

**SR 18 Maple Valley to Issaquah-Hobart Road
(MP 16.6 to 19.3) (SR 18 Cedar River Tributary SE 216th
Place) Restoration Site
WIN A01820C**

USACE IP 200200594

Northwest Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

Issued March 2011



**Washington State
Department of Transportation**

Environmental Services Office

Author:

Cori Flowers

Editor:

Tony Bush

Contributors:

Teri Fisher

Diana Martinez


For additional information about this report or the WSDOT Wetland Assessment and Monitoring Program, please contact:

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

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

SR 18 Maple Valley to Issaquah-Hobart Road (MP 16.6 to 19.3) (SR 18 Cedar River Tributary SE 216th Place) Restoration Site

USACE IP 200200594

	General Site Information	
	USACE IP Number	200200594
	WDFW HPA Number	00000F4792-13
	King County Number	L01CG513
	Mitigation Location	Located along the Cedar River near the SR 18-SR 169 Interchange in King County.
	LLID Number	1220419474077
	Construction Date	2006-2007
	Monitoring Period	2007-2016
	Year of Monitoring	4 of 10
	Area of Project Impact	1.65 acres Buffer 620 ft Stream Channel
	Type of Mitigation	Stream Restoration/Enhancement
	Area of Mitigation	6.83 acres

This Page Intentionally Left Blank

Summary of Monitoring Results and Management Activities (2010)

Permit Requirement	2010 Results ¹	Management Activities
80% survival of planted species in the riparian area	96% cover (CI _{80%} = 94-98%)	Weed Control occurred in June of 2010.
Consistent measurements of less than 4-inches of water depth over a one year period may be cause to require modification of the project, and may require removal of the build-up or modification of the stream design. 'Consistent' is defined as three out of four of the measurements at each of the three locations.	Permit Requirement met. See Appendix 2.	

Report Introduction

This report summarizes (Year-4) monitoring activities at the State Route (SR) 18 Cedar River Tributary SE 216th Stream Realignment. 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 stream depth measurements. Vegetation surveys were conducted on July 19 and 20. Stream depth measurements were conducted on July 20, August 10, and September 16.

¹ Estimated values are presented with their corresponding statistical confidence interval. For example, 96% (CI_{80%} = 94-98% cover) means we are 80% confident that the true aerial cover value is between 94% and 98%.

What is the SR 18 Cedar River Tributary 216th Stream Realignment site?

This 6.83-acre site (Figure 1) is a riparian re-vegetation and stream restoration site. The site compensates for impacts to 1.65 acres of riparian buffer and 620 linear feet of stream channel due to stream channel realignment and bridge construction associated with road improvements along SR 18.

