SR 522: Snohomish River Bridge to US 2 Phase 1: SR 522/US 2 Interchange Vicinity (Al Borlin Park & French Creek Tributary) Mitigation Sites

WIN: A52234K

USACE NWP (14) NWS-2010-31

Northwest Region

2014 MONITORING REPORT

Wetlands Program

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Environmental Services Office

Author:
Sean Patrick

Editor:
Tony Bush

Contributors:
Kristen Andrews and Tatiana Dreisbach

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

Tony Bush, Wetlands Program
WSDOT, Environmental Services Office
P. O. Box 47332, Olympia, WA 98504
Phone: 360-570-6640 E-mail: busht@wsdot.wa.gov

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SR 522 Al Borlin Park & French Creek Tributary Mitigation Sites

USACE NWP (14) NWS-2010-31

General Site Information		
USACE Permit Number	NWP (14) NWS-2010-31	
Mitigation Location	At the intersection of SR 522 and US 2 and at Al Borlin Park along the Skykomish River	
LLID Number	1219818478623	
Work Item Number	A52234K	
Construction Date	2010-2011	
Monitoring Period	2012-2016	
Year of Monitoring	3 of 5	
Type of Project Impact	Stream Buffer	Stream Channel
Area of Project Impact[1]	1.74 acres	773 linear feet
Type of Mitigation	Stream Buffer Creation/ Enhancement	Stream Channel Creation
Planned Area of Mitigation[1]	1.47 acres	1,083 linear feet

[1] Impact and mitigation acreages were referenced from the Wetland and Stream Mitigation Report (WSDOT 2009). Wetland impacts (0.16 acre) from this project were mitigated by purchasing credits at the Snohomish Basin Mitigation Bank, which is located in WRIA 07.

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Summary of Monitoring Results and Management Activities (2014)

Performance Standards	2014 Results[2]	Management Activities
The native woody species will maintain a minimum average density of four plants per 100 square feet in the riparian buffer planting areas. Native colonizing vegetation will be included in this density calculation.	**Al Borlin Park:** 11 plants/100ft² ($CI_{80\%}$ = 10-12) **French Creek Trib:** 5.9 plants/100ft² ($CI_{80\%}$ = 5.4-6.5)	
No more than 20 percent cover by nonnative, invasive species (Appendix 3, Table 1).	**Al Borlin Park:** <5% cover **French Creek Trib:** 23% cover ($CI_{80\%}$ = 17-29%)	Weed control conducted at the Al Borlin Park site on 5 dates between January and July, 2014. Weed control performed at French Creek several times during the spring and summer of 2014.
If at any point during the monitoring period purple loosestrife (*Lythrum salicaria*) and/or Japanese knotweed (*Polygonum cuspidatum*) (and related species and hybrids) are found on the mitigation site, immediate removal and control will be initiated.	**Al Borlin Park:** A few Japanese knotweed plants were observed on-site. **French Creek Trib:** None	Japanese Knotweed is controlled regularly on the Al Borlin Park site. Al Borlin Park covers a large area, and knotweed has established in other areas of the park.
The tree top revetment will be monitored for structural integrity to ensure that the performance standards related to stream buffer enhancement planting are achieved.	The tree top revetment structure is no longer present and all the willow stakes have been removed.	WSDOT and the City of Monroe agreed not to replace the revetment or live stake plantings in February 2013
Inspect channel condition and document that channel does not show signs of significant headcutting, avulsion, or subsurface seepage as determined from visual inspection.	No signs of significant headcutting, avulsion, or subsurface seepage.	

Report Introduction

This report summarizes third-year (Year-3) monitoring activities at the State Route (SR) 522 Al Borlin Park & French Creek Tributary Mitigation Sites. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities in 2014 included vegetation surveys and photo-documentation. Vegetation monitoring occurred on July 2, 8, and 9.

[2] Estimated values are presented with their corresponding statistical confidence interval. For example, 11 plants/100ft² ($CI_{80\%}$ = 10-12) means we are 80% confident that the true density value is between 10 and 12 plants/100ft².

What are the SR 522 Al Borlin & French Creek Tributary Mitigation Sites?

Mitigation for the impacts associated with this project is provided in two locations. The 0.92 acre off-site mitigation area is located within Al Borlin Park along the Skykomish River. The 90-acre park is on a peninsula formed by the Skykomish River and Woods Creek. It is a natural park that is thickly wooded and crisscrossed with a network of trails. The portion of the park used for mitigation was primarily unvegetated or vegetated by non-native blackberries. Mitigation activities in this area included clearing non-native vegetation, soil amendments, native shrub and tree plantings along and above the bank of the Skykomish River, and stabilizing the bank using tree top revetments.

