Cape Horn Bridge to Cape Horn Rd Vicinity (SR 14 St. Cloud) Mitigation Site

USACE NWP (14) NWS-2009-1257

Southwest Region

2015 MONITORING REPORT

Wetlands Program

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Washington State Department of Transportation

Environmental Services Office

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SR 14 St. Cloud Mitigation Site and CRGNSA Revegetation

USACE NWP (14) NWS-2009-1257

General Site Information			
USACE NWP 14 Number	NWS-2009-1257		
Mitigation Location	Skamania Co., north of SR 14 and just east of Smith Cripe Rd		
LLID Number	1221099456020		
Construction Date	2010 to 2011		
Monitoring Period	2013 to 2022		
Year of Monitoring	3 of 10		
Type of Project Impact[1]	Wetland	Stream	Buffer
Area of Project Impact	0.03 acre	65 linear feet	0.68 acre
Type of Mitigation	Wetland /Riparian Enhancement		
Area of Mitigation	2.6 acres		

[1]Project impact, type of mitigation and their corresponding areas were sourced from Table 1 on page ii in the Final Natural Resource Mitigation Plan (WSDOT 2010).

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Summary of Monitoring Results and Management Activities (2015)

Performance Standards	2015 Results[2]	Management Activities
St. Cloud: At monitoring Year 3, there will be a minimum density of native woody trees and/or shrubs: • Density of 400 trees per acre • Density of 4,000 shrubs per acre • At least 2 species of trees and 4 species of shrubs, no species shall achieve more than 60% cover	**Trees:** 1,208 plants/acre ($CI_{60\%}$ = 970-1,447) **Shrubs:** 2,408 plants/acre ($CI_{80\%}$ = 2,132-2,683) Trees and shrubs present	
St. Cloud: The aerial extent of Blackberry Species and Class A noxious weeds will not exceed 15% across the entire site.	Less than 5% cover	Weed control: March 24, 2014, May 19, 2014, August 4, 2014, April 23, 2015, May 11, 2015, June 26, 2015, July 29, 2015.
St. Cloud: Japanese Knotweed shall not be present in any amount within the mitigation site.	None observed	
St. Cloud: The aerial extent of Reed Canarygrass will be managed at a threshold 10% below the existing baseline conditions.	Less than 5% cover	
Columbia River George National Scenic Area (CRGNSA) revegetation areas: At monitoring Year 3, there will be a minimum density of native woody trees and/or shrubs: • Density of 400 trees per acre • Density of 4,000 shrubs per acre • At least 2 species of trees and 4 species of shrubs, no species shall achieve more than 60% cover	**Trees and shrubs combined:** 3,000 plants per acre Trees and shrubs present	

Report Introduction

This report summarizes Year-3 monitoring activities at the State Route (SR) 14 St. Cloud 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 and photo-documentation on August 12 and September 8, 2015.

[2] Estimated values are presented with their corresponding statistical confidence interval. For example, 1,208 plants/acre ($CI_{60\%}$ = 970-1,447) means we are 60% confident that the true density value is between 970 and 1,447 stems per acre.

What are the SR 14 St. Cloud Mitigation Site and CRGNSA Revegetation Areas?

The SR 14 St. Cloud Mitigation site is a 7.8-acre parcel containing 2.6 acres (Figure 1) of wetland and riparian enhancement along the lower reaches of Archer Creek. This site was created to compensate for the loss of 0.03 acre of wetland, 65 linear feet of stream, and 0.68 acre of wetland buffer due to road improvements along SR 14. In addition, vegetated areas disturbed during project construction have been revegetated. These areas comprise the CRGNSA Revegetation Areas of the mitigation (Appendix 1).

