

**SR 305 Vicinity Poulsbo South City Limits to Bond Road  
(SR 305 Poulsbo and Wall 10) Mitigation Site**

**USACE NWP 200500967**

**Olympic Region**

**2010 MONITORING REPORT**

**Wetland Assessment and Monitoring Program**

*Issued March 2011*



**Washington State  
Department of Transportation**

**Environmental Services Office**

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# SR 305 Vicinity Poulsbo South City Limits to Bond Road (SR 305 Poulsbo and Wall 10) Mitigation Site

## USACE NWP 200500967

	General Site Information			
	<b>USACE NWP 23 Number</b>	200500967		
	<b>Mitigation Location</b>	Southwest of SR 305, near Dogfish Creek in Poulsbo, Kitsap County.		
	<b>LLID Number</b>	1226398477475		
	<b>Construction Date</b>	2008		
	<b>Monitoring Period</b>	2010-2020		
	<b>Year of Monitoring</b>	1 of 10		
	<b>Area of Project Impact</b>	2.05 acres		
	<b>Type of Mitigation</b>	Wetland Establishment	Wetland Enhancement	Temporary Impact Re-vegetation
	<b>Area of Mitigation<sup>1</sup></b>	2.33 acres	2.20 acres	0.47 acres

<sup>1</sup>The mitigation strategy for this project is to establish 2.62 acres of wetland, and to enhance 3.63 acres of existing wetland. This planned mitigation acreage exceeds the recommended ratios by 1.72 acres (Appendix 4). WSDOT is currently not asking for extra mitigation credit for these acres. If future projects impact wetlands within the same vicinity, WSDOT, USACE, and WSDOE may be consulted to see if this extra acreage is appropriate to use as mitigation credit to offset the impacts.

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## Summary of Monitoring Results and Management Activities (2010)

Performance Standards	2010 Results <sup>2</sup>	Management Activities
Total count of woody debris piles and perch poles	6 brush piles and 2 perch poles are present as per as-built.	
Wetland hydrology present	Not present in all intended areas	
Survival of planted woody species in PFO	85% (CI <sub>80%</sub> = 84-87%) survival	
Survival of planted woody species in the buffer	94% (CI <sub>80%</sub> = 93-95%) survival	
Cover of WA State and Kitsap County A, B and C noxious weeds entire area. Note if any <i>Polygonum</i> spp. (knotweeds or smartweeds) are observed	Qualitatively estimated at < 5%	Ongoing invasive control
Survival of planted woody species in Wall 10 retaining wall area	98% survival	

## Report Introduction

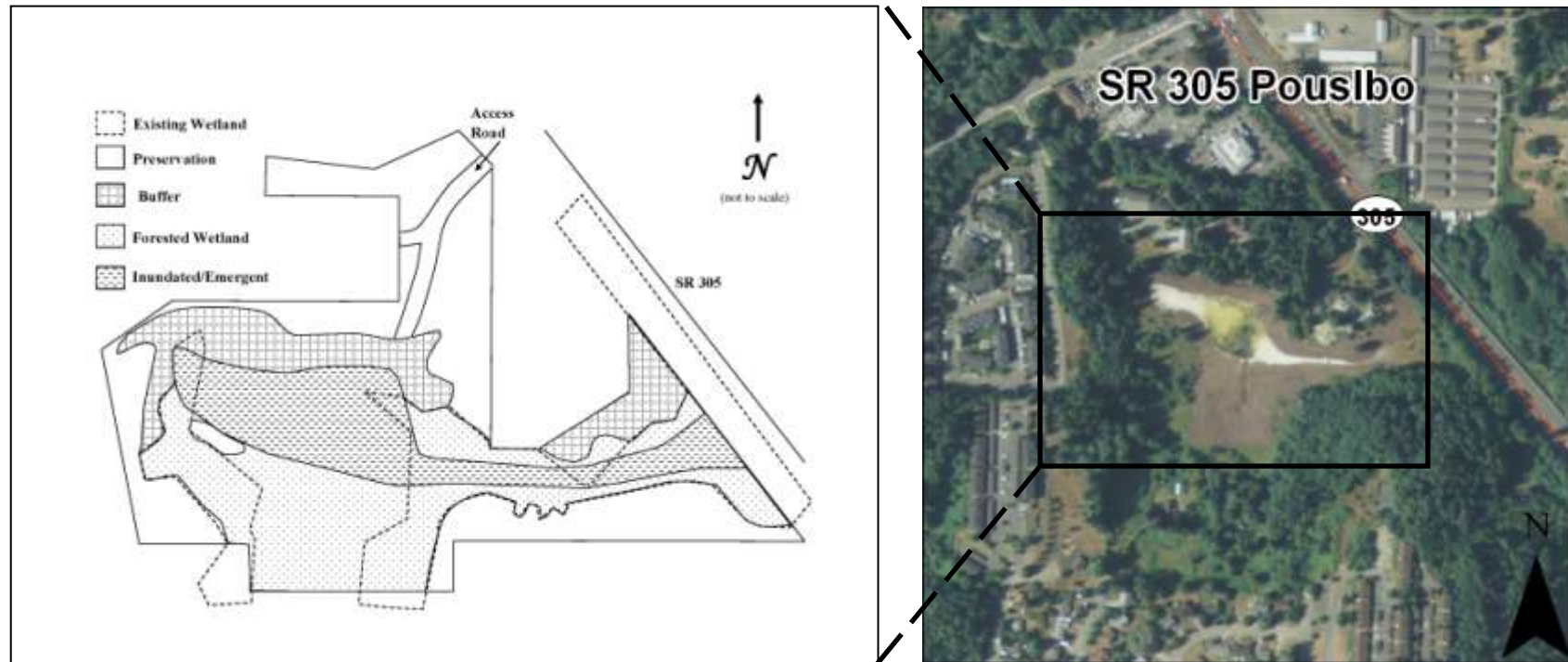
This report summarizes first-year (Year-1) monitoring activities at the State Route (SR) 305 Poulsbo Mitigation Site and Wall 10 Revegetation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities included vegetation surveys, photo-documentation, and assessments of wetland hydrology. Vegetation surveys occurred on the 19<sup>th</sup> and 20<sup>th</sup> of July and the 25<sup>th</sup> of August, 2010. Assessments of wetland hydrology occurred on the 8<sup>th</sup> and 24<sup>th</sup> of February and the 8<sup>th</sup> and 29<sup>th</sup> of March, 2010.

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<sup>2</sup> Estimated values are presented with their corresponding statistical confidence interval. For example, 85% (CI<sub>80%</sub> = 84-87% cover) means we are 80% confident that the true survival value is between 84% and 87%.

