

**I-405 SR 515 Interchange Project
(Thunder Hills Creek Tributary) Stream Mitigation Site**

USACE NWP (14) NWS-2007-1788

Northwest Region

2014 MONITORING REPORT

Wetlands Program

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I-405 SR 515 Interchange (Thunder Hills Creek Tributary) Stream Mitigation Site

USACE NWP (14) NWS-2007-1788

	General Site Information		
	USACE NWP 14 Number	NWS-2007-1788	
	Mitigation Location	Cedar Ave S. Renton, King County, WA	
	Construction Date	2010-2011	
	Monitoring Period	2012-2016	
	Year of Monitoring	3 of 5	
	Type of Project Impact¹	Stream Channel	Riparian Buffer
	Area of Project Impact	495 ft ²	34,412 ft ²
	Type of Mitigation	Channel Relocation	Buffer Enhancement
	Area of Mitigation	514 ft ²	34,600 ft ²

¹ Wetland impacts of 0.26 acre are being mitigated with a debit of 0.191 credits from the Springbrook Creek Wetland and Habitat Mitigation Bank. Impacts acreage sourced from(USACE 2007) mitigation acreage sourced from(WSDOT 2007).

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Summary of Monitoring Results and Management Activities (2014)

Performance Standards	2014 Results	Management Activities
Channel Stability	Visually inspected	
Native woody species will maintain a density of 4 plants/100ft ²	2.8 plants/100ft ²	120 native woody species planted
No more than 20% cover by non-native invasive species	3% invasive cover	3 separate visits in 2014 for weed control

Report Introduction

This report summarizes third-year (Year-3) monitoring activities at the Interstate (I) 405 State Route (SR) 515 Interchange (Thunder Hills Tributary) Stream 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. Monitoring activities occurred on September 16, 2014.

What is the I-405 Thunder Hills Tributary Stream Mitigation Site?

This 0.84-acre stream mitigation site (Figure 1) consists of a relocated stream channel and riparian buffer established just northeast of the I-405 and SR 515 interchange. This site was created to compensate for the loss of 0.79 acre of riparian buffer and 495 ft² of stream channel due to road improvements at the I-405 and SR 515 interchange. The relocated stream channel and the riparian buffer are designed to provide mitigation for lost stream and buffer functions including water quality, biological functions, and provide additional beneficial functions, such as riparian habitat suitability and native plant richness.

