

**SR 161 234th Street to 176th Street East (Graham Hill)
Mitigation Site**

Ecology Order DE 03SEAHQ-5832

Olympic Region

2015 MONITORING REPORT

Wetlands Program

Issued March 2016



**Washington State
Department of Transportation**

Environmental Services Office

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SR 161 234th Street East to 176th Street East (Graham Hill) Mitigation Site

Ecology Order DE-03SEAHQ-5832



General Site Information		
Ecology Order Number	DE-03SEAHQ-5832	
Mitigation Location	West Side of SR 161, south of Graham, near 234 th Street East, Pierce County	
LLID Number	1222960470438	
Construction Date	2005	
Monitoring Period	2006-2015	
Year of Monitoring	10 of 10	
Area of Project Impact	0.55 acre	
Type of Mitigation	Wetland Establishment	Wetland Enhancement
Planned Area of Mitigation	0.8 acre	0.5 acre

¹Impact acreage sourced from Ecology 2003 and mitigation acreage sourced from WSDOT 2003.

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Summary of Monitoring Results and Management Activities (2015)

Performance Standards and Monitoring Task	2015 Results ²	Management Activities
Performance Standards		
Wetland hydrology	present	
Cover of woody species will achieve 75 percent cover in the wetland	33% cover (CI _{80%} = 28-39%)	
Reed canarygrass and other invasive species not to exceed 20 percent in the wetland	Less than 5%	Weed control was conducted: April 27, 2015, June 23, 2015, September 23, 2015, September 30, 2015, October 22, 2015
Monitoring Task		
Three formal bird surveys will be conducted and any wildlife signs will be recorded	Three bird surveys were conducted and wildlife signs observed	

Report Introduction

This report summarizes final-year (Year-10) monitoring activities at the State Route (SR) 161 Graham Hill Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site success. Monitoring activities included vegetation surveys, photo-documentation on August 5, 2015 and a wetland delineation on March 25, 2015. Bird surveys were completed May 26, June 4 and 9, 2015.

² Estimated values are presented with their corresponding statistical confidence interval. For example, 33% cover (CI_{80%} = 28-39%) means we are 80% confident that the true cover value is between 28% and 39%.

What is the SR 161 Graham Hill Mitigation Site?

This 8.93 acre WSDOT property (Figure 1) contains 1.3 acres of mitigation to compensate for impacts to 0.55 acre of isolated wetlands due to road widening along SR 161. The mitigation site is located south of Graham, and at the southern end of the road project. Connected to a larger wetland complex and situated on a slight slope, the site combines forested wetland establishment and wetland enhancement. The site provides mitigation for lost wetland functions including wildlife habitat, groundwater recharge, and water quality.

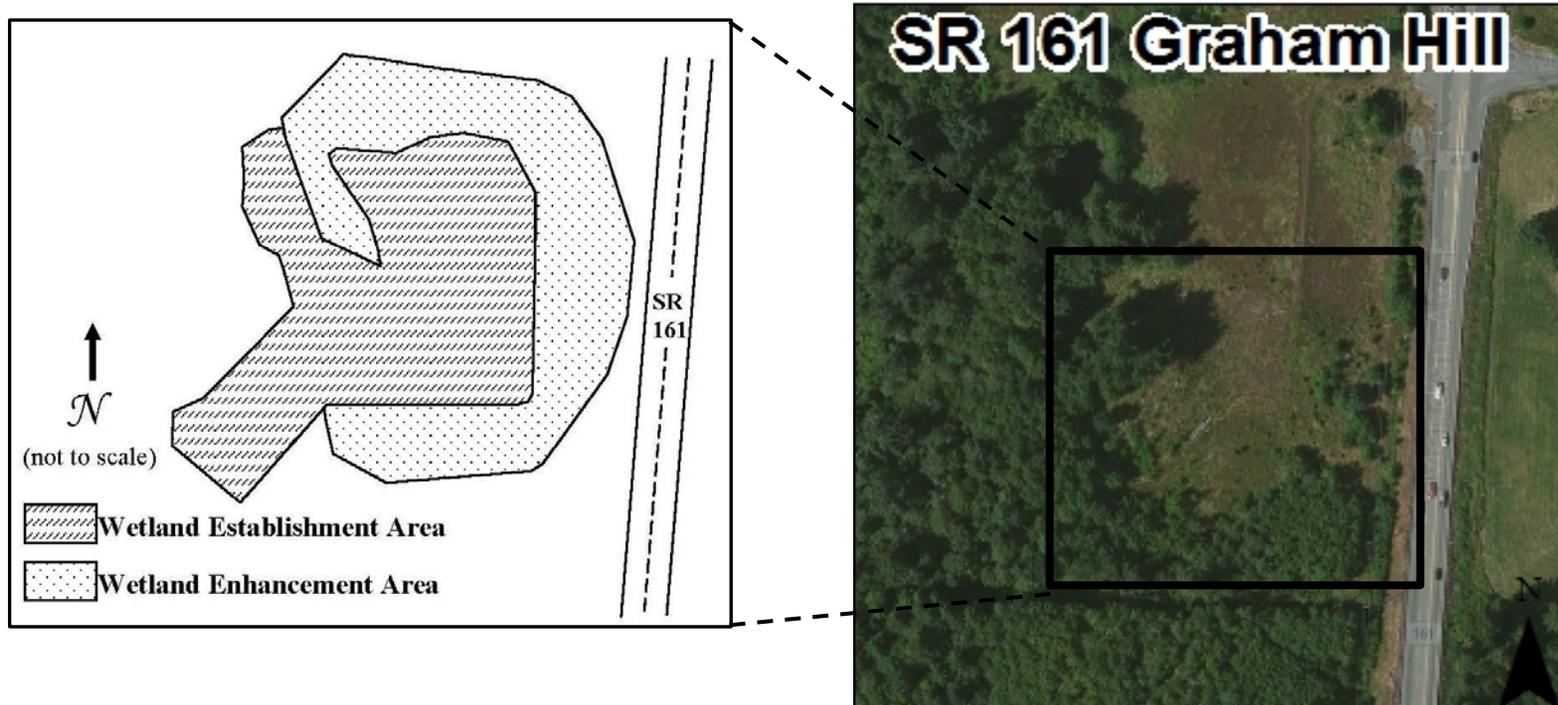


Figure 1 Site Sketch

The SR 161 Graham Hill Mitigation Site includes a sloped and forested wetland establishment area surrounded by wetland enhancement. Existing wetlands border the site to the north and west. Appendix 2 contains driving directions.

What are the performance standards for this site?³

Year 10

Performance Standard 1

Inundation or saturation within 12 inches of the surface for at least 12.5 percent of the growing season will be present in the wetland creation and enhancement areas.

Performance Standard 2

Native woody vegetation in the wetland creation and enhancement areas will achieve a minimum of 75 percent aerial cover in year 10.

Performance Standard 3

Cover of reed canarygrass, or other invasive species will not exceed 20 percent in the wetland creation and enhancement areas.