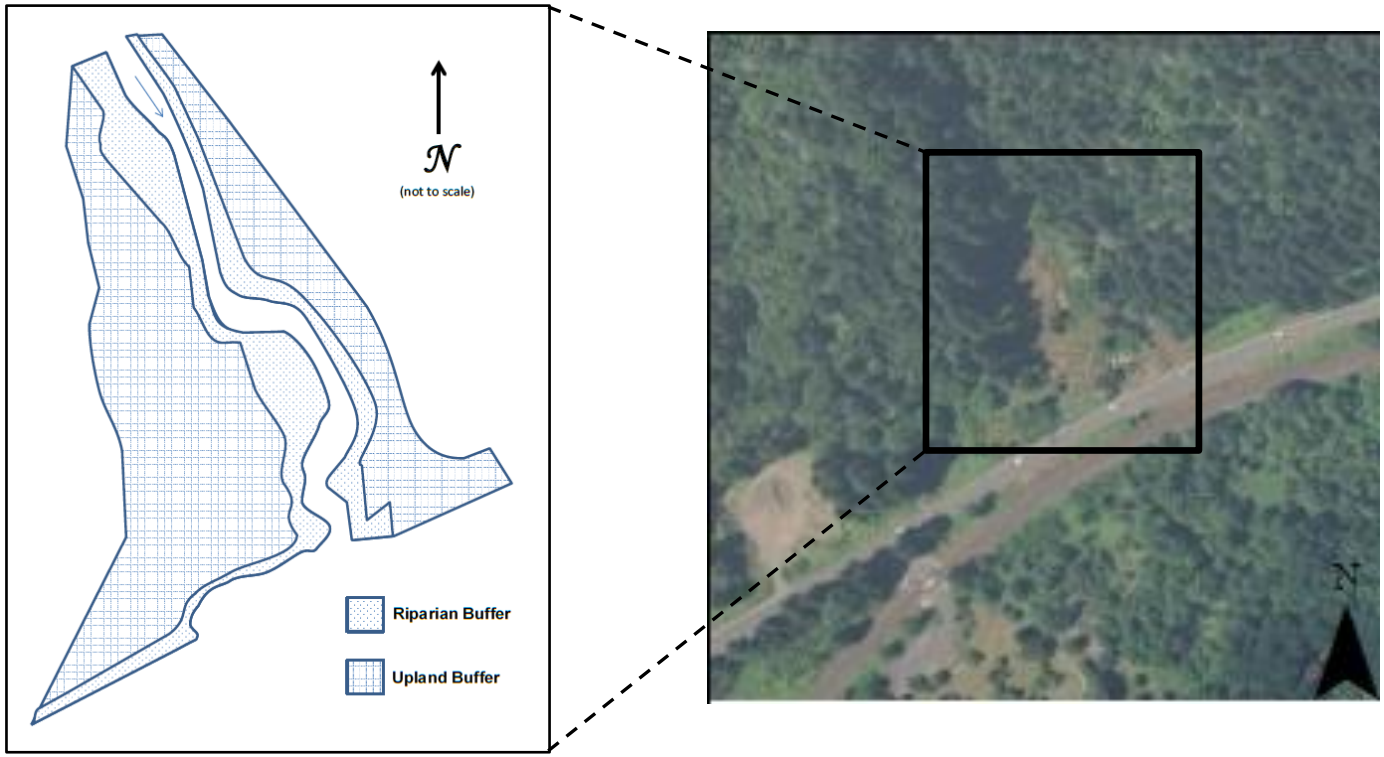


Figure 1 Site Sketch

The SR 14 St. Cloud Mitigation Site is riparian buffer with some areas wetter than others. A small wetland is located in an old stream channel depression on the north end of the site. Appendix 2 includes site directions.

What are the performance standards for this site?

Year 3

Performance Standard 1

At monitoring Year 3, there will be a minimum density of native woody trees and/or shrubs:

- Minimum density of 400 living native trees per acre
- Minimum density of 4,000 living native shrubs per acre
- At least two species of native trees and four species of native shrubs will be present in the forested area. No single species will provide more than 60 percent total aerial cover

Performance Standard 2

The aerial extent of Blackberry Species and Class A noxious weeds will not exceed 15 percent across the entire site.

Performance Standard 3

Japanese Knotweed shall not be present in any amount within the mitigation site.

Performance Standard 4

The aerial extent of Reed Canarygrass will be managed at a threshold 10 percent below the existing baseline conditions established in Performance Standard 3A.

Performance Standard 5

Impacted portions of the project corridor (CRGNSA):

At monitoring Year 3, there will be a minimum density of native woody trees and/or shrubs:

- Minimum density of 400 living native trees per acre
- Minimum density of 4,000 living native shrubs per acre
- At least two species of native trees and four species of native shrubs will be present in the restored area. No single species will provide more than 60 percent total aerial cover

Appendix 1 shows the planting plan (as built) (WSDOT 2010).

How were the performance standards evaluated?

The tables below document the sampling methodology utilized for all of the performance standards as required by the permits. For additional details on the methods see the WSDOT Wetland Mitigation Site Monitoring Methods Paper (WSDOT 2008).

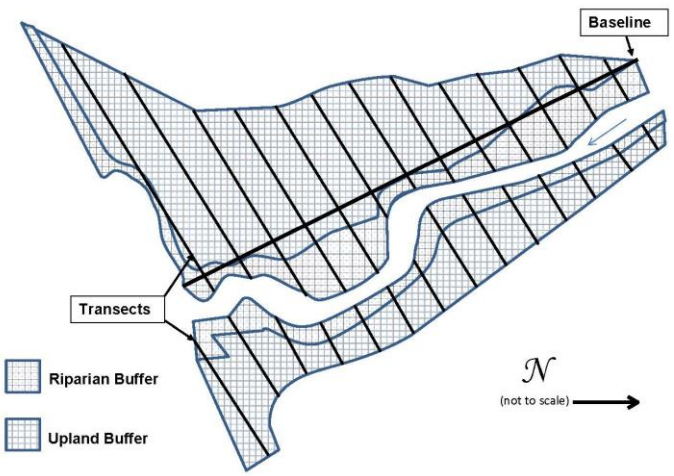


Figure 2 Site Sampling Design (2015)

Placement of Baseline: The 165-meter baseline was placed north to south through the middle of the site on the west side of the creek.

