

Grass Creek Mitigation Site

SR 520 Pontoon Construction Project SR 520 Bridge Replacement and HOV Program USACE NWS-2008-151

Olympic Region

2015 MONITORING REPORT

Wetlands Program

Issued March 2016



**Washington State
Department of Transportation**

Environmental Services Office

Author:

Tom Mohagen

Editor:

Doug Littauer

For additional information about this report or the WSDOT Wetlands Program, please contact:

Doug Littauer, Wetlands Program
WSDOT, Environmental Services Office
P. O. Box 47332, Olympia, WA 98504
Phone: 360-570-2579 E-mail: littaud@wsdot.wa.gov

Monitoring reports are published on the web at: <http://www.wsdot.wa.gov/Environment/Wetlands/Monitoring/reports.htm>

SR 520 Pontoon Construction Project SR 520 Bridge Replacement and HOV Program (Grass Creek) Mitigation Site

USACE NWS-2008-151



General Site Information			
USACE NWS Number	2008-151		
LLID	1240052470103		
Mitigation Location	At the mouth of Grass Creek in the North Bay of Grays Harbor		
Construction Date	2011		
Monitoring Period	2013 - 2022		
Year of Monitoring	3 of 10		
Area of Project Impact	1.10 acre		
Type of Mitigation	Estuarine Rehabilitation	Tidal Flat Re-establishment	Tidal Channel and Edge Re-establishment
Area of Mitigation¹	4.02 acre	0.62 acre	4.13 acre

¹Mitigation acres from WSDOT (2010). An additional 46.01 acre of mitigation is available for use for other projects subject to future permits and approval by permitting agencies.

This Page Intentionally Left Blank

Summary of Monitoring Results and Management Activities (2015)

Performance Standards	2015 Results ²	Management Activities
Estuarine hydrology present	Present	
Palustrine hydrology present	Present	
Extent of salt-tolerant and existing fresh water vegetation showing signs of stress will be photo documented.	Documented	
30% cover of native, wetland (facultative and wetter), woody species	37% cover (CI _{80%} = 28-46%)	Six separate visits occurred in 2015 to conduct weed control
Buffer native woody density will achieve an average density of five plants/100ft ²	5 stems/100ft ² 40% cover (CI _{80%} = 34-47%)	Six separate visits occurred in 2015 to conduct weed control
Non-native species will not cover more than 10% of the estuarine wetland areas or more than 20% of the palustrine and upland buffer plant communities.	<ul style="list-style-type: none"> • Palustrine: 5% cover • Estuarine: 17% cover (CI_{80%} = 13-21%) • Upland buffer: 5% cover 	Six separate visits occurred in 2015 to conduct weed control
Washington State and Grays Harbor County-listed Class A noxious weeds, Japanese knotweed, and common reed (<i>Phragmites australis</i>) identified on the site will be eradicated.	None of the listed species were observed on site.	

Report Introduction

This report summarizes Year-3 monitoring activities at the Grass Creek 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 20-22, 2015. Hydrology monitoring occurred on March 12, 26, and April 9, 2015.

² Estimated values are presented with their corresponding statistical confidence interval. For example, 37% cover (CI_{80%} = 28-46%) means we are 80% confident that the true cover value is between 28% and 46%.

What is the Grass Creek Mitigation Site?

This 65.64-acre mitigation site (Figure 1) is a combination of preservation, restoration, re-habilitation, and enhanced wetlands adjacent to State Route (SR) 109 at the mouth of Grass Creek in the North Bay of Grays Harbor. This site was created to compensate for the loss of 1.10 acres of wetlands and 2.54 acres of aquatic resources. The losses come as a result of the construction of a casting basin facility designed to accommodate simultaneous construction of multiple pontoons for the SR 520, I-5 to Medina: Bridge Replacement and HOV Project.