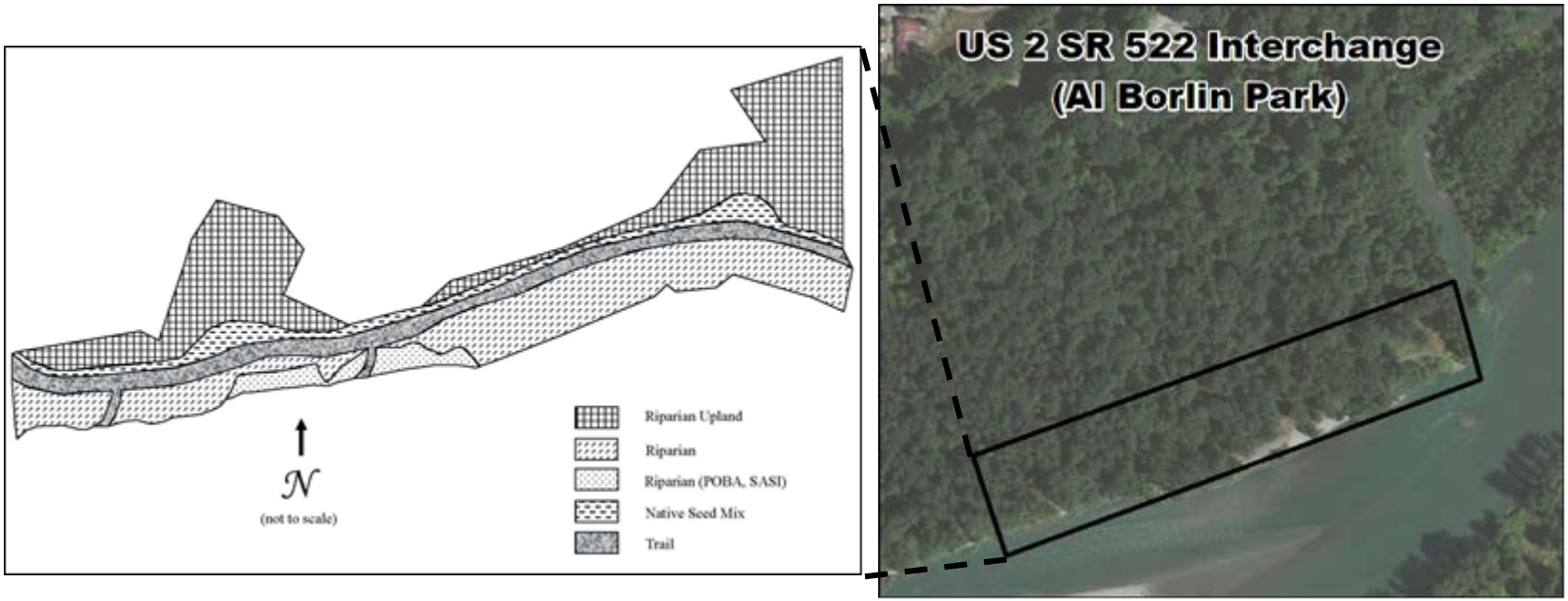


Figure 1 Site Sketch

The US 2/SR 522 Interchange (Al Borlin Park) Mitigation Site consists of several types of vegetation communities. These communities include wet riparian shrub species closer to the river, upland riparian buffer areas as the topography changes as well as a native seed mix to fill in the bare ground areas. Under plantings in areas with existing vegetation also create multiple strata while inhibiting weed growth. Appendix 2 includes site directions.

The US 2/SR 522 Interchange On-Site Mitigation Area (French Creek Tributary) is located immediately north of US 2 on both sides of the SR 522 overpass. On-site mitigation activities include daylighting and realigning a reach of Stream WRIA 07-0186(b) along US 2 and creating 20,473 square feet of new riparian buffer area associated with the new sections of stream channel, as well as enhancing 3,485 square feet of existing riparian buffer.

What are the performance standards for these sites?

Performance Standard 1
The native woody species will maintain a minimum average density of four plants per 100 square feet in the riparian buffer planting areas. Native colonizing vegetation will be included in this density calculation.

Performance Standard 2
No more than 20 percent cover by nonnative, invasive species (Appendix 3, Table 1).

Performance Standard 3
If at any point during the monitoring period purple loosestrife (*Lythrum salicaria*) and/or Japanese knotweed (*Polygonum cuspidatum*) (and related species and hybrids) are found on the mitigation site, immediate removal and control will be initiated.

Performance Standard 4
The tree top revetment will be monitored for structural integrity to ensure that the performance standards related to stream buffer enhancement planting are achieved. If at any time during the establishment of the stream buffer vegetation, the tree top revetment is damaged, or significant erosion is observed, the monitoring team will relay the information to site managers to repair the revetment. Permanent photo points will document the condition of the tree top revetment and the development of the stream buffer vegetation.

Performance Standard 5
Inspect channel condition and document that channel does not show signs of significant headcutting, avulsion, or subsurface seepage as determined from visual inspection.

Appendix 1 shows the planting plans (WSDOT 2009 and 2012).

How were the performance standards evaluated?

To evaluate native woody density (Performance Standard 1) at the Al Borlin Park site, a 187-meter baseline was established parallel to the Skykomish River (Figure 2). Nineteen one-meter-wide unequal-area belt transects were placed perpendicular to the baseline using a systematic random sample design. The area in the red box in Figure 2 was not sampled for density due to previous vandalism and the subsequent decision not to replace the treetop revetment or replant in this area. Visual observations were used to assess the presence, and estimate the cover, of targeted non-native, invasive species (Performance Standards 2 and 3). Photos were used to document the presence and condition of the tree-top revetment (Performance Standard 4).

