SR 520 Medina to SR 202: Eastside Transit and HOV Project (Evans Creek) Mitigation Site

USACE NWS-2009-562

Northwest Region

2014 MONITORING REPORT

Wetlands Program

Issued March 2015

Washington State Department of Transportation

Environmental Services Office

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SR 520 Evans Creek Mitigation Site USACE NWS-2009-562

General Site Information			
USACE #	NWS-2009-563		
Mitigation Location	At the confluence of Evans Creek and Bear Creek, King County		
LLID Number	1220897476792		
Construction Date	2013		
Monitoring Period	2014-2023		
Year of Monitoring	1 of 10		
Area of Project Impact[1]	7.08 acres		
Type of Mitigation	Wetland Rehabilitation	Stream Channel Establishment	Riparian Enhancement
Planned Area of Mitigation	26.16 acres	0.54 acre	1.63 acres

[1] Impact and mitigation acreage sourced from Medina to SR 202: Eastside Transit and HOV Project Final Wetland Mitigation Report Evans Creek Mitigation Site Addendum, WSDOT 2012.

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Summary of Monitoring Results and Management Activities (2014)

Proposed Performance Standards	2014 Results[2]	Management Activities
Hydrology Present	Present (see Appendix 3, Table 1)	
At least 4 plants/100ft^2 in the scrub-shrub and forested rehabilitated wetland	9.5 plants/100ft^2 ($CI_{80\%}$= 9-10)	Plantings occurred on Oct. 27-31 and Nov. 3 and 4 in 2014 throughout the site
Washington State and King County Class A noxious weeds in rehabilitated wetland eradicated	None observed	Weed control activity performed on Nov. 13, 20, and 22, in 2013, and on April 15, 16, and 24, May 21 and 22, June 9-11, 18, 25, and 26, July 3, 9, 16, 17, 21, and 31, Aug. 12, and 18-20, Sept. 25 and 29, Oct. 8-10, and 22, and Nov. 6, 7, 10, 11, and 20 in 2014 throughout the site
King County Class B and C noxious weeds in the rehabilitated wetland contained on site	purple loosestrife (*Lythrum salicaria*) present in the wetland enhancement zone	
< 25% cover non-King County Class B and C noxious weeds reed canarygrass (*Phalaris arundinacea*), non-native blackberries (*Rubus* species), and Scotch broom (*Cytisus scoparius*) collectively in the rehabilitated wetland	> 25% cover	
At least 4 native woody plants/100ft^2 in the riparian upland and upland buffer	7.5 plants/100ft^2 ($CI_{80\%}$= 7-8.1)	
Washington State and King County Class A noxious weeds in the riparian upland and upland buffer eradicated	None observed	
King County Class B and C noxious weeds in the riparian upland contained on site	None observed	
< 25% cover reed canarygrass, non-native blackberries, and Scotch broom collectively in the riparian upland area	5% cover	
At least 4 native woody plants/100ft^2 in the buffer enhancement (wet) area	7.9 plants/100ft ($CI_{80\%}$= 7.1-8.7)	

[2] Estimated values are presented with their corresponding statistical confidence interval. For example, 9.5 plants/100ft^2 ($CI_{80\%}$= 9-10) means we are 80% confident that the true density value is between nine and 10 plants per square foot.

Washington State and King County Class A noxious weeds in the buffer enhancement (wet) area eradicated.	None observed	
King County Class B and C noxious weeds in the buffer enhancement (wet) area contained on site	Purple loosestrife present	
< 25% cover non-King County Class B and C noxious weeds reed canarygrass, non-native blackberries, and Scotch broom collectively in the buffer enhancement (wet) area	10% cover	
At least 4 native woody plants/100ft^2 in the temporary wetland impact restoration zones	5 plants/100ft^2	
Washington State and King County Class A noxious weeds in the temporary wetland impact restoration zones eradicated	None observed	
King County Class B and C noxious weeds in the temporary wetland impact restoration zones contained on site	Purple loosestrife present	
< 25% cover reed canarygrass, non-native blackberries, and Scotch broom collectively in the temporary wetland impact restoration zones	40% cover	
At least 4 native woody plants/100ft^2 in the temporary stream buffer impact zones	10.9 stems/100ft^2	
Washington State and King County Class A noxious weeds in the temporary stream buffer impact zones eradicated	None observed	
< 25% cover reed canarygrass, non-native blackberries, and Scotch broom collectively in the temporary stream buffer impact zones	None observed	
< 25% cover reed canarygrass, non-native blackberries, and Scotch broom collectively in the rehabilitated wetlands	5% cover	
Habitat structures verified and documented	See Appendix 1	

Report Introduction

This report summarizes first-year (Year-1) monitoring activities at the State Route (SR) 520 Evans Creek Mitigation 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 took place on August 25-27, 2014, and hydrology visits took place on April 8 and 24, 2014.