	PS 1	PS 2	PS 3	PS 4	PS 5
Attribute	Density	Cover	Presence/ Absence	Cover	Density
Target pop.	Native Woody	Noxious Weeds/ Invasive sp.	Invasive sp.	Invasive sp.	Native Woody
Zone	Entire site	Entire site	Entire site	Entire site	Restored
Sample method	UBT	Qualitative	Qualitative	Qualitative	Qualitative
SU length	N/A	N/A	N/A	N/A	N/A
SU width	1 meter	N/A	N/A	N/A	N/A
Points per SU	N/A	N/A	N/A	N/A	N/A
Total # of SU	8	N/A	N/A	N/A	N/A

How is the site developing?

This site is fairly successful despite not achieving the woody density performance standards for Year 3. It has developed a diverse and thriving shrub and tree community. It should blend in nicely with the existing forest that surrounds it when the plantings mature. Bigleaf maple (*Acer macrophyllum*) continues to volunteer and snowberry (*Symphoricarpos albus*) continues to spread throughout the planting area.

Hydrologic function, water quality, and general habitat functions are intended for this site. Plant establishment activities have likely enhanced the performance of these functions. The creek did not appear to have any additional erosion. The plantings are providing increased stream bank stability as well as shade to help the stream stay cool during the summer months (Photo 1). The vegetation in the riparian corridor has also developed to a degree that it is likely that it is providing the intended water quality functions by intercepting surface water flow and allowing sediment and nutrients to be deposited before being discharged to Archer Creek. Many signs of wildlife were observed during monitoring indicating that the site is providing wildlife habitat for birds as well as terrestrial species.

Photo 1
Riparian plantings (Aug 2015)

Results for Performance Standard 1
(Density of 400 trees per acre, 4,000 shrubs per acre, and at least two species of trees and four species of shrubs. No species shall achieve more than 60% cover):

The density of all native woody species is 3,616 plants/acre ($CI_{80\%}$ = 3,137-4,095).

The density of trees onsite is 1,208 plants/acre ($CI_{60\%}$ = 970-1,447). Dominant tree species present include bigleaf maple (*Acer macrophyllum*), Oregon ash (*Fraxinus latifolia*), and Indian plum (*Oemleria cerasiformis*).

The density of shrubs onsite is 2,408 plants/acre ($CI_{80\%}$ = 2,132-2,683). Dominant shrub species present include snowberry (*Symphoricarpos albus*), vine maple (*Acer circinatum*), beaked hazelnut (*Corylus cornuta*), and salmonberry (*Rubus spectabilis*) (Photo 2).

Cover was not monitored but snowberry (*Symphoricarpos albus*) is one of the most abundant species on site and because of its growing habit could reach the 60 percent cover threshold.

Results for Performance Standard 2 and 3
(Blackberry Species and Class A noxious weeds will not exceed 15%, Japanese Knotweed shall not be present):

Aerial cover of invasive species is estimated at less than five percent cover. Small isolated patches or individuals of Himalayan blackberry (*Rubus armeniacus*) were present in the interior of the site. Japanese knotweed (*Reynoutria japonica*) was not present on site.

Photo 2
Woody species in the riparian buffer (Aug 2015)

Results for Performance Standard 4
(Reed Canarygrass will be managed at a threshold 10% below the existing baseline conditions):

The aerial cover of reed canarygrass was qualitatively estimated at less than five percent. This cover was predominantly concentrated in patches directly adjacent to the creek and is definitely meeting this standard. The baseline conditions for reed canarygrass (*Phalaris arundinacea*) were not quantified but it appears that the overall baseline cover of invasive species was 100 percent (See Figure 3, Page 8).

Results for Performance Standard 5
(CRGNSA: Density of 400 trees per acre, 4,000 shrubs per acre, and at least two species of trees and four species of shrubs. No species shall achieve more than 60% cover):

Roadside planting areas within the project were assessed qualitatively due to inaccessibility and safety issues along steep slopes. The density of native woody species in the project corridor area is approximately 3,000 plants per acre. The tree and shrub species were lumped together for this estimate.