To evaluate vegetative performance standards at the French Creek Tributary site, a 303-meter baseline was established parallel to French Creek Tributary (Figure 3). Twenty transects were placed perpendicular to the baseline using a systematic random sample design. One-meter-wide unequal-area belt transects were used to estimate the density of native woody species (Performance Standard 1). The point-line method was used to estimate the cover of targeted non-native, invasive species (Performance Standard 2). Twenty-three 10-meter-long point-line sample units (20 points per sample unit) were randomly positioned along the transects. Visual observations were used to assess the presence of purple loosestrife and Japanese knotweed (Performance Standard 3) and to assess the condition of the stream channel (Performance Standard 5).

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

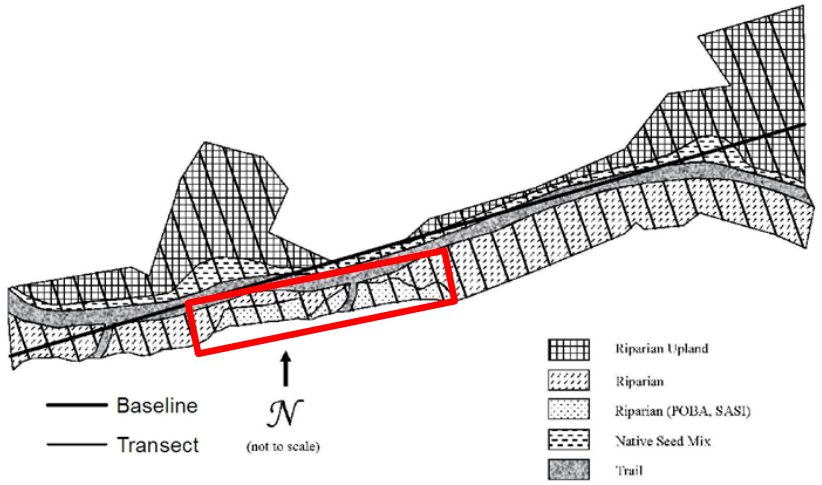


Figure 2 Al Borlin Park Sampling Design (2014)

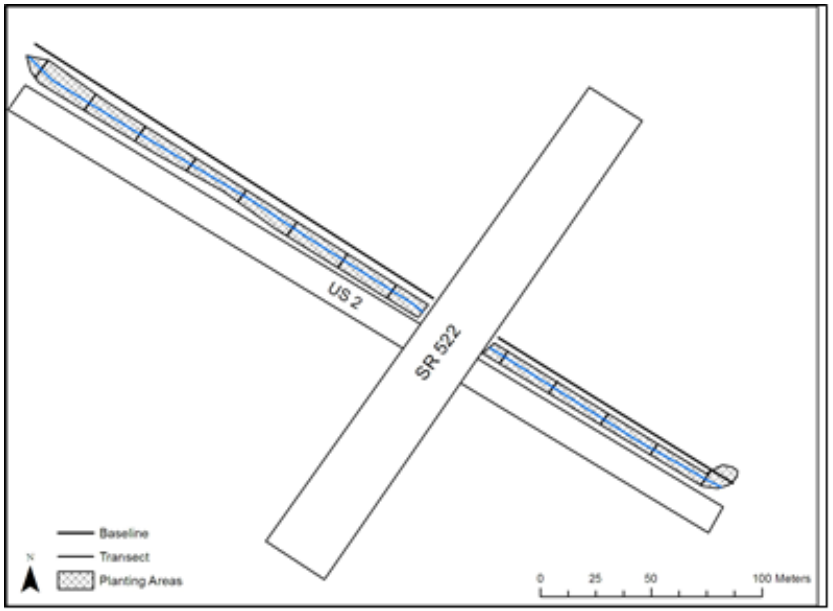


Figure 3 French Creek Tributary Sampling Design (2014)

How are the sites developing?

These sites are developing as intended, with the exception of the tree-top revetment area at the Al Borlin Park site (see Results for Performance Standard 4 below). On both sites, the densities of native woody species are exceeding the targets (Performance Standard 1).

At the Al Borlin Park site, a diverse native woody community (consisting of at least 17 species) has developed, with native woody cover visually estimated at 30 percent. Despite some Japanese knotweed (*Reynoutria japonica*) continuing to creep onto the site from established infestations just off-site, cover of invasive species is quite low (visually estimated at less than five percent), due to sheet mulching and ongoing weed control efforts.

The native woody community at the French Creek Tributary site, although somewhat less diverse with at least 12 species present and willows (*Salix spp.*) dominating, has quickly developed dense cover that is providing shade to the creek and is, for the most part, outcompeting non-native species in a highly disturbed urban environment. Although the cover of reed canarygrass (*Phalaris arundinacea*) on this site has resulted in the overall cover of targeted invasive species being estimated at slightly over the performance standard threshold, it does not seem to be significantly impacting the development of the native woody community, which has now achieved about 80 percent cover.