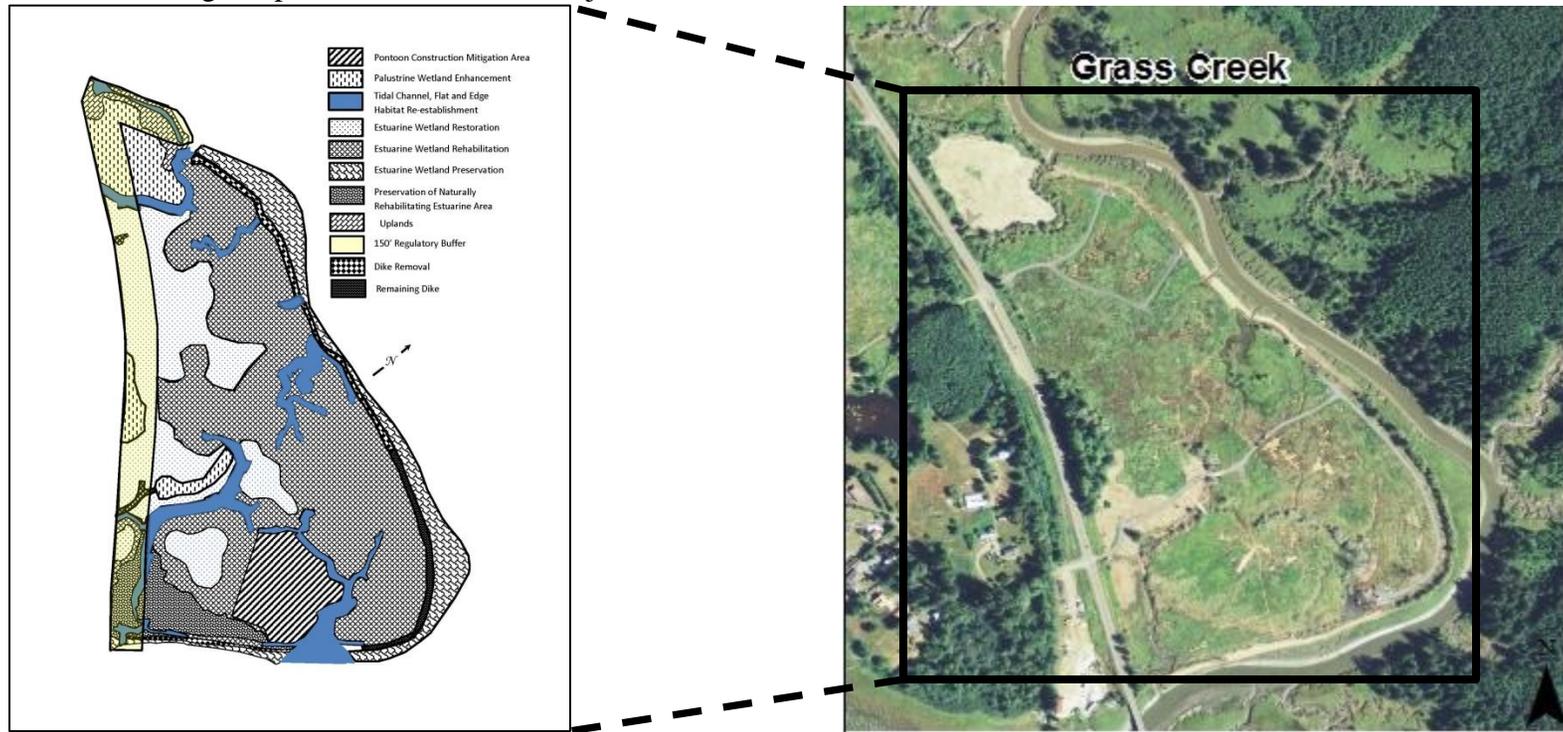


Figure 1 Site Sketch

The Grass Creek Mitigation Site’s goals include restoring natural tidal influence, the rehabilitation of tidal channels and flats through the removal of portions of the dike, removal of a non-functioning tide gate, and the filling of agricultural drainage ditches. In addition a 150-foot buffer was established to protect the functions of the rehabilitated wetland and channels. Appendix 2 includes site directions.

What are the performance standards for this site?

Year 3

Performance Standard 1

Estuarine areas will be evaluated annually (Years 1–10) during a high tide event predicted by NOAA to exceed 9.5 feet above sea level (based on NAVD88 datum). Photographs will also be taken at selected locations and representative dates to document tidal inundation to 9.0 feet or higher above sea level (based on NAVD88 datum).

Performance Standard 2

The soils in palustrine wetlands at the Grass Creek Mitigation Site will be inundated or saturated within 12 inches of the surface for at least 12.5 percent of the growing season (41 consecutive days, as measured in the WETS table for Hoquiam FCWOS AP [USDA NRCS 2002]) in years when rainfall meets or exceeds the 30-year average.