## What is the SR 305 Poulsbo and Wall 10 Mitigation Site?

This 13.6-acre mitigation site (Figure 1) located west of SR 305 focuses on establishing a scrub-shrub and forested wetland and enhancing the existing wetland with woody vegetation to provide structural diversity. This site was created to compensate for the loss of 2.05 acres of wetlands due to road improvements along SR 305. The large seasonally ponded depression and surrounding scrub-shrub and forested areas are designed to provide mitigation for lost wetland functions including flood flow alteration, sediment removal, nutrient and toxicant removal, erosion control and shoreline stabilization, production of organic matter and its export, general habitat suitability, habitat for wetland-associated birds, and general fish habitat.



**Figure 1 Site Sketch**

The SR 305 Poulsbo Mitigation Site includes wetland establishment, wetland enhancement, buffer enhancement, and riparian enhancement adjacent to South Fork Dogfish Creek.

## **What are the performance standards for this site?**

### Performance Standard 1

Forested and scrub-shrub vegetation communities should be present within the wetland along with at least five large woody debris piles and two perch poles.

### Performance Standard 2

The soils in the wetland creation and enhancement areas will be saturated to the surface, or standing water will be present at 12 inches below the surface or less, on consecutive days amounting to at least 12.5% of the growing season.

### Performance Standard 3

Planted native woody vegetation in the forested and scrub-shrub wetland areas will achieve 90% survival at the end of the first year plant establishment period. If all dead woody plantings are replaced, the performance measure will be met.

### Performance Standard 4

Native planted woody vegetation in the buffer will achieve 90% survival at the end of the first year plant establishment period. If all dead woody plantings are replaced, the performance measure will be met.

### Performance Standard 5

Noxious weeds will not exceed 20% aerial cover over the entire mitigation site and the stream realignment areas. *Polygonum bohemicum* (Bohemian knotweed), *Polygonum cuspidatum* (Japanese knotweed), *Polygonum polystachyum* (Himalayan knotweed), and *Polygonum sachalinense* (giant knotweed) shall not be present at the mitigation site or stream realignment areas.

### Performance Standard 6

(Wall 10) Native planted woody vegetation in the enhancement, riparian, and temporarily impacted retaining wall areas will achieve 90% survival at the end of the first year plant establishment period.

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 5 shows the planting plan for both the SR 305 Poulsbo Mitigation Site and the separate riparian enhancement at Wall 10 (WSDOT 2006).

## How were the performance standards evaluated?

WSDOT staff collected hydrology data using methods described in the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997). Seven permanent hydrology pit locations were established in Year-1 of monitoring and recorded on a map (Appendix 3). During each monitoring visit, visual observations are made to determine the extent of inundation and surface saturation. Depth and location of standing water is recorded. At each pit location, in the absence of inundation or surface saturation, subsurface observations are made (Performance Standard 2).

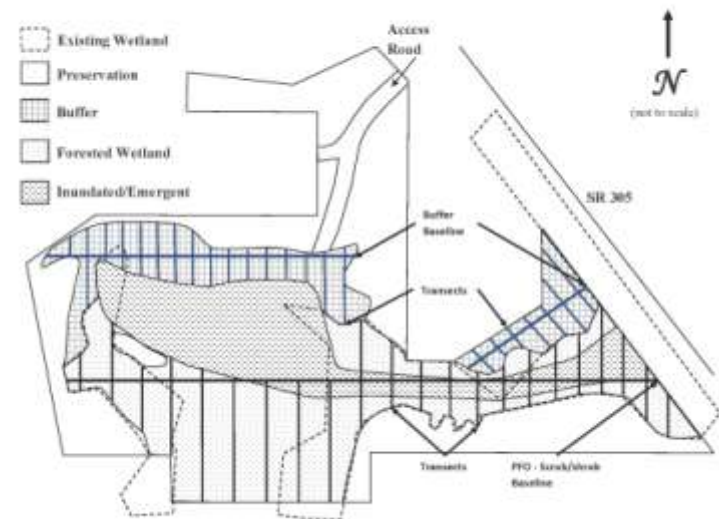
To evaluate standards for vegetative cover, two separate baselines were established (Figure 2). One baseline was established to sample the buffer, while the second was established to sample the combined scrub/shrub and forested wetland. The unequal belt transect method was used to estimate survival in the buffer and the wetland (Performance Standards 3 and 4).

Aerial cover of invasive species was qualitatively assessed across the site (Performance Standard 5).

Habitat structures were counted to ensure all debris piles and perch poles were present according to plan (Performance Standard 1).

A total count of live versus dead native woody plantings was used to estimate survival at the Wall 10 riparian planting area (Performance Standard 6).

For additional details on the methods, see Appendix 2 of this report or view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).



**Figure 2 Site Sampling Design (2010)**

## How is the mitigation site developing?

The mitigation site is developing well in its first year. The center portion of the site has developed a more persistent water regime than originally intended. This area which was intended as scrub-shrub experienced a high mortality of planted willows (*Salix* spp.) stakes, possibly due to extended periods of inundation. An adaptive management decision was made to plant this area with emergent plugs in the early summer of 2010 (see Appendix 5 and Additional Information).

The woody plantings on the site are generally thriving. Survival is generally high across the site. Invasive species are fairly limited on site. The majority of the site was sheet-mulched, which tends to suppress the immediate colonization of invasive species. With continued weed control, invasive species should not present significant problems on the site.

The site was intended to provide wildlife habitat and food chain support, and it appears that both functions are supported. Twenty-two species of birds were observed during the Year-1 monitoring period. A Spotted Sandpiper, a wetland obligate specie, was documented with juveniles, suggesting breeding on site. Deer have been observed browsing vegetation on the site, and small mammals and birds have been observed using the habitat structures.

Flood flow alteration, sediment removal, nutrient and toxicant removal, erosion control and shoreline stabilization, production of organic matter and its export were other functions intended for this site. Grading and plant establishment activities have likely enhanced the performance of these functions.

Results for Performance Standard 1

(Total count of woody debris piles and perch poles):

Six brush piles and 2 perch poles are present as per the as-built (Photo 1).

Results for Performance Standard 2

(The soils in the wetland creation and enhancement areas will be saturated to the surface, or standing water will be present at 12 inches below the surface or less, on consecutive days amounting to at least 12.5% of the growing season):

Based on our four hydrology visits in the months of February and March, 2010 we likely did not achieve the hydrology standard this year (see results in Appendix 3). Pits five and six did not meet the wetland hydrology criteria during the second visit on February 24<sup>th</sup>. On the third visit March 8<sup>th</sup>, pits one, two, three, and six did not meet the wetland hydrology criteria. The first and final visit February 8<sup>th</sup> and March 29<sup>th</sup>, respectively, met the wetland hydrology criteria at all seven sampling pits. Data from the National Weather Service shows that precipitation was 24 percent and 18 percent below normal, respectively, for the months of February and March. This may account for the first site visit in March not meeting the hydrology criteria.