What is the SR 520 Evans Creek Mitigation Site?

This 31.6-acre mitigation site (Figure 1) is a new wetland created at the confluence of Bear and Evans Creeks. This site was created to compensate for the permanent loss of 6.77 acres and temporary long term impact to 0.11 acre of wetlands due to construction of the Medina to SR202: Eastside Transit and HOV Project. The site is designed to provide mitigation for lost wetland functions including wildlife habitat, biological support, and storm water control.

The SR 520 Evans Creek Mitigation Site contains a wetland rehabilitation area, an area to restore wetlands from temporary impacts and an area to restore streams from temporary impacts on the south end, wet buffer enhancement areas on the north and east sides, an upland buffer enhancement area on the north side, and upland riparian enhancement area along Bear Creek on the west side of the site. Appendix 2 includes site directions.

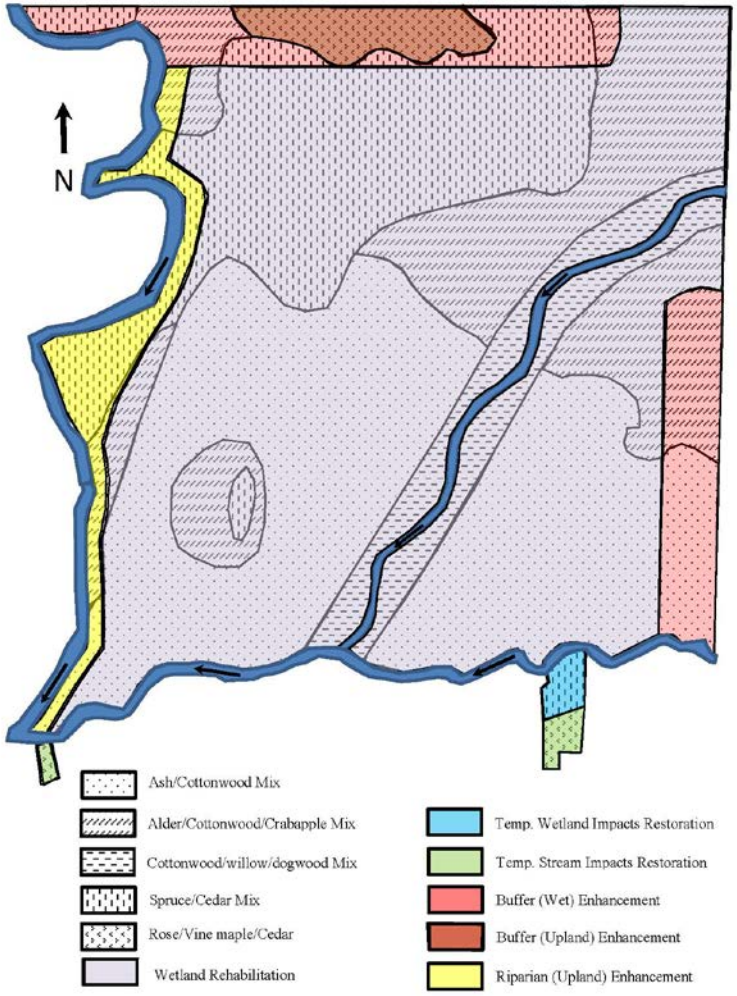


Figure 1 Site Sketch

What are the proposed year 1 performance standards for this site?

Wetland Rehabilitation

Performance Standard 1
The soils in the rehabilitated wetland will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least four consecutive weeks (10 percent) of the growing season in years when rainfall meets or exceeds the 30-year average.

Performance Standard 2
Native, wetland (facultative and wetter) woody species (planted and volunteer) will achieve an average density of at least four plants per 100 square feet in the wetland rehabilitation zones. Gravel stream bed areas will not be included in the cover assessment.

Performance Standard 3
Washington State and King County listed Class A noxious weeds identified in the wetland rehabilitation zones shall be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.

