

**SR 305 Vicinity Poulsbo South City Limits to Bond Road
(Stream Realignment and Wall 8) Mitigation Site**

**USACE IP 200500967
HPA 104408-1**

Olympic Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

Issued March 2011



Environmental Services Office

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USACE IP 200500967

HPA 104408-1



| General Site Information | | |
|---------------------------------|---|--------------------------------|
| USACE IP Number | 200500967 | |
| HPA Number | 104408-1 | |
| Mitigation Location | Southwest of SR 305, along Dogfish Creek in Poulsbo, Kitsap County. | |
| LLID Number | 1226379477451 | |
| Construction Date | 2007 | |
| Monitoring Period | 2007-2017 | |
| Year of Monitoring | 3 of 7 | |
| Area of Project Impact | 1.15 acres | |
| Type of Mitigation | Stream Realignment | Temporary impact Re-vegetation |
| Area of Mitigation | 2.25 acres | 0.23 acre |

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Summary of Monitoring Results and Management Activities (2010)

| Performance Standards | 2010 Results ¹ | Management Activities |
|--|--|-----------------------|
| Less than 20% aerial cover of noxious weeds | 10% cover (CI _{80%} = 6-15%) | Weed Control |
| Bohemian knotweed, Japanese knotweed, Himalayan knotweed and giant knotweed shall not be present | None observed | |
| Hydrology present on a continuous basis and minimum of 10 instream woody debris structures | Present | |
| 15% aerial cover in the stream realignment area and temporarily impacted retaining wall areas | 65% cover (CI _{90%} = 52-79%) | |
| Permit Requirement | | |
| 80% survival in the riparian area | 100% | |

Report Introduction

This report summarizes third year (Year-3) monitoring activities at the State Route (SR) 305 Poulsbo Stream Realignment and Wall 8 Mitigation Site. Included are a site description, the performance criteria, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities included vegetation surveys, photo-documentation, and assessments of stream hydrology and presence of woody debris structures. Monitoring activities occurred July 21st and 26th, 2010.

¹ Estimated values are presented with their corresponding statistical confidence interval. For example, 10% (CI_{80%} = 6-15% cover) means we are 80% confident that the true aerial cover value is between 6% and 15%.

What is the SR 305 Stream Realignment and Wall 8 Mitigation Site?

This 2.48-acre WSDOT property contains mitigation (Figure 1) to compensate for impacts from the realignment of South Fork Dogfish Creek away from SR 305 and temporary impacts from the construction of Wall 8. The realignment of South Fork Dogfish Creek is intended to provide additional meandering of the creek, introduction of streambed gravels, placement of habitat features, and improved water quality by reducing the amount of highway runoff that flows directly into the creek.