Results for Performance Standard 3

(90% survival of planted woody species in PFO):

Survival of planted woody species in PFO is 85% (CI<sub>80%</sub>= 84-87%). If all dead woody plantings are replaced, the performance measure will be met. Dominant species include Nootka rose (*Rosa nutkana*), redosier dogwood (*Cornus*

*sericea*), and twinberry honeysuckle (*Lonicera involucrata*) ranging from 0.2 -2.5 meters in height.



**Photo 1**  
**Two perch poles and a brush pile (March 2010)**

Results for Performance Standard 4

(90% survival of planted woody species in the buffer):

Survival of planted woody species in the buffer is 94% (CI<sub>80%</sub>= 93-95%). This meets the performance measure. Dominant species include thimbleberry (*Rubus parviflorus*), tall oregongrape (*Mahonia aquifolium*), oceanspray (*Holodiscus discolor*), and snowberry (*Symphoricarpos albus*) ranging in heights from 0.2 to 2.5 meters (Photo 2).

Results for Performance Standard 5

(Cover of WA State and Kitsap County A, B and C noxious weeds entire area will not exceed 20% Note if any *Polygonum* spp. (knotweeds or smartweeds) are observed):

Cover of noxious weed is qualitatively estimated at less than five percent. Species observed include Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus armeniacus*), and bull thistle (*Cirsium vulgare*).

Results for Performance Standard 6

(90% survival of planted woody species in Wall 10 retaining wall area):

Survival of planted woody species is 98 percent, this attains the performance standard. The dominant species on site is red alder (*Alnus rubra*) with redosier dogwood (*Cornus sericea*) and willows (*Salix* spp.) as sub-dominants (Photo 3).



**Photo 2**  
**Woody cover in the buffer (July 2010)**



**Photo 3**  
**Woody cover at Wall 10 (July 2010)**

Additional Information:

The assessment of the scrub/shrub zone that was replanted with emergent species resulted in an aerial cover of emergent plantings qualitatively estimated at five percent during our visit on the 20<sup>th</sup> of July. A return trip that occurred on the 12<sup>th</sup> of October showed a dramatic increase in the aerial cover of emergent plantings (Photo 5). Soft-stem bulrush (*Schoenoplectus tabernaemontani*) exhibited the greatest increase in cover, with slough sedge (*Carex obnupta*) showing an increase to a lesser extent. This entire area was covered in a thick algal mat in July (Photo 4).



**Photo 4**  
**Scrub/shrub zone planted with emergent species in early summer (July 2010)**



**Photo 5**  
**Scrub/shrub zone planted with emergent species in early fall (October 2010)**

## **What is planned for this site?**

Weed control will continue as needed throughout the site. Replanting will not take place this year since many species are volunteering across the site.

# Appendix 1 – Goals and Performance Standards

The following excerpt is from the *SR 305 Vicinity Poulsbo South City Limits to Band Road Final Wetland Mitigation Plan*. The performance criteria addressed this year are identified in bold font.

## GOALS AND OBJECTIVES

### Objectives and Performance Criteria

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#### Objective 1 – Wildlife Habitat

Forested and scrub-shrub vegetation communities will be present within the created/enhanced wetland areas.

#### All Years

Interim Performance Measure/Final Success Standard

**Forested and scrub-shrub vegetation communities should be present within the wetland along with at least five large woody debris piles and two perch poles.**

#### Methods

Site will be constructed per plan.

#### Monitoring

**A total of eight photo stations will be located throughout the site.** Each photo station will consist of a permanent marker where photographs will be taken to capture a panoramic view of the site in all years during the height of the growing season (July 15 to August 1). These photos will be included in the annual monitoring reports in years 1,3,5,7, and 10. **A total count of the woody debris piles and perch poles will also be conducted.**

#### Contingency

Replanting will be conducted to ensure that native woody forest and scrub-shrub species are present on the site. The large woody debris piles and perch poles will be replaced if needed

**Objective 2 – Wetland Hydrology**

The wetland creation areas (at least 2.12 acres) and the wetland enhancement areas (at least 2.32 acres) will provide ground or surface water inundation or saturation sufficient to support a long-term wetland site.

All Years

**Interim Performance Measure 1**

**The soils in the wetland creation and enhancement areas will be saturated to the surface, or standing water will be present at 12 inches below the surface or less, on consecutive days amounting to at least 12.5% of the growing season. Depending on site microclimate, this should be at least 30 consecutive days during the period between March 1 and October 31.**

Methods

Site will be constructed per plan.

Monitoring

A determination of wetland hydrology will be made during the growing season using standard wetland delineation methods.

Contingency

Regrade the site and/or look for additional mitigation opportunities.

Year 10

**Final Success Standard 1**

The wetland creation and enhancement areas will be delineated using the current methodology to assure that the mitigation site contains at least 4.44 acres of wetland (2.12 acres of created wetland and 2.32 acres of enhance wetland).

Methods

Site will be constructed per plan.

Monitoring

A determination of wetland hydrology will be made during the growing season using standard wetland delineation methods to aid in the delineation.

#### Contingency

Resource agencies will be consulted immediately for advice if the intended created acreage is not met.

### **Objective 3 – Forested and Scrub-Shrub Wetland Vegetation**

The mitigation site will include areas of native forested and scrub-shrub wetland vegetation in the enhanced and created areas.

#### Year 1

##### **Interim Performance Measure 1**

**Planted native woody vegetation in the forested and scrub-shrub wetland areas will achieve 90% survival at the end of the first year plant establishment period. If all dead woody plantings are replaced, the performance measure will be met.**

#### Methods

Native woody species will be planted throughout the forested and scrub-shrub wetland areas during plant installation.

#### Monitoring

A total count, belt transects, or other appropriate methods will be used to measure the survival of native woody vegetation. Survival information will be collected between July 1 to mid-September. The results will be recorded as alive, stressed, or dead. Site inspections/qualitative monitoring will also occur several times during the summer months to evaluate management needs.

#### Contingency

Replanting will be conducted to replace all dead woody plantings. Management activities such as weed control and watering will also be conducted as necessary to ensure continued woody species survival.

#### Year 2

##### **Interim Performance Measure 1**

Achieve a density of 0.57 native woody plants, including native natural recruitment, per square meter in the forested and scrub-shrub wetland areas.<sup>3</sup>

#### Methods

Native woody species will be planted throughout the forested and scrub-shrub wetland areas.

Monitoring

Belt transects or appropriate methods will be used to measure the density of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

Year 3

**Interim Performance Measure 1**

Native woody vegetation in the forested and scrub-shrub wetland areas will achieve a minimum of 15% aerial cover.

