium</u>	<u>35</u>	<input checked="" type="checkbox"/> 33.0%	<u>FACU</u>	
2. <u>Symphoricarpos albus</u>	<u>20</u>	<input type="checkbox"/> 18.9%	<u>FACU</u>	
3. <u>Cornus alba</u>	<u>40</u>	<input checked="" type="checkbox"/> 37.7%	<u>FACW</u>	
4. <u>Quercus garryana</u>	<u>7</u>	<input type="checkbox"/> 6.6%	<u>FACU</u>	
5. <u>Rubus armeniacus</u>	<u>4</u>	<input type="checkbox"/> 3.8%	<u>FACU</u>	
<b>106 = Total Cover</b>				
<b>Herb Stratum</b> (Plot size: <u>5 by 5 feet</u> )				<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrologic Vegetation <input type="checkbox"/> 2 - Dominance Test is > 50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
5. _____	_____	<input type="checkbox"/> 0.0%	_____	
6. _____	_____	<input type="checkbox"/> 0.0%	_____	
7. _____	_____	<input type="checkbox"/> 0.0%	_____	
8. _____	_____	<input type="checkbox"/> 0.0%	_____	
9. _____	_____	<input type="checkbox"/> 0.0%	_____	
10. _____	_____	<input type="checkbox"/> 0.0%	_____	
11. _____	_____	<input type="checkbox"/> 0.0%	_____	
<b>0 = Total Cover</b>				
<b>Woody Vine Stratum</b> (Plot size: <u>5 by 5 feet</u> )				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
<b>0 = Total Cover</b>				
<b>% Bare Ground in Herb Stratum:</b> <u>100</u>				
Hydrophytic Vegetation Present? Yes <input type="radio"/> No <input checked="" type="radio"/>				

Remarks:

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

**Soil**

Sampling Point: W1-sp2

**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 <sup>1</sup>	Loc <sup>2</sup>		
0-16	10YR	2/1	100				Silt Loam	

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

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

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

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?**    Yes     No

Remarks:

**Hydrology**

**Wetland Hydrology Indicators:**

<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (minimum of two required)</b>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

**Field Observations:**

Surface Water Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches): <input type="text"/>	<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Water Table Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches): <input type="text"/>	
Saturation Present? (includes capillary fringe)	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches): <input type="text"/>	

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

Remarks:

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

Project/Site: SR 500 Burnt Bridge East City/County: Vancouver/Clark Sampling Date: 14-May-14  
 Applicant/Owner: WSDOT State: WA Sampling Point: w2-sp1  
 Investigator(s): Doug Littauer, Sean Patrick Section, Township, Range: S T 2N R 2E  
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): flat Slope: 5.0 % / 2.9 °  
 Subregion (LRR): MLRA 2 Lat.: 45.697 Long.: -122.566 Datum: NAD83HARN  
 Soil Map Unit Name: Lauren gravelly loam, 0 to 8 percent slopes NWI classification: PSS

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 <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks: section dlc56	

