

**I-5/SR 532 Interchange Improvements Milepost (MP) 212.35
to MP 212.88 (Stanwood) Mitigation Site
WIN A00552R**

USACE NWP (14) 200500845

Northwest Region

2014 MONITORING REPORT

Wetlands Program

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USACE NWP (14) 200500845



General Site Information		
USACE NWP 14 Number	200500845	
WIN Number	A00552R	
Mitigation Location	West of Pilchuck Creek, near Stanwood, Snohomish County.	
LLID Number	1222437482381	
Construction Date	2007	
Monitoring Period	2008-2017	
Year of Monitoring	7 of 10	
Type of Project Impact¹	Wetland	Wetland Buffer
Area of Project Impact	0.12 acre	0.63 acre
Type of Mitigation	Wetland Establishment	Wetland Enhancement
Area of Mitigation	0.33 acre	0.007 acre
Type of Mitigation	Buffer	
Area of Mitigation	0.79 acre	

¹Impact and mitigation acreage sourced from (WSDOT 2005).

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Summary of Monitoring Results and Management Activities (2014)

Performance Standards	2014 Results ²	Management Activities
Wetland hydrology present	Present	
75% cover of native FAC or wetter herbs in the emergent wetland	1% cover	
50% cover of native FAC or wetter woody species in the PSS/PFO communities	70% cover (CI _{80%} = 61-79%)	160 Red Osier Dogwood and 160 Spirea were planted in October 2014
Three native FAC or wetter species with at least 6% relative cover in the PSS/PFO communities	4 species with at least 6% relative cover	160 Red Osier Dogwood and 160 Spirea were planted in October 2014
Less than 30% relative cover of red alder in the wetland	13% relative cover	
No more than 20% cover of Snohomish County Class A weeds plus reed canarygrass, non-native blackberries, and Scot's broom in the wetland	2% cover	4 weed control were conducted in February, May, September, and October 2014
35% cover of native woody species in the buffer	95% cover	
Three native species with at least 6% relative cover in the buffer	3 species with ≥ 6% relative cover	
Less than 30% relative cover of red alder in the buffer	20% relative cover	
No more than 20% cover of Snohomish County Class A weeds plus reed canarygrass, non-native blackberries, and Scot's broom in the buffer	2% cover	4 weed control were conducted in February, May, September and October 2014,

² Estimated values are presented with their corresponding statistical confidence interval. For example, 70% (CI_{80%} = 61-79% cover) means we are 80% confident that the true cover value is between 61% and 79%.

Report Introduction

This report summarizes Year-7 monitoring activities at the State Route (SR) 532 Stanwood 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, and assessments of wetland hydrology. Vegetation monitoring occurred on July 15, 2014 and hydrology monitoring occurred on March 3, March 18, and April 7, 2014.

What is the SR 532 Stanwood Mitigation Site?

This 4.92-acre WSDOT property (Figure 1) contains established and enhanced wetlands, with an enhanced stream channel and its associated buffer. This site is located west of the Pilchuck River, in the Stillaguamish River basin. This site was established to compensate for 0.12 acre of wetland impacts, 0.08 acre of stream buffer impacts, and 0.63 acre of wetland buffer impacts related to improvements along the SR 532 and I-5 interchange. This site connects adjacent wetland complexes and is intended to provide water quality functions and create habitat for fish and amphibians.