Performance Standard 4
King County designated Class B and C weeds identified in the wetland rehabilitation zones shall be controlled. Control of noxious weeds means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants.

Performance Standard 5
The following non-designate King County Class C weeds shall not exceed 25 percent cover collectively in wetland rehabilitation zones: reed canarygrass, non-native blackberries and Scotch broom.

Riparian (Upland) and Buffer (Upland) Enhancement

Performance Standard 6
Native, wetland (facultative and wetter) woody species (planted and volunteer) will achieve an average density of at least four plants per 100 square feet in the riparian (upland) and buffer (upland) enhancement zones.

Performance Standard 7
Washington State and King County listed Class A noxious weeds identified in the riparian (upland) and buffer (upland) enhancement zones shall be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.

Performance Standard 8
King County designated Class B and C weeds identified in the riparian (upland) and buffer (upland) enhancement areas shall be controlled. Control of noxious weeds means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants.

Performance Standard 9
The following non-designate King County Class C weeds shall not exceed 25 percent cover collectively in riparian (upland) and buffer (upland) enhancement areas: reed canarygrass, non-native blackberries and Scotch broom.

Buffer Enhancement (Wet)

Performance Standard 10
Native, wetland (facultative and wetter) woody species (planted and volunteer) will achieve an average density of at least four plants per 100 square feet in the buffer enhancement (wet) zones.

Performance Standard 11
Washington State and King County listed Class A noxious weeds identified in the buffer enhancement (wet) zones shall be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.

Performance Standard 12
King County designated Class B and C weeds identified in the buffer enhancement (wet) zones shall be controlled. Control of noxious weeds means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants.

Performance Standard 13
The following non-designate King County Class C weeds shall not exceed 25 percent cover collectively in buffer enhancement (wet) zones: reed canarygrass, non-native blackberries and Scotch broom.

Temporary Wetland Impact Restoration

Performance Standard 14
Native, wetland (facultative and wetter) woody species (planted and volunteer) will achieve an average density of at least four plants per 100 square feet in the temporary wetland impact zones.

Performance Standard 15
Washington State and King County listed Class A noxious weeds identified in the temporary wetland impact zones shall be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.

Performance Standard 16
King County designated Class B and C weeds identified in the temporary wetland impact zones shall be controlled. Control of noxious weeds means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants.

Performance Standard 17
The following non-designate King County Class C weeds shall not exceed 25 percent cover collectively in temporary wetland impact zones: reed canarygrass, non-native blackberries and Scotch broom.

Temporary Stream Buffer Impact Restoration

Performance Standard 18
Native, wetland (facultative and wetter) woody species (planted and volunteer) will achieve an average density of at least four plants per 100 square feet in the temporary stream buffer impact restoration areas.

Performance Standard 19
Washington State and King County listed Class A noxious weeds identified in the temporary stream buffer impact restoration areas shall be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.

Performance Standard 20
King County designated Class B and C weeds identified in the temporary stream buffer impact restoration areas shall be controlled. Control of noxious weeds means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants.

Performance Standard 21
The following non-designate King County Class C weeds shall not exceed 25 percent cover collectively in temporary stream buffer impact restoration areas: reed canarygrass, non-native blackberries and Scotch broom.

All Zones

Performance Standard 22
Habitat structures installation will be verified and an as-built plan will document that all habitat structures were installed.

Appendix 1 shows the as-built planting plan (WSDOT 2014).

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 1).

To evaluate standards for vegetative cover in the wetland and riparian areas, a 329-meter baseline was established along the west edge of the site (Figure 2). Twenty-one sampling transects were systematically placed 16 meters apart, perpendicular to the baseline. The unequal-area belt transect method was used to determine woody density with 21 one-meter wide sample units (Performance Standards 2 and 14). A 453-meter segmented baseline was established along the north and east fence lines in the buffer areas. Another 21 sampling transects were systematically placed 22-meters apart, perpendicular to the baseline. The unequal-area belt transect method was used to determine woody density in the buffer areas with 21 one-meter wide sample units (Performance Standards 6, 10, and 18). Cover of invasive species was visually estimated in each vegetation zone (Performance Standards 5, 9, 13, 17, and 21).