**VEGETATION - Use scientific names of plants.**

	Absolute % Cover	Rel.Strat. Cover	Indicator Status		
<b>Tree Stratum</b> (Plot size: 5 by 15 feet )					
1. _____	_____	<input type="checkbox"/> 0.0%	_____	<b>Dominance Test worksheet:</b> 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>100.0%</u> (A/B)	
2. _____	_____	<input type="checkbox"/> 0.0%	_____		
3. _____	_____	<input type="checkbox"/> 0.0%	_____		
4. _____	_____	<input type="checkbox"/> 0.0%	_____		
<b>= Total Cover</b>					
0				<b>Prevalence Index worksheet:</b> Total % Cover of:      Multiply by: <b>OBL species</b> <u>0</u> x 1 = <u>0</u> <b>FACW species</b> <u>155</u> x 2 = <u>310</u> <b>FAC species</b> <u>15</u> x 3 = <u>45</u> <b>FACU species</b> <u>2</u> x 4 = <u>8</u> <b>UPL species</b> <u>0</u> x 5 = <u>0</u> <b>Column Totals:</b> <u>172</u> (A) <u>363</u> (B)  Prevalence Index = B/A = <u>2.110</u>	
<b>Sapling/Shrub Stratum</b> (Plot size: 5 by 15 feet )					
1. <u>Lonicera involucrata</u>	15	<input type="checkbox"/> 14.3%	FAC		
2. <u>Cornus alba</u>	60	<input checked="" type="checkbox"/> 57.1%	FACW		
3. <u>Fraxinus latifolia</u>	30	<input checked="" type="checkbox"/> 28.6%	FACW		
4. _____	0	<input type="checkbox"/> 0.0%	_____		
5. _____	0	<input type="checkbox"/> 0.0%	_____		
<b>= Total Cover</b>					
105					
<b>Herb Stratum</b> (Plot size: 5 by 5 feet )					
1. <u>Phalaris arundinacea</u>	25	<input checked="" type="checkbox"/> 37.3%	FACW		
2. <u>Impatiens capensis</u>	35	<input checked="" type="checkbox"/> 52.2%	FACW		
3. <u>Epilobium ciliatum</u>	5	<input type="checkbox"/> 7.5%	FACW		
4. <u>Gallium aparine</u>	2	<input type="checkbox"/> 3.0%	FACU		
5. _____	0	<input type="checkbox"/> 0.0%	_____		
6. _____	0	<input type="checkbox"/> 0.0%	_____		
7. _____	0	<input type="checkbox"/> 0.0%	_____		
8. _____	0	<input type="checkbox"/> 0.0%	_____		
9. _____	0	<input type="checkbox"/> 0.0%	_____		
10. _____	0	<input type="checkbox"/> 0.0%	_____		
11. _____	0	<input type="checkbox"/> 0.0%	_____		
<b>= Total Cover</b>					
67					
<b>Woody Vine Stratum</b> (Plot size: 5 by 5 feet )					
1. _____	_____	<input type="checkbox"/> 0.0%	_____		
2. _____	_____	<input type="checkbox"/> 0.0%	_____		
<b>= Total Cover</b>					
0					
<b>% Bare Ground in Herb Stratum:</b> <u>33</u>					
<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrologic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is > 50% <input checked="" type="checkbox"/> 3 - Prevalence Index is ≤ 3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)					
<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.					
<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>					
Remarks:					

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



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

Project/Site: SR 500 Burnt Bridge East City/County: Vancouver/Clark Sampling Date: 14-May-14  
 Applicant/Owner: WSDOT State: WA Sampling Point: w2-sp2  
 Investigator(s): Doug Littauer, Sean Patrick Section, Township, Range: S T 2N R 2E  
 Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): flat Slope: 30.0 % / 16.6 °  
 Subregion (LRR): MLRA 2 Lat.: 45.697 Long.: -122.566 Datum: NAD83HARN

Soil Map Unit Name: Lauren gravelly loam, 0 to 8 percent slopes NWI classification: Upland

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 <input type="radio"/> No <input checked="" type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	Is the Sampled Area within a Wetland? Yes <input type="radio"/> No <input checked="" type="radio"/>
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Remarks:  
 section dlc56

**VEGETATION - Use scientific names of plants.**

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	Dominance Test worksheet:
<b>Tree Stratum</b> (Plot size: <u>5 by 15 feet</u> )				Number of Dominant Species That are OBL, FACW, or FAC: <u>0</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>0.0%</u> (A/B)
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
<b>0 = Total Cover</b>				
<b>Sapling/Shrub Stratum</b> (Plot size: <u>5 by 15 feet</u> )				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>3</u> x 2 = <u>6</u> FAC species <u>2</u> x 3 = <u>6</u> FACU species <u>80</u> x 4 = <u>320</u> UPL species <u>20</u> x 5 = <u>100</u> Column Total s: <u>105</u> (A) <u>432</u> (B) Prevalence Index = B/A = <u>4.114</u>
1. <u>Mahonia aquifolium</u>	<u>40</u>	<input checked="" type="checkbox"/> <u>54.8%</u>	<u>FACU</u>	
2. <u>Symphoricarpos albus</u>	<u>25</u>	<input checked="" type="checkbox"/> <u>34.2%</u>	<u>FACU</u>	
3. <u>Rosa rubiginosa</u>	<u>3</u>	<input type="checkbox"/> <u>4.1%</u>	<u>FACW</u>	
4. <u>Amelanchier alnifolia</u>	<u>5</u>	<input type="checkbox"/> <u>6.8%</u>	<u>FACU</u>	
5. _____	<u>0</u>	<input type="checkbox"/> <u>0.0%</u>	_____	
<b>73 = Total Cover</b>				
<b>Herb Stratum</b> (Plot size: <u>5 by 5 feet</u> )				<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrologic Vegetation <input type="checkbox"/> 2 - Dominance Test is > 50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Arrhenatherum elatius</u>	<u>20</u>	<input checked="" type="checkbox"/> <u>58.8%</u>	<u>UPL</u>	
2. <u>Urtica dioica</u>	<u>2</u>	<input type="checkbox"/> <u>5.9%</u>	<u>FAC</u>	
3. <u>Vicia spp.</u>	<u>2</u>	<input type="checkbox"/> <u>5.9%</u>	_____	
4. <u>Trifolium pratense</u>	<u>10</u>	<input checked="" type="checkbox"/> <u>29.4%</u>	<u>FACU</u>	
5. _____	<u>0</u>	<input type="checkbox"/> <u>0.0%</u>	_____	
6. _____	<u>0</u>	<input type="checkbox"/> <u>0.0%</u>	_____	
7. _____	<u>0</u>	<input type="checkbox"/> <u>0.0%</u>	_____	
8. _____	<u>0</u>	<input type="checkbox"/> <u>0.0%</u>	_____	
9. _____	<u>0</u>	<input type="checkbox"/> <u>0.0%</u>	_____	
10. _____	<u>0</u>	<input type="checkbox"/> <u>0.0%</u>	_____	
11. _____	<u>0</u>	<input type="checkbox"/> <u>0.0%</u>	_____	
<b>34 = Total Cover</b>				
<b>Woody Vine Stratum</b> (Plot size: <u>5 by 5 feet</u> )				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
<b>0 = Total Cover</b>				
<b>% Bare Ground in Herb Stratum:</b> <u>66</u>				