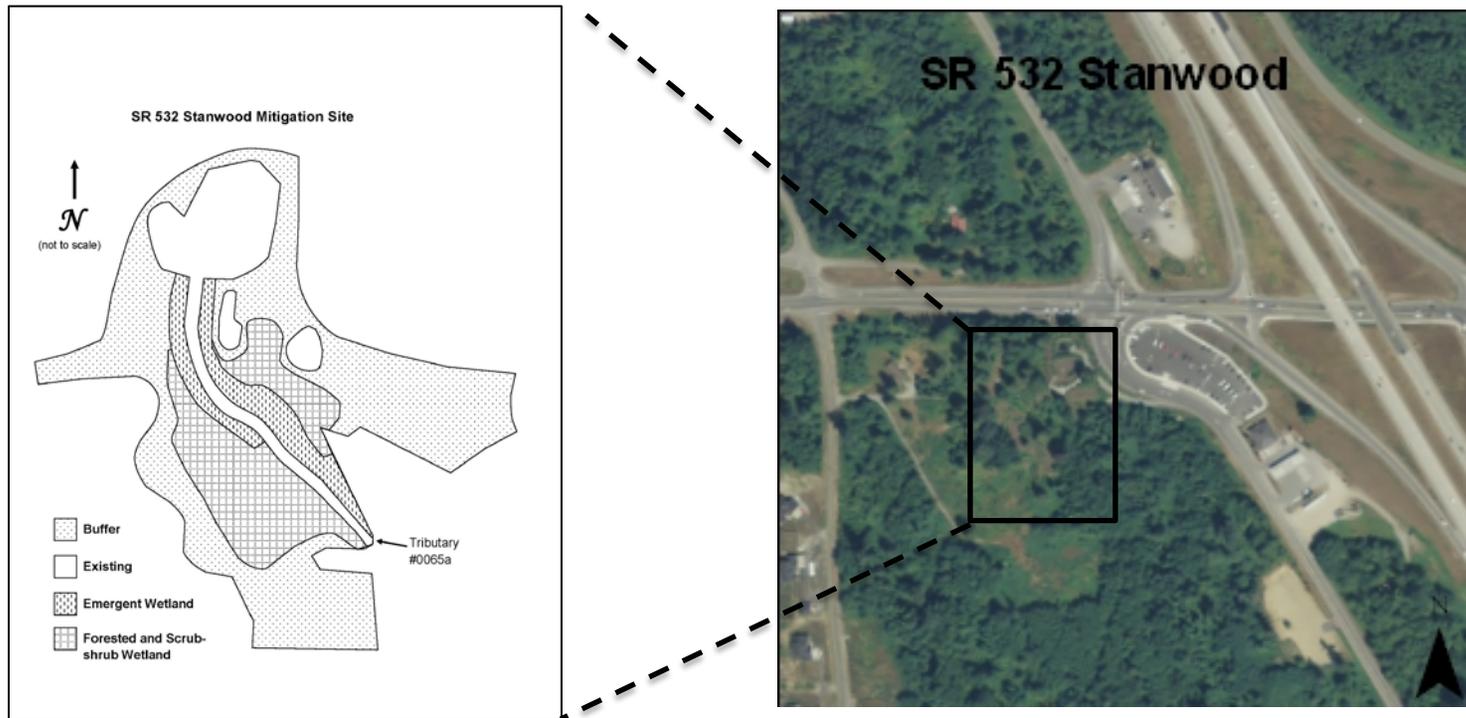


Figure 1 Site Sketch

The SR 532 Stanwood Mitigation Site includes forested, scrub-shrub and emergent wetland areas. Tributary #0065a crosses the established wetland area and connects to adjacent wetlands. Small preserve areas are scattered throughout the buffer. Appendix 2 includes site directions.

What are the performance standards for this site?

Year 7

Performance Standard 1

The soils will be saturated to the surface, or standing water will be present in a monitoring well at 12 inches below the surface or less, for a consecutive number of days greater than or equal to 12.5% of the growing season in years when rainfall meets or exceeds the 30-year average. Wetland hydrology will be determined using indicators of wetland hydrology), as listed in the *Washington State Wetlands Identification and Delineation Manual* (Ecology) publication #96-94.

Performance Standard 2

Native herbaceous facultative or wetter vegetation will achieve 75 percent coverage in emergent wetland communities. Native colonizing vegetation will be included in this coverage calculation.

Performance Standard 3

Native facultative or wetter woody species will achieve 50 percent cover in each PSS or PFO community. Native colonizing vegetation will be included in this coverage calculation.

Performance Standard 4

Three native facultative or wetter vegetation species will achieve 6 percent or greater relative cover in the PSS and PFO communities combined.

Performance Standard 5

Relative cover of red alder will be less than 30% in the wetland creation and enhancement areas.