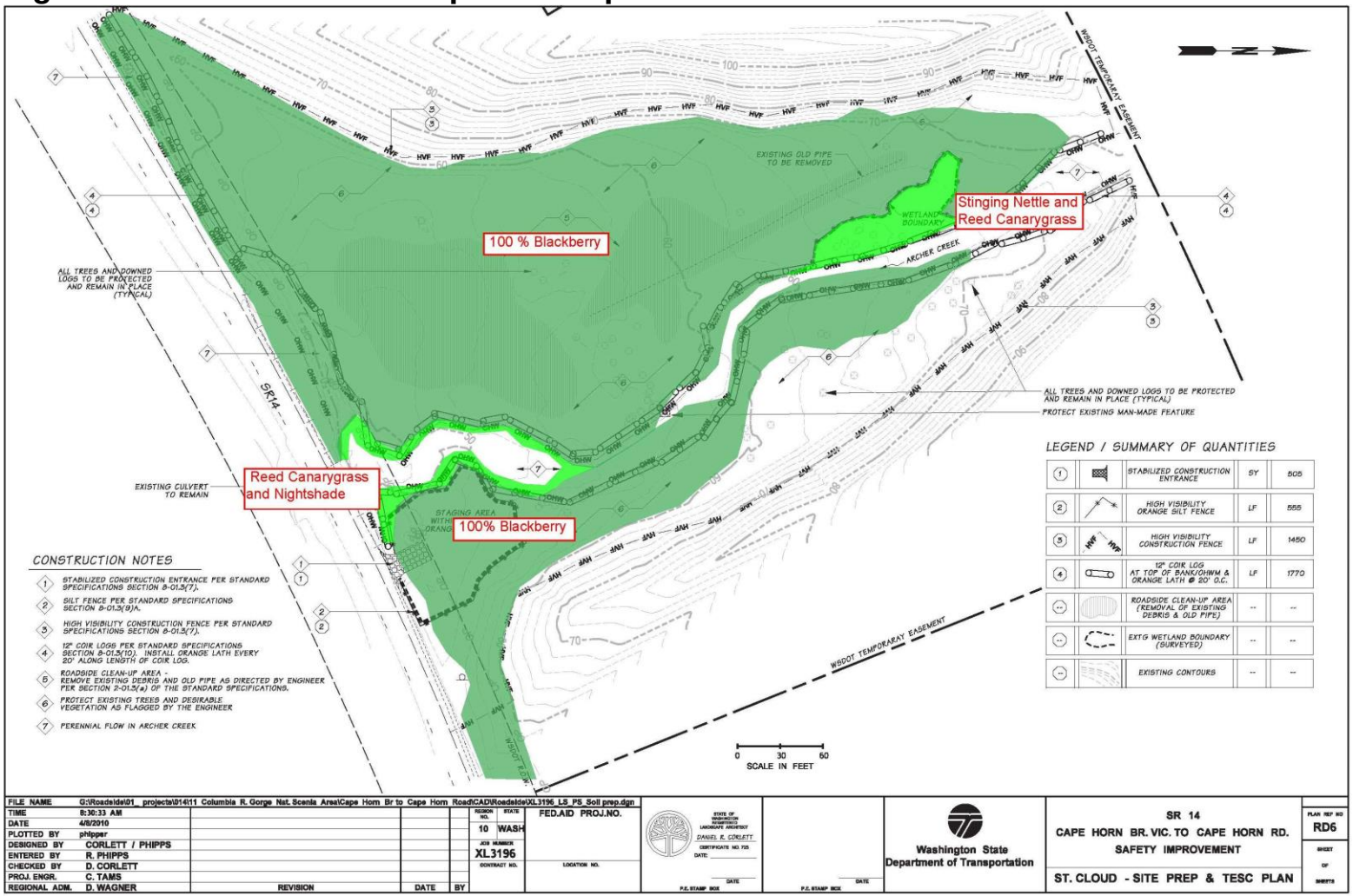
We observed at least five different shrub species and seven tree species. In many areas, there are a lot of big leaf maple, red alder and black cottonwood volunteers (Photos 3, 4). The western most planting area on the south side of the road appeared to be the weediest with blackberry, Canada thistle, and scotch broom present.

If any one species might be approaching the 60 percent cover threshold, it would be the maple due to all of the volunteers present. However, it has not exceeded the threshold at this time.

Photo 3
Woody species on roadside (Sept 2015)

Photo 4
Woody species on roadside (Sept 2015)

Figure 3. Baseline Invasive Species Map.