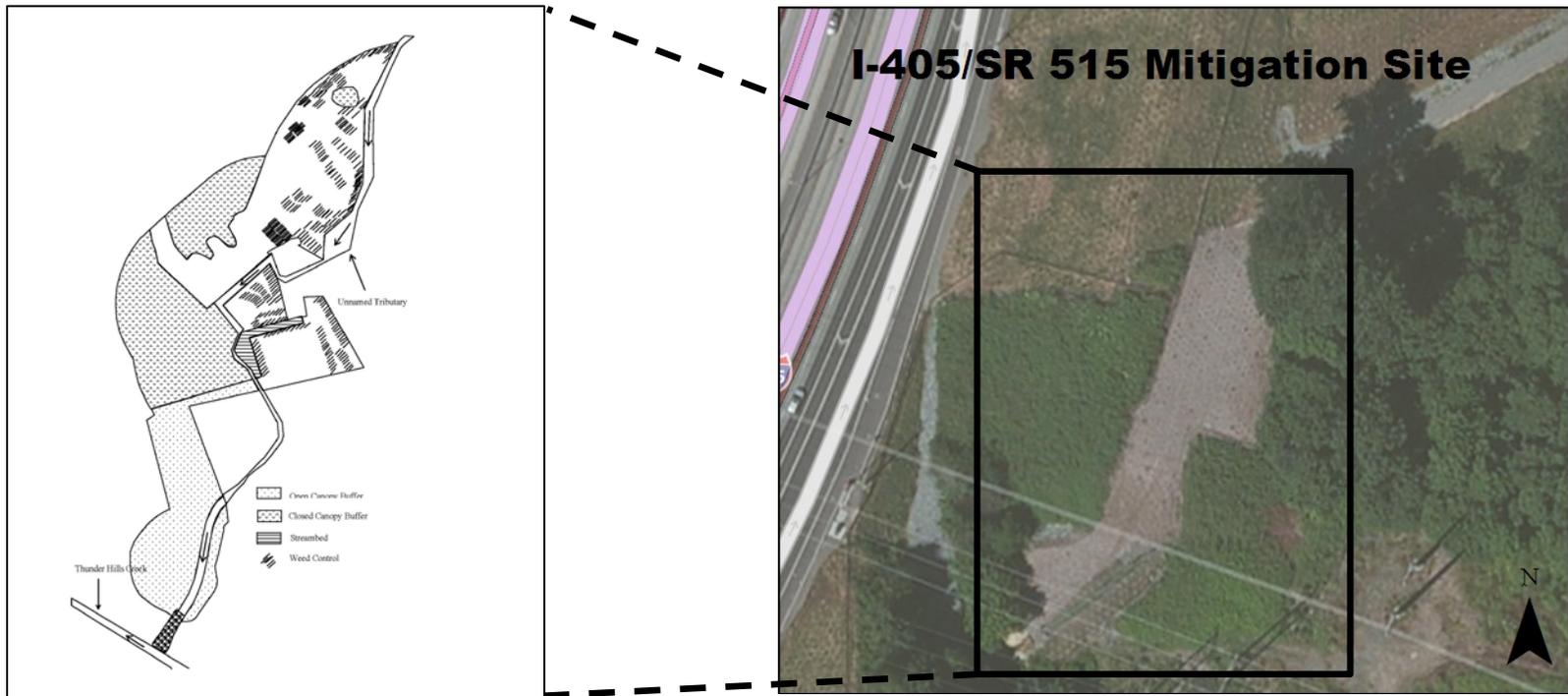


Figure 1 Site Sketch

The I-405 Thunder Hills Tributary Stream Mitigation site contains three vegetative communities along the new stream channel: a streambed mix, an open canopy mix, and a closed canopy mix. Appendix 1 includes site directions.

What are the performance standards for this site?

Year 3

Performance Standard 1

- The channel will not show signs of significant headcutting, avulsion, or subsurface seepage as determined from visual inspection.
- The drop structures and pervious weir will remain intact and properly functioning as determined from visual inspection. The inspection should look for evidence of settling, movement, undercutting, flanking, end running, and subsurface flow.
- The vegetated riprap bank protection will not show signs of significant subsurface seepage or avulsion from the new channel to the old one (as determined from visual inspection) and will grow willow stakes in the voids between the rocks in conformance with vegetation performance standards described herein.

Performance Standard 2

The native woody species will maintain a density of four plants per 100 square feet in each riparian plant community (excludes trees in areas below PSE transmission lines).

Performance Standard 3

King County listed Class A weeds and reed canarygrass (*Phalaris arundinacea*), non-native blackberries, Scot's broom (*Cytisus scoparius*), Japanese knotweed (*Polygonum cuspidatum*), and purple loosestrife (*Lythrum salicaria*) will not exceed 20 percent coverage in each riparian plant community.

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

How were the performance criteria evaluated?

To evaluate standards for vegetative survival a total count of live stems was compared to the total acreage of the site taken from the as-builts (Performance Standard 2). Due to the low cover of noxious and listed invasive species, cover was qualitatively estimated (Performance Standard 3). A visual inspection of the creek was conducted (Performance Standard 1).

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

How is the site developing?

The planted vegetation is still struggling to establish over a majority of the site. During the winter of 2013 an additional 364 native woody species were installed. The upper northern bench of the site is beginning to fill in and has experienced better survival rates overall. Additionally the upper bench is beginning to accumulate a large number of bigleaf maple (*Acer macrophyllum*) volunteers. The greatest mortality continues to occur on the southern facing steep slope as well as on the lower terrace near the confluence with Thunder Hills Creek. There has also been a fair amount of herbivory that has been contributing to the difficulty in establishing native woody species.

The intended goal of increased native plant richness is being met despite the high mortality, as the site had previously been a monoculture of Himalaya blackberry (*Rubus armeniacus*). The goals of increased organic production and export shall improve as the planted native species mature.

Results for Performance Standard 1
(Channel Stability):

- No signs of headcutting, avulsion, or subsurface seepage were apparent.
- The drop structures and pervious weir appeared to be intact.
- The vegetated riprap bank protection did not show signs of significant subsurface seepage or avulsion from the new channel to the old. There is a high mortality of the willow stakes that were planted in the rip rap bank.

Results for Performance Standard 2
(Native woody density of 4 plants/100ft²):

Native woody density is estimated at 2.8 plants per 100 square feet. Survival has been exceedingly low on the steep slope and the lower southern bench (Photo 2); however the upper bench is beginning to develop (Photo 1). A total of 10 bigleaf maple (*Acer macrophyllum*), 30 western red cedar (*Thuja plicata*), 10 beaked hazelnut (*Corylus cornuta*), 20 snowberry (*Symphoricarpos albus*), 20 tall oregongrape (*Mahonia aquifolium*), and 30 western swordfern (*Polystichum munitum*) were planted in the fall of 2014.