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

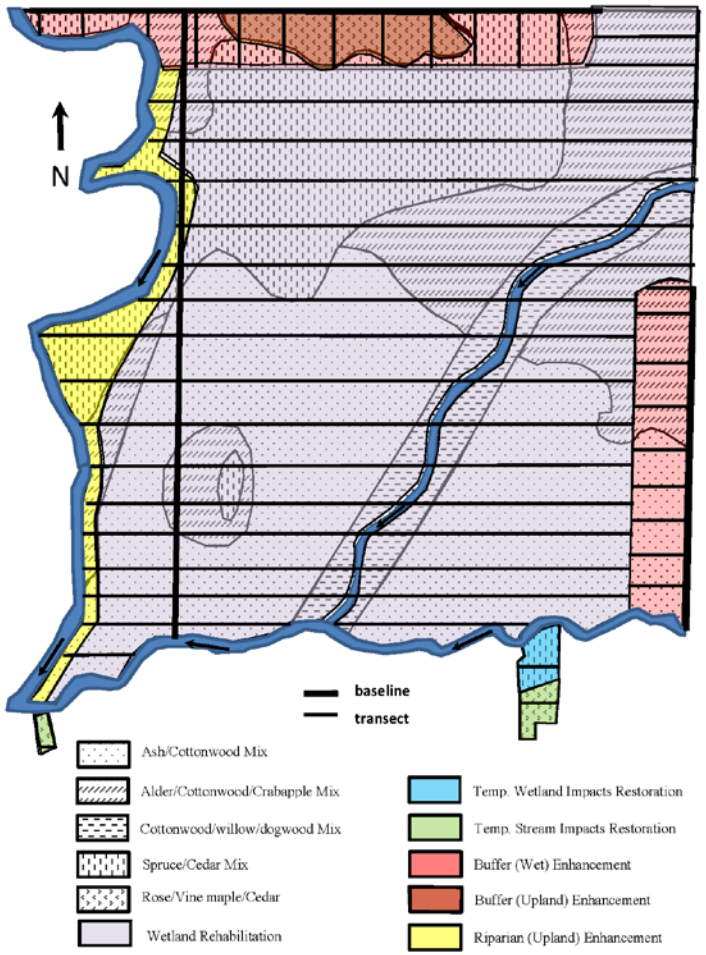


Figure 2 Site Sampling Design (2014)

How is the site developing?

In general, the site is doing well. Reed canarygrass cover across the wetland rehabilitation zone has the potential to become quite problematic and is being treated aggresively. There is also a fair amount of purple loosestrife that needs to be eradicated. The woody species are doing well in all zones and exceed the density requirements of the performance standards.

Additional water on the site near the access bridge does not appear to be causing any adverse consequences at this time to the overall woody density of the wetland rehabilitation zone. It has caused some woody mortality, but not enough to be detrimental to the site. In addition, there is now a diverse patch of emergent species in this area, including: water blinks (*Montia Fontana*), Schweinitz's flatsedge (*Cyperus schweinitzii*), and Hyssop lythrum (*Lythrum hyssopifolia*).

Wildlife and wildlife signs are present. Bullfrogs, tadpoles, and fish fry are in the stream. Ground nesting bees, pond snails, mole hills, deer tracks, and rabbit droppings were observed during monitoring activities. A beaver dam (including recently a lodge) has been on site since mid-summer and has caused extensive flooding of the southeast portion of the site.

Wetland Rehabilitation

Results for Performance Standard 1
(Wetland Hydrology):

This site is meeting the wetland hydrology requirement. On the first visit on March 18, all intended wet areas were saturated to the surface or inundated (Photo 1). In April, on the second hydrology monitoring visit, well readings were taken. Well 1 was damaged. The ground was saturated to the surface at wells 2 and 4. Well 3 did not meet the ground water standard on this visit. On the third visit, wells 2-4 met the standard. Hydrology observations are included in Appendix 3, Table 1.

Photo 1
Inundation in the wetland rehabilitation zone (March 2014)

Results for Performance Standard 2
(At least four native woody plants/100ft^2 in the wetland rehabilitation zones):

The density of native woody species in the wetland rehabilitation zones is 9.5 plants/100ft^2 ($CI_{80\%}$= 9-10) (Photo 2). This exceeds the performance standard target. Dominate species include: Hooker's willow (*Salix hookeriana*), salmonberry (*Rubus spectabilis*), Pacific crabapple (*Malus fusca*), roses (*Rosa spp.*), and western red cedar (*Thuja plicata*). Black hawthorn (*Crataegus douglasii*) and Sitka spruce (*Picea sitchensis*) were also observed during monitoring activities.