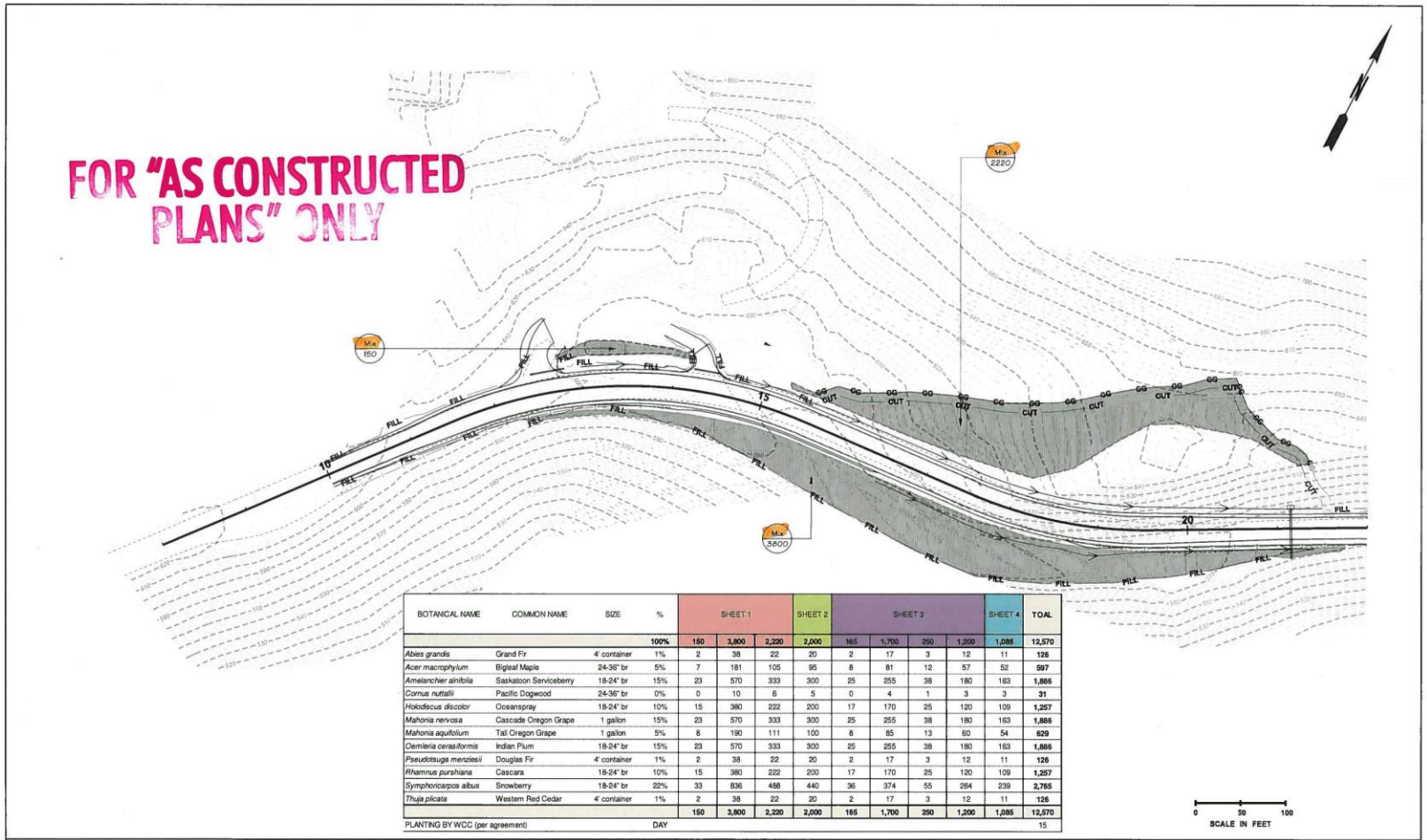


What is planned for this site?

The region has plans to continue weed control with a focus on removing grass within the understory (bark mulch areas) and blackberry during the 2016 growing season at all mitigation areas. Replanting will occur during the 2016/2017 dormant season.

Appendix 1 – As-Built with Photo Point Locations

(from WSDOT 2013)



BOTANICAL NAME	COMMON NAME	SIZE	%	SHEET 1			SHEET 2	SHEET 3				SHEET 4	TOAL
			100%	150	3,800	2,220	2,000	165	1,700	250	1,200	1,085	12,570
Abies grandis	Grand Fir	4' container	1%	2	38	22	20	2	17	3	12	11	126
Acer macrophylum	Bigleaf Maple	24-36" br	5%	7	181	105	95	8	81	12	57	52	597
Amelanchier alnifolia	Saskatoon Serviceberry	18-24" br	15%	23	570	333	300	25	255	38	180	163	1,886
Cornus nuttallii	Pacific Dogwood	24-36" br	0%	0	10	6	5	0	4	1	3	3	31
Holodiscus discolor	Oceanspray	18-24" br	10%	15	380	222	200	17	170	25	120	109	1,257
Mahonia nervosa	Cascade Oregon Grape	1 gallon	15%	23	570	333	300	25	255	38	180	163	1,886
Mahonia aquifolium	Tall Oregon Grape	1 gallon	5%	8	190	111	100	8	85	13	60	54	629
Oemleria cerasiformis	Indian Plum	18-24" br	15%	23	570	333	300	25	255	38	180	163	1,886
Pseudotsuga menziesii	Douglas Fir	4' container	1%	2	38	22	20	2	17	3	12	11	126
Rhamnus purshiana	Cascara	18-24" br	10%	15	380	222	200	17	170	25	120	109	1,257
Symphoricarpos albus	Snowberry	18-24" br	22%	33	836	488	440	36	374	55	264	239	2,765
Thuja plicata	Western Red Cedar	4' container	1%	2	38	22	20	2	17	3	12	11	126
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PLANTING BY WCC (per agreement)			DAY										15