Results for Performance Standard 1
(At least 4 plants/100ft^2 in the riparian buffer):

The density of native woody species in the sampled area of the Al Borlin Park site (Photo 1) is estimated at 11 plants per 100 square feet ($CI_{80\%}$ = 10-12). The dominant woody species on this site are salmonberry (*Rubus spectabilis*), snowberry (*Symphoricarpos albus*), and cluster rose (*Rosa pisocarpa*).

The density of native woody species at the French Creek Tributary site (Photo 2) is estimated at 5.9 plants per 100 square feet ($CI_{80\%}$ = 5.4-6.5). The dominant woody species on this site are western serviceberry (*Amelanchier alnifolia*), snowberry (*Symphoricarpos albus*), Scouler's willow (*Salix scouleriana*), and Pacific willow (*Salix lasiandra*).

Results for Performance Standard 2
(No more than 20% cover of targeted invasive species):

The cover of targeted invasive species at the Al Borlin Park site is visually estimated at less than five percent. The applicable species observed on-site were Himalayan blackberry (*Rubus armeniacus*), reed canarygrass (*Phalaris arundinacea*), Robert geranium (*Geranium robertianum*), English ivy (*Hedera helix*), and Japanese knotweed (*Reynoutria japonica*).

The cover of targeted invasive species at the French Creek Tributary site is estimated at 23% ($CI_{80\%}$ = 17-29%). The dominant invasive species on-site are reed canarygrass and Himalayan blackberry. The other applicable species observed on-site are Robert geranium, Scotch broom (*Cytisus scoparius*), and cutleaf blackberry (*Rubus laciniatus*).

Photo 1
Woody density at the Al Borlin Park site (July 2014)

Photo 2
Woody density at the French Creek Tributary site (July 2014)

Results for Performance Standard 3
(Immediate control of any purple loosestrife or Japanese knotweed found on the mitigation site):

Japanese knotweed (*Reynoutria japonica*) was present just to the north of the Al Borlin Park site with a few individuals found on-site. This will be an ongoing issue until the knotweed in the vicinity of the site is eradicated. Japanese knotweed was targeted in weed control efforts four times in 2014 (three times prior to monitoring and once about a week after monitoring was completed).

Japanese knotweed was not observed on the French Creek Tributary site during monitoring activities.

Photo 3
Tree top revetment area (July 2014)

Results for Performance Standard 4
(The tree top revetment will be monitored for structural integrity):

The tree top revetment is no longer present and all the willow stakes have been removed (Photo 3). WSDOT met with the City of Monroe in February 2013, and the City agreed that the revetment and live stakes are not compatible with the recreational use of the area. These features will not be replaced.

Results for Performance Standard 5
(Inspect and document channel condition at the French Creek Tributary site):

During monitoring, the creek channel at the French Creek Tributary site was inspected and the banks were found to be stable and densely vegetated in the planted areas of the site (Appendix 2, Photo Point 6). No signs of significant headcutting, avulsion, or subsurface seepage were observed.

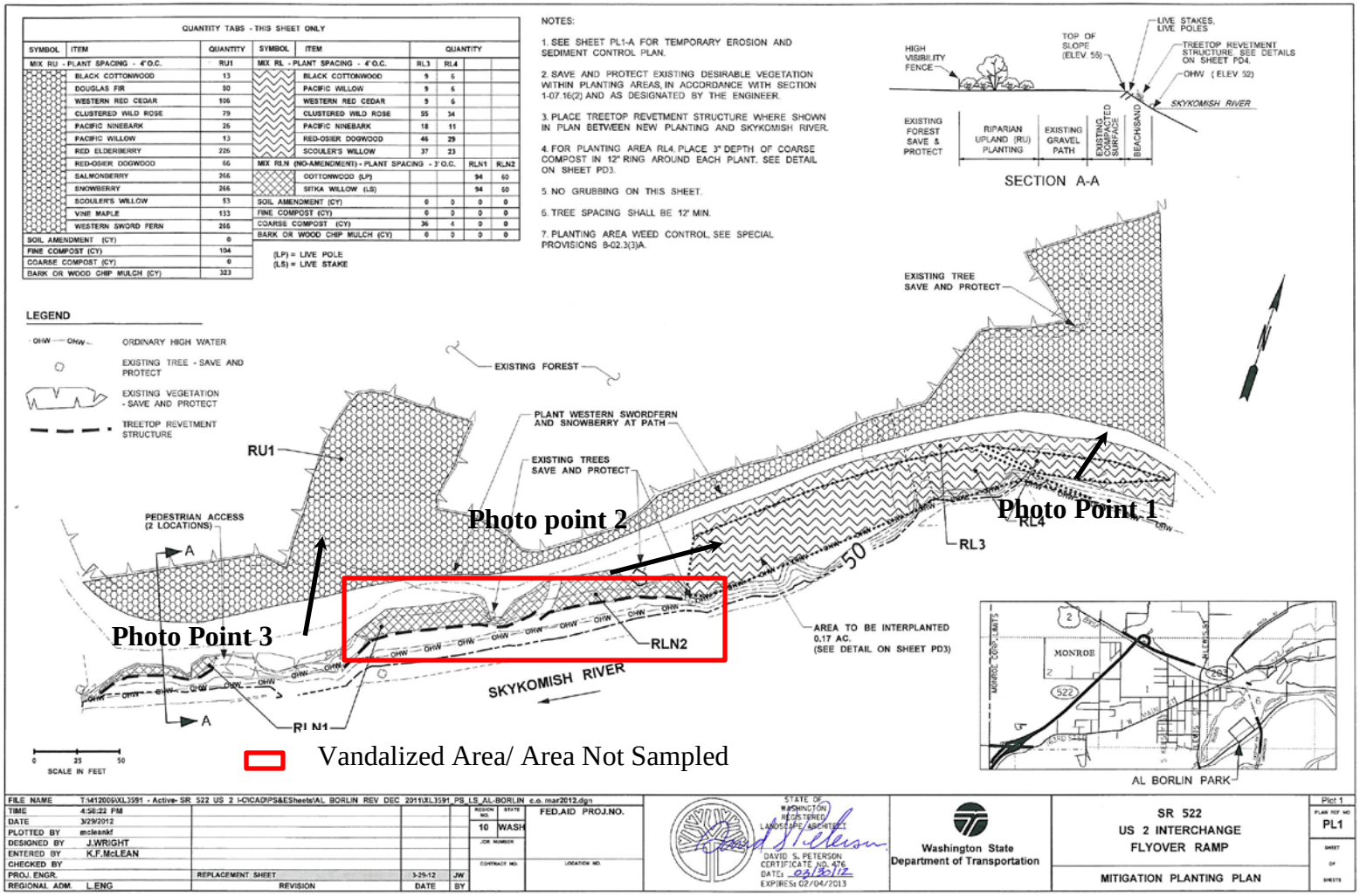
What is planned for these sites?