Photo 2
Density in the wetland rehabilitation zone (August 2014)

Results for Performance Standard 3
(Washington State and King County listed Class A Noxious Weeds eradicated):

No Class A noxious weeds were observed in the wetland rehabilitation zone during monitoring activities.

Results for Performance Standard 4
(King County Class B and C controlled):

Purple loosestrife was observed in the wetland rehabilitation zone. Site managers have been notified.

Results for Performance Standard 5
(Less than 25% cover non-designate King County Class C weeds: reed canarygrass, non-native blackberries, and Scotch broom collectively):

The cover of the listed species in the wetland rehabilitation zone is visually estimated to be greater than 25 percent, exceeding the threshold for this performance standard. Extensive weed control was performed in this zone in the fall, so this percentage is expected to drop in 2015.

Riparian (Upland) and Buffer (Upland) Enhancement

Results for Performance Standard 6
(At least four native woody plants/100ft^2 in the upland and upland buffer enhancement areas):

Native woody density in the riparian (upland) and buffer (upland) enhancement zones is 7.5 plants/100ft^2 ($CI_{80\%}$= 7-8.1). This value exceeds the performance standard target. Dominant species include: twinberry honeysuckle (*Lonicera involucrata*), roses, and willows (*Salix spp.*). Other species present include: black cottonwood (*Populus balsamifera*), Sitka spruce, and redosier dogwood (*Cornus alba*).

Results for Performance Standard 7
(Washington State and King County listed Class A Noxious Weeds eradicated):

No Class A noxious weeds were observed in the riparian (upland) and buffer (upland) enhancement zones during monitoring activities.

Results for Performance Standard 8
(King County Class B and C controlled):

No designated Class B and C weeds were observed in the riparian (upland) and buffer (upland) enhancement zones.

Results for Performance Standard 9
(Less than 25% cover non-designate King County Class C weeds: reed canarygrass, non-native blackberries, and Scotch broom collectively):

Cover of the listed non-designated Class C weeds is visually estimated to be five percent. This value is below the performance standard threshold and consists of scattered pockets of reed canarygrass and Himalayan blackberry (*Rubus armeniacus*).

Buffer Enhancement (Wet)

Results for Performance Standard 10
(At least four native woody plants/100ft^2 in the buffer enhancement (wet) zones):

Native woody density in the wet buffer enhancement (wet) zones is 7.9 plants/100ft^2 ($CI_{80\%}$= 7.1-8.7). This value exceeds the performance standard target. The wet buffer is divided into several distinct plant communities. The dominate species in the northern half of the eastern buffer is Sitka willow, with sub-dominate species: Pacific crabapple, Sitka spruce, black cottonwood, and redosier dogwood. Dominate species in the southern half of the eastern buffer are redosier dogwood and Pacific willow (*Salix lasiandra*), with sub-dominate species: black cottonwood, Oregon ash (*Fraxinus latifolia*), and twinberry honeysuckle. Dominate species in the most southern tip of the eastern buffer area include: black cottonwood and Pacific willow with redosier dogwood, Oregon ash, and twinberry honeysuckle. The northern buffer area is dominated by cluster rose (*Rosa pisocarpa*), thimbleberry (*Rubus parviflorus*), and Cascara buckthorn (*Frangula purshiana*), with sub-dominate species: western red cedar, vine maple (*Acer circinatum*), Sitka spruce, black hawthorn, red alder (*Alnus rubra*), and salmonberry (*Rubus spectabilis*).

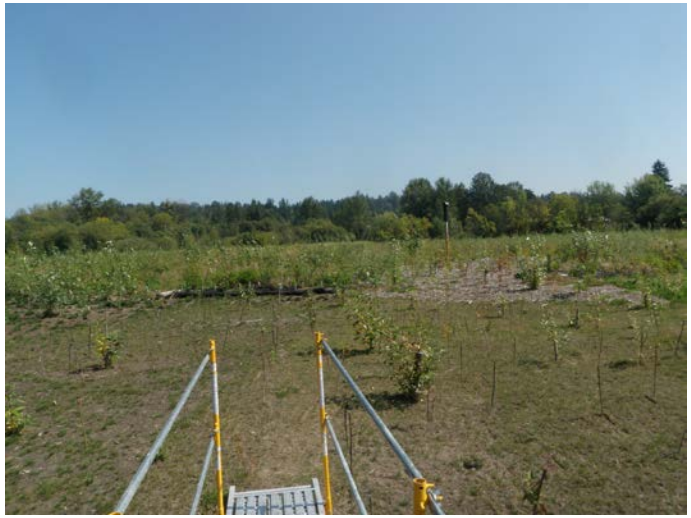


Photo 3
Density in the buffer enhancement (wet) zone (August 2014)

Results for Performance Standard 11
(Washington State and King County listed Class A Noxious Weeds eradicated):

No Class A noxious weeds were observed in the buffer enhancement (wet) zone during monitoring activities.