Performance Standard 3

The extent of salt-tolerant plant species (as listed by Hruby 2004) and of existing fresh water vegetation, principally reed canarygrass, showing signs of salt-induced stress (browning, salt marks on vegetation or soil, and others) will be documented by photographic documentation and by surveying (GPS) the upland limits of these indicators of the tidally-influenced area.

Performance Standard 4

Aerial cover of native, wetland (facultative and wetter), woody species (both planted and volunteer) will be at least 30 percent in the scrub-shrub and forested communities of the rehabilitated and enhanced wetland.

Performance Standard 5

Native woody species (planted and volunteer) will achieve an average density of at least 5 plants per 100 square feet in the buffer planting areas.

Performance Standard 6

Non-native species will not cover more than 10 percent of the estuarine wetland areas or more than 20 percent of the palustrine and upland buffer plant communities.

Performance Standard 7

Washington State and Grays Harbor County-listed Class A noxious weeds, Japanese knotweed, and common reed (*Phragmites australis*) identified on the site will be eradicated.

Appendix 1 shows the as-built planting plan (WSDOT 2011).

How were the performance standards evaluated?

WSDOT staff collected hydrology data 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 Standard 2). Photographs were taken at selected locations and on representative dates to document tidal inundation to 9.0 feet or higher above sea level as well as at low tide (Performance Standard 1).

The figures and table below document the sampling methodology utilized for all the remaining performance standards (PS) as required by the mitigation plan. For additional details on the methods see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

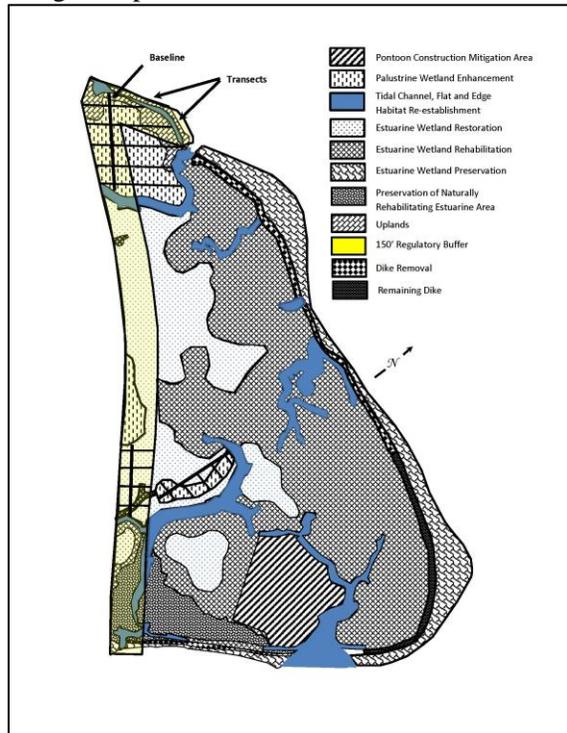


Figure 2 Palustrine and Buffer Sampling Design (2015)

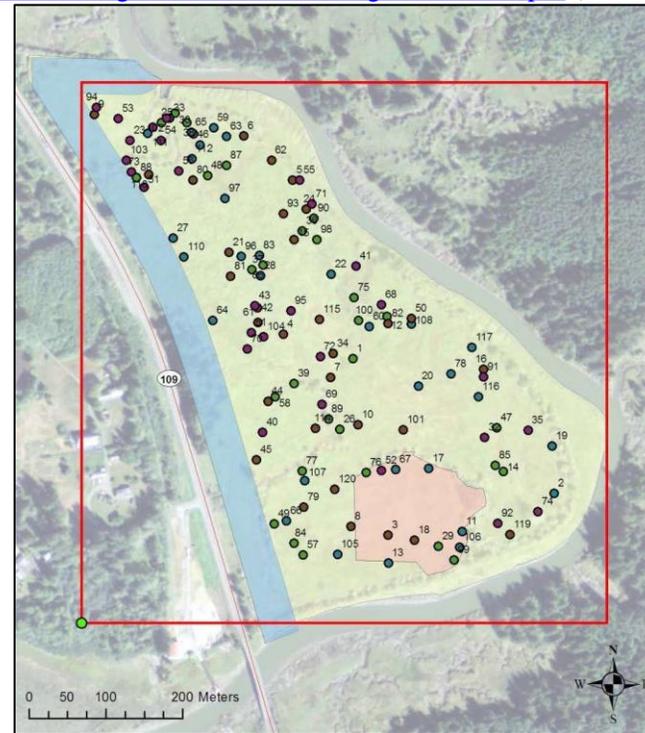


Figure 3 Permanent Plot Sampling Design (2015)

Placement of Baseline: A 373-meter segmented baseline was placed along the environmental gradient in both the northern and southern portions of the palustrine wetland and buffer (Figure 2). One hundred and twenty permanent plots were randomly distributed across four distinct elevation zones (Figure 3).