Methods

Native woody species will be replanted within the forested and scrub-shrub wetland areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be continued as necessary.

Year 5

**Interim Performance Measure 1**

Native woody vegetation in the forested and scrub-shrub wetland areas will achieve a minimum of 40% aerial cover.

Methods

Native woody species will be replanted within the forested and scrub-shrub wetland areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

### Contingency

Management activities such as replanting, weed control, and watering will be continued as necessary.

### **Interim Performance Measure 2**

The underplanted *Thuja plicata* (western red cedar) in the forested wetland areas will achieve 90% survival. If all dead *T. plicata* plantings are replaced, the performance measure will be met.

### Methods

Underplant *T. plicata* in the forested wetland areas where a deciduous canopy is present.

### Monitoring

A total count, belt transects, or other appropriate methods will be used to measure the survival of the *T. plicata*. Survival information will be collected between July first to mid-September. The results will be recorded as alive, stressed, or dead.

Site inspections/qualitative monitoring will also occur several times during the summer months to evaluate management needs.

### Contingency 1

Replanting will be conducted to replace all dead woody plantings. Management activities such a weed control and watering will also be conducted as necessary to ensure continued woody species survival.

### Contingency 2

If underplanting is not appropriate during year five, WSDOT biologists will work with resource agency staff to develop an adaptive management strategy. This Interim Performance Measure will then be applied to the year underplanting occurs.

## Year 7

### **Interim Performance Measure 1**

Native woody vegetation in the forested and scrub-shrub wetland areas will achieve a minimum of 50% aerial cover.

### Methods

Native woody species will be replanted within the forested and scrub-shrub wetland areas as necessary.

#### Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

#### Contingency

Management activities such as replanting, weed control, and watering will be continued as necessary.

### Year 10

#### **Final Success Standard 1**

Native woody vegetation in the forested and scrub-shrub wetland areas will achieve a minimum of 75% aerial cover. Native tree species in the forested wetland areas will achieve a minimum of 30% aerial cover.

#### Methods

Native woody species will be replanted within the forested and scrub-shrub wetland areas as necessary.

#### Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

#### Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

#### **Objective 4 – Upland Buffer Vegetation**

The mitigation site will include 1.17 acres of upland buffer that will be planted with native vegetation.

### Year 1

#### **Interim Performance Measure 1**

**Native planted woody vegetation in the buffer will achieve 90% survival at the end of the first year plant establishment period. If all dead woody plantings are replaced, the performance measure will be met.**

#### Methods

Native woody species will be planted throughout the buffer during plant installation.

### Monitoring

A total count, belt transects, or other appropriate methods will be used to measure the survival of native woody vegetation. Survival information will be collected between July first to mid-September. The results will be recorded as alive, stressed, or dead.

Site inspections/qualitative monitoring will also occur several times during the summer months to evaluate management needs.

### Contingency

Replanting will be conducted to replace all dead woody plantings. Management activities such as weed control and watering will also be conducted as necessary to ensure continued woody species survival.

## Year 2

### **Interim Performance Measure 1**

Achieve a density of 0.57 native woody plants including native natural recruitment, per square meter in the buffer.

### Methods

Native woody species will be planted throughout the buffer areas as necessary.

### Monitoring

Belt transects or other appropriate methods will be used to measure the density of native woody vegetation.

### Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

## Year 3

### **Interim Performance Measure 1**

Native woody vegetation in the buffer will achieve a minimum of 20% aerial cover.

### Methods

Native woody species will be replanted within the buffer areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

Year 5

**Interim Performance Measure 1**

Native woody vegetation in the buffer will achieve a minimum of 30% aerial cover.

Methods

Native woody species will be replanted within the buffer areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

**Interim Performance Measure 2**

The underplanted *Tsuga heterophylla* (western hemlock) in the buffer areas will achieve 90% survival. If all dead, *T. heterophylla* plantings are replaced, the performance measure will be met.

Methods

Underplant *T. heterophylla* in the buffer areas where a deciduous canopy is present.

Monitoring

A total count, belt transects, or other appropriate methods will be used to measure the survival of the *T. heterophylla*. Survival information will be collected between July 1 to mid-September. The results will be recorded as alive, stressed, or dead.

Site inspections/qualitative monitoring will also occur several times during the summer months to evaluate management needs.

Contingency 1

Replanting will be conducted to replace all dead woody plantings. Management activities such as weed control and watering will also be conducted as necessary to ensure continued woody species survival.

Contingency 2

If underplanting is not appropriate during year five, WSDOT biologist will work with resource agency staff to develop an adaptive management strategy. This Interim Performance Measure will then be applied to the year underplanting occurs.

Year 7

**Interim Performance Measure 1**

Native woody vegetation in the buffer will achieve a minimum of 40% aerial cover.

Methods

Native woody species will be replanted within the buffer areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

Year 10

**Final Success Standard 1**

Native woody vegetation in the buffer will achieve a minimum of 75% aerial cover.

### Methods

Native woody species will be replanted within the buffer areas as necessary.

### Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

### Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

## **Objective 5 – Noxious Weeds<sup>3</sup>**

All Class A, Class B, and Class C noxious weeds on the State or County Weed list will be chemically and/or mechanically controlled on the entire mitigation site and stream realignment areas to insure that they do not out compete or interfere with the development of desirable vegetation.

### All Years

#### **Interim Performance Measure/Final Success Standard 1**

**Noxious weeds will not exceed 20% aerial cover over the entire mitigation site and the stream realignment areas.**

### Monitoring

The point-line or other appropriate methods will be used to measure the aerial cover of noxious weeds during years 1,3,5,7, and 10. Qualitative monitoring will be conducted during years 2,4,6,8, and 9.

### Contingency

Chemical and mechanical weed control will be conducted as necessary to meet the performance measure/final success standard.

#### **Interim Performance Measure/Final Success Standard 1**

***Polygonum bohemicum* (Bohemian knotweed), *Polygonum cuspidatum* (Japanese knotweed), *Polygonum polystachyum* (Himalayan knotweed), and *Polygonum sachalinense* (giant knotweed) shall not be present at the mitigation site or stream realignment areas.**

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<sup>3</sup> The Wetland mitigation site and the stream realignment areas will be monitored separately.

Methods

If these species are discovered during any site visit, they will be immediately removed.

Monitoring

Site visits will be conducted throughout the year.

Contingency

Chemical weed control will be conducted as necessary to meet the performance measure/final success standard.

**Objective 6 – Stream Realignment (this does not apply to the wetland mitigation site)**

Create and enhance the fish habitat in the South Fork Dogfish Creek.

All Years

Interim Performance Measure/Final Success Standard 1

The relocated streams will have hydrology present on a continuous basis and will have a minimum of 10 instream woody debris structures.