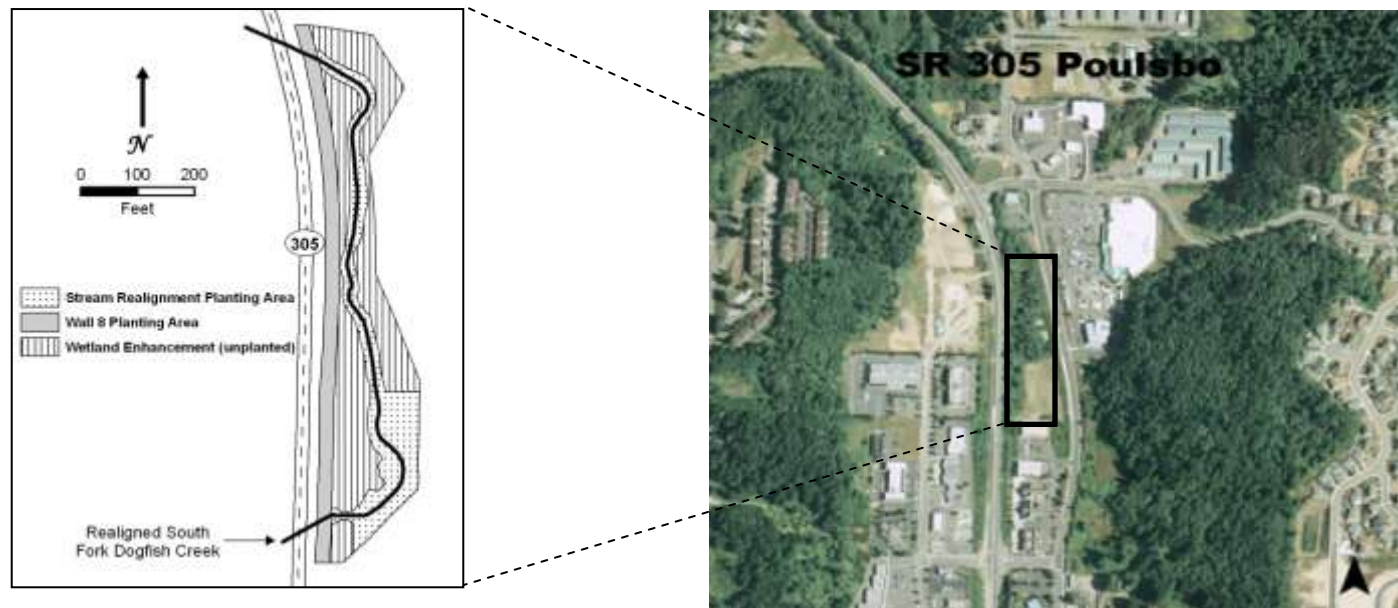


Figure 1 Site Sketch

The SR 305 Poulso Mitigation Site follows the realigned Dogfish Creek along SR 305.

What are the performance criteria for this site?

Performance Standard 1

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

Performance Standard 2

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

Performance Standard 3

The relocated stream areas will have hydrology present on a continuous basis and will have a minimum on ten instream woody debris structures.

Performance Standard 4

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

Permit Requirement 1

Within one year of project competition, the banks shall be revegetated with native or other approved woody species. Vegetative cuttings shall be planted at a maximum interval of three feet (on center) and maintained as necessary for three years to ensure 80 percent survival.

Appendix 1 provides the complete text of the performance criteria for this project, and Appendix 3 shows the planting plan (WSDOT 2005).

How were the performance criteria evaluated?

To evaluate criteria for vegetative cover, two parallel baselines were established: one parallel to SR 305, and one on the east side of Dogfish Creek (Figure 2). Twenty-six sampling transects were randomly placed perpendicular to both of the baselines. The two baselines were used to insure transects lined up on either side of dense vegetation in the enhancement area. The line intercept method was used to estimate woody cover (Performance Standard 4), the point intercept method was used to estimate invasive species cover (Performance Standards 1 and 2), and 1-meter wide unequal area belt transects were used to estimate survival (Permit Requirement 1).

Instream woody debris structures were counted to ensure all were present according to plan. Hydrology in the relocated stream channel was visually observed (Performance Standard 3).

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

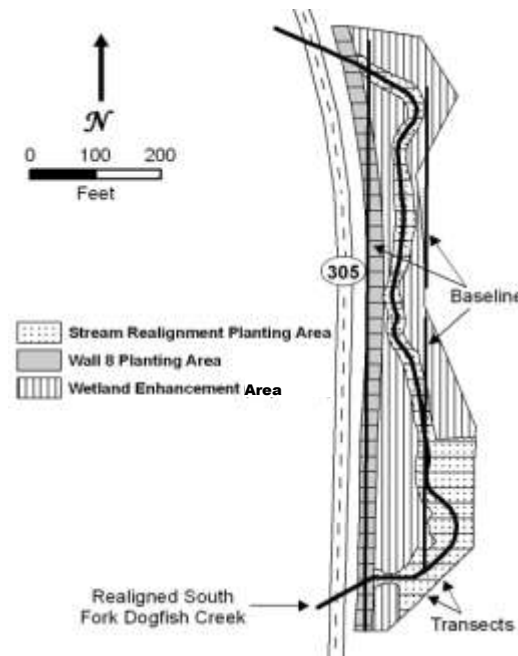


Figure 2 Site Sampling Design (2010)

How is the site developing?