Monitoring Task

Three formal bird surveys will be conducted each monitoring season at permanent census stations throughout the mitigation site. Surveys will take place between sunrise and noon, from May through June. In addition to the surveys, any wildlife sign and/or other sighting will be recorded during all site visits.

Appendix 1 shows the as-built planting plan (WSDOT 2005).

³ The original Performance Standards in the Mitigation Plan ended at Year-5. The Department of Ecology required WSDOT to propose Year-8 and Year-10 Performance Standards. This was completed in 2011 in a compliance communication between WSDOT and The Department of Ecology (WSDOT 2011).

How were the performance standards evaluated?

WSDOT staff collected hydrology data and performed a wetland delineation using 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) and a Global Positioning System (Trimble Mapping Grade) (Performance Standards 1).

The tables below document the sampling methodology utilized for all of the/the remaining performance standards (PS)/performance criteria (PC) as required by the mitigation plan or permits. For additional details on the methods see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

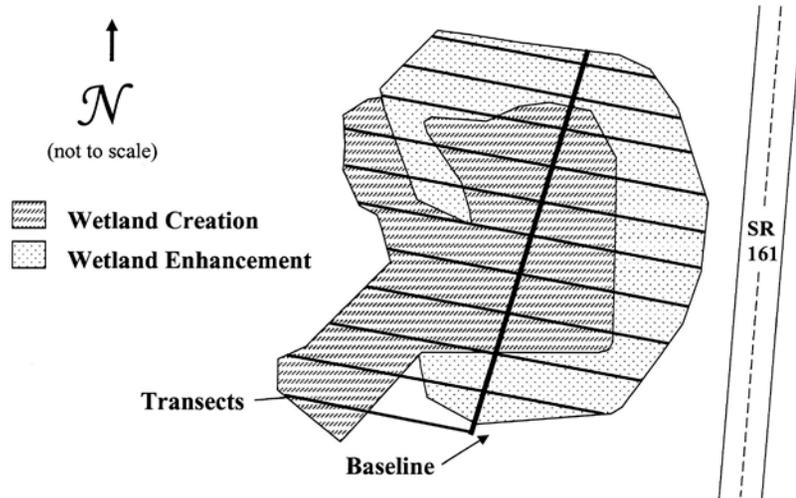


Figure 2 Site Sampling Design (2015)

Placement of Baseline: The baseline was 100 meters long and placed north to south through the middle of the site.

	PS 2	PS 3
Attribute	Cover	Cover
Target pop.	Native Woody	Noxious Weeds/ Invasive sp.
Zone	Wetland	Entire site
Sample method	Line Intercept	Qualitative
SU length	15 meters	N/A
SU width	N/A	N/A
Points per SU	N/A	N/A
Total # of SU	29	N/A

Is this site a success?

SR 161 Graham Hill is steadily progressing towards achieving its intended goals and objectives. The woody vegetation standard was not met this year, but it appears that many of the intended functions are being supported. Work done in previous years includes additional plantings, plant protector removal on established woody species, weed control, and control of competitive grasses around the plantings. This has helped increase cover over the past few years. Red alder (*Alnus rubra*) and black cottonwood (*Populus balsamifera*) were planted as suggested by regulatory personnel to increase cover rapidly. However, the extremely hot and dry conditions that western Washington experienced in 2015 impacted these plantings and many have died or appear stressed.

The wetland enhancement area has developed more rapidly than the wetland establishment area. The enhancement area was planted with conifers, primarily Sitka spruce (*Picea sitchensis*). The Sitka spruce dominates the area along with red alder. The spruce is approximately three to seven meters tall in this area. The wetland establishment area has less cover when compared to the enhancement area and is dominated by Oregon ash (*Fraxinus latifolia*) and red alder. Shrub species have less cover but are present in the area. Redosier dogwood (*Cornus alba*) show signs of herbivory and the salmonberry (*Rubus spectabilis*) show signs of stress most likely related to the hot and dry conditions. Although the wetland area lacks the cover to achieve the performance standard for Year 10, there is a robust herbaceous understory present that consists of soft rush (*Juncus effusus*), swordleaf rush (*Juncus ensifolius*), sawbeak sedge (*Carex stipata*), slough sedge (*Carex obnupta*), intermixed with native and nonnative pasture grasses.

The functions that this site is intended to provide include wildlife habitat, sediment and toxicant retention, groundwater discharge and recharge. Habitat for a variety of wetland dependent and wetland associated birds is present. See Appendix 3, Table 1 for a cumulative list of bird species for the entire monitoring period. Deer have been observed on site as well as additional signs of wildlife use including herbivory and scat. The wetland is a slope wetland with many micro-depressions scattered across the landscape and is part of a larger depressionnal wetland complex. These micro-depressions are inundated during the growing season. Seasonal inundation paired with a dense herbaceous understory indicates that the structure is present to store water and allow the sediment and toxicants to settle out of the water.

Results for Performance Standard 1
(Wetland Hydrology)

The site was delineated on March 9, 2013 and again on March 25, 2015 and has met the final-year wetland acreage requirements. On February 27, 2013 a request to discontinue hydrology monitoring was sent to the Department of Ecology; this request was accepted on March 20, 2013. See Appendix 4 for the Delineation Report.

Results for Performance Standard 2
(At least 60% cover of woody vegetation in the wetland):

The wetland has 33% cover ($CI_{80\%} = 28-39\%$). The species contributing the most cover include red alder, Sitka spruce, and Oregon ash. The wetland enhancement area appears to be establishing faster than the creation area (Photo 1). The enhancement area is made up of the Sitka spruce which dominates the wetland (Photo 2).

Results for Performance Standard 3
(Reed canarygrass and other invasive species not to exceed 20% in the wetland):

Total cover of invasive species is low, estimated at less than five percent across the site. Species present include reed canarygrass (*Phalaris arundinacea*), thistles (*Cirsium spp.*), and Himalayan blackberry (*Rubus armeniacus*).