	PS 3	PS 4	PS 5	PS 6	PS 6	PS 7
Attribute	Cover	Cover	Cover	Cover	Cover	Presence/ Absence
Target pop.	Herbaceous	Native Woody	Native Woody	Invasive sp.	Invasive sp.	Noxious Weeds
Zone	Estuarine	Palustine	Buffer	Estuarine	Wetland & Buffer	Entire site
Sample method	Daubenmeyer plots	Line Intercept	Line Intercept	Daubenmeyer plots	Qualitative	Qualitative
SU length	1 m	15 m	5 m	1 m	N/A	N/A
SU width	0.5 m	N/A	N/A	0.5 m	N/A	N/A
Points per SU	N/A	N/A	N/A	N/A	N/A	N/A

How is the site developing?

This site is developing well and continues to transition from freshwater to saltwater/brackish conditions. The removal of the earthen dike and the non-functioning tide gate has helped to restore the natural hydrology/tidal exchange and floodplain connectivity. High tides regularly inundate the tidal channels and mudflats with subsequent draining during a receding tide. The natural recruitment of salt tolerant emergent species continues in the newly connected tidal channels.

The only performance standard not being met this year is invasive species cover within the estuarine wetland. However, the cover of reed canarygrass has decreased from 33% cover ($CI_{80\%} = 28-37\%$) in 2013 to 17% cover ($CI_{80\%} = 13-21\%$) in 2015; a dramatic decrease in two years. Invasive cover within the palustrine wetland and the buffer remain low.

Results for Performance Standard 1
(Estuarine hydrology present):

Photos to document tidal inundation were taken on December 14, 2015 during a NOAA predicted 10.26 feet above sea level tide. See Appendix 2 for selected photos. High tides regularly inundate the tidal channels and mudflats with subsequent draining during a receding tide (Photos 2 and 3).

Results for Performance Standard 2
(Palustrine hydrology present):

The single ground monitoring well exhibited water within the top 12 inches of the soil surface on all three visits in March and April (Photo 1). This zone is also frequently being inundated tidally.



Photo 1
Inundation in the palustrine wetland (March 2015)

Results for Performance Standard 3

(Extent of salt-tolerant and existing fresh water vegetation, principally reed canarygrass, showing signs of stress will be documented):

There has been a significant increase in salt tolerant species and subsequent decrease in salt sensitive species (Photo 4). Spear saltbush (*Atriplex patula*), which is listed as very salt tolerant species has seen an increase in cover from 0.2% cover ($CI_{80\%} = 0.1-0.3\%$) in 2013 to 10% cover ($CI_{80\%} = 8-12\%$) in 2015. The cover of reed canarygrass has decreased from 33% cover ($CI_{80\%} = 28-37\%$) in 2013 to 17% cover ($CI_{80\%} = 13-21\%$) in 2015.

Results for Performance Standard 4

(30% cover of native, wetland (facultative and wetter), woody species):

The cover of native, wetland facultative and wetter, woody species is estimated at 37% cover ($CI_{80\%} = 28-46\%$). A total of twelve separate species are present in the palustrine wetland.

Results for Performance Standard 5

(Buffer native woody density will achieve an average density of 5 plants/100ft²):

The density of native woody species in the buffer is estimated at 5 plants/100ft². The northern buffer has a lower density estimate of 2 plants/100ft² while the southern buffer is estimated to have a density of 7 plants/100ft². Native woody cover was also sampled and is estimated at 40% cover ($CI_{80\%} = 34-47\%$). The performance standard for year five should be readily achievable.



Photo 2
Low tide on the established tidal flat (July 2015)



Photo 3
High tide on the established tidal flat (December 2015)

Results for Performance Standard 7

(Non-native species will not cover more than 10 percent of the estuarine wetland areas or more than 20 percent of the palustrine and upland buffer plant communities):

Palustrine: Invasive species included reed canarygrass (*Phalaris arundinacea*) and bull thistle (*Cirsium vulgare*) with a total cover estimated at five percent. There are obvious signs that both species have been treated with herbicides. Himalayan blackberry (*Rubus armeniacus*) is present on the outside of the fence line and could potentially become a problem.