This site is doing very well. Aerial cover of woody vegetation in the stream realignment area and temporarily impacted retaining wall area has exceeded the performance standard for year-3 and is meeting year-7 aerial cover standards. Volunteer red alder (*Alnus rubra*), roses (*Rosa* spp.), and willows (*Salix* spp.) are growing in both the stream realignment area and temporarily impacted retaining wall area. Invasive cover is low in the stream realignment and temporarily impacted retaining wall areas, indicating invasive control has been effective so far. Plantings have a high survival rate in the stream realignment area and an emergent community is observed developing along Dogfish Creek.

Dogfish Creek was inundated during summer monitoring. Sediment deposits as well as drift deposits were found in herbaceous vegetation along the creek. Some erosion was observed near the center of the realignment, behind woody debris structures.

Results for Performance Standard 1

(Less than 20% aerial cover of noxious weeds):

Aerial cover of noxious weeds in the stream realignment and temporarily impacted retaining wall areas is estimated to be 10% ($CI_{80\%} = 6-15\%$) (Photo 1). This estimate is below the 20 percent threshold. Common St. Johnswort (*Hypericum perforatum*), Himalayan blackberry (*Rubus armeniacus*), Scotch broom (*Cytisus scoparius*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), and reed canarygrass (*Phalaris arundinacea*) were all observed in the riparian area and growing on or near the retaining wall.



Photo 1
Invasive cover in temporarily impacted retaining wall area (July 2010)

Results for Performance Standard 2

(Bohemian knotweed, Japanese knotweed, Himalayan knotweed, and giant knotweed shall not be present at the stream realignment areas):

Knotweed has not been observed during monitoring activities within the stream realignment area.

Results for Performance Standard 3

(Hydrology present on a continuous basis and minimum of 10 instream woody debris structures):

Hydrology was visually observed in the relocated stream (Photo 2). Ten instream woody debris structures were accounted for in the relocated stream.



Photo 2
Hydrology present in relocated stream (July 2010)

Results for Performance Standard 4

(15% aerial cover in the riparian area and temporarily impacted retaining wall areas):

The calculated aerial cover in the stream realignment and temporarily impacted wall area is 65% (CI_{90%} = 52-79%). This estimate exceeds the 15 percent performance standard. Volunteer red alder (*Alnus rubra*), and roses (*Rosa* spp.) were observed in both the riparian area and temporarily impacted retaining wall area. Pacific ninebark (*Physocarpus capitatus*), redosier dogwood (*Cornus sericea*), red alder (*Alnus rubra*), and roses (*Rosa* spp.) are the dominate species in the stream realignment. Red alder (*Alnus rubra*), redosier dogwood (*Cornus sericea*), and roses (*Rosa* spp.) dominate the temporarily impacted retaining wall. The area directly adjacent to the realigned stream has higher aerial cover then the other areas (Photo 3).

Results for Permit Requirement 1

(80% survival in the riparian area):

Survival of woody vegetation in the riparian area is estimated to be 100 percent. This exceeds the 80 percent permit requirement. Vegetation appears healthy and vigorous. Volunteer willows (*Salix* spp.), red alder (*Alnus rubra*), and roses (*Rosa* spp.) were observed in the riparian area (Photo 4).



Photo 3
Aerial cover in the stream realignment area (July 2010)



Photo 4
Planting along stream realignment area (July 2010)

What is planned for this site?

Ongoing weed control will be conducted as needed in 2011.

Appendix 1 – Goals and Performance Standards

The following excerpt is from the *SR 305 Vicinity Poulsbo South City Limits to Bond Road Wetland Mitigation Plan* (WSDOT 2006). The performance criteria addressed this year are identified in **bold** font.

GOALS AND OBJECTIVES²

Objective 5 – Noxious Weeds

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 stream realignment areas.

Methods

Noxious weeds will be controlled to insure that they do not out compete or interfere with the development of desirable vegetation.

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 2

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

² Objectives 1 through 4 apply to the Phase 2 wetland mitigation site, and were not included in this appendix. Only Objectives 5 through 7 apply to the Phase 1 stream realignment and Wall 8 restoration area.