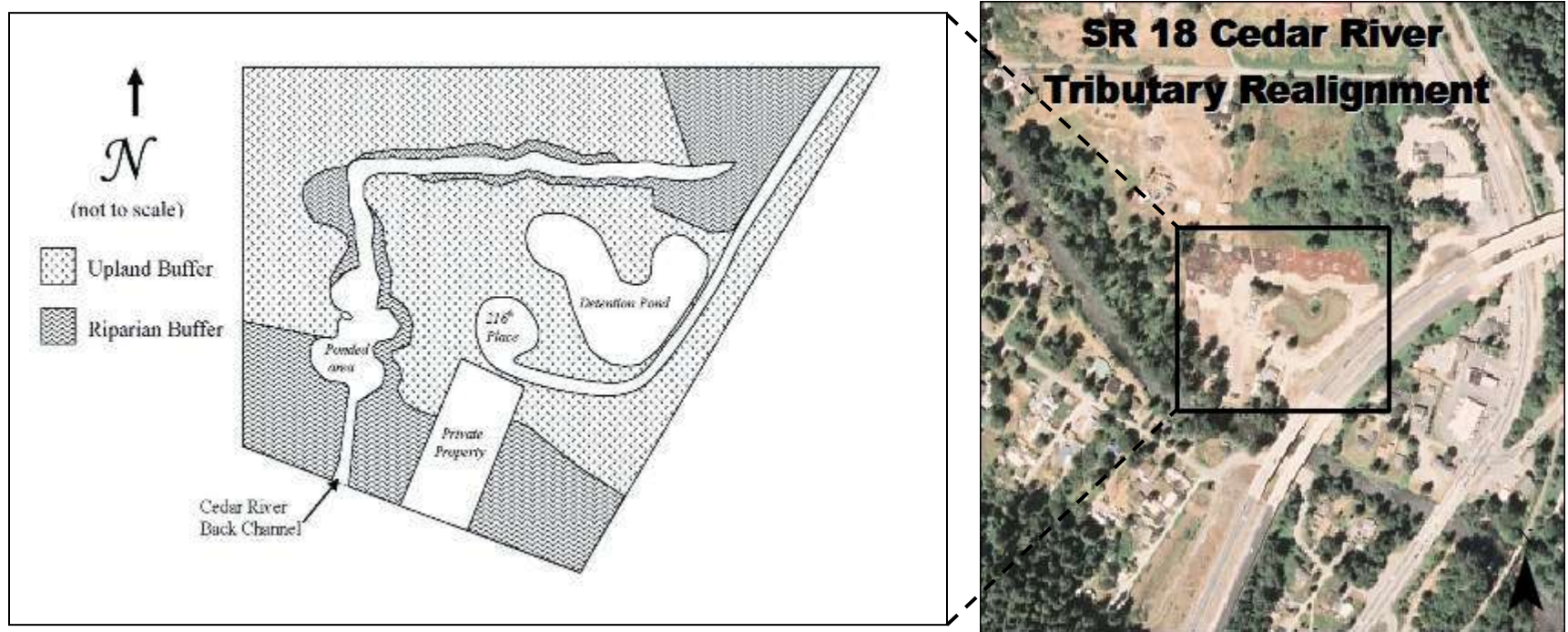


Figure 1 Site Sketch

The SR 18 Cedar River Tributary SE 216th Place Restoration Site includes a large upland buffer area that extends east across a private drive and up a steep slope to SR 18. The riparian buffer runs northeast, along the steeply banked backwater channel and ponded areas. A detention pond and a preservation area occupy the center of the site.

What are the permit requirements for this site?

Permit Requirement 1

Plantings shall be maintained as necessary for ten years to ensure 80 percent or greater survival for each species or a contingency species and shall not be trimmed or removed without the approval of the WDFW Area Habitat Biologist.

Permit Requirement 2

- 1) Three monitoring events will be completed each year, once per month between mid-July and late September, for 10 years following construction of the new stream.
- 2) A minimum of three locations must be tested, with a minimum of four water depth measurements taken at each location.
- 3) Consistent measurements of less than 4-inches of water depth over a one year period may be cause to require modification of the project, and may require removal of the build-up or modification of the stream design. ‘Consistent’ is defined as three out of four of the measurements at each of the three locations.
- 4) At the same time as the water depth testing, visual evaluation will be made of any gravel buildup at the mouth of the realignment. A brief anecdotal report must be submitted with the water monitoring report. Buildup of gravel sufficient to reduce water flows such that fish may be stranded within the stream, may require that some or all of the buildup material be removed.

Appendix 1 provides the complete text of the permit requirements for this project, and Appendix 3 shows the planting plan (Sawich 2003).

How were the permit requirements evaluated?

To evaluate permit requirements for vegetative survival, a baseline consisting of two segments was established. Segment A was placed across the center of the site (Figure 2). Segment B was placed parallel to the retaining wall. Twenty-eight transects were randomly placed perpendicular to the baseline segments. One meter unequal-area belt transects were used to estimate survival (Permit Requirement 1).

To conduct stream depth monitoring, a baseline was placed between the lower pool and the Cedar River. Three transects were randomly placed perpendicular to the baseline. Four points were randomly selected from each transect. Water depth was measured at each point (Permit Requirement 2). This was repeated a total of three times as the permit dictates.

For additional information, view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

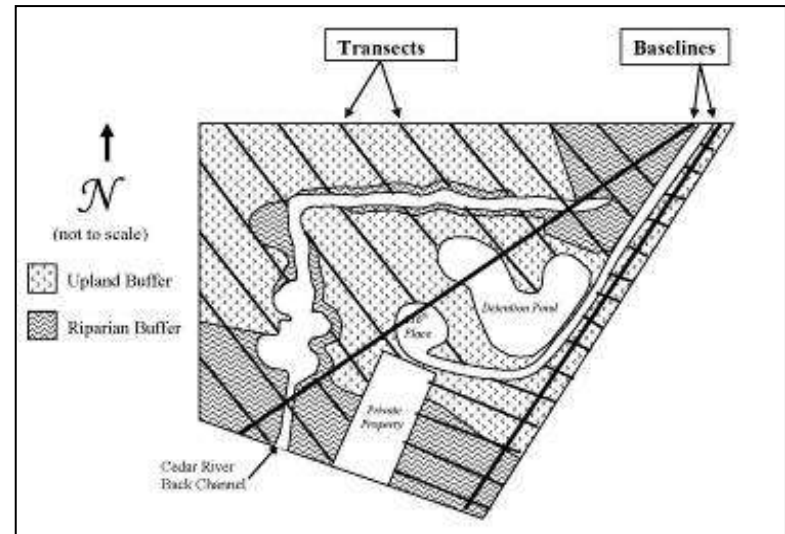


Figure 2 Site Sampling Design (2010)

How is the site developing?