Estuarine: Invasive cover over the entire site was estimated at 17% cover (CI_{80%} = 13-21%) and is comprised primarily of reed canarygrass. The reed canary grass is stressed in areas closer to the channels on the south and east sides of the site, displaying stunted growth and less inflorescence than those on the west side. Bull thistle is sporadic throughout the site in areas with higher ground elevations.

Buffer: Invasive cover in the buffer is estimated at two percent, which is comprised of reed canarygrass and bull thistle.

Results for Performance Standard 8

(Washington State and Grays Harbor County-listed Class A noxious weeds, Japanese knotweed, and common reed (*Phragmites australis*) identified on the site will be eradicated.):

None of the listed species were observed during the monitoring visits.



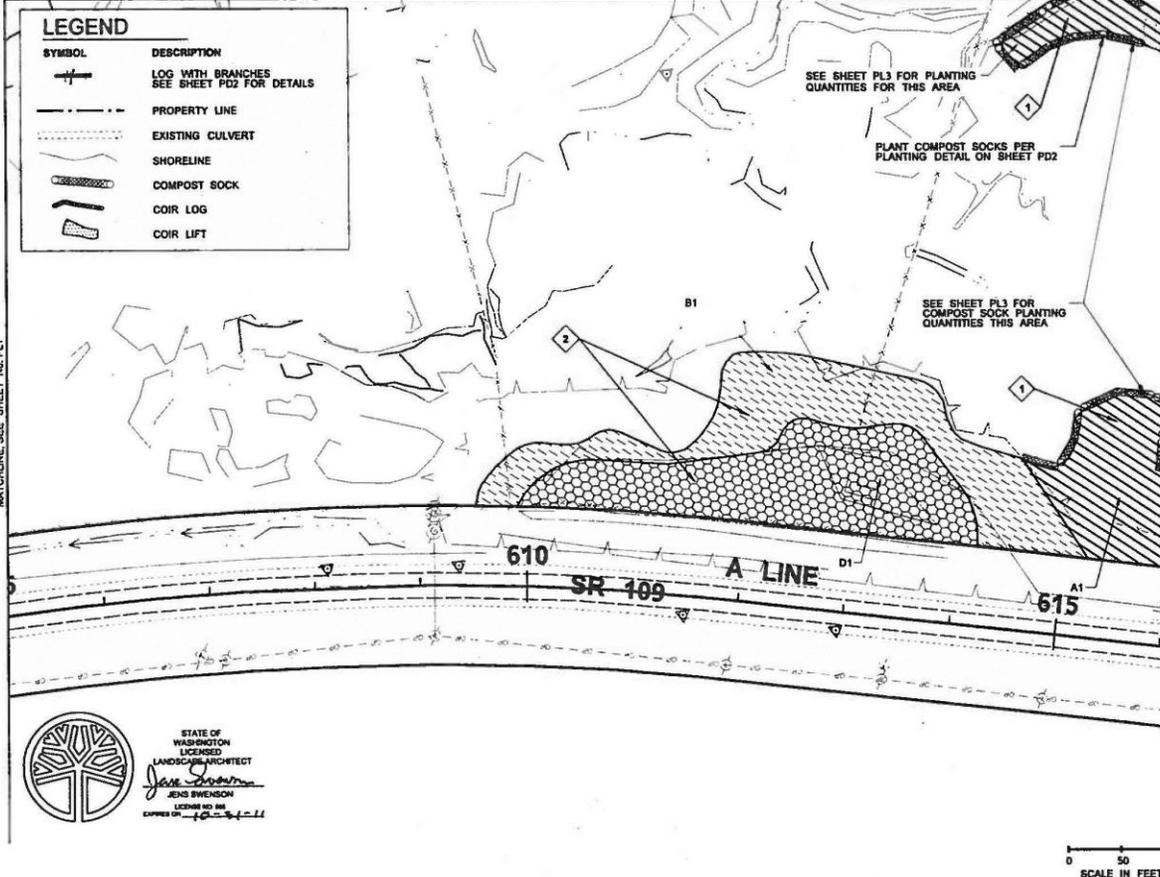
Photo 4
A mix of salt tolerant and fresh water species (July 2015)

What is planned for this site?

The region has plans to continue weed control as needed.