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

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 in-stream woody debris structures.

Methods

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

Monitoring

Count the number of in-stream 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

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

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 31st 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 State Department of Fish and Wildlife Hydraulic Project Approval 104408-1*. Requirements addressed this year are identified in **bold** font.

Within one year of project completion, the banks, including riprap areas, shall be re-vegetated with native or other approved woody species. **Vegetative cuttings shall be planted at a maximum interval of four feet (on center) and maintained as necessary for three years to ensure 80 percent survival.**

Appendix 2 – Methods

To evaluate standards for vegetative cover, two parallel baselines were established: one parallel to SR 305, and on the east side of Dogfish Creek. The baseline length was 262 meters. Twenty-six temporary sampling transects were placed perpendicular to the baseline using a systematic random sampling method (Figure 2). Aerial cover of invasive species in the stream realignment and temporarily impacted retaining wall areas (Performance Standards 1 and 2) was assessed using the point intercept method. Twenty-seven randomly positioned 10-meter point-line sample units (20 points each) were placed along the sampling transects. The line intercept method was used to estimate aerial of woody vegetation in the stream realignment and temporarily impacted wall area (Performance Standard 4). Twenty-seven 10-meter line-segment sample units were randomly positioned along the sampling transects in this zone. Survival in the stream realignment area was estimated using 26 unequal area belt transects placed along the sampling transects (Permit Requirement 1). Instream woody structures were counted and compared to the planting plan and hydrology in the realigned stream channel was visually observed (Performance Standard 3).

Sample size analysis confirmed sufficient sampling had been completed based on site sampling objectives and the desired level of statistical confidence. The sample size equation shown here (below) was used to perform the analysis on data collected (Performance Standards 1, 2, and 4). In this equation, the precision level (*B*) equals half the maximum acceptable confidence interval width multiplied by the sample mean.