Performance Standard 6

Snohomish County Class A weeds including reed canarygrass (*Phalaris arundinacea*), non-native blackberries (*Rubus* sp.), and Scot's broom (*Cytisus scorparius*) will not exceed 20 percent coverage in each forested, scrub-shrub and emergent wetland community. If coverage by native plant species falls below 80 percent of the success standard, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.

Performance Standard 7³

Native upland buffer woody species will achieve a minimum of 35 percent coverage in each upland buffer community. Native colonizing vegetation will be included in this coverage calculation.

Performance Standard 8

Three native upland vegetation species each will achieve at least 6 percent relative cover in the buffer community.

Performance Standard 9

Relative cover of red alder will be less than 30 percent in the upland buffer community.

Performance Standard 10

Snohomish County Class A weeds including reed canarygrass (*Phalaris arundinacea*), non-native blackberries (*Rubus* sp.), and Scot's broom (*Cytisus scorparius*) will not exceed 20 percent coverage in the upland buffer community.

Appendix 1 shows the planting plan (WSDOT 2006).

³ The monitoring plan states that, "Native herbaceous facultative or wetter vegetation will achieve a minimum of 35% cover in the upland buffer". We interpreted this as a typo as there should not be facultative or wetter species planted in the buffer. The standards in year-5 and for year-10 are for native woody cover in the buffer as well.

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) (Performance Standards 1).

To evaluate standards for native woody cover in the wetland, a 58-meter baseline was placed roughly north to south through the center of the wetland (Figure 2). Eleven sampling transects were randomly placed perpendicular to the baseline. The line intercept method was used to estimate woody cover (Performance Standard 3, 4, and 5). Twenty-three five-meter long line-segment sample units were randomly positioned along the sampling transects.

Native emergent cover (Performance Standard 1), native woody cover in the buffer (Performance Standards 7, 8, and 9), and noxious/invasive cover were all evaluated qualitatively (Performance Standards 6 and 10).

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

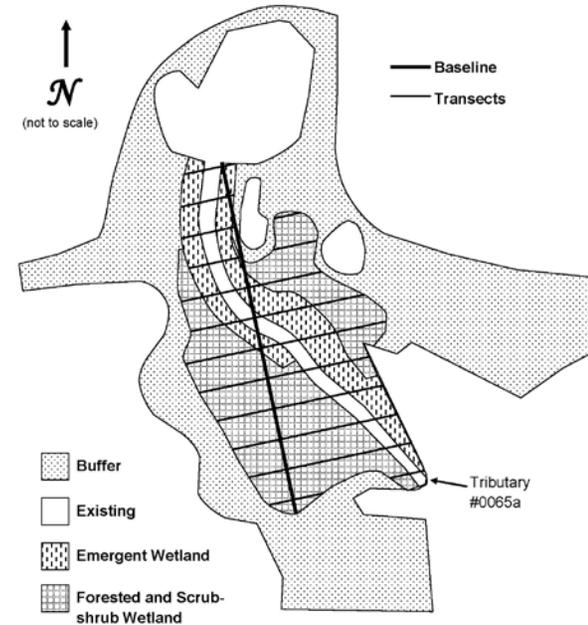


Figure 2 Site Sampling Design (2014)

How is the site developing?

This site is progressing well despite the continuing setback in native herbaceous cover in the emergent wetland since 2012 due to prolonged deep inundation through the spring, likely caused by beaver activity. Apart from the cover of emergent species, the site is meeting all of its current (year-7) performance standards. The original herbaceous zone no longer exists, due to the beaver dam and the change in hydrology. The prolonged inundation has caused some die of within the scrub-shrub zone and this area is now dominated by an herbaceous layer. However, this area is dominated by spatulaleaf loosestrife (*Lythrum portula*) (Photo 1) which is an introduced species and does not count towards the herbaceous cover performance standard. With the continuing fluctuation of the water levels and the ongoing beaver activity (Photo 2) on the site it may be difficult to meet the emergent performance standard.