Mitigation area maintenance at Al Borlin Park will continue for 2 more years. Maintenance will focus on weed control within the newly planted areas. Blackberry and Japanese Knotweed are expected to require aggressive control. Due to the success of the planting, additional planting is not likely to be needed.

French Creek will continue to receive weed control for 2 more years. A major focus will be to control reed canarygrass at the stream, and blackberry in the buffer areas. This control will occur during the active growing season. Additional planting is not expected due to the successful coverage of the planted areas.

Appendix 1 – Planting Plans with Photo Point Locations

(from WSDOT 2009 and 2012)



SYMBOL	ITEM	QUANTITY
MIX RU - PLANT SPACING - 4' O.C.		RU1
	BLACK COTTONWOOD	13
	DOUGLAS FIR	90
	WESTERN RED CEDAR	106
	CLUSTERED WILD ROSE	79
	PACIFIC NINEBARK	25
	PACIFIC WILLOW	13
	RED ELDERBERRY	226
	RED-OSIER DOGWOOD	66
	SALMONBERRY	266
	SNOWBERRY	266
	SCOULER'S WILLOW	53
	VINE MAPLE	133
	WESTERN SWORD FERN	266
SOIL AMENDMENT (CY)		0
FINE COMPOST (CY)		104
COARSE COMPOST (CY)		0
BARK OR WOOD CHIP MULCH (CY)		323

SYMBOL	ITEM	QUANTITY			
MIX RL - PLANT SPACING - 4' O.C.		RL3	RL4		
	BLACK COTTONWOOD	9	5		
	PACIFIC WILLOW	9	5		
	WESTERN RED CEDAR	9	5		
	CLUSTERED WILD ROSE	55	34		
	PACIFIC NINEBARK	18	11		
	RED-OSIER DOGWOOD	46	29		
	SCOULER'S WILLOW	37	23		
MIX RLN (NO-AMENDMENT) - PLANT SPACING - 3' O.C.				RLN1	RLN2
	COTTONWOOD (LP)			94	60
	SITKA WILLOW (LS)			94	60
SOIL AMENDMENT (CY)		0	0	0	0
FINE COMPOST (CY)		0	0	0	0
COARSE COMPOST (CY)		36	4	0	0
BARK OR WOOD CHIP MULCH (CY)		0	0	0	0

FILE NAME	T:\412006\XL\3591 - Active- SR 522 US 2 I-C\CAD\PS&E\Sheets\AL BORLIN REV DEC 2011\XL\3591_PS_LS_AL-BORLIN c.o. mar2012.dgn
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DATE	3/29/2012
PLOTTED BY	mcleankf
DESIGNED BY	J.WRIGHT
ENTERED BY	K.F.McLEAN
CHECKED BY	
PROJ. ENGR.	
REGIONAL ADM.	L.ENG

REPLACEMENT SHEET		3-25-12	JW
REVISION		DATE	BY

REGION NO. 10 STATE WASH
FED.AID PROJ.NO.
JOB NUMBER
CONTRACT NO.
LOCATION NO.