Photo 1
Woody cover in the created wetland (Sept 2015)



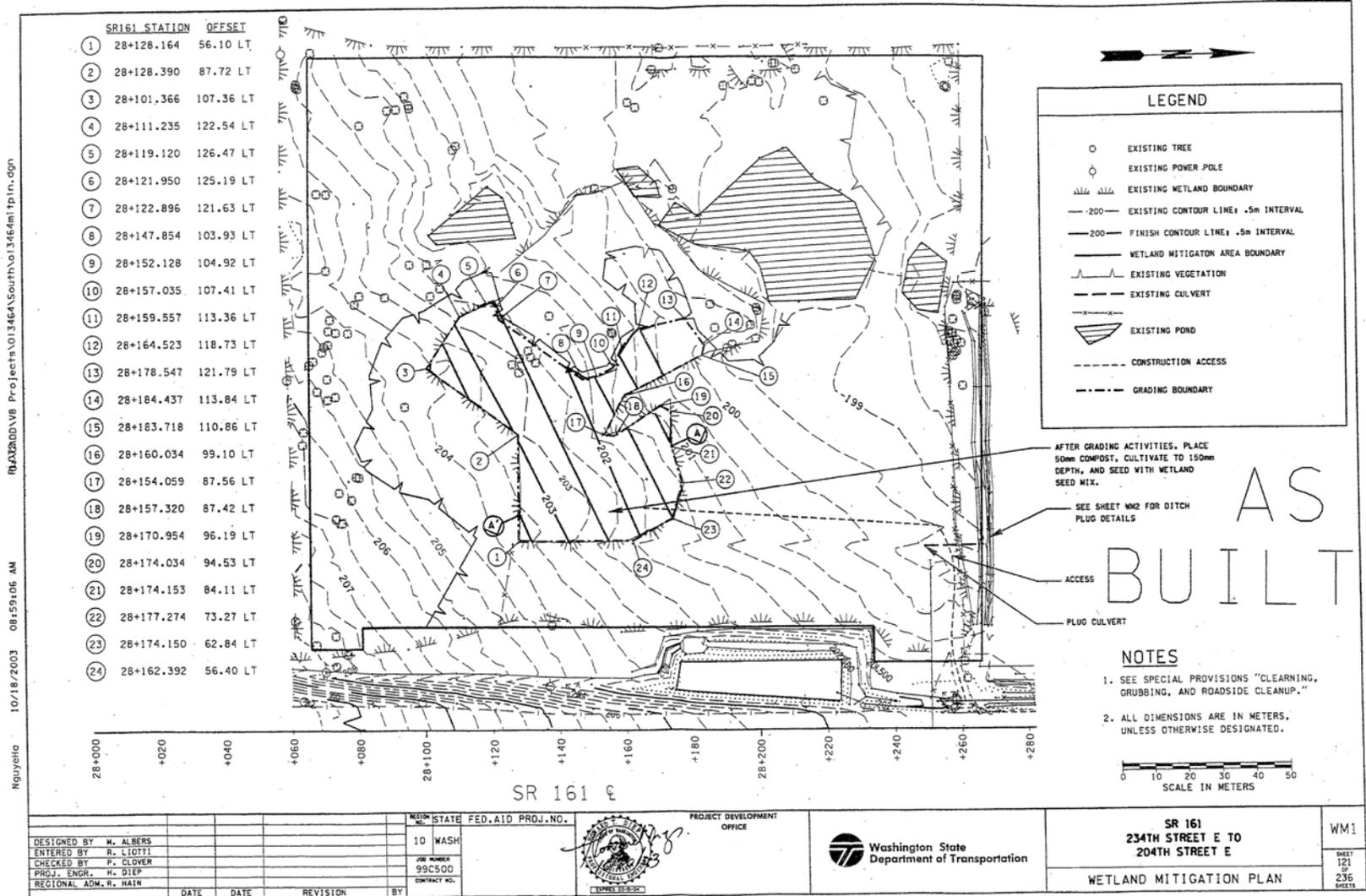
Photo 2
Woody cover in the enhanced wetland (Sep 2015)

What is planned for this site?

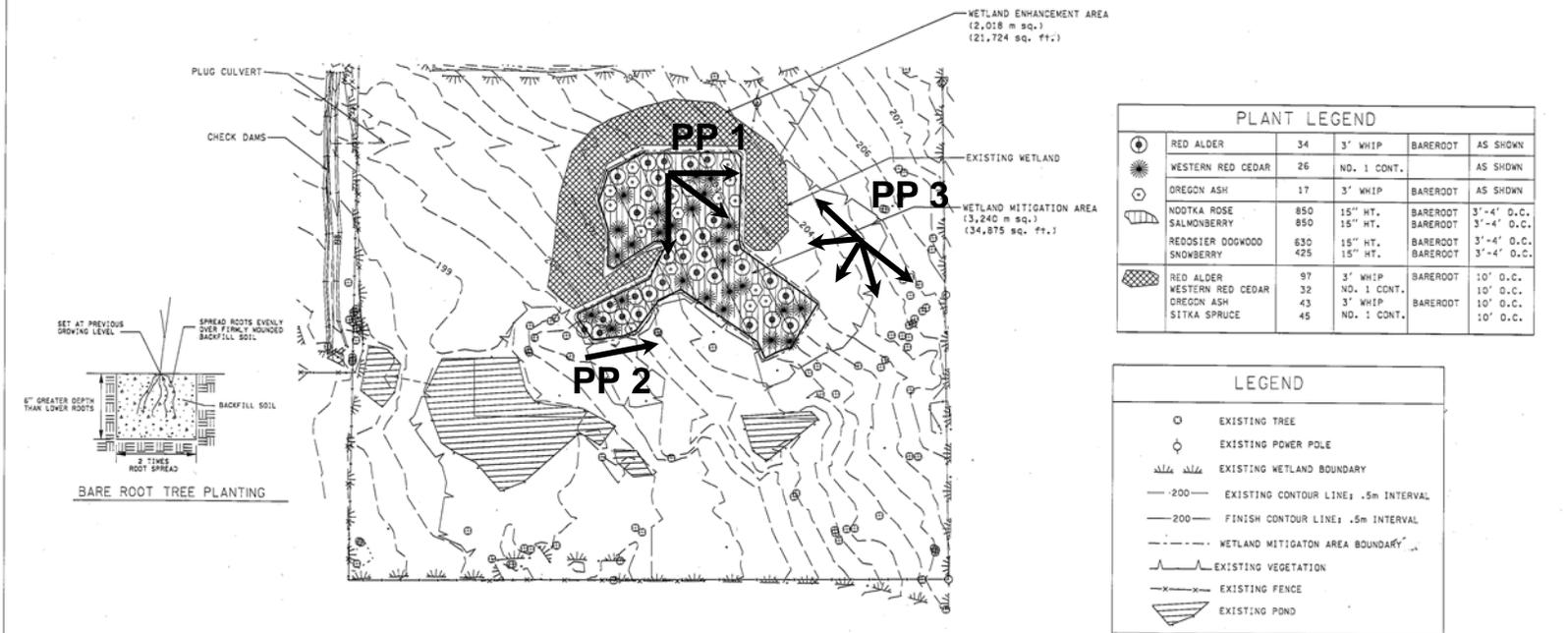
The Region has plans to continue weed control.

Appendix 1 – As-Built with Photo Point Locations

(from WSDOT 2006)



T18N R4E SR 161



AS BUILT

DESIGNED BY KSAER	REGION 10	STATE WASH	FED.AID PROJ.NO.	Washington State Department of Transportation	SR 161 234TH STREET E TO 204TH STREET E	PLANTING PLAN	SHEET OF SHEETS
ENTERED BY KS	10	WASH					
CHECKED BY CW			JOB NUMBER				
PROJ. ENGR. M. MORISHIGE			CONTRACT NO.				
REGIONAL ADM. G. DEMICH			BY				
..CADD files\103464mitpln.dgn 10/2/2006 3:20:07 PM				REVISION			

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on September 24, 2015 and document current site development.