The buffer has developed more rapidly than anticipated and has been meeting the year-10 final year standard for three years. On April 23, 2014 a request to discontinue quantitative sampling for the buffer was sent to USACE and the Department of Ecology, this request was accepted on May 22, 2013. The final year standards are still currently being met and the buffer is beginning to develop differentiated canopy layers.

Flood attenuation, sediment removal, toxicant and nutrient removal and production/export of organic matter are functions present at this site. Plant establishment activities and the presence of beaver on site have likely enhanced these functions by increasing water storage capacity and residence time.



Photo 1
Spatulaleaf loosestrife (*Lythrum portula*) in the wetland (July 2014)



Photo 2
Active beaver herbivory (July 2014)

Results for Performance Standard 1
(Adequate wetland hydrology):

During three hydrology monitoring visits on March 3, March 18, and April 14 90 percent of the wetland area was inundated and 10% was saturated to the soil surface (Photo 3).

Results for Performance Standard 2
(75% cover of native FAC or wetter herbs in the emergent wetland):

The cover of native FAC or wetter herbs in the emergent wetland is estimated at one percent. The prolonged inundation has virtually purged the emergent zone of native herbs and this area is now dominated by mud flats and spatulaleaf loosestrife (*Lythrum portula*).

Results for Performance Standard 3, 4, and 5
(50% cover of native FAC or wetter woody species in the PSS/PFO communities. Three native FAC or wetter species with at least 6% relative cover in the PSS/PFO communities. Less than 30% relative cover of red alder in the wetland):

Native facultative or wetter woody species is estimated at 70% cover ($CI_{80\%} = 61-79\%$) (Photo 4). In the PSS/PFO communities red alder (*Alnus rubra*), willows (*Salix spp.*), and salmonberry (*Rubus spectabilis*) each have greater than six percent cover. Red alder (*Alnus rubra*) has a relative cover of 13 percent.



Photo 3
Inundation in the wetland (April 2014)

Results for Performance Standard 6

(No more than 20% cover of targeted noxious weeds in the wetland):

The cover of Snohomish County Class A plus other targeted noxious weeds in the buffer is visually estimated to be two percent. The applicable noxious weeds observed in this zone were reed canarygrass (*Phalaris arundinacea*), Himalayan blackberry (*Rubus armeniacus*), and cutleaf blackberry (*Rubus laciniatus*).

Results for Performance Standard 7, 8, and 9

(35% cover of native woody species in the buffer. Three native species with at least 6% relative cover in the buffer. Less than 30% relative cover of red alder in the buffer):

The cover of native woody species in the buffer (Photo 5) is 95%. Salmonberry (*Rubus spectabilis*), snowberry (*Symphoricarpos albus*), and red alder (*Alnus rubra*) achieve at least six percent relative cover in the buffer community. Relative cover of red alder is estimated at 20 percent in the upland buffer community.

Performance Standard 10

(No more than 20% cover of targeted noxious weeds in the upland buffer):

The cover of Snohomish County Class A plus other targeted noxious weeds in the buffer is visually estimated to be two percent. The applicable noxious weeds observed in this zone were reed canarygrass (*Phalaris arundinacea*), Himalayan blackberry (*Rubus armeniacus*), and cutleaf blackberry (*Rubus laciniatus*).



Photo 4
Wetland woody cover (July 2014)