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REGIONAL ADM.	D. WAGNER

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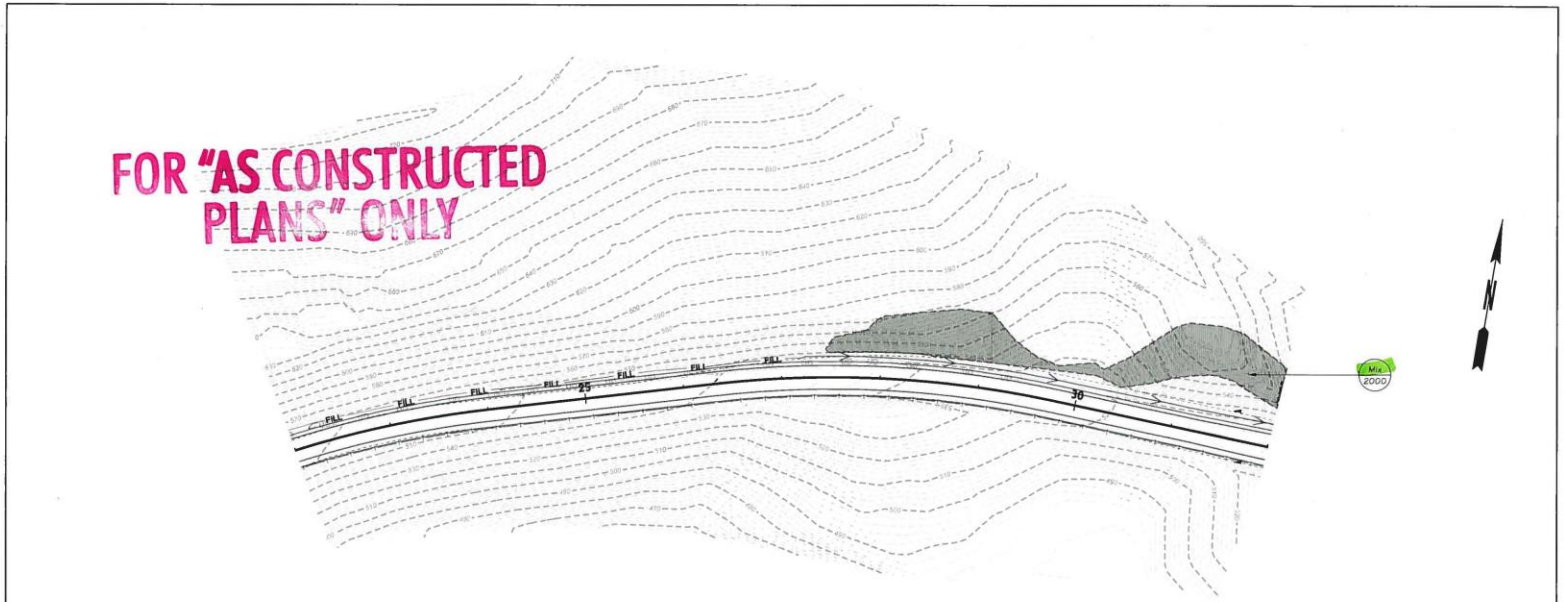

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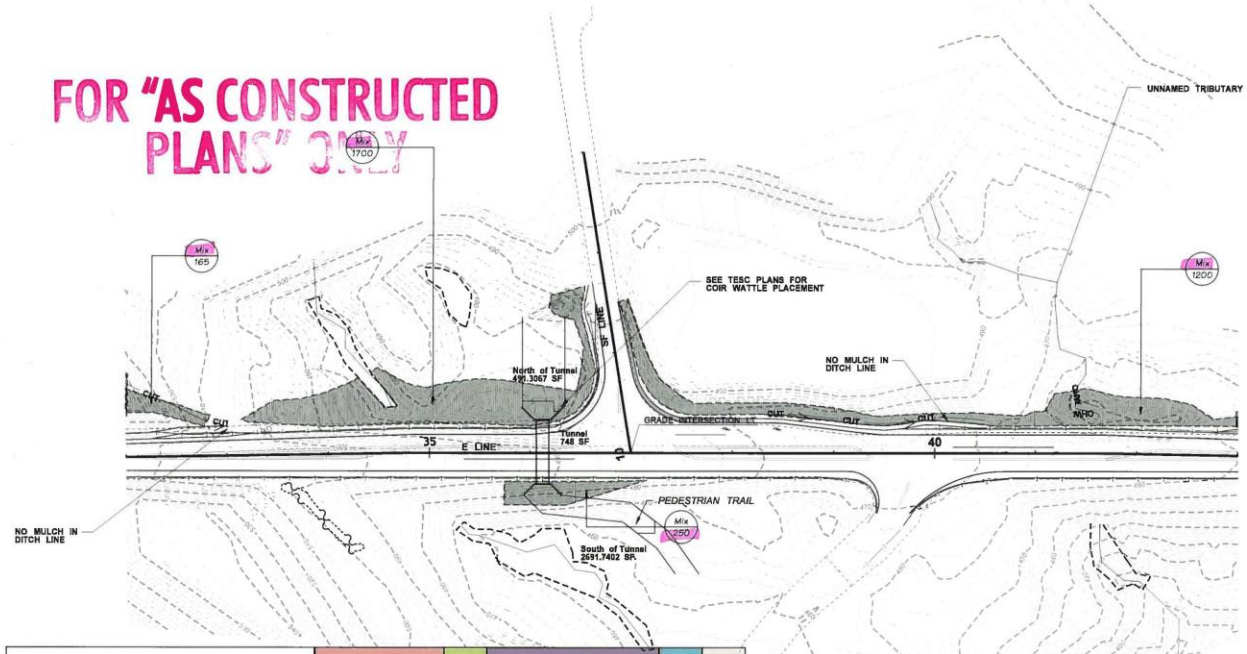