Photo Point 1a



Photo Point 1b



Photo Point 1c



Photo Point 2



Photo Point 3a



Photo Point 3b



Photo Point 3c



Photo Point 3d

Driving Directions:

From Olympia, take I-5 North to Exit 111/SR 510 Southeast. At end of exit ramp, stay right. Drive through the first roundabout and then take a right on to Marvin Road. Follow the second roundabout left and then straight towards Yelm. In Yelm, follow 507 North to 702 East, towards the right. At the intersection of SR 702 and SR 7, go straight ahead onto Eatonville Cutoff Road. When you get to a “T” intersection, turn left (north) onto SR 161. The site is on the west side of SR 161 across from 234th Street. in Graham. You will need an Olympic Region Key to open the gate.

Appendix 3 – Data Tables

Table 1. List of Birds Observed Using the Mitigation Site during the monitoring period (years-1 to 10)

SR 161 Graham Hill Cumulative Bird List			
Family Name ⁴	Common Name	Scientific Name	Status⁵
<i>Anatidae</i>	Mallard	<i>Anas platyrhynchos</i>	wetland-dependent
<i>Ardeidae</i>	Great Blue Heron	<i>Ardea herodias</i>	wetland-dependent
<i>Accipitridae</i>	Red-tail Hawk	<i>Buteo jamaicensis</i>	
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	wetland-associated
<i>Trochilidae</i>	Rufous Hummingbird	<i>Selasphorus rufus</i>	
<i>Alcedinidae</i>	Belted Kingfisher	<i>Megaceryle alcyon</i>	wetland-dependent
<i>Picidae</i>	Northern Flicker	<i>Colaptes auratus</i>	
	Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	
	Hairy Woodpecker	<i>Picoides billosus</i>	
<i>Tyrannidae</i>	Willow Flycatcher	<i>Empidonax traillii</i>	wetland-associated
	Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	
<i>Vireonidae</i>	Warbling Vireo	<i>Vireo gilvus</i>	wetland-associated
<i>Corvidae</i>	Steller’s Jay	<i>Cyanocitta stelleri</i>	
	American Crow	<i>Corvus brachyrhynchos</i>	
<i>Hirundinidae</i>	Violet-green Swallow	<i>Tachycineta thalassina</i>	wetland-associated
	Barn Swallow	<i>Hirundo rustica</i>	wetland-associated
<i>Paridae</i>	Black-capped Chickadee	<i>Poecile atricapillus</i>	wetland-associated
	Chestnut-backed Chickadee	<i>Sitta canadensis</i>	
<i>Aegithalidae</i>	Bushtit	<i>Psaltriparus minimus</i>	
<i>Sittidae</i>	Red-breasted nuthatch		
<i>Troglodytidae</i>	Bewick’s Wren	<i>Thryomanes bewickii</i>	
<i>Turdidae</i>	Swainson’s Thrush	<i>Catharus ustulatus</i>	
	American Robin	<i>Turdus migratorius</i>	
<i>Parulidae</i>	Wilson’s Warbler	<i>Wilsonia pusilla</i>	wetland-associated
	Black-throated Bray Warbler	<i>Dendroica nirescens</i>	

⁴ The SR 161 Graham Hill bird species list follows the American Ornithologists’ Union Checklist of North American Birds (AOU 1998). The list incorporates changes made in the 42nd, 43rd, and 44th Supplement to the Checklist as published in the Auk 117:847-858 (2000), 119:897-906 (2002), and 120:923-932 (2003).

⁵ Brown, S. C. and C. R. Smith 1998

SR 161 Graham Hill Cumulative Bird List			
Family Name ⁴	Common Name	Scientific Name	Status ⁵
	Yellow Warbler		
<i>Thraupidae</i>	Western Tanager	<i>Piranga ludoviciana</i>	
<i>Sturnidae</i>	European Starling	<i>Sturnus vulgaris</i>	
<i>Bombycillidae</i>	Cedar Waxwing	<i>Bombycilla cedrorum</i>	
<i>Parulidae</i>	Common Yellowthroat	<i>Geothlypis trichas</i>	wetland-dependent
<i>Emberizidae</i>	Song Sparrow	<i>Melospiza melodia</i>	
	Savannah Sparrow	<i>Passerculus sandwichensis</i>	
	Dark-Eyed Junco	<i>Junco hyemalis</i>	
	Spotted Towhee	<i>Pipilo maculatus</i>	
	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	
<i>Cardinalidae</i>	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	
<i>Icteridae</i>	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	wetland-dependent
	Brown-headed Cowbird	<i>Molothrus ater</i>	
<i>Fringillidae</i>	American Goldfinch	<i>Carduelis tristis</i>	
	House Finch	<i>Carpodacus domesticus</i>	

Appendix 4 – Wetland Delineation

WETLAND DELINEATION REPORT

SR 161 Graham Hill Mitigation Site

SR 161 234th Street East to 176th Street East

USACE reference number 1999-4-01105

ECY permit number DE 03SEAHQ-5832

Pierce County, Washington

Prepared by:

Tatiana Dreisbach

WSDOT Environmental Services Office

Olympia, Washington

February 2016



**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 161 Graham Hill mitigation site. Field work was conducted by WSDOT wetland biologists Tatiana Dreisbach and Doug Littauer, on March 25, 2015. The delineation identifies 1.41 acres of wetland within the mitigation areas within the property boundaries.

General Information for the SR 161 Graham Hill Mitigation Site		
Location:	S16, T18N, R4E. Pierce County. (Vicinity map, Figure 1)	
	USACE Reference Number	1999-4-01105
	Ecology Permit	DE 03SEAHQ-5832
	Long./Lat. ID Number	1222960470438
	Land Resource Region (LRR)	A
	Major Land Resource Area (MLRA)	2
	Construction Date	2005-2006
	Monitoring Period	2006-2015
	Year of Monitoring	10 of 10 (in 2015)
Area of Project Impact¹	0.55 acre	
Type of Mitigation	Required Area²	2015 Delineated Area
Wetland Establishment	0.80 acre	0.80 acre
Wetland Enhancement	0.50 acre	0.39 acre
Delineated Wetland Beyond Planned Mitigation Area³	n/a	0.22 acre
Totals	1.30 acres	1.41 acres

¹ USACE determined that impacted wetlands were isolated and therefore did not necessitate issuance of a nationwide permit (USACE 2002). Project impact numbers from Ecology Order Number DE 03SEAHQ-5832 with 0.55 acre impacts (Ecology 2003).

² Required mitigation acreages from page 5 of the revised final wetland mitigation plan (WSDOT 2003).

³ The 2015 delineation includes 0.22 acre of wetland occurring beyond intended mitigation areas (Figure 2). These areas were included because they meet wetland criteria and occur where mitigation plantings were evident in the field.