Methods

Relocate the tributary and install large woody debris structures according to the plans.

Monitoring

Count the number of instream large woody debris structures. Site inspections/observations will also occur several times during the summer months to ensure that water is present within the relocated tributary on a continuous basis.

Contingency

Appropriate management actions such as regarding and installation of woody debris, will be taken to ensure successful realignment and enhancement of the tributary.

**Objective 7 – Stream Realignment Planting Areas (this applies to Wall 10)**

Create and enhance fish habitat in the South Fork Dogfish Creek by planting native trees and shrubs in the riparian and the temporarily impacted retaining wall areas. Enhancement plantings will also be planted in some of the existing riparian areas.

**Year 1**

**Interim Performance Measure 1**

**Native planted woody vegetation in the enhancement, riparian, and temporarily impacted retaining wall areas will achieve 90% survival at the end of the first year plant establishment period. If all dead woody plantings are replaced, the performance measure will be met.**

Methods

The enhancement, riparian, and temporarily impacted retaining wall areas will be planted per plan.

Monitoring

A total count, belt transects, or other appropriate methods will be used to measure the survival of native woody vegetation. Survival information will be collected between July 1 to mid-September. The results will be recorded as alive, stressed, or dead.

Site inspections/qualitative monitoring will also occur several times during the summer months to evaluate management needs.

Contingency

Replanting will be conducted to replace all dead woody plantings. The dead woody plantings will be replaced with the same species. Management activities such as weed control and watering will also be conducted as necessary to ensure continued woody species survival.

**Year 2**

**Interim Performance Measure 1**

Achieve a density of 0.57 native woody plants, including native natural recruitment, per square meter in the riparian and the temporarily impacted retaining areas.

Methods

Native woody species will be replanted in the riparian and the temporarily impacted retaining wall areas.

Monitoring

Belt transects or other appropriate methods will be used to measure the density of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

Year 3

**Interim Performance Measure 1**

Native woody vegetation will achieve a minimum of 15% aerial cover in the riparian and the temporarily impacted retaining wall areas.

Methods

Native woody species will be replanted in the riparian and the temporarily impacted retaining wall areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

Year 5

**Interim Performance Measure 1**

Native woody vegetation will achieve a minimum of 45% aerial cover in the riparian and the temporarily impacted retaining wall areas.

Methods

Native woody species will be replanted in the riparian and the temporarily impacted retaining wall areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

Year 7

**Interim Performance Measure 1**

Native woody vegetation will achieve a minimum of 60% aerial cover in the riparian and the temporarily impacted retaining wall areas.

Methods

Native woody species will be replanted in the riparian and the temporarily impacted retaining wall areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

Year 10

**Final Success Standard 1**

Native woody vegetation will achieve a minimum of 80% aerial cover in the riparian and the temporarily impacted retaining wall areas.

Methods

Native woody species will be replanted in the riparian and the temporarily impacted retaining wall areas as necessary.

Monitoring

The point-line, line-intercept, or other appropriate methods will be used to measure the aerial cover of native woody vegetation.

Contingency

Management activities such as replanting, weed control, and watering will be conducted as necessary.

## Monitoring and Site Management/Maintenance

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All wetland mitigation areas are anticipated to be monitored over a ten-year period. During this time, WSDOT monitors the site for plant survival, health and growth, herbivory, weeds, and vandalism. At completion of construction, an as-built plan will be prepared showing any deviations from the planting plan. This can also serve as the baseline monitoring report.

Formal monitoring procedures will be performed in years one, three, five, seven, and ten after initial acceptance of the mitigation construction.

A monitoring report will be submitted to the appropriate regulatory agencies for review and comment by March 31<sup>st</sup> of each subsequent year. The site will be monitored qualitatively in years two, four, six, eight, and nine. WSDOT staff will visit the site at least two times a year to assure that management activities or corrections are promptly made. Recommendations to correct deficiencies will be made to appropriate WSDOT personnel after each site visit. WSDOT will correct deficiencies in a timely and responsible manner.

In the event that the wetland creation and enhancement goals and objectives are not met by the third year, contingency measures must be taken and resource agencies must be notified. These include but are not limited to: replanting, mulching of plants, weed control, litter pickup, installing and adjusting tree protection devices, installing a fence, repairing any vandalism and any other practices necessary to meet the goals of the mitigation plan.

The purpose of the mitigation plan is to achieve the prescribed success standards unless WSDOT in consultation with the regulatory agency establish replacement standards based on circumstances and conditions observed at the mitigation site. If formal or qualitative monitoring indicates site failure, or inability to meet the state objectives, the regulatory agencies will be notified immediately. The monitoring program will be extended and such reasonable measures will be performed as necessary to meet the objectives of the plan, or other objectives agreed upon by WSDOT and the Corps of Engineers to comply with mitigation requirements and offset project impacts.

## PERMIT REQUIREMENTS

The following excerpt is from the Washington Department of Fish and Wildlife Hydraulic Permit Approval (HPA) # 104408-1. Requirements addressed this year are identified in **bold font**.

Alteration or disturbance of the banks and vegetation shall be limited to that necessary to construct the project. Within seven calendar days of project completion, all disturbed areas shall be protected from erosion using vegetation and other means. Within one year of project completion, the disturbed riparian areas, including outfall pads, shall be re-vegetated with native or other woody species approved by WDFW and per the approved plans (Provision 3). **Vegetative cuttings shall be planted at a maximum interval of three feet (on center). Plantings shall be maintained as necessary for ten years to ensure 80 percent or greater survival for each species or a contingency species and shall not be trimmed or removed without the approval of the WDFW Area Habitat Biologist.**

## Appendix 2 – Methods

To evaluate standards for vegetative cover, two separate baselines were established (Figure 2). A segmented 257-meter baseline was established to sample the buffer, while a second 340-meter baseline was established to sample the combined scrub/shrub and forested wetland. The unequal belt transect method was used to estimate survival in the buffer and the wetland (Performance Standard 3 and 4). Thirty-four 2-meter transects were randomly placed perpendicular to the wetland baseline and twenty-six 1-meter transects were randomly placed perpendicular to the buffer baseline.

Aerial cover of invasive species was qualitatively assessed across the site (Performance Standard 5).

Habitat structures were counted to ensure all logs and root wads were present according to plan (Performance Standard 1).

A total count of woody plantings was used to estimate survival at the Wall 10 riparian planting area (Performance Standard 7). Survival is based on numbers established in the field, comparing the ratio of visibly live to dead native woody species.