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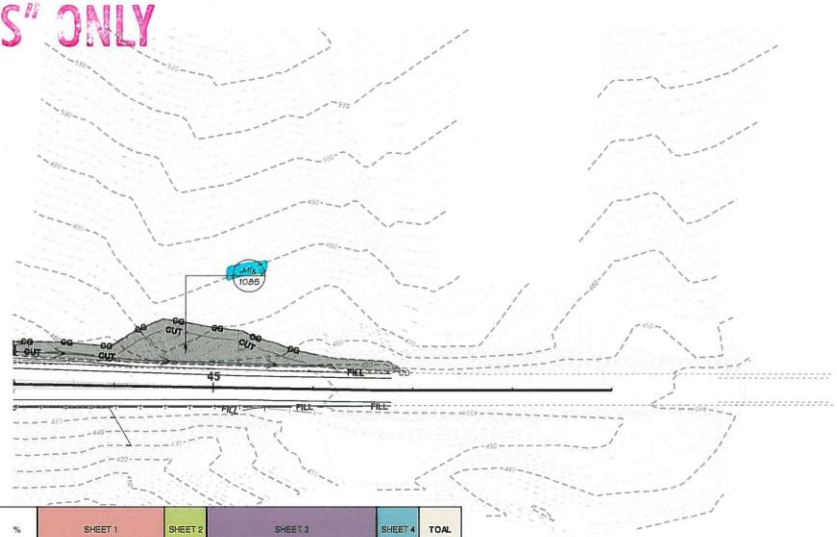

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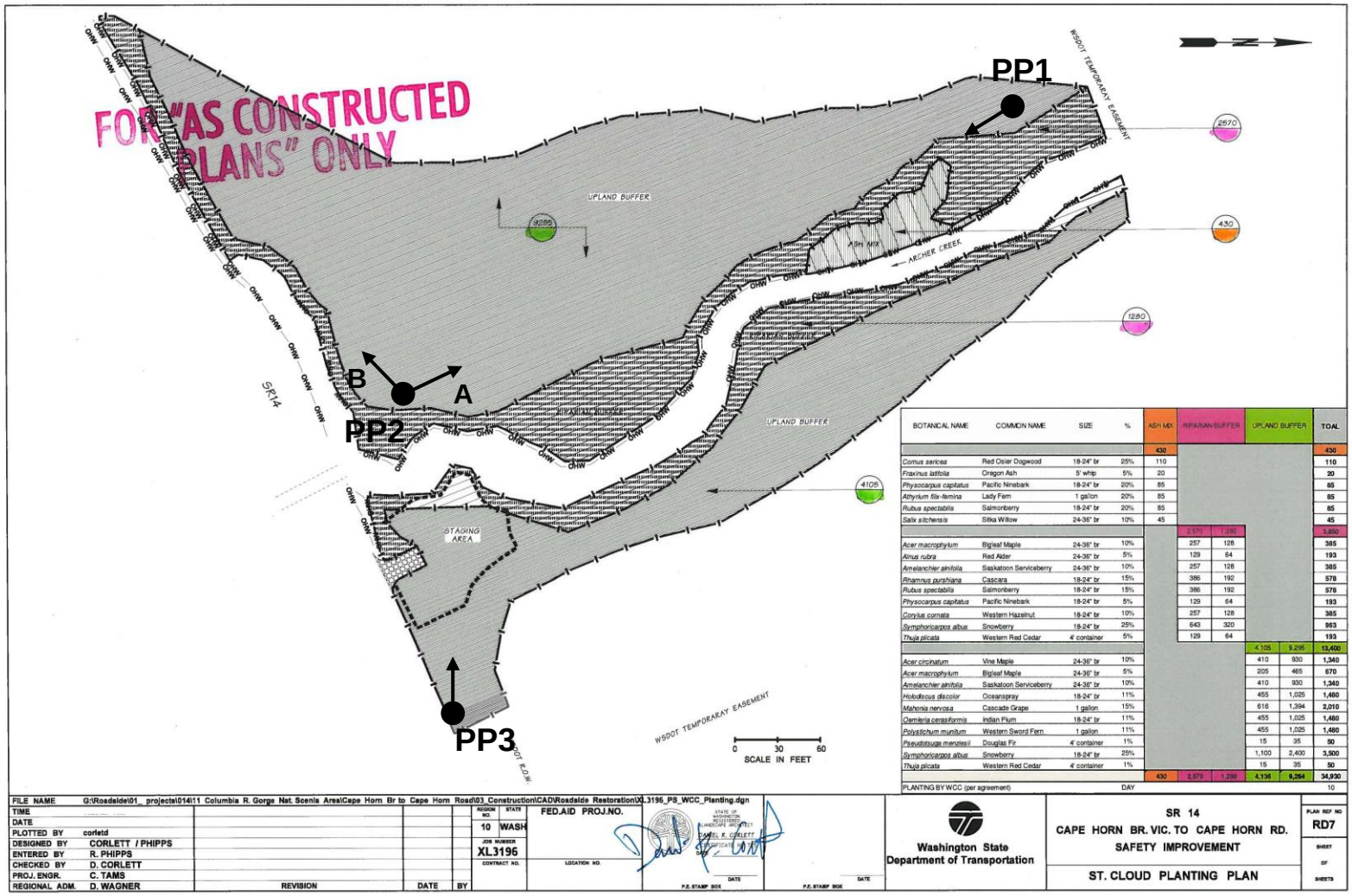