The site has exceeded the required minimum survival in its fourth year. Woody plantings show low mortality and a volunteer black cottonwood (*Populus balsamifera ssp. trichocarpa*) community is beginning to develop. Large woody debris in the stream channel is in place, and there is no evidence of erosion on the stream bank. As required by permit, stream depth was not consistently below four inches at each of the three sampling locations.

Results for Permit Requirement 1

(At least 80% survival for each planted species):

Survival of total planted species is 96% ($CI_{80\%} = 94-98\%$) in the riparian corridor, with each species surviving at a rate qualitatively estimated to be greater than 80 percent. This meets the permit requirement for Year-4. Plantings are forming a diverse community with more than 20 different native species.

Results for Permit Requirement 2

(Stream depth greater than or equal to four inches at each monitoring location; note gravel buildup at the mouth of realignment):

The permit requirement is achieved. Although the stream depth was not greater than four inches during every monitoring event at each sampling location, at no point did we cross the threshold of “consistent” measurements below the four inch requirement (Appendices 1 and 2). Some minor gravel build up was observed in mouth of the realignment but not an amount sufficient enough to reduce flows. A sketch of the stream channel is available on the following page (Figure 3).



Photo 1
Sediment accumulation (July 2010)

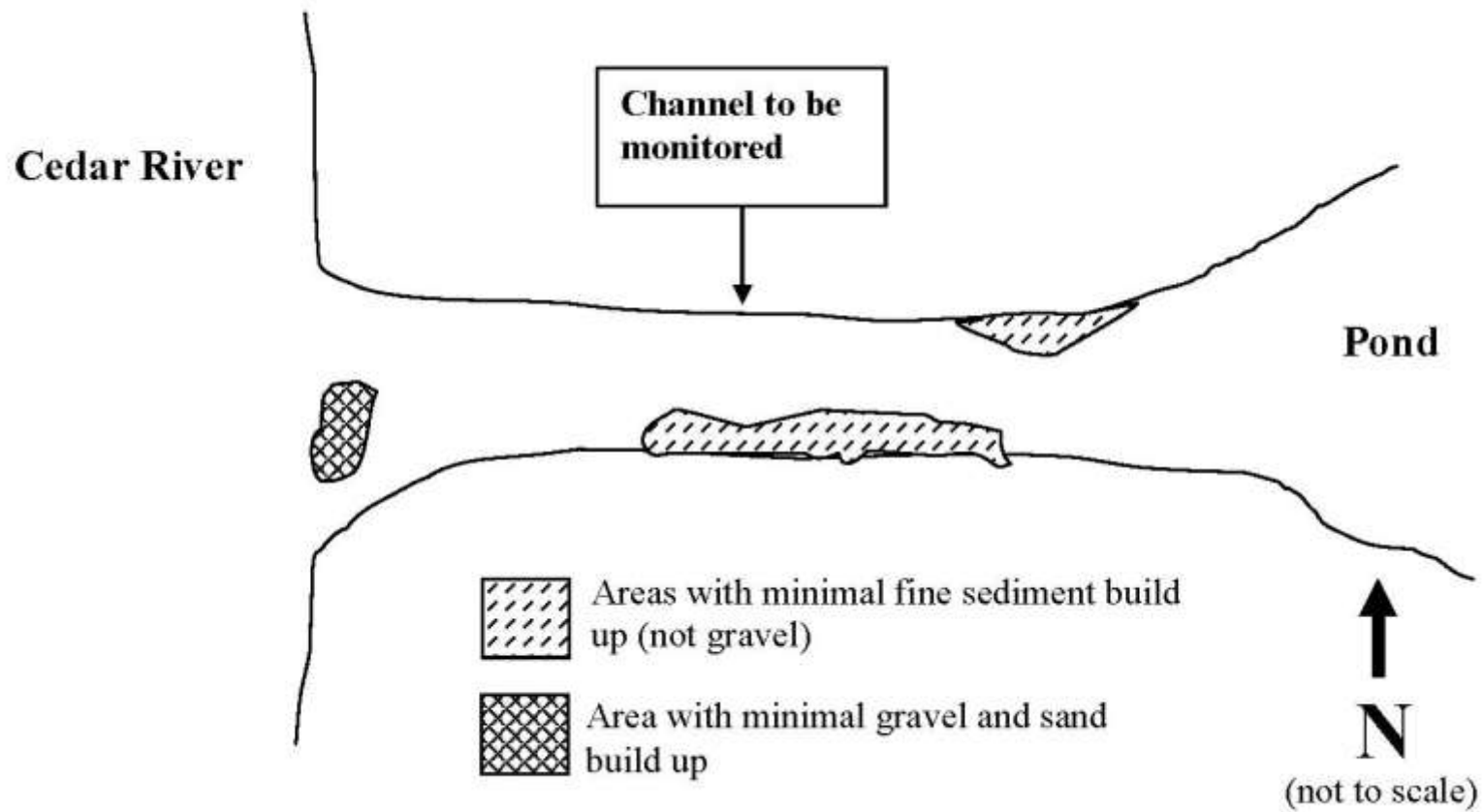


Figure 3 Sketch of stream depth monitoring area

What is planned for this site?

Ongoing weed control is planned through the 2011 growing season. Adaptive management activities may be required to repair the berm along the Cedar River backwater channel that was damaged in the January 2011 flooding.

Appendix 1 – Permit Requirements

The following excerpt is from the *Washington Department of Fish and Wildlife Hydraulic Project Approval Permit 0000F4792-13*. Requirements addressed this year are identified in **bold** font.

Within one year of project completion, the disturbed riparian areas, including outfall pads, shall be revegetated with native or other woody species approved by WDFW and per the approved plans (Provision 3). Vegetative cuttings shall be planted at a maximum interval of three feet (on center). **Plantings shall be maintained as necessary for ten years to ensure 80 percent or greater survival for each species or a contingency species** and shall not be trimmed or removed without the approval of the WDFW Area Habitat Biologist.