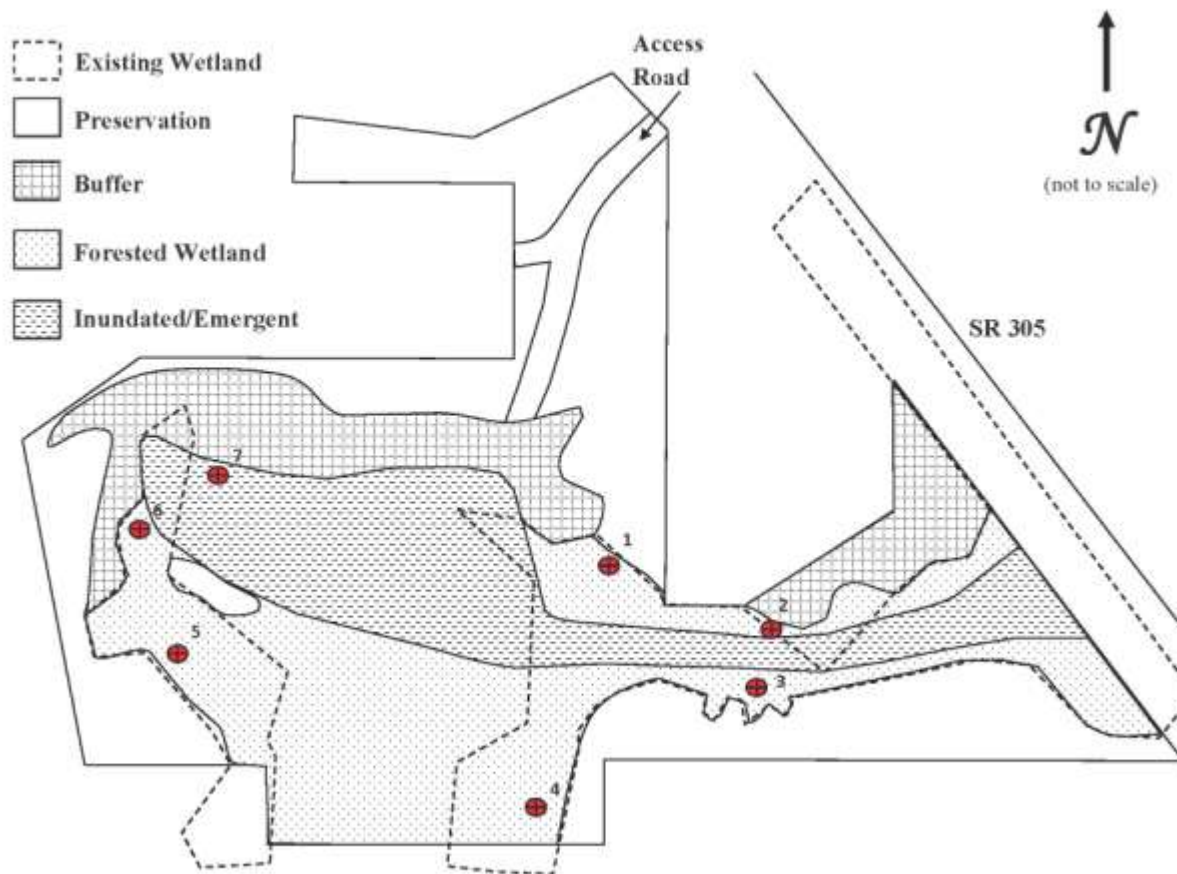
WSDOT staff collected hydrology data using methods described in the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997) (Performance Standard 1). Seven permanent hydrology pit locations were established in Year-1 of monitoring and recorded on a map. During each monitoring visit, visual observations are made to determine the extent of inundation and surface saturation. Depth and location of standing water is recorded. At each pit location, in the absence of inundation or surface saturation, subsurface observations are made (Performance Standard 2).

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

# Appendix 3 – Hydrology

Hydrology Observations For SR 305 Poulsbo Wetland Mitigation site				
Date	2/8/2010	2/24/2010	3/8/2010	3/29/2010
Observer	KA, JB	KA/TM	DL	KA, SP
Was wetland hydrology observed in intended areas?	Yes	Mostly	No	Yes
Surface observation	Large part of site is inundated, approx. 35% of the site. All of the scrub shrub zone is inundated. Will be planted with emergents this year. Water draining off the hill on the east side of the site leaving drainage channels leading to the inundated area and the "daylighted culvert".	Hydrology observed in most intended areas. Scrub-shrub zone is completely inundated. Pit 1 is on the edge of PFO and the buffer. In this pit, saturation was observed in the 4 inches below the mulch, but underneath this layer, the soil was dry.	Hydrology was not present in all intended areas; however, the PSS zone was completely inundated.	The PSS was completely inundated. Much of the site was saturated to the surface, but when the soil was exposed it was very clayey and not saturated. The water was pouring into the hole from above.
Subsurface Observations	Water seeping in quickly at around 8 inches, Soil all around pretty saturated			
Pit 1	Not dug - soil surface saturated	No standing water, saturation observed in the first 4 inches of pit.	none	Standing water at 12", water pouring in from 0-3"
Pit 2	Water seeping in at 9 inches, soil saturated under mulch	Standing water at 10" and saturation at 7"	Standing water at 18", saturation at 17"	Standing water at 6" saturated from 0-8"
Pit 3	Water seeping in at 8 inches, soil saturated under mulch	Standing water at 11" and saturation at 3"	Standing water at 16", saturation at 14"	Standing water at 5"
Pit 4	Not dug - soil surface saturated	saturation to the surface	Standing water at 11"	Saturated to soil surface.
Pit 5	Not dug - soil surface saturated	saturation to the surface	Saturation to the surface	Saturated to soil surface.
Pit 6	Not dug - soil surface saturated	None, pit is on edge of buffer and PFO. Possibly needs to be moved.	Standing water at 19", saturation at 18"	Standing water at 11" and saturation at 8"
Pit 7	Not dug - Inundated to 5 inches	Inundated to 4"	Inundated to 6"	Inundated to 10"
water marks				
drift lines				
sediment deposits				
drainage patterns	yes	yes	yes	Yes
algal mats	yes	yes		
water-stained leaves	yes	yes		

# Hydrology Pit Location Map



# National Weather Service Precipitation Data

CLIMATE REPORT  
 NATIONAL WEATHER SERVICE SEATTLE WA  
 230 AM PST MON MAR 1 2010

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...THE SEATTLE WA WFO CLIMATE SUMMARY FOR THE MONTH OF FEBRUARY 2010...