Results for Performance Standard 12
(King County Class B and C controlled):

Purple loosestrife was observed in the buffer enhancement (wet) zone. Site managers have been notified.

Results for Performance Standard 13
(Less than 25% cover non-designate King County Class C weeds: reed canarygrass, non-native blackberries, and Scotch broom collectively):

Cover of listed non-designated Class C weeds is visually estimated to be 40 percent in the buffer enhancement (wet) zone, consisting of primarily reed canarygrass. This value exceeds the performance standard threshold and site managers have been notified.

Temporary Wetland Impact Restoration

Results for Performance Standard 14
(At least four native woody plants/100ft^2 in the temporary wetland impact restoration zones):

Density of native wetland woody species is visually estimated at five plants/100ft^2. High water prevented sampling. This value exceeds the performance standard target. Redosier dogwood and willows are dominate species in this zone.

Results for Performance Standard 15
(Washington State and King County listed Class A Noxious Weeds eradicated):

No Class A noxious weeds were observed in the temporary wetland impact restoration zone during monitoring activities.

Results for Performance Standard 16
(King County Class B and C controlled):

Purple loosestrife was observed in the temporary wetland impact restoration zone during monitoring activities. Site managers have been notified.

Results for Performance Standard 17
(Less than 25% cover non-designate King County Class C weeds: reed canarygrass, non-native blackberries, and Scotch broom collectively):

Cover of listed non-designated Class C weeds is visually estimated at 40 percent in the temporary wetland impact restoration zone, consisting primarily of reed canarygrass. This estimate exceeds the performance standard threshold. Site managers have been notified.

Temporary Stream Buffer Impact Restoration

Results for Performance Standard 18
(At least four native woody plants/100ft^2 in the temporary stream buffer impact restoration zones):

Density of native woody species in the temporary stream buffer impact restoration zone was visually estimated at 10.9 plants/100ft^2. This value exceeds the performance standard target. Dominate species include: roses, salmonberry, and Hooker's willow.

Results for Performance Standard 19
(Washington State and King County listed Class A Noxious Weeds eradicated):

No Class A noxious weeds were observed in the temporary stream buffer impact restoration zone during monitoring activities.

Results for Performance Standard 20
(King County Class B and C controlled):

No Class B or C noxious weeds were observed in the temporary stream impact restoration zones during monitoring activities.

Results for Performance Standard 21
(Less than 25% cover non-designate King County Class C weeds: reed canarygrass, non-native blackberries, and Scotch broom collectively):

Cover of listed non-designated Class C weeds is visually estimated at five percent in the temporary stream impact restoration zone. This estimate is below the performance standard threshold. All weeds observed were on the west side of the zone along Evans Creek.

All Zones

Results for Performance Standard 22
(Habitat Structures):

Habitat structures were installed (see Appendix 1).