Results for Performance Standard 3
(No more than 20% cover of non-native invasive species):

Currently invasive species cover is low on the site and is estimated at less than three percent. This is comprised of predominantly Himalayan blackberry (*Rubus armeniacus*). The site is bordered by dense stands of Himalayan blackberry, which provides a continued source of propagules.



Photo 1
Woody density on the upper bench (September 2014)



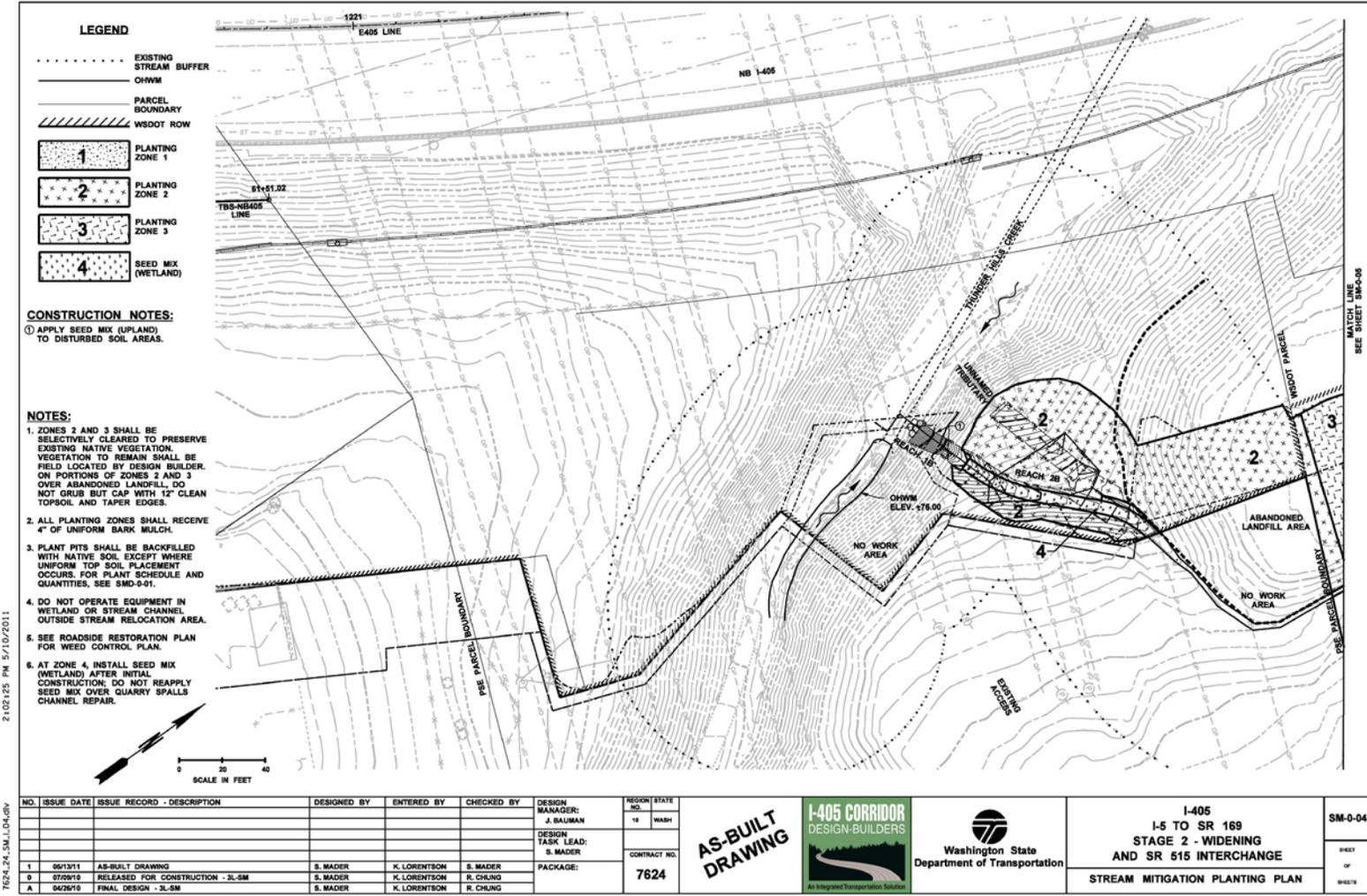
Photo 2
Woody density on the slope and lower bench (September 2014)