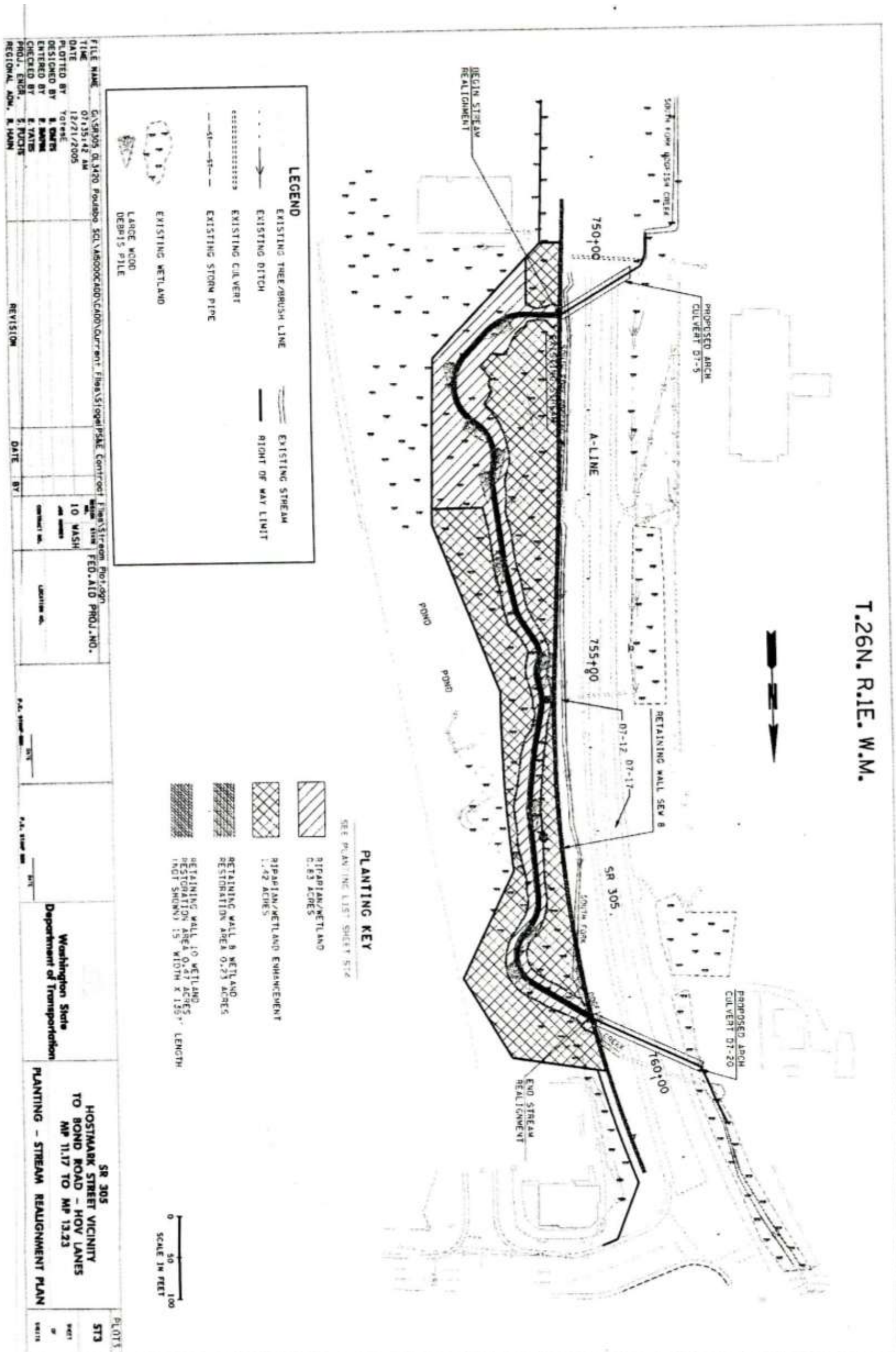
$$n = \frac{(z)^2 (s)^2}{(B)^2}$$

n = unadjusted sample size
z = standard normal deviate
s = sample standard deviation
B = precision level

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

Appendix 3 – Planting Plan

(from WSDOT 2005)



FILE NAME: G:\SR305_01_2400_Poulsbo_SCI\AR0000\CADD\CURRENT\Fig\SR305\Stream_Proj.dgn
DATE: 07/15/12 AM
TIME: 12/21/2005
DESIGNED BY: T. J. WASH
ENTERED BY: K. VALES
CHECKED BY: S. TUCKER
PROJ. ENGR.: K. HAHN
REGIONAL ADM.: K. HAHN

| REVISION | DATE | BY | DESCRIPTION |
|----------|------|----|-------------|
| 10 WASH | | | |

LEGEND

- EXISTING TREE/BRUSH LINE
- - - - - EXISTING DITCH
- - - - - EXISTING CULVERT
- - - - - EXISTING STORM PIPE
- EXISTING WETLAND
- EXISTING STREAM
- RIGHT OF WAY LIMIT