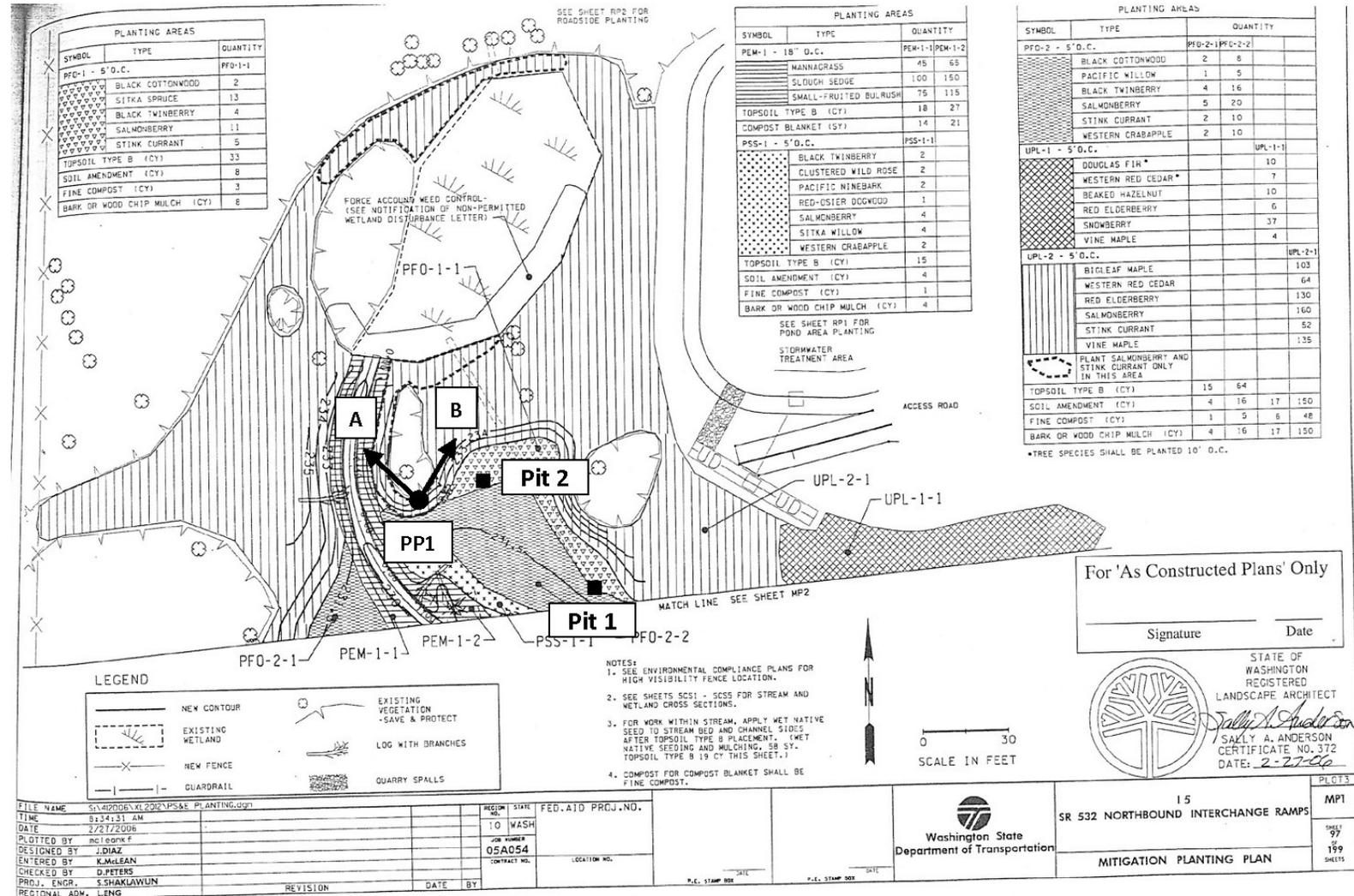
Photo 5
Buffer woody cover (July 2014)