Remarks:

<sup>1</sup>Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

**Soil**

Sampling Point: W2-sp2

**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 <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR	3/1	100				Sandy Loam	
6-16	10YR	4/2	100				Sandy Loam	

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

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

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

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?**    Yes     No

Remarks:

**Hydrology**

**Wetland Hydrology Indicators:**

<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (minimum of two required)</b>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

**Field Observations:**

Surface Water Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches): <input type="text"/>	<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Water Table Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches): <input type="text"/>	
Saturation Present? (includes capillary fringe)	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches): <input type="text"/>	

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

Remarks:

# Appendix B — Precipitation Data

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## Appendix B-1. Comparison of Observed and Normal Precipitation (NRCS 1997)

Monthly precipitation data for Vancouver, Washington.

		Long-term rainfall records <sup>a</sup>							
	Month	3 yrs. in 10 less than	Average	3 yrs. in 10 more than	Rain fall <sup>a</sup>	Condition dry, wet, normal <sup>b</sup>	Condition Value	Month weight value	Product of previous two columns
1 <sup>st</sup> prior month	Apr	3.07	3.07	3.63	3.60	N	2	3	6
2 <sup>nd</sup> prior month	Mar	3.27	4.21	4.87	6.21	W	3	2	6
3 <sup>rd</sup> prior month	Feb	3.41	4.86	5.76	5.56	N	2	1	2
								<b>Sum</b>	<b>14</b>

<sup>a</sup>NRCS 2014

<sup>b</sup> Conditions are considered normal if they fall within the low and high range around the average.

Note: If sum is

- 6 - 9 then prior period has been drier than normal
- 10 - 14 then period has been normal
- 15 - 18 then period has been wetter than normal

Condition value:

- Dry (D) =1
- Normal (N) =2
- Wet (W) =3

Conclusions: Normal precipitation conditions were present prior to the field visit.

## Appendix B-2. Daily Precipitation 10 days preceding field work, Vancouver, Washington

Date (2014)	Daily Precipitation (inches) <sup>a</sup>
May 13	0.00
May 12	0.00
May 11	0.00
May 10	0.20
May 9	0.50
May 8	0.00
May 7	0.00
May 6	0.00
May 5	0.24
May 4	0.22

<sup>a</sup>NOAA 2014

## Literature Cited

1. Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Online. Available at: <http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm>
2. Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Vicksburg (MS): US Army Engineer Waterways Experiment Station. Technical Report Y-87-1. Available at: <http://el.ercd.usace.army.mil/elpubs/pdf/wlman87.pdf>
3. [USACE] US Army Corps of Engineers. 2007. Department of the Army Nationwide (14) Permit Number NWS-2007-806.
4. [USACE] US Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), Wakeley JS, Lichvar RW, Noble CV, editors. Vicksburg (MS): US Army Engineer Research and Development Center. ERDC/EL TR-10-3. Available at: [http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg\\_supp/west\\_mt\\_finalsupp.pdf](http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/west_mt_finalsupp.pdf)
5. [WSDOT] Washington State Department of Transportation. 2007. SR-500/I-205 Interchange Improvements Project Draft Wetland Mitigation Plan. Vancouver (WA): Washington State Department of Transportation, Southwest Region.
6. [WSDOT] Washington State Department of Transportation. 2010. SR-500/I-205 Interchange Mitigation Site Planting Plan.
7. [WSDOT] Washington State Department of Transportation. 2008. WSDOT Wetland Mitigation Site Monitoring Methods. <http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>