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
DAVID S. PETERSON CERTIFICATE NO. 476
DATE: 03/30/12
EXPIRES: 02/04/2013

PLAN REF NO. PL1
SHEET OF SHEETS

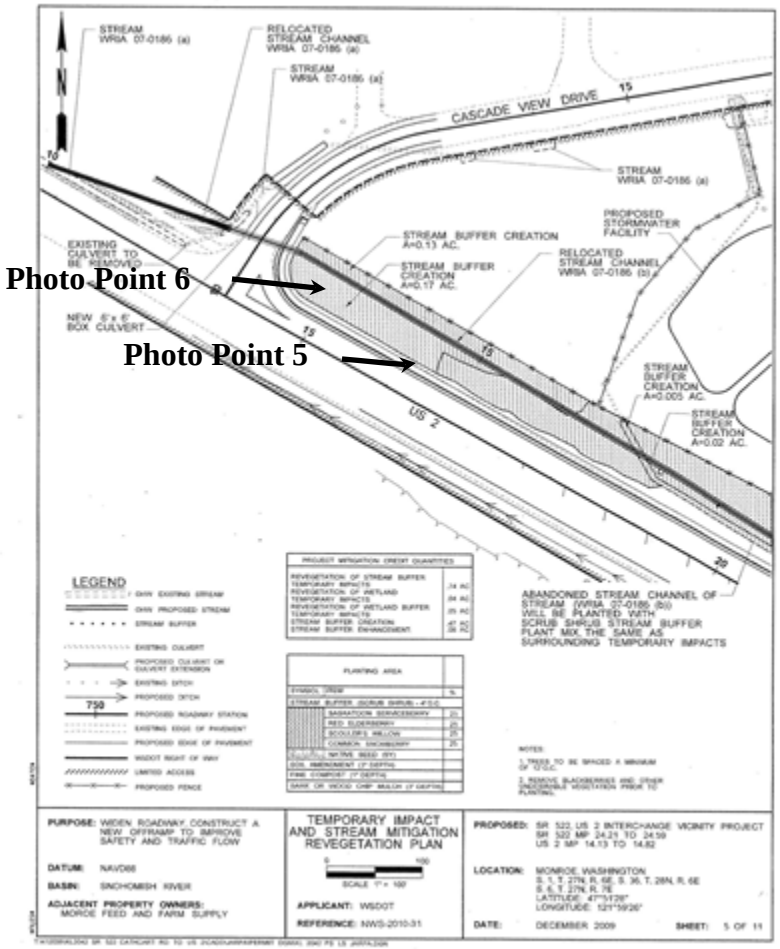
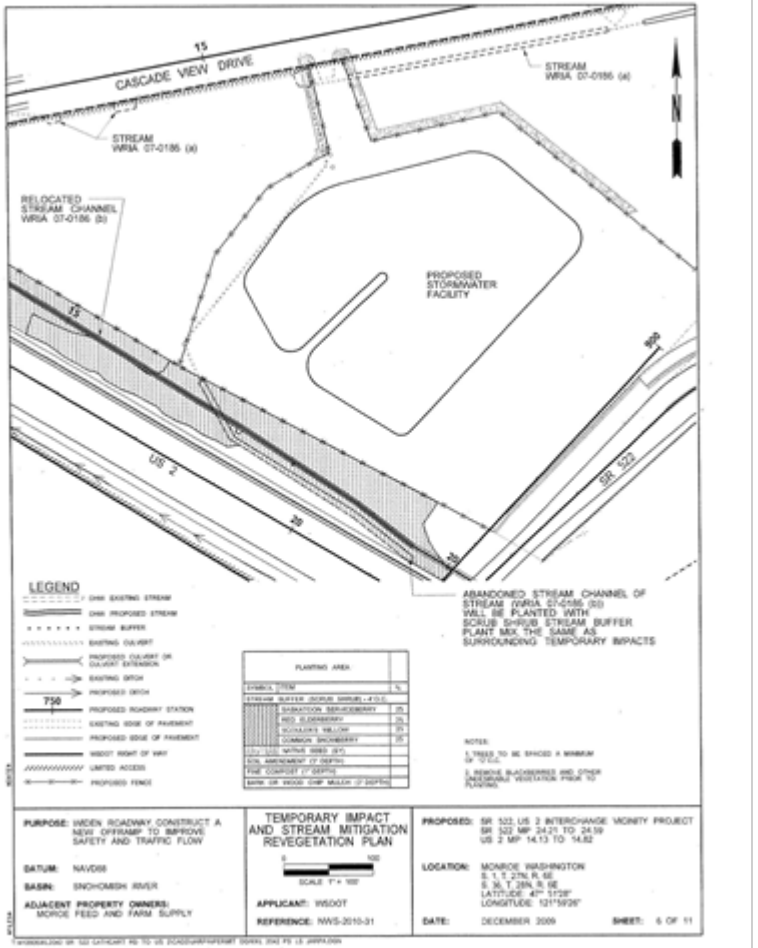
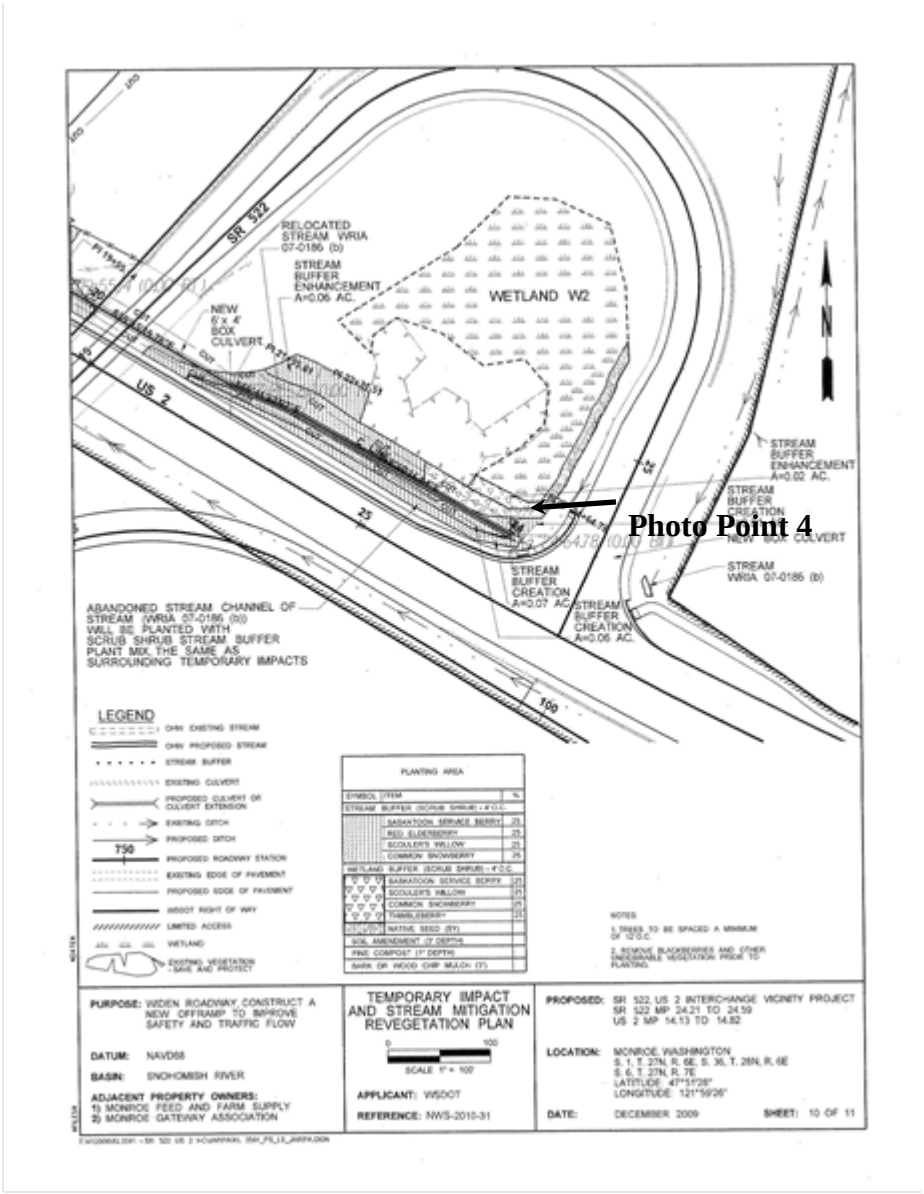