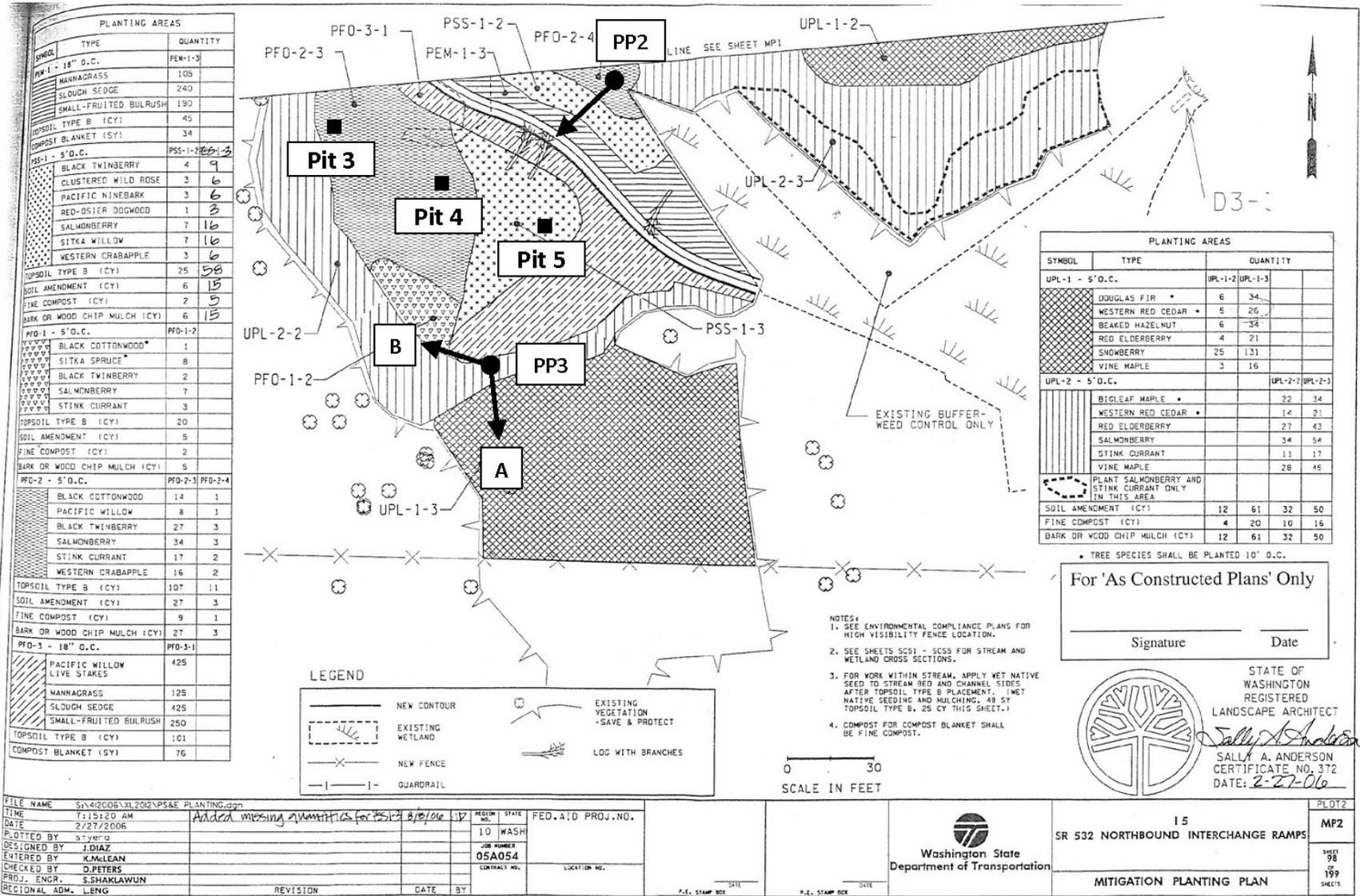
What is planned for this site?

Ongoing weed control is planned in 2015. Emergent planting will occur in late spring early summer with a potential planting of an aquatic bed component in the areas that are now permanently inundated. The location will be evaluated at the time of planting due to the existing beaver dam.

Appendix 1 – Planting Plan (As-Built) with Photo Point Locations and Hydrology Pit or Well Locations

(from WSDOT 2001)