CLIMATE NORMAL PERIOD 1986 TO 2000  
 CLIMATE RECORD PERIOD 1986 TO 2010

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR'S VALUE	DATE(S)
.....						
TEMPERATURE (F)						
RECORD						
HIGH	66	02/26/1992				
		02/28/1990				
LOW	19	02/18/2006				
HIGHEST	59	02/06	MM	MM	57	02/23
LOWEST	30	02/22	MM	MM	30	02/03
AVG. MAXIMUM	53.4		49.7	3.7	48.8	
AVG. MINIMUM	39.8		36.2	3.6	35.1	
MEAN	46.6		43.0	3.6	41.9	
DAYS MAX >= 90	0		MM	MM	0	
DAYS MAX <= 32	0		MM	MM	0	
DAYS MIN <= 32	1		MM	MM	8	
DAYS MIN <= 0	0		MM	MM	0	
.....						
PRECIPITATION (INCHES)						
RECORD						
MAXIMUM	MM	MM				
MINIMUM	MM	1993				
TOTALS	2.79		3.67	-0.88	1.74	
DAILY AVG.	0.10		0.13	-0.03	0.06	
DAYS >= .01	19		MM	MM	11	
DAYS >= 1.00	0		MM	MM	0	
.....						
SNOWFALL (INCHES)						
TOTALS	0.0					

CLIMATE REPORT  
 NATIONAL WEATHER SERVICE SEATTLE WA  
 330 AM PDT THU APR 1 2010

.....

...THE SEATTLE WA WFO CLIMATE SUMMARY FOR THE MONTH OF MARCH 2010...

CLIMATE NORMAL PERIOD 1986 TO 2000  
 CLIMATE RECORD PERIOD 1986 TO 2010

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR'S VALUE	DATE(S)
.....						
TEMPERATURE (F)						
RECORD						
HIGH	78	03/29/2004				
LOW	27	03/10/2009				
HIGHEST	70	03/24	MM	MM	60	03/02
LOWEST	30	03/09	MM	MM	27	03/10
AVG. MAXIMUM	55.7		53.6	2.1	49.7	
AVG. MINIMUM	39.7		38.1	1.6	35.8	
MEAN	47.7		45.9	1.8	42.8	
DAYS MAX >= 90	0		MM	MM	0	
DAYS MAX <= 32	0		MM	MM	0	
DAYS MIN <= 32	2		MM	MM	8	
DAYS MIN <= 0	0		MM	MM	0	
.....						
PRECIPITATION (INCHES)						
RECORD						
MAXIMUM	MM	MM				
MINIMUM	MM	MM				
TOTALS	3.16		3.84	-0.68	3.87	
DAILY AVG.	0.10		0.12	-0.02	0.12	
DAYS >= .01	18		MM	MM	22	
DAYS >= 1.00	0		MM	MM	0	
.....						
SNOWFALL (INCHES)						
TOTALS	0.0					

# Appendix 4 – Wetland Impacts and Mitigation Acreage Breakdown

**Table 1 (Page 8).** Total Impacts to Wetlands as a Result of the SR 305 Vicinity Poulusbo South City Limits to Bond Road Upgrade Project.

Wetland #	Class	Category	Temporary Impact (Acres)	Permanent Impact (Acres)	Stream Realignment Impact (Acres)
1a	PFO	I	0	0.04	0
1	PFO	III	0	0.25	0
2	PFO/SS	II	0.35	1.28	1.15
3	PEM	III	0	0.20	0
4	PEM	III	0	0	0
5	PEM	III	0	0.08	0
6	PEM/SS	III	0	0.01	0
7	PFO	III	0	0.15	0
9	PEM	III	0	0.04	0
10	PFO/SS	II	0	0.003	0
<b>Totals</b>			<b>0.35</b>	<b>2.053</b>	<b>1.15</b>

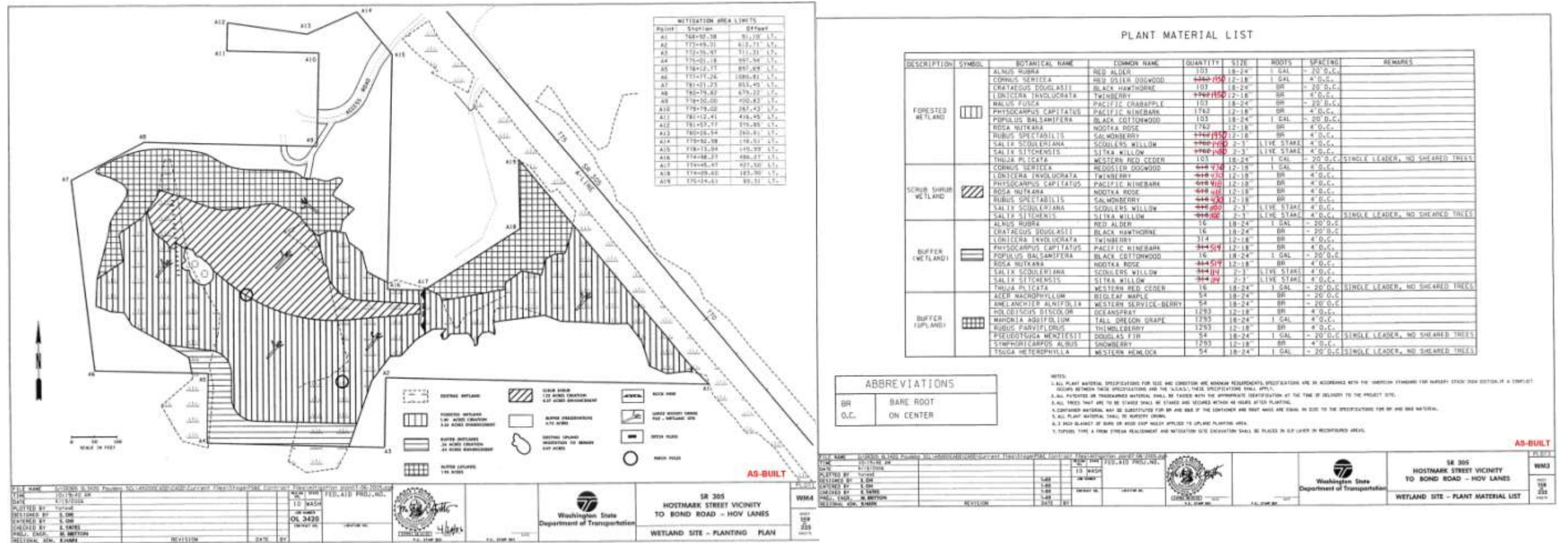
**Table 2 (Page 12).** Proposed Wetland Enhancement and Creation for the SR 305 Vicinity Poulusbo South City Limits to Bond Road Improvement Project.