Location

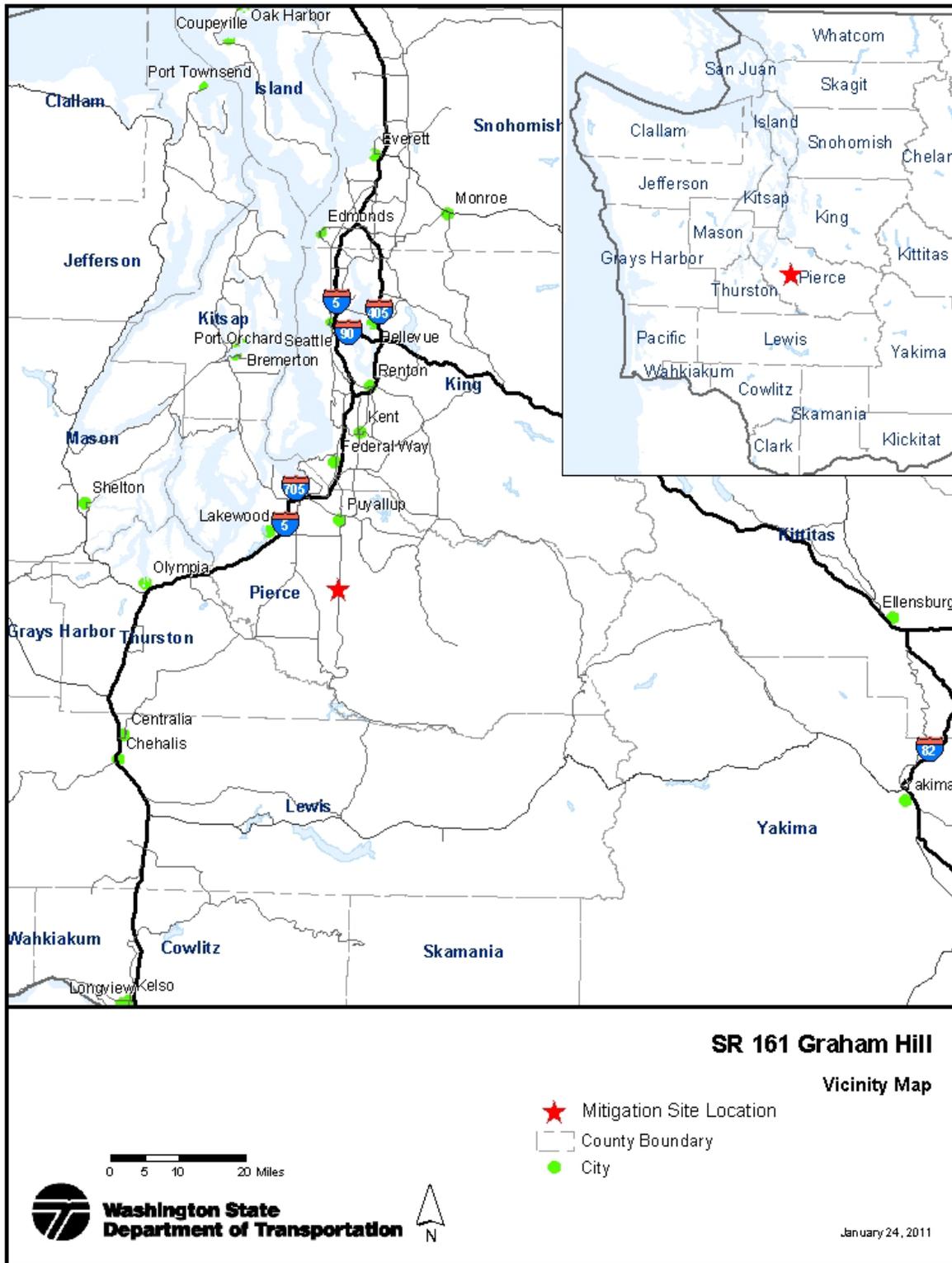


Figure 1. Vicinity Map

Methods

Wetland boundaries within the 161 Graham Hill 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 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 mitigation types (Figure 2) were georeferenced by digitizing the mitigation site as-built planting plan in ArcGIS 10.2.2. Inherent in both GPS and georeferencing are minute errors, resulting in slight inaccuracies in both boundary line placement and acreage calculations. These tools represent the best available methods at the time of the study and report preparation.

Wetland Delineation and Study Area

Study Area

The property includes both mitigation areas as well as additional upland and wetland areas beyond the mitigation area. Wetlands described in this report were assessed only within the wetland mitigation area of the site and are referred to as the study area (Figure 2). The biologic wetland extends beyond the study area to the north and south.

Wetlands

The SR 161 Graham Hill Mitigation Site has depressional wetland areas currently dominated by a palustrine scrub-shrub (PSS) vegetation community. This area will likely develop into a PFO community over time.

The delineation determined 1.41 acres of wetland were present within the mitigation areas at the SR 161 Graham Hill 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. Additional wetland sample points characterize various wetland vegetation communities. 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. Each of the three months prior to field work was within the normal range (Appendix B-1).

Moderate to heavy 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 vegetative growth was present on some herbaceous plants.
- The leaves on most woody species were partially or fully emerged.