SYMBOL	TYPE	QUANTITY
PF0-1 - 18" O.C.		
	MANNAGRASS	108
	SLOUGH SEDGE	240
	SMALL-FRUITED BULRUSH	190
	TOPSOIL TYPE B (CY)	45
	COMPOST BLANKET (SY)	34
PSS-1 - 5'O.C.		
	BLACK TWINBERRY	4
	CLUSTERED WILD ROSE	3
	PACIFIC NINEBARK	3
	RED-OSIER DOGWOOD	1
	SALMONBERRY	7
	SITKA WILLOW	7
	WESTERN CRABAPPLE	3
	TOPSOIL TYPE B (CY)	25
	SOIL AMENDMENT (CY)	6
	FINE COMPOST (CY)	2
	BARK OR WOOD CHIP MULCH (CY)	6
PF0-1 - 5'O.C.		
	BLACK COTTONWOOD*	1
	SITKA SPRUCE*	8
	BLACK TWINBERRY	2
	SALMONBERRY	7
	STINK CURRANT	3
	TOPSOIL TYPE B (CY)	20
	SOIL AMENDMENT (CY)	5
	FINE COMPOST (CY)	2
	BARK OR WOOD CHIP MULCH (CY)	5
PF0-2 - 5'O.C.		
	BLACK COTTONWOOD	14
	PACIFIC WILLOW	8
	BLACK TWINBERRY	27
	SALMONBERRY	34
	STINK CURRANT	17
	WESTERN CRABAPPLE	16
	TOPSOIL TYPE B (CY)	107
	SOIL AMENDMENT (CY)	27
	FINE COMPOST (CY)	9
	BARK OR WOOD CHIP MULCH (CY)	27
PF0-3 - 18" O.C.		
	PACIFIC WILLOW LIVE STAKES	425
	MANNAGRASS	125
	SLOUGH SEDGE	425
	SMALL-FRUITED BULRUSH	250
	TOPSOIL TYPE B (CY)	101
	COMPOST BLANKET (SY)	76

SYMBOL	TYPE	QUANTITY
UPL-1 - 5'O.C.		
	DOUGLAS FIR *	6
	WESTERN RED CEDAR *	5
	BEAKED HAZELNUT	6
	RED ELDERBERRY	4
	SNOWBERRY	25
	VINE MAPLE	3
UPL-2 - 5'O.C.		
	BIGLEAF MAPLE *	22
	WESTERN RED CEDAR *	14
	RED ELDERBERRY	27
	SALMONBERRY	34
	STINK CURRANT	11
	VINE MAPLE	28
	PLANT SALMONBERRY AND STINK CURRANT ONLY IN THIS AREA	
	SOIL AMENDMENT (CY)	12
	FINE COMPOST (CY)	4
	BARK OR WOOD CHIP MULCH (CY)	12

For 'As Constructed Plans' Only

Signature _____ Date _____

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
Sally A. Anderson
SALLY A. ANDERSON
CERTIFICATE NO. 372
DATE: 2-27-06

FILE NAME	S:\42006\XL2006\PS&E PLANTING.dgn	REGION	STATE	FED. AID PROJ. NO.					
TIME	7:15:20 AM	10	WASH						
DATE	2/27/2006								
DESIGNED BY	J. DIAZ								
ENTERED BY	K. McLEAN								
CHECKED BY	D. PETERS								
PROJ. ENGR.	S. SHAKLAWUN								
REGIONAL ADM.	LENG								

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on July 15, 2014 and document current site development.



Photo Point 1



Photo Point 1a



Photo Point 2



Photo Point 3a

The photographs below were taken from permanent photo-points on July 15, 2014 and document current site development.



Photo Point 3b

Driving Directions:

From I-5 take Exit 212 at SR 532. Travel west on SR 532, also called Stanwood Bryant Road. Turn left onto Old Highway 99. The site is immediately on the right. The gate leading onto the parking pad is unlocked.

Appendix 3 – Data Tables

Table 1 Hydrology Observations

Date	Surface Observations	Subsurface Observations	
March 3, 2014	Approximately 90% of the wetland inundated, with the other 10% saturated to the surface.	Pit 1	Inundated
		Pit 2	Inundated
		Pit 3	Inundated
		Pit 4	Inundated
		Pit 5	Inundated
March 18, 2014	Approximately 90% of the wetland inundated, with the other 10% saturated to the surface.	Pit 1	Inundated
		Pit 2	Inundated
		Pit 3	Inundated
		Pit 4	Inundated
		Pit 5	Inundated
April 7, 2014	Approximately 90% of the wetland inundated, with the other 10% saturated to the surface.	Pit 1	Inundated
		Pit 2	Inundated
		Pit 3	Inundated
		Pit 4	Inundated
		Pit 5	Inundated

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