BOTANICAL NAME	COMMON NAME	SIZE	%	ASH MIX	RIPARIAN BUFFER		UPLAND BUFFER		TOAL
				430					430
Cornus sericea	Red Osier Dogwood	18-24" br	25%	110					110
Fraxinus latifolia	Oregon Ash	5' whip	5%	20					20
Physocarpus capitatus	Pacific Ninebark	18-24" br	20%	85					85
Athyrium filix-femina	Lady Fern	1 gallon	20%	85					85
Rubus spectabilis	Salmonberry	18-24" br	20%	85					85
Salix sitchensis	Sitka Willow	24-36" br	10%	45					45
					2,570	1,280			3,850
Acer macrophylum	Bigleaf Maple	24-36" br	10%		257	128			385
Alnus rubra	Red Alder	24-36" br	5%		129	64			193
Amelanchier alnifolia	Saskatoon Serviceberry	24-36" br	10%		257	128			385
Rhamnus purshiana	Cascara	18-24" br	15%		386	192			578
Rubus spectabilis	Salmonberry	18-24" br	15%		386	192			578
Physocarpus capitatus	Pacific Ninebark	18-24" br	5%		129	64			193
Corylus cornata	Western Hazelnut	18-24" br	10%		257	128			385
Symphoricarpos albus	Snowberry	18-24" br	25%		643	320			963
Thuja plicata	Western Red Cedar	4' container	5%		129	64			193
							4,105	9,295	13,400
Acer circinatum	Vine Maple	24-36" br	10%				410	930	1,340
Acer macrophylum	Bigleaf Maple	24-36" br	5%				205	465	670
Amelanchier alnifolia	Saskatoon Serviceberry	24-36" br	10%				410	930	1,340
Holodiscus discolor	Oceanspray	18-24" br	11%				455	1,025	1,480
Mahonia nervosa	Cascade Grape	1 gallon	15%				616	1,394	2,010
Oemleria cerasiformis	Indian Plum	18-24" br	11%				455	1,025	1,480
Polystichum munitum	Western Sword Fern	1 gallon	11%				455	1,025	1,480
Pseudotsuga menziesii	Douglas Fir	4' container	1%				15	35	50
Symphoricarpos albus	Snowberry	18-24" br	25%				1,100	2,400	3,500
Thuja plicata	Western Red Cedar	4' container	1%				15	35	50
				430	2,570	1,280	4,105	9,295	34,930
PLANTING BY WCC (per agreement)			DAY						10

FILE NAME	G:\Roadside\01_ projects\014\11 Columbia R. Gorge Nat. Scenic Area\Cape Horn Br to Cape Horn Road\03_Construction\CAD\Roadside Restoration\XL3196_PS_WCC_Planting.dgn
TIME	
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PLOTTED BY	corletd
DESIGNED BY	CORLETT / PHIPPS
ENTERED BY	R. PHIPPS
CHECKED BY	D. CORLETT
PROJ. ENGR.	C. TAMS
REGIONAL ADM.	D. WAGNER

REVISION | DATE | BY

REGION NO. 10 | STATE WASH | FED.AID PROJ.NO.

JOB NUMBER XL3196

CONTRACT NO. | LOCATION NO.

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT DANIEL R. CORLETT CERTIFICATE NO. 2

DATE | P.E. STAMP BOX | DATE | P.E. STAMP SIGN

Washington State Department of Transportation

SR 14
CAPE HORN BR. VIC. TO CAPE HORN RD.
SAFETY IMPROVEMENT

ST. CLOUD PLANTING PLAN

PLAN REF NO RD7

SHEET OF SHEETS

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on August 12, 2015 and document current site development.

Photo Point 1

Photo Point 2a

Photo Point 2b

Photo Point 3

Driving Directions:
From I-5 take SR 14 east along the Columbia River. The site is located in Skamania County, east of Beacon Rock State park. The parcel is located directly north of SR 14, just 2,500 feet past Smith Cripe Road. Parking is available on rip rap directly off the road on the east side of Archer Creek.

Literature Cited

1. [USACE] US Army Corps of Engineers. 2009. Department of the Army Nationwide Permit Number (14) NWS-2009-1257.

2. [WSDOT] Washington State Department of Transportation. 2010. Final Natural Resource Mitigation Plan, Cape Horn Bridge to Cape Horn Rd Vicinity, MP 25.50 to 26.50. Vancouver (WA): Washington State Department of Transportation, Southwest Region.

3. [WSDOT] Washington State Department of Transportation. 2013. SR 14 Cape Horn Br. Vic. To Cape Horn Rd. Safety Improvement St. Cloud Planting Plan.

4. [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