T. 18N., R. 11W., W.M.

MATCHLINE, SEE SHEET No. PL5



STATE OF WASHINGTON
LICENSED LANDSCAPE ARCHITECT
Jens Swenson
JENS SWENSON
LICENSED BY ME
EXPIRES ON 12-31-11

PLANTING QUANTITY TAB - THIS SHEET ONLY -

SYMBOL	ITEM	QUANTITY BY AREA
TRANSITION FORESTED PLANTING AREA		A1 41 AC
SHRUBS 4'O.C.		
	BLACK TWNBERRY	242
	OREGON CRABAPPLE	145
	SWEET GALE	97
	NOOKA ROSE	48
	HOOKEYS WILLOW	339
	DOUGLAS SPIREA	97
TREES 8'O.C.		
	RED ALDER	81
	SITKA SPRUCE	194
	CASCARA	48
	COMPOST BAGS (EA)	82
	HERBIVORE PROTECTION TUBES (EA)	274
	HOG FUEL MULCH (CU. YDS.)	165
TRANSITION FORESTED INTERPLANTING AREA		B1 64 AC
SHRUBS 4'O.C.		
	OREGON CRABAPPLE	95
	CLUSTERED ROSE	48
	SCOUERS WILLOW	167
	SITKA WILLOW	167
TREES 8'O.C.		
	SITKA SPRUCE	76
	CASCARA	19
	WESTERN RED CEDAR	32
	HERBIVORE PROTECTION TUBES (EA)	146
	HOG FUEL MULCH (CU. YDS.)	18
PALUSTRINE FORESTED INTERPLANTING AREA		D1 67 AC
SHRUBS 4'O.C.		
	INDIAN PLUM	124
	CLUSTERED ROSE	124
	COMMON SNOWBERRY	124
	EVERGREEN HUCKLEBERRY	124
TREES 8'O.C.		
	VINE MAPLE	20
	SITKA SPRUCE	40
	CASCARA	13
	WESTERN RED CEDAR	33
	WESTERN HEMLOCK	25
	HERBIVORE PROTECTION TUBES (EA)	56
	HOG FUEL MULCH (CU. YDS.)	18

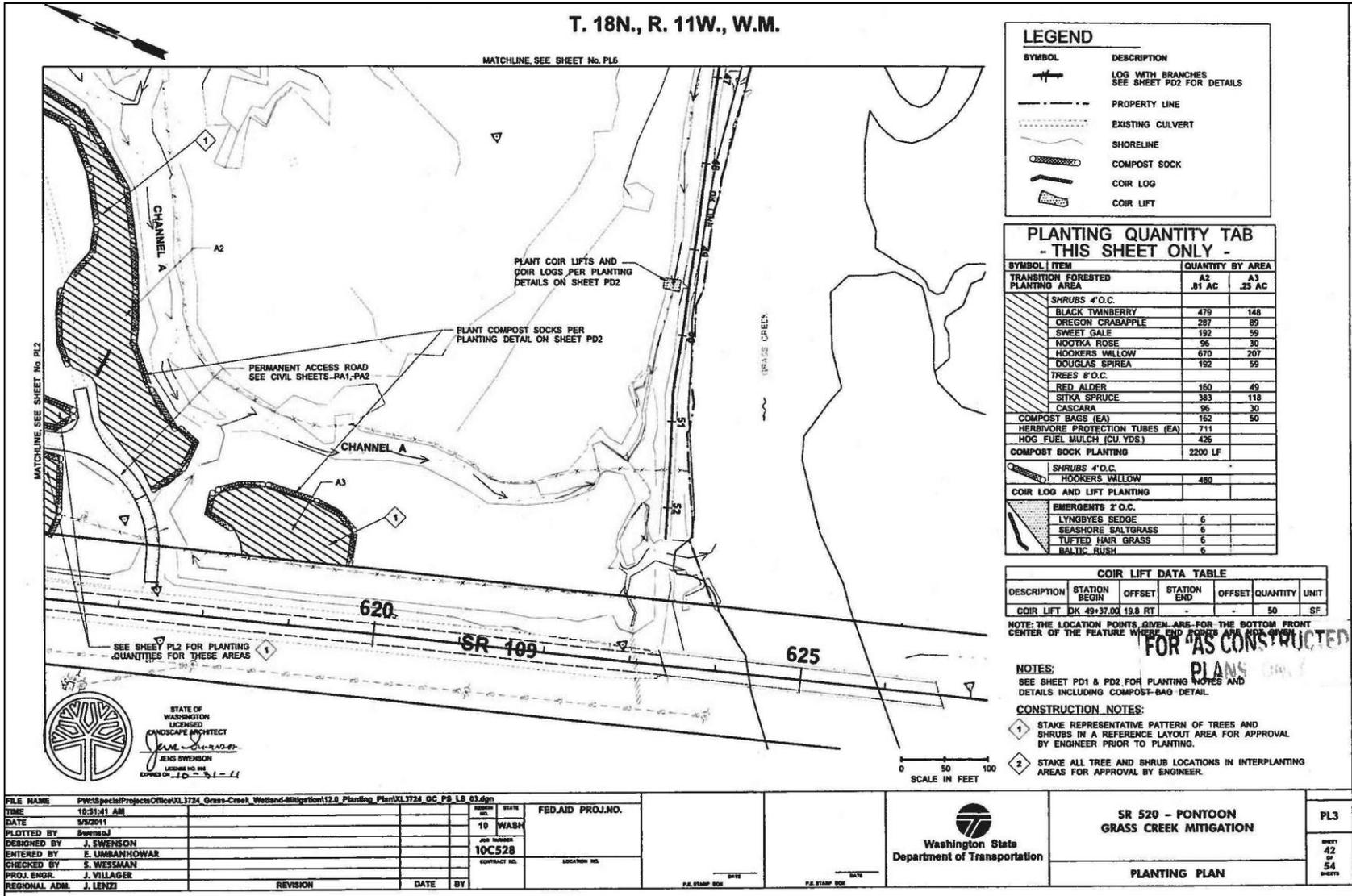
NOTES:
SEE SHEET PD1 & PD2 FOR PLANTING NOTES AND DETAILS INCLUDING COMPOST BAG DETAIL.