Area of Impact	Acres of Permanent Impacts	Implementing Agreement Ratios	Type of Mitigation	Acres Required (Creation)	Acres Required (Enhancement)
Wetlands (Cat I)	0.04	4:1	Creation	0.04 acres at 4:1 = 0.16 acres	-
Wetlands (Cat II)	1.253	4:1	Enhancement	-	0.55 acres at 4:1 = 2.20 acres
		2:1	Creation	0.703 acres at 2:1 = 1.41 acres	-
Wetlands (Cat III)	0.76	1-1.5:1	Creation	0.76 acres at 1:1 = 0.76 acres	-
<b>Total Ac.</b>	<b>2.053</b>	-	-	<b>2.33</b>	<b>2.20</b>
<b>Planned Mitigation Ac.</b>	-	-	-	<b>2.62</b>	<b>3.63</b>

(WSDOT 2007)

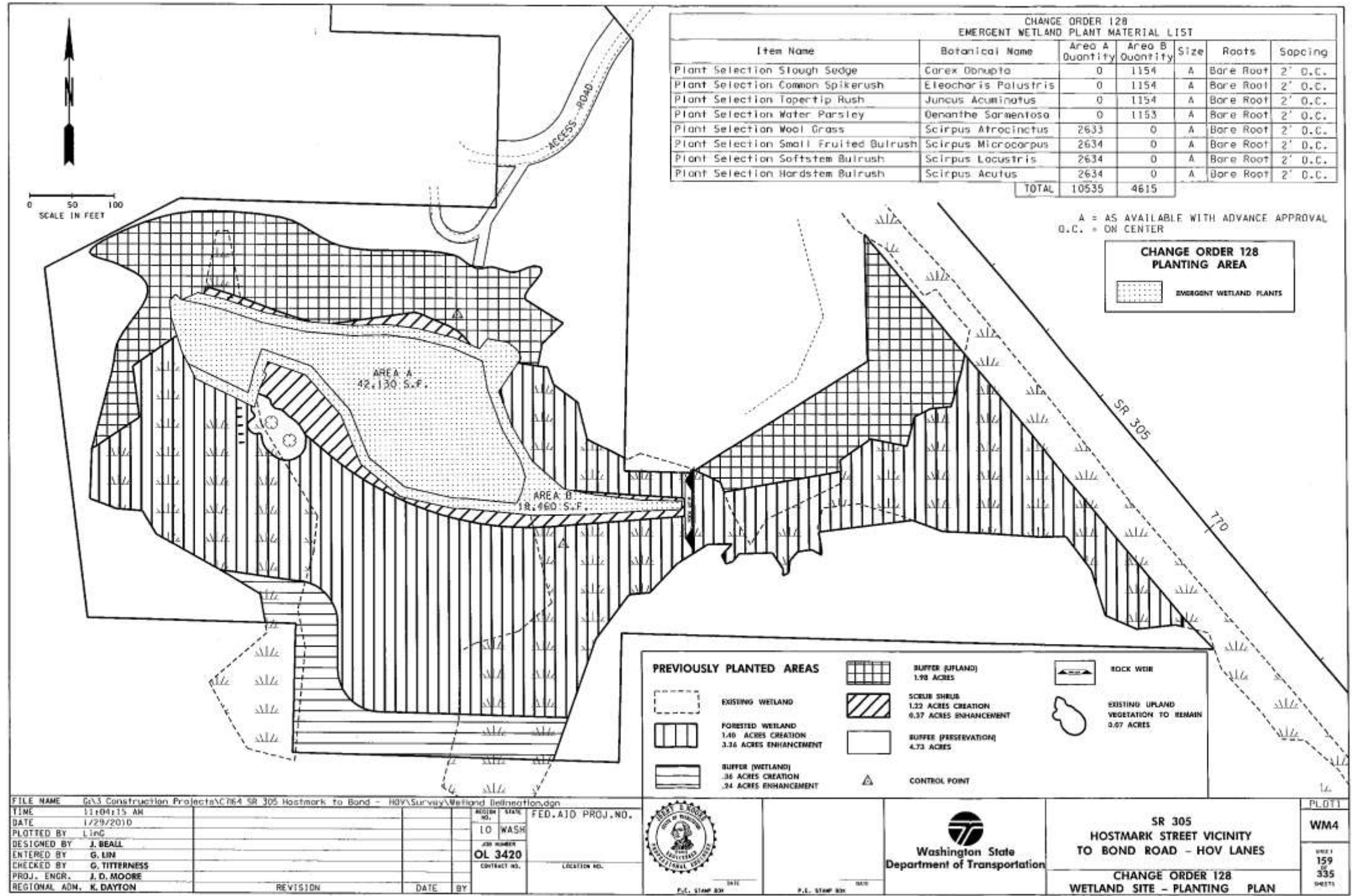
# Appendix 5 – Planting Plans

(WSDOT 2006)



# Planting Plan Addendum

(WDOT 2007)







# Appendix 6 – Photo Points

The photographs below were taken from permanent photo-points on July 20, 2010 and document current site development.



**Photo Point 1a**



**Photo Point 1b**



**Photo Point 1c**



**Photo Point 1d**

The photographs below were taken from permanent photo-points on July 20, 2010 and document current site development.



**Photo Point 1e**



**Photo Point 2a**



**Photo Point 2b**



**Photo Point 2c**

The photographs below were taken from permanent photo-points on July 20, 2010 and document current site development.



**Photo Point 2d**



**Photo Point 2e**

^^



**Photo Point 2f**



**Photo Point 3a**

The photographs below were taken from permanent photo-points on July 20, 2010 and document current site development.



**Photo Point 3b**



**Photo Point 3c**



**Photo Point 3d**



**Photo Point 3e**

The photographs below were taken from permanent photo-points on July 20, 2010 and document current site development.



**Photo Point 3f**



**Photo Point 3g**



**Photo Point 3h**



**Photo Point 3i**

The photographs below were taken from permanent photo-points on July 20, 2010 and document current site development.



**Photo Point 3j**



**Photo Point 3k**



**Photo Point 3l**



**Photo Point 3m**

The photographs below were taken from permanent photo-points on July 20, 2010 and document current site development.



**Photo Point 3n**



**Photo Point 3o**



**Photo Point 3p**



**Photo Point 3q**

The photographs below were taken from permanent photo-points on July 20, 2010 and document current site development.



**Photo Point 5a**



**Photo Point 5b**



**Photo Point 5c**



**Photo Point 5d**



## Literature Cited

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2. [NOAA] National Oceanic and Atmospheric Administration [Internet]. 2011. Seattle (WA): National Weather Service Forecast Office. Available from: <http://www.weather.gov/climate/index.php?wfo=sew>
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4. Washington State Department of Ecology (Ecology). 1997. Washington State Wetlands Identification and Delineation Manual. Publication No.96-94, Olympia, WA.
5. Washington State Department of Transportation (WSDOT) WSDOT Wetland Mitigation Site Monitoring Methods (12 June 2008). <http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>
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7. Washington State Department of Transportation (WSDOT) 2007. Addendum to SR 305 Vicinity Poulsbo South City limits to Bond Road Final Wetland Mitigation Plan