SR 161 Graham Hill, GPS Data: 3/25/2015

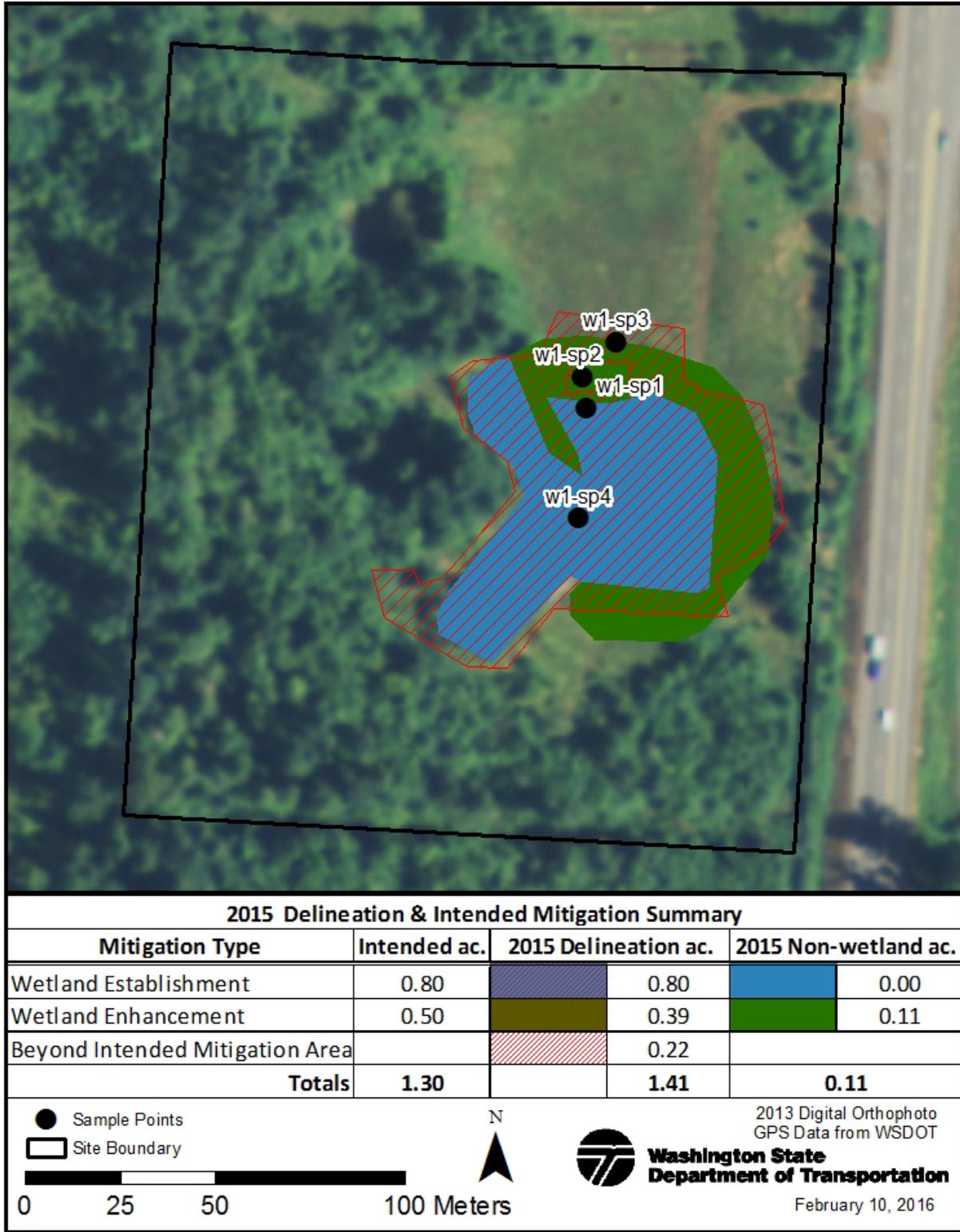


Figure 2. Wetland boundary/study area in red, sampling point locations in black.

SR 161 Graham Hill Mitigation Site – Wetland Delineation Summary		
Total Delineated Wetland Area	1.41 acres	
	Wetland Determination Data Form(s)	Appendix A; Sampling Points W1-SP1, W1-SP3, W1-SP4
	Upland Determination Data Form(s)	Appendix A; Sampling Point W1-SP2
	Delineator(s)	Tatiana Dreisbach. Doug Littauer
	Delineation Date	March 25, 2015
Vegetation	Trees – none Shrubs – redosier dogwood (<i>Cornus alba</i>), red alder (<i>Alnus rubra</i>) saplings, Nootka rose (<i>Rosa nutkana</i>), Sitka spruce (<i>Picea sitchensis</i>) and Oregon ash (<i>Fraxinus latifolia</i>) plantings Herbs – creeping buttercup (<i>Ranunculus repens</i>), soft rush (<i>Juncus effusus</i>), colonial bentgrass (<i>Agrostis capillaris</i>), quackgrass (<i>Elymus repens</i>), orchard grass (<i>Dactylis glomerata</i>), bird's-foot trefoil (<i>Lotus corniculatus</i>), and slough sedge (<i>Carex obnupta</i>),	
Soils	Soils examined to a depth of 16 inches exhibited hydric characteristics. Matrix colors of 10YR 3/1, 10YR 3/2, 10YR 6/1, and 10 Y 5/1 were observed. Redoximorphic concentrations and depletions were observed in some layers. Indicator Depleted Below Dark Surface (A11), Depleted Matrix (F3), and Redox Dark Surface (F6) met.	
Hydrology	Groundwater and sub-surface seepage from higher elevation areas to the south appear to be the main sources of hydrology. Precipitation also contributes to the hydrologic regime of this wetland. Water in the observation pits ranged from 5 inches to 10 inches below the surface. Surface water less than one-inch deep was observed in some areas.	
Rationale for Delineation	Positive indicators of all three wetland criteria are present. Placement of boundary determined by mainly by presence/absence of hydric soil and hydrology indicators.	

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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10. [WSDOT] Washington State Department of Transportation. 2015. Wetland Delineation and Assessment [Internet]. Olympia (WA): Environmental Services Office. [cited 2015 Aug 31]. 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

W1-SP3

W1-SP4

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

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

Project/Site: 161 Graham Hill City/County: na/Pierce Sampling Date: 25-Mar-15
 Applicant/Owner: WSDOT State: WA Sampling Point: w1-sp1
 Investigator(s): Tatiana Dreisbach, Doug Littauer Section, Township, Range: S 16 T 18N R 4E
 Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): sloping Slope: 20.0 % / 11.3 °
 Subregion (LRR): LRR A Lat.: 47.043 Long.: -122.296 Datum: NAD83HARN
 Soil Map Unit Name: Kapowsin gravelly loam, 0 to 6 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:	

VEGETATION - Use scientific names of plants.

Stratum	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	Dominance Test worksheet:
Tree Stratum (Plot size: <u>15 x 15 feet</u>)				Number of Dominant Species That are OBL, FACW, or FAC: <u>4</u> (A)
1. _____	_____	<input type="checkbox"/> 0.0%	_____	Total Number of Dominant Species Across All Strata: <u>4</u> (B)
2. _____	_____	<input type="checkbox"/> 0.0%	_____	Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15 x 15 feet</u>)				Prevalence Index worksheet:
1. <u>Cornus alba</u>	20	<input checked="" type="checkbox"/> 33.3%	FACW	Total % Cover of: Multiply by:
2. <u>Rosa nutkana</u>	10	<input type="checkbox"/> 16.7%	FAC	OBL species <u>10</u> x 1 = <u>10</u>
3. <u>Alnus rubra</u>	20	<input checked="" type="checkbox"/> 33.3%	FAC	FACW species <u>25</u> x 2 = <u>50</u>
4. <u>Populus balsamifera</u>	5	<input type="checkbox"/> 8.3%	FAC	FAC species <u>115</u> x 3 = <u>345</u>
5. <u>Fraxinus latifolia</u>	5	<input type="checkbox"/> 8.3%	FACW	FACU species <u>2</u> x 4 = <u>8</u>
	60	= Total Cover		UPL species <u>0</u> x 5 = <u>0</u>
Herb Stratum (Plot size: <u>5 x 5 feet</u>)				Column Total s: <u>152</u> (A) <u>413</u> (B)
1. <u>Agrostis capillaris</u>	30	<input checked="" type="checkbox"/> 32.6%	FAC	Prevalence Index = B/A = <u>2.717</u>
2. <u>Lotus corniculatus</u>	30	<input checked="" type="checkbox"/> 32.6%	FAC	
3. <u>Carex obnupta</u>	10	<input type="checkbox"/> 10.9%	OBL	
4. <u>Ranunculus repens</u>	10	<input type="checkbox"/> 10.9%	FAC	
5. <u>Elymus repens</u>	10	<input type="checkbox"/> 10.9%	FAC	
6. <u>Taraxacum officinale</u>	2	<input type="checkbox"/> 2.2%	FACU	
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%	_____	
	92	= Total Cover		
Woody Vine Stratum (Plot size: <u>5 x 5 feet</u>)				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
	0	= Total Cover		
% Bare Ground in Herb Stratum: <u>8</u>				