The following excerpt is from the *United States Army Corps of Engineers Nation Wide Permit Number 200200594*. Requirements addressed this year are identified in **bold** font.

- F. The permittee must implement a stream-depth monitoring program at the mouth of the new creek alignment entering the Cedar River, as outlined below.
 - 1. **Three (3) monitoring events will be completed each year, once per month between mid-July and late September, for 10 years following construction of the new stream.**
 - 2. **A minimum of three (3) locations must be tested. Locations will be equally spaced between the low pool and the Cedar River. A minimum of four (4) discrete water depth measurements will be taken at each location. A map of the locations must accompany the report. (Monitoring report will include a minimum of 36 discrete values).**
 - 3. **Consistent measurements of less than 4 inches of water depth over a one year period may be cause to require modification of the project, and may require removal of the build-up or modification of the steam design ‘Consistent’ is defined as 3 out of 4 measurements at each of the three locations.**
 - 4. **At the same time as the water depth testing, visual evaluation will be made of any gravel buildup at the mouth of the realignment. A brief anecdotal report must be submitted with the water monitoring report. Buildup of gravel sufficient to reduce water flows such that fish may be stranded within the stream, may require that some or all of the buildup material be removed.**
 - 5. **Permittee will send annual stream-depth monitoring results to the Environmental Permit Reviewer (Fisheries Division, Muckleshoot Indian Tribe), and to the Corps by October 31 of each year, starting one year from the completion of the new creek alignment.**

Appendix 2 – Data Table

Table 1 – Stream Depth Measurements (inches)

	Transect	Measurements (in)			
		1	2	3	4
20 July 2010	1	12	8.25	7.7	11.75
	2	10.6	7.9	.1	2.75
	3	6.25	12.0	9	8
10 Aug. 2010	1	3.5	3.5	2.0	10
	2	0	3	8	8
	3	5.5	2	.7	9.5
16 Sept. 2010	1	8	7.5	7.5	9
	2	9	9	9.5	8
	3	2	4	8	11.5

Appendix 3 – Planting Plan

(Sawich 2003)



Literature Cited

1. Sawich, Alisa. 2003. SR 18 Maple Valley to Issaquah/Hobart Rd. SR 18 Cedar River Tributary SE 216th Place Stream Planting Plan. Washington State Department of Transportation, Northwest Region, Seattle, WA.
2. United States Army Corps of Engineers. 2004. Department of the Army Permit Number 200400594.
3. Washington State Department of Fish and Wildlife. 2005. Hydraulic Project Approval Permit Number 0000F4792-13.
4. Washington State Department of Transportation (WSDOT) WSDOT Wetland Mitigation Site Monitoring Methods (12 June 2008). <http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>