- CONSTRUCTION NOTES:
- 1 STAKE REPRESENTATIVE PATTERN OF TREES AND SHRUBS IN A REFERENCE LAYOUT AREA FOR APPROVAL BY ENGINEER PRIOR TO PLANTING.
 - 2 STAKE ALL TREE AND SHRUB LOCATIONS IN INTERPLANTING AREAS FOR APPROVAL BY ENGINEER.

FOR "AS CONSTRUCTED" PLANS

FILE NAME: P:\18\Special\Projects\Office\KL1724_Grass-Creek_Wetland-Mitigation\11.6_Planting_Plan\KL1724_GC_PL5_L6_02.dgn	STATE: WASH	FED/AID PROJ.NO.	SR 520 - PONTOON GRASS CREEK MITIGATION	PL2
TIME: 12:31:13 AM	REGION: 10			
DATE: 5/2/2011	JOB NUMBER: 10C528	LOCATION NO.	PLANTING PLAN	SHEET 41 OF 54 SHEETS
PLOTTED BY: BoremanJ	CONTRACT NO.			
DESIGNED BY: J. SWENSON				
ENTERED BY: E. UMBANHOWAR				
CHECKED BY: S. WESLAMAN				
PROJ. ENGR: J. VILLAGER				
REGIONAL ADM. J. LENZ	REVISION	DATE		

T. 18N., R. 11W., W.M.



LEGEND

SYMBOL	DESCRIPTION
	LOG WITH BRANCHES SEE SHEET PD2 FOR DETAILS
	PROPERTY LINE
	EXISTING CULVERT
	SHORELINE
	COMPOST SOCK
	COIR LOG
	COIR LIFT

PLANTING QUANTITY TAB - THIS SHEET ONLY -

SYMBOL ITEM	QUANTITY BY AREA	
	A2 .81 AC	A3 .25 AC
TRANSITION FORESTED PLANTING AREA		
SHRUBS 4' O.C.		
BLACK TWNBERRY	479	148
OREGON CRABAPPLE	287	89
SWEET GALE	192	59
NOOTKA ROSE	96	30
HOOKERS WILLOW	670	207
DOUGLAS SPIREA	192	59
TREES 8' O.C.		
RED ALDER	150	49
SITKA SPRUCE	283	118
CASCARA	96	30
COMPOST BAGS (EA)	162	50
HERBIVORE PROTECTION TUBES (EA)	711	
HOG FUEL MULCH (CU YDS)	426	
COMPOST SOCK PLANTING	2200 LF	
SHRUBS 4' O.C.		
HOOKERS WILLOW	480	
COIR LOG AND LIFT PLANTING		
EMERGENTS 2' O.C.		
LYNGBYES SEDGE	6	
SEASHORE SALTGRASS	6	
TUFTED HAIR GRASS	6	
BALTIC RUSH	6	

COIR LIFT DATA TABLE

DESCRIPTION	STATION BEGIN	OFFSET	STATION END	OFFSET	QUANTITY	UNIT
COIR LIFT	DK 49+37.00	19.8 RT	-	-	50	SF

NOTE: THE LOCATION POINTS GIVEN ARE FOR THE BOTTOM FRONT CENTER OF THE FEATURE WHERE END POINTS ARE INDICATED.