PLANTING KEY

SEE PLANTING LIST SHEET 574

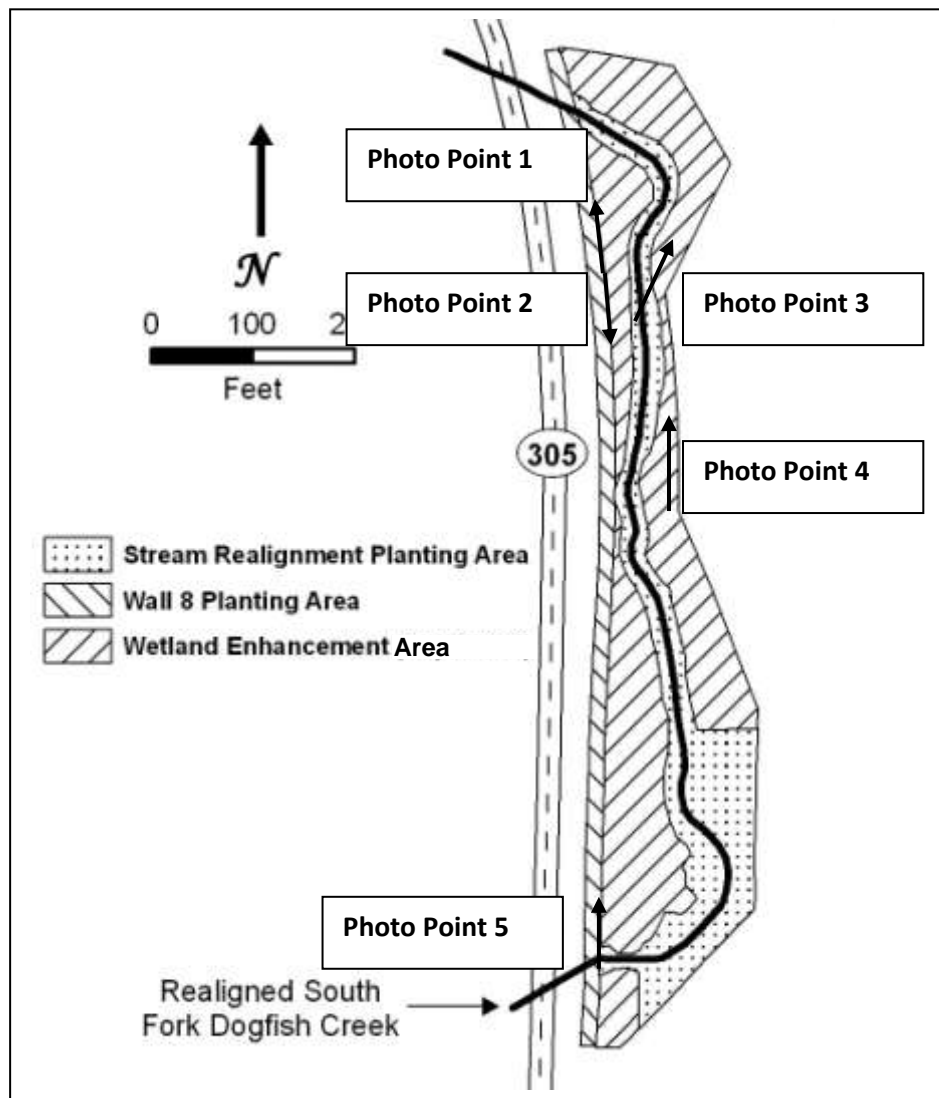
- ▨ RIPARIAN/WETLAND 0.83 ACRES
- ▨ RIPARIAN/WETLAND ENHANCEMENT 1.42 ACRES
- ▨ RETAINING WALL 9 WETLAND RESTORATION AREA 0.23 ACRES
- ▨ RETAINING WALL 10 WETLAND RESTORATION AREA 0.41 ACRES (NOT SHOWN) IS WIDTH X 150' LENGTH

SR 305
 HOSTMARK STREET VICINITY
 TO BOND ROAD - HOV LANES
 MP 11.17 TO MP 13.23
PLANTING - STREAM REALIGNMENT PLAN

SCALE 1/4" = 1'

PLOTS
 STA 573

Appendix 4 – Photo Points



The photographs below were taken from permanent photo-points on July 26, 2010 and document current site development.



Photo Point 1



Photo Point 2



Photo Point 3



Photo Point 4



Photo Point 5

Literature Cited

1. Thomas, J. W. (tech. ed.). 1979. Wildlife Habitats in Managed Forests – the Blue Mountains of Oregon and Washington. USDA Forest Service, Agricultural Handbook No. 553.
2. United States Army Corps of Engineers. 2006. Department of the Army Permit Number 200500967.
3. Washington State Department of Fish and Wildlife. 2006. Hydraulic Project Approval Number 104408-1.
4. Washington State Department of Transportation (WSDOT). 2005. SR 305 Vicinity Poulsbo South City Limits to Bond Road Planting Plan. Olympic Region, Olympia, WA.
5. Washington State Department of Transportation (WSDOT). 2006. SR 305 Vicinity Poulsbo South City Limits to Bond Road Wetland Mitigation Plan. Olympic Region, Olympia, WA
6. 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>