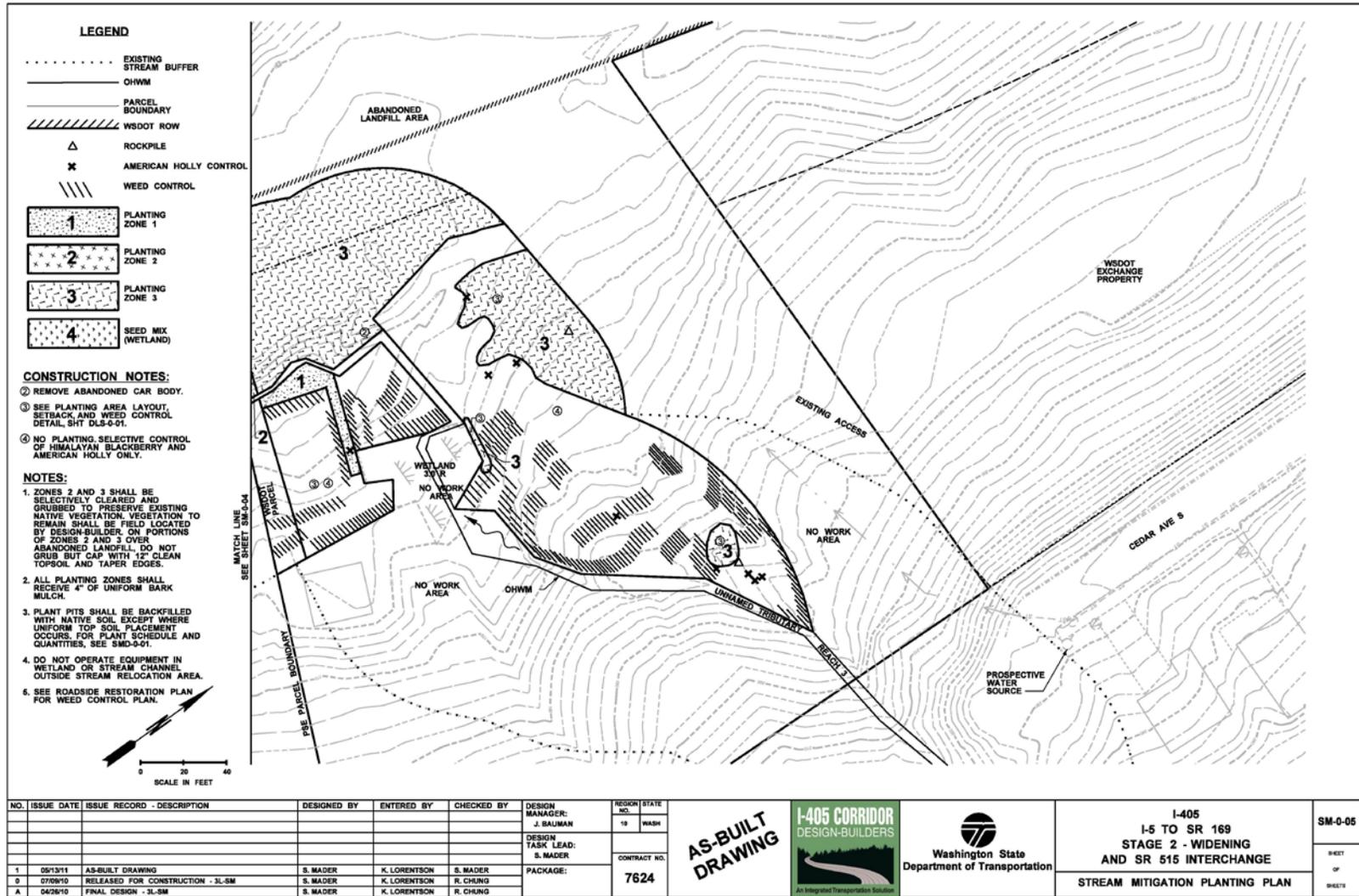
What is planned for this site?

Fall 2014 replanting efforts will be evaluated for successful establishment. Supplemental planting will occur in fall 2015 as-needed. Herbivory will be assessed, and plant protection added if needed. Weed control efforts will be ongoing.