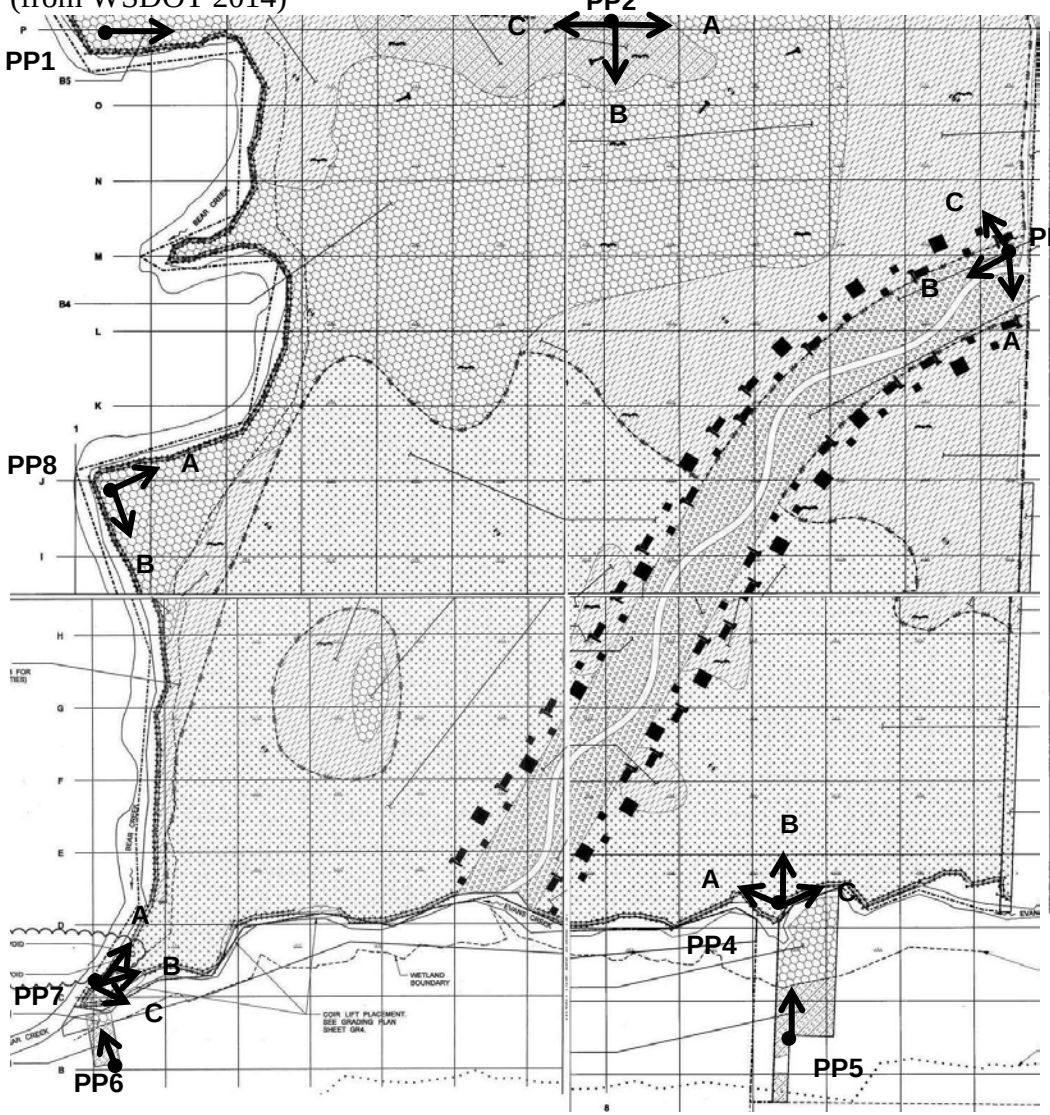
Photo 4
Habitat structures (August 2014)

What is planned for this site?

Ongoing weed control is planned for 2015.

Appendix 1 – Asbuilt Planting Plan with Habitat Structures and Photo Point Locations, and Hydrology Well Locations

(from WSDOT 2014)