Photo Point 6
Photo Point 5
STREAM WRIA 07-0186 (a)
RELOCATED STREAM CHANNEL WRIA 07-0186 (a)
CASCADE VIEW DRIVE
PROPOSED STORMWATER FACILITY
STREAM BUFFER CREATION A=0.13 AC.
STREAM BUFFER CREATION A=0.17 AC.
RELOCATED STREAM CHANNEL WRIA 07-0186 (b)
EXISTING CULVERT TO BE REMOVED
NEW 6' x 6' BOX CULVERT
US 2
STREAM BUFFER CREATION A=0.005 AC.
STREAM BUFFER CREATION A=0.02 AC.
ABANDONED STREAM CHANNEL OF STREAM (WRIA 07-0186 (b)) WILL BE PLANTED WITH SCRUB SHRUB STREAM BUFFER PLANT MIX THE SAME AS SURROUNDING TEMPORARY IMPACTS
LEGEND
TEMPORARY IMPACT AND STREAM MITIGATION REVEGETATION PLAN
PURPOSE: WIDEN ROADWAY CONSTRUCT A NEW OFFRAMP TO IMPROVE SAFETY AND TRAFFIC FLOW
DATUM: NAVD88
BASIN: SNOHOMISH RIVER
ADJACENT PROPERTY OWNERS: MORCE FEED AND FARM SUPPLY
APPLICANT: WSDOT
REFERENCE: NWS-2010-31
PROPOSED: SR 522, US 2 INTERCHANGE VICINITY PROJECT SR 522 MP 24.21 TO 24.59 US 2 MP 14.13 TO 14.82
LOCATION: MONROE, WASHINGTON S. 1, T. 27N, R. 6E, S. 36, T. 28N, R. 6E S. 6, T. 27N, R. 7E LATITUDE: 47°51'28" LONGITUDE: 121°59'26"
DATE: DECEMBER 2009
SHEET: 5 OF 11