Hydrophytic Vegetation Indicators:
 1 - Rapid Test for Hydrologic Vegetation
 2 - Dominance Test is > 50%
 3 - Prevalence Index is ≤ 3.0¹
 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 5 - Wetland Non-Vascular Plants¹
 Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No

Remarks:

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

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 ¹	Loc ²		
0-3	10YR	3/1	100						Silt Loam	
3-16	10Y	6/1	70	10YR	4/6	20	C	/PL	Silt Loam	concentration is prominent
				10YR	6/3	10	D	M		

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils³:
<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 checked="" type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" 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)	

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

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)		Secondary Indicators (minimum of two required)
<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 checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" 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 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"/>	Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>
Water Table Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Depth (inches): <input type="text" value="8"/>	
Saturation Present? (includes capillary fringe)	Yes <input checked="" type="radio"/> No <input type="radio"/>	Depth (inches): <input type="text" value="5"/>	

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

Remarks:
 Shallow inundation in small depressions to 0.5 inches nearby.

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

Project/Site: 161 Graham Hill City/County: na/Pierce Sampling Date: 25-Mar-15
 Applicant/Owner: WSDOT State: WA Sampling Point: w1-sp2
 Investigator(s): Tatiana Dreisbach, Doug Littauer Section, Township, Range: S 16 T 18N R 4E
 Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): sloping Slope: 20.0 % / 11.3 °
 Subregion (LRR): LRR A Lat.: 47.043 Long.: -122.296 Datum: NAD83HARN
 Soil Map Unit Name: Kapowsin gravelly loam, 0 to 6 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 checked="" type="radio"/> No <input 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:
 Picia sitchensis planted. Growing season notes: Alnus rubra/Rosa nutkana / Populus balsamifera leaf emergence. Cardamine oligosperma/Taraxacum officinale blooming.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	
Tree Stratum (Plot size: <u>15 x 15 feet</u>)				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
= Total Cover				
Sapling/Shrub Stratum (Plot size: <u>10 x 15 feet</u>)				
1. <u>Picea sitchensis</u>	10	<input checked="" type="checkbox"/> 100.0%	FAC	Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>100</u> x 3 = <u>300</u> FACU species <u>10</u> x 4 = <u>40</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>110</u> (A) <u>340</u> (B) Prevalence Index = B/A = <u>3.091</u>
2. _____	0	<input type="checkbox"/> 0.0%	_____	
3. _____	0	<input type="checkbox"/> 0.0%	_____	
4. _____	0	<input type="checkbox"/> 0.0%	_____	
5. _____	0	<input type="checkbox"/> 0.0%	_____	
= Total Cover				
Herb Stratum (Plot size: <u>5 x 5 feet</u>)				
1. <u>Agrostis capillaris</u>	90	<input checked="" type="checkbox"/> 90.0%	FAC	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrologic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is > 50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Dactylis glomerata</u>	10	<input type="checkbox"/> 10.0%	FACU	
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%	_____	
= Total Cover				
Woody Vine Stratum (Plot size: <u>5 x 5 feet</u>)				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
= Total Cover				
% Bare Ground in Herb Stratum: <u>0</u>				

Remarks:

¹Indicator 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 ¹	Loc ²		
0-6	10YR	3/2	100				Silt Loam	
6-16	7.5YR	4/4	80%					
6-16	10YR	3/2	20				Silt Loam	second matrix color

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils³:
<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)	

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

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)		Secondary Indicators (minimum of two required)
<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"/>	Wetland Hydrology Present? 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: 161 Graham Hill City/County: na/Pierce Sampling Date: 25-Mar-15
 Applicant/Owner: WSDOT State: WA Sampling Point: w1-sp3
 Investigator(s): Tatiana Dreisbach, Doug Littauer Section, Township, Range: S 16 T 18N R 4E
 Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): sloping Slope: 20.0 % / 11.3 °
 Subregion (LRR): LRR A Lat.: 47.043 Long.: -122.296 Datum: NAD83HARN
 Soil Map Unit Name: Kapowsin gravelly loam, 0 to 6 percent slopes NWI classification: PEM

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:
 Sample point typical of sloping pasture wetland north of planted area

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	
Tree Stratum (Plot size: <u>15 x 15 feet</u>)				Dominance Test worksheet:
1. _____	_____	<input type="checkbox"/> 0.0%	_____	Number of Dominant Species That are OBL, FACW, or FAC: <u>2</u> (A)
2. _____	_____	<input type="checkbox"/> 0.0%	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____	_____	<input type="checkbox"/> 0.0%	_____	Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15 x 15 feet</u>)				Prevalence Index worksheet:
1. <u>Picea sitchensis</u>	10	<input checked="" type="checkbox"/> 100.0%	FAC	Total % Cover of: Multiply by:
2. _____	0	<input type="checkbox"/> 0.0%	_____	OBL species <u>0</u> x 1 = <u>0</u>
3. _____	0	<input type="checkbox"/> 0.0%	_____	FACW species <u>0</u> x 2 = <u>0</u>
4. _____	0	<input type="checkbox"/> 0.0%	_____	FAC species <u>105</u> x 3 = <u>315</u>
5. _____	0	<input type="checkbox"/> 0.0%	_____	FACU species <u>5</u> x 4 = <u>20</u>
	10	= Total Cover		UPL species <u>0</u> x 5 = <u>0</u>
Herb Stratum (Plot size: <u>5 x 5 feet</u>)				Column Total s: <u>110</u> (A) <u>335</u> (B)
1. <u>Agrostis capillaris</u>	85	<input checked="" type="checkbox"/> 85.0%	FAC	Prevalence Index = B/A = <u>3.045</u>
2. <u>Elymus repens</u>	10	<input type="checkbox"/> 10.0%	FAC	
3. <u>Dactylis glomerata</u>	5	<input type="checkbox"/> 5.0%	FACU	
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%	_____	
	100	= Total Cover		
Woody Vine Stratum (Plot size: <u>5 x 5 feet</u>)				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
	0	= Total Cover		
% Bare Ground in Herb Stratum: <u>0</u>				

Hydrophytic Vegetation Indicators:
 1 - Rapid Test for Hydrologic Vegetation
 2 - Dominance Test is > 50%
 3 - Prevalence Index is ≤3.0¹
 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 5 - Wetland Non-Vascular Plants¹
 Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No

Remarks:

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

Soil

Sampling Point: w1-sp3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features				Texture	Remarks	
	Color (moist)		%	Color (moist)		%	Type ¹			Loc ²
0-18	10YR	3/2	95	10YR	5/8	5	C	M	Silt Loam	concentration is prominent

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Muck Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4)		<input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Loamy Mucky Mineral (F1) (except in MLRA 1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input checked="" type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox depressions (F8)		Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Other (Explain in Remarks)	
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Hydrology

Wetland Hydrology Indicators:

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

Surface Water Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Depth (inches):	<input type="text"/>	Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>
Water Table Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Depth (inches):	<input type="text" value="10"/>	
Saturation Present? (includes capillary fringe)	Yes <input checked="" type="radio"/> No <input type="radio"/>	Depth (inches):	<input type="text" value="6"/>	

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: 161 Graham Hill City/County: na/Pierce Sampling Date: 25-Mar-15
 Applicant/Owner: WSDOT State: WA Sampling Point: w1-sp4
 Investigator(s): Tatiana Dreisbach, Doug Littauer Section, Township, Range: S 16 T 18N R 4E
 Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): sloping Slope: 20.0 % / 11.3 °
 Subregion (LRR): LRR A Lat.: 47.043 Long.: -122.297 Datum: NAD83HARN
 Soil Map Unit Name: Kapowsin gravelly loam, 0 to 6 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:	

VEGETATION - Use scientific names of plants.

Stratum	Absolute % Cover	Rel.Strat. Cover	Indicator Status	Dominance Test worksheet:
Tree Stratum (Plot size: <u>15 x 15 feet</u>)				Number of Dominant Species That are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across All Strata: <u>8</u> (B) Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</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%	_____	
= Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15 x 15 feet</u>)				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>52</u> x 2 = <u>104</u> FAC species <u>64</u> x 3 = <u>192</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column Total s: <u>116</u> (A) <u>296</u> (B) Prevalence Index = B/A = <u>2.552</u>
1. <u>Picea sitchensis</u>	<u>10</u>	<input checked="" type="checkbox"/> 33.3%	<u>FAC</u>	
2. <u>Cornus alba</u>	<u>5</u>	<input checked="" type="checkbox"/> 16.7%	<u>FACW</u>	
3. <u>Rosa nutkana</u>	<u>5</u>	<input checked="" type="checkbox"/> 16.7%	<u>FAC</u>	
4. <u>Fraxinus latifolia</u>	<u>5</u>	<input checked="" type="checkbox"/> 16.7%	<u>FACW</u>	
5. <u>Alnus rubra</u>	<u>5</u>	<input checked="" type="checkbox"/> 16.7%	<u>FAC</u>	
= Total Cover				
Herb Stratum (Plot size: <u>5 x 5 feet</u>)				Hydrophytic Vegetation Indicators: <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 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Juncus effusus</u>	<u>40</u>	<input checked="" type="checkbox"/> 46.5%	<u>FACW</u>	
2. <u>Ranunculus repens</u>	<u>20</u>	<input checked="" type="checkbox"/> 23.3%	<u>FAC</u>	
3. <u>Agrostis capillaris</u>	<u>20</u>	<input checked="" type="checkbox"/> 23.3%	<u>FAC</u>	
4. <u>Geum macrophyllum</u>	<u>2</u>	<input type="checkbox"/> 2.3%	<u>FAC</u>	
5. <u>Epilobium ciliatum</u>	<u>2</u>	<input type="checkbox"/> 2.3%	<u>FACW</u>	
6. <u>Rumex crispus</u>	<u>2</u>	<input type="checkbox"/> 2.3%	<u>FAC</u>	
7. _____	<u>0</u>	<input type="checkbox"/> 0.0%	_____	
8. _____	<u>0</u>	<input type="checkbox"/> 0.0%	_____	
9. _____	<u>0</u>	<input type="checkbox"/> 0.0%	_____	
10. _____	<u>0</u>	<input type="checkbox"/> 0.0%	_____	
11. _____	<u>0</u>	<input type="checkbox"/> 0.0%	_____	
= Total Cover				
Woody Vine Stratum (Plot size: <u>5 x 5 feet</u>)				Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/>
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
= Total Cover				
% Bare Ground in Herb Stratum: <u>0</u>				
Remarks:				

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

Soil

Sampling Point: w1-sp4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix			Redox Features					Texture	Remarks
	Color (moist)		%	Color (moist)		%	Type ¹	Loc ²		
0-5	10YR	3/2	100						Silt Loam	
5-18	10Y	5/1	60	7.5YR	4/6	30	C	M	Sandy Loam	concentration is prominent
				2.5Y	5/2	10	D	M		

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils³:
<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 checked="" type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" 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)	

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

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)		Secondary Indicators (minimum of two required)
<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 checked="" 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 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"/>	Wetland Hydrology Present? 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="5"/>	

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

Remarks:
 Episaturated conditions due to soil textural change at 5 inches. These hydrologic conditions are typical of slope wetland.

Appendix B — Precipitation Data

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

Monthly precipitation data for McMillin Reservoir, Pierce County, Washington.

		Long-term rainfall records ^a			Rain fall ^a	Condition dry, wet, normal ^b	Condition Value	Month weight value	Product of previous two columns
Month	3 yrs. in 10 less than	Average	3 yrs. in 10 more than						
1 st prior month	Feb	3.06	4.68	5.63	3.91	N	2	3	6
2 nd prior month	Jan	3.67	5.54	6.65	4.28	N	2	2	4
3 rd prior month	Dec	4.23	5.92	6.99	6.89	N	2	1	2
Sum								12	12

^aNRCS 2015

^bConditions 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,
McMillin Reservoir, Pierce County, Washington**

Date (2015)	Daily Precipitation (inches) ^a
March 24	0.05
March 23	1.16
March 22	M ^b
March 21	M
March 20	0.05
March 19	0.02
March 18	0.05
March 17	T ^c
March 16	2.06
March 15	M

^a NRCS 2015

^b "M" indicates data is missing for that day

^c "T" indicates trace amounts of precipitation were recorded for that day

Literature Cited

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5. Brown, S. C. and C. R. Smith. 1998. Breeding Season Bird Use of Recently Restored Versus Natural Wetlands in New York. *Journal of Wildlife Management* 62 (4): 1480-1491.
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9. [WSDOT] Washington State Department of Transportation. 2001, Revised 2003. 235th Street East to 176th Street East SR 161 OL 3464 Final Wetland Mitigation Plan. Olympia (WA): Washington State Department of Transportation, Olympic Region.
10. [WSDOT] Washington State Department of Transportation. 2006. SR 161 234th Street E to 204th Street E As-built Planting Plan.
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12. [WSDOT] Washington State Department of Transportation. 2011. RE: Follow-up for Site Visit to SR 161 234th Street East to 204th Street East (Graham Hill) Compensatory Wetland Mitigation Site Comments (Corps Ref. #1999401104 and Ecology Administrative Order #5832).