BID ITEMS QUANTITIES

SYMBOL	ITEM		QUANTITY**								
MIX 1 (4' O.C.)			S1	S2	S3						
	*OREGON ASH			1502	39						
	*BLACK COTTONWOOD (LP)			751	20						
	*BLACK COTTONWOOD (LS)			751	20						
	*PACIFIC WILLOW			1502	39						
	SITKA WILLOW			2253	59						
	RED OSIER DOGWOOD			2253	59						
	PACIFIC NINEBARK			3004	79						
	BLACK TWINBERRY			3004	79						
MIX 2 (4' O.C.)			A1	A2	A3	A4	A5	A6	A7	A8	A9
	*RED ALDER				130	80	96				
	*SITKA SPRUCE				98	60	72				
	*BLACK COTTONWOOD (LP)				52	32	38				
	*BLACK COTTONWOOD (LS)				46	28	34				
	SITKA WILLOW				65	40	48				
	PACIFIC CRABAPPLE				98	60	72				
	RED OSIER DOGWOOD				98	60	72				
	BLACK TWINBERRY				65	40	48				
	SALMONBERRY				65	40	48				
	WOOD CHIP MULCH	(SY)			250	154	185				
MIX 3 (4' O.C.)			B1	B2	B3	B4	B5				
	*RED ALDER				27						
	*SITKA SPRUCE				55						
	*WESTERN RED CEDAR				82						
	SCOULERS WILLOW				109						
	BLACK HAWTHORN				55						
	PEAFRUIT ROSE				109						
	SALMONBERRY				109						
	COARSE COMPOST	(SY)			210						
	WOOD CHIP MULCH	(SY)			210						
MIX 4 (4' O.C.)			C1	C2	C3						
	*SITKA SPRUCE			53							
	*WESTERN RED CEDAR			106							
	CASCARA			53							
	THIMBLEBERRY			106							
	VINE MAPLE			106							
	NOOTKA ROSE			106							
	COARSE COMPOST	(SY)		205							
	WOOD CHIP MULCH	(SY)		205							
MIX 5 (3' O.C.) - SEE NOTE 2.			D1	D2							
	*BLACK COTTONWOOD (LP)										
	*BLACK COTTONWOOD (LS)										
	RED OSIER DOGWOOD (LS)										
	SITKA WILLOW (LS)										
PLANTING MOUNDS - SEE SHEET PD2 FOR DETAILS.			E1								
	*SITKA SPRUCE		384								
	SALMONBERRY		384								
	BLACK TWINBERRY		375								
	COMPOST SOCK	(LF)	14400								
LIVE STAKES (3' O.C.) - SEE SHEET PD2 FOR DETAILS.			F1								
	SITKA WILLOW (LS)		1622								
	RED OSIER DOGWOOD (LS)		1622								
HABITAT FEATURES - SEE SHEET PD3 FOR DETAILS.			G1								
	HABITAT LOG		7								
	NEST BOX		3								

*PLANT TREES AT 8' O.C. MINIMUM SPACING.
**ALL QUANTITIES ARE PER EACH UNLESS OTHERWISE INDICATED.

LEGEND:

- IRR - - TEMPORARY IRRIGATION AREA LIMITS
- PIEZOMETER

NOTE:

1. TREE SPECIES SHALL BE RANDOMLY MIXED THROUGHOUT EACH PLANTING AREA PLANT SHRUBS IN SINGLE SPECIES GROUPINGS OF 3-5 PLANTS EACH.
2. MIX 5 SHALL BE PLANTED IN TEMPORARY SOD. SEE TESC PLANS.
3. PLANTING AREA WEED CONTROL COVERED UNDER PSIPE FOR ALL PLANTING AREAS.

GPS Data - SR 520 Evans Creek, 4/8/2014

2013 Digital Orthophoto
from USDA NAIP.

N

0 100 200 300 400
Feet

4/16/2014

Groundwater Monitoring Wells

i:/gps/gpsdata/sr520EvansCreek.mxd

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on August 25, 2014 and document current site development.

Photo Point 1

Photo Point 2a

Photo Point 2b

Photo Point 2c

Photo Point 3a

Photo Point 3b

Photo Point 3c

Photo Point 4a

Photo Point 4b

Photo Point 4c

Photo Point 5

Photo Point 6

Photo Point 7a

Photo Point 7b

Photo Point 7c

Photo Point 8a

Photo Point 8b

Driving Directions:

From I-5, exit onto I-90 East. Take exit 10A for I-405 North towards Bothell/Everett. Continue onto I-405 North. Take exit 14 for Washington 520 East toward Redmond. Merge onto Highway 520 East. After 6.3 miles, turn right onto Northeast Union Hill Road. Turn left onto 188th Avenue Northeast. The gate is down a gravel road at the end of 188th Avenue Northeast before the road turns right and becomes Northeast 84th Street. The combination is 2646.

Appendix 3 – Data Tables

Table 1 Hydrology Observations

Date	Surface Observations	Well #	Water Level (inches below soil surface unless otherwise noted)
April 8, 2014	Wells were installed this visit. Well 1 was damaged and not sampled. The south side of the site is saturated or inundated. The north side is dry at the surface or ponded in low areas. The palustrine forest area has no surface water and appears dry. Algal mat/crust, drainage patterns, and hydrogen sulfide odor present.	1	
		2	Saturated to the surface
		3	**13**
		4	Saturated to the surface
April 24, 2014	Site is wetter than on previous visit, appearing to have plenty of water to support hydrophytic vegetation.	1	
		2	9.5
		3	7.5
		4	3

Literature Cited

1. Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Vicksburg (MS): US Army Engineer Waterways Experiment Station. Technical Report Y-87-1.

2. [USACE] US Army Corps of Engineers. 2011. Department of the Army Individual Permit Number NWS-2009-562.

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