CASCADE VIEW DRIVE
STREAM WRIA 07-0186 (a)
RELOCATED STREAM CHANNEL WRIA 07-0186 (b)
PROPOSED STORMWATER FACILITY
US 2
SR 522
ABANDONED STREAM CHANNEL OF STREAM (WRIA 07-0186 (b)) WILL BE PLANTED WITH SCRUB SHRUB STREAM BUFFER PLANT MIX THE SAME AS SURROUNDING TEMPORARY IMPACTS
LEGEND
TEMPORARY IMPACT AND STREAM MITIGATION REVEGETATION PLAN
PURPOSE: WIDEN ROADWAY CONSTRUCT A NEW OFFRAMP TO IMPROVE SAFETY AND TRAFFIC FLOW
DATUM: NAVD88
BASIN: SNOHOMISH RIVER
ADJACENT PROPERTY OWNERS: MORCE FEED AND FARM SUPPLY
APPLICANT: WSDOT
REFERENCE: NWS-2010-31
PROPOSED: SR 522, US 2 INTERCHANGE VICINITY PROJECT SR 522 MP 24.21 TO 24.59 US 2 MP 14.13 TO 14.82
LOCATION: MONROE, WASHINGTON S. 1, T. 27N, R. 6E S. 36, T. 28N, R. 6E LATITUDE: 47° 51'28" LONGITUDE: 121°59'26"
DATE: DECEMBER 2009
SHEET: 6 OF 11


SR 522
US 2
RELOCATED STREAM WRIA 07-0186 (b)
STREAM BUFFER ENHANCEMENT A=0.06 AC.
WETLAND W2
NEW 6' x 4' BOX CULVERT
STREAM BUFFER ENHANCEMENT A=0.02 AC.
STREAM BUFFER CREATION A=0.07 AC.
STREAM BUFFER CREATION A=0.06 AC.
STREAM WRIA 07-0186 (b)
Photo Point 4
ABANDONED STREAM CHANNEL OF STREAM (WRIA 07-0186 (b)) WILL BE PLANTED WITH SCRUB SHRUB STREAM BUFFER PLANT MIX THE SAME AS SURROUNDING TEMPORARY IMPACTS
LEGEND
PLANTING AREA
TEMPORARY IMPACT AND STREAM MITIGATION REVEGETATION PLAN
PURPOSE: WIDEN ROADWAY, CONSTRUCT A NEW OFFRAMP TO IMPROVE SAFETY AND TRAFFIC FLOW
DATUM: NAVD88
BASIN: SNOHOMISH RIVER
ADJACENT PROPERTY OWNERS:
1) MONROE FEED AND FARM SUPPLY
2) MONROE GATEWAY ASSOCIATION
APPLICANT: WSDOT
REFERENCE: NWS-2010-31
PROPOSED: SR 522, US 2 INTERCHANGE VICINITY PROJECT
SR 522 MP 24.21 TO 24.59
US 2 MP 14.13 TO 14.82
LOCATION: MONROE, WASHINGTON
S. 1, T. 27N, R. 6E, S. 36, T. 28N, R. 6E
S. 6, T. 27N, R. 7E
LATITUDE: 47°51'28"
LONGITUDE: 121°59'26"
DATE: DECEMBER 2009
SHEET: 10 OF 11

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on July 2 and 8, 2014 and document current site development.

Photo Point 1

Photo Point 2

Photo Point 3

Photo Point 4

Photo Point 5

Photo Point 6

Driving Directions:
From I-405 North, take Exit 23 onto SR 522 East. Travel east on SR 522 for about 14 miles to the intersection of SR 522 and US 2. To find the Al Borlin Park site, travel east on US 2 and go right onto N Lewis Street. Turn left onto E Fremont Street which will curve to the left and turns into S Anne St. Turn right onto Simons Road which will take you into the park. The plantings can be found along the Skykomish River.

Appendix 3 – Data Tables

Table 1. Nonnative Invasive Species

Scientific Name	Common Name
Buddleja alternifolia	Fountain butterfly bush
Cytisus scoparius	Scot's broom
Geranium robertianum	Herb Robert
Hedera helix	English ivy
Ilex aquifolium	English holly
Iris pseudacorus	Yellow flag iris
Lythrum salicaria	Purple loosestrife
Phalaris arundinacea	Reed canarygrass
Polygonum cuspidatum (and related species and hybrids)	Japanese knotweed
Prunus laurocerasus	Cherry laurel
Rubus laciniatus	Evergreen blackberry
Rubus armeniacus	Himalayan blackberry

Literature Cited

1. [USACE] US Army Corps of Engineers. 2010. Department of the Army Nationwide Permit (14) Number NWS-2010-31.

2. [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

3. [WSDOT] Washington State Department of Transportation. 2009. Wetland and Stream Mitigation Report SR 522: Snohomish River Bridge to US 2 Phase 1: SR 522/US 2 Interchange Vicinity MP 24.21 to MP 24.68. Seattle (WA): Washington State Department of Transportation, Northwest Region.

4. [WSDOT] Washington State Department of Transportation. 2009. Temporary Impact and Stream Mitigation Revegetation Plan.

5. [WSDOT] Washington State Department of Transportation. 2012. SR 522 US 2 Interchange Flyover Ramp Mitigation Planting Plan.