NOTES:
SEE SHEET PD1 & PD2 FOR PLANTING NOTES AND DETAILS INCLUDING COMPOST-BAG DETAIL.

CONSTRUCTION NOTES:

- 1 STAKE REPRESENTATIVE PATTERN OF TREES AND SHRUBS IN A REFERENCE LAYOUT AREA FOR APPROVAL BY ENGINEER PRIOR TO PLANTING.
- 2 STAKE ALL TREE AND SHRUB LOCATIONS IN INTERPLANTING AREAS FOR APPROVAL BY ENGINEER.

FILE NAME	PW:\Special\Projects\Office\UL\3724_Grass-Creek_Wetland-Mitigation\12.0 Planting Plan\UL3724_GC_PL3.LB.dgn	PROJECT NO.	10 WASH	FED.AID PROJ.NO.		Washington State Department of Transportation	SR 520 - PONTOON GRASS CREEK MITIGATION	PL3
DATE	10/21/11 AM	STATE	WASH	LOCATION NO.				
DESIGNED BY	J. SWENSON	JOB NUMBER	10C528			PLANTING PLAN	SHEET 42 OF 54	
ENTERED BY	E. UMBANHOWAR	CONTRACT NO.						
CHECKED BY	S. WESSMAN							
PROJ. ENGR.	J. VILLAGER							
REGIONAL ADM.	J. LENZI	REVISION		DATE	BY			

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on December 15, 2015 and document current site development.



Photo Point 1



Photo Point 2a



Photo Point 2b



Photo Point 2c



Photo Point 2d



Photo Point 3a



Photo Point 3b



Photo Point 4a



Photo Point 4b



Photo Point 4c



Photo Point 5a



Photo Point 5b



Photo Point 5c



Photo Point 6



Photo Point 7a



Photo Point 7b



Photo Point 8a



Photo Point 8b

Driving Directions:

From US 101 North take SR 8 West, and then continue on US 12 West. Continue on East Wishkah Street; turn right onto South Alder Street, to a slight left onto Sumner Avenue, to a right onto Levee Street. Turn left onto SR 109 for approximately 10 minutes. The site is on the east side of SR 109, look for parking pads.

Photo Point and Ground Monitoring Well Map



Appendix 3 – Data Tables

Table 1. Hydrology Observations.

Date	Surface Observations	Well ID #	Water Level (inches below soil surface unless otherwise noted)
March 12, 2015	Two small pockets of saturation one in the SE corner and one just north of the gate	1	11.5"
March 26, 2015	SE corner inundated up to 6" deep. Shallow inundation/surface saturation scattered throughout the rest of the wetland covering a total of about 80% of the area.	1	6"
April 9, 2015	Small depressions inundated	1	11"

Literature Cited

1. Coulloudon, B. et. al.1999. Sampling Vegetation Attributes. Technical Reference1734-4, Bureau of Land Management. Denver, Colorado
2. [USACE] US Army Corps of Engineers. 2008. Department of the Army Individual Permit Number NWS-2008-151.
3. [USACE] US Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), Wakeley JS, Lichvar RW, Noble CV, editors. Vicksburg (MS): US Army Engineer Research and Development Center. ERDC/EL TR-10-3. Available at: http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/west_mt_finalsupp.pdf
4. [WSDOT] Washington State Department of Transportation. 2010. Wetland and Aquatic Resources Mitigation Report Grass Creek Mitigation Site. Seattle (WA): Washington State Department of Transportation, Northwest Region.
5. [WSDOT] Washington State Department of Transportation. 2011. SR 520 - Pontoon Grass Creek Mitigation Site As-built Planting Plan.
6. [WSDOT] Washington State Department of Transportation. 2008. WSDOT Wetland Mitigation Site Monitoring Methods. <http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>