Appendix 1 – As-Built

(from WSDOT 2011)





21:02:130 PM 5/10/2011

7624_24_SML05.dwg

2:02:13 PM 5/10/2011

7624_24_SMD.L.DLGV

STREAM MITIGATION PLANT SCHEDULE AND QUANTITIES									
	SYMBOL	BOTANICAL NAME*	COMMON NAME	SIZE**	PERCENTAGE	SLOPE ADJUSTED AREA	QUANTITY***		
ZONE 1	STREAMBED - 2.5' O.C.								
		CORNUS STOLONIFERA SALIX HOOKERIANA SALIX SITCHENSIS	REDSTEM DOGWOOD HOOKER WILLOW SITKA WILLOW	1 GAL. 1 GAL. 1 GAL.	34% 33% 33%	0.01 AC	37 36 36		
ZONE 2	BUFFER OPEN CANOPY - 5' O.C.								
		ACER CIRCINATUM AMELANCHIER ALMFOLIA CORNUS STOLONIFERA CORYLUS CORNUTA CRATAEGUS DOUGLASSII RUBUS PARVIFLORUS	VINE MAPLE WESTERN SERVICEBERRY REDSTEM DOGWOOD BEAKED HAZELNUT BLACK HAWTHORN THIMBLEBERRY	2 GAL. 2 GAL. 1 GAL. 2 GAL. 2 GAL. 1 GAL.	10% 20% 20% 10% 20% 20%	0.18 AC	36 72 72 36 72 72		
	BUFFER CLOSED CANOPY (INTERPLANT), TREE SPACING - 10' O.C. MIN, SHRUB SPACING - 5' O.C.								
		MAHONIA AQUIFOLIUM POLYSTICHUM MUNITUM RHAMNUS PURSHIANA TSUGA HETEROPHYLLA THUJA PLICATA VACCINIUM PARVIFOLIUM	TALL OREGON GRAPE SWORD FERN CASCARA WESTERN HEMLOCK WESTERN RED CEDAR RED HUCKLEBERRY	2 GAL. 1 GAL. 2 GAL. 2 GAL. 2 GAL. 1 GAL.	18% 20% 25% 8% 9% 22%		0.26 AC	112 140 176 36 40 164	
	ZONE 3								
		SEED MIX (WETLAND)	AMERICAN SLOUGHGRASS NORTHWESTERN MAHNA GRASS TUFTED HAIRGRASS MEADOW BARLEY		30% 30% 20% 20%			0.02 AC	
ZONE 4									

- * NATIVE SPECIES SUCH AS DOUGLAS HAWTHORN, HAZELNUT, OCEAN SPRAY, AND SERVICEBERRY MAY BE SUBSTITUTED FOR LISTED SPECIES WITH APPROVAL OF THE LANDSCAPE ARCHITECT.
- ** ALTERNATE SIZES ALLOWED WITH APPROVAL OF THE LANDSCAPE ARCHITECT. BARE ROOT MAY BE SUBSTITUTED FOR CONTAINER STOCK WITH APPROVAL OF THE LANDSCAPE ARCHITECT.
- *** STREAM MITIGATION ONLY. APPLY PLANTING AREA LAYOUT, SETBACK, AND WEED CONTROL DETAIL SHT. DLS-0-01.

NO.	ISSUE DATE	ISSUE RECORD - DESCRIPTION	DESIGNED BY	ENTERED BY	CHECKED BY	DESIGN MANAGER:	REGION NO.	STATE	AS-BUILT DRAWING	I-405 CORRIDOR DESIGN-BUILDERS	Washington State Department of Transportation	I-405 I-5 TO SR 169 STAGE 2 - WIDENING AND SR 515 INTERCHANGE	STREAM MITIGATION DETAILS	SMD-0-01
						J. BAUMAN	18	WASH						
						DESIGN TASK LEAD:								OF
						S. MADER	CONTRACT NO.							SHEET
1	05/13/11	AS-BUILT DRAWING	S. MADER	K. LORENTSON	S. MADER	PACKAGE:	7624							
0	07/20/10	RELEASED FOR CONSTRUCTION - 3L-SM	S. MADER	K. LORENTSON	R. CHUNG									
A	04/29/10	FINAL DESIGN - 3L-SM	S. MADER	K. LORENTSON	R. CHUNG									

Driving Directions:

From I-5 take Exit 142a in Renton. Merge onto WA-18 E. Take exit onto WA-167. Turn right onto S. Grady Way; continue onto Main Ave S. Turn right onto S 4th St. Turn right onto S 3rd St. Take first left onto Cedar Ave S. Park at top of hill, walk down gravel access road.

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on September 16, 2014 and document current site development.



Photo Point 1a



Photo Point 1b



Photo Point 1c



Photo Point 2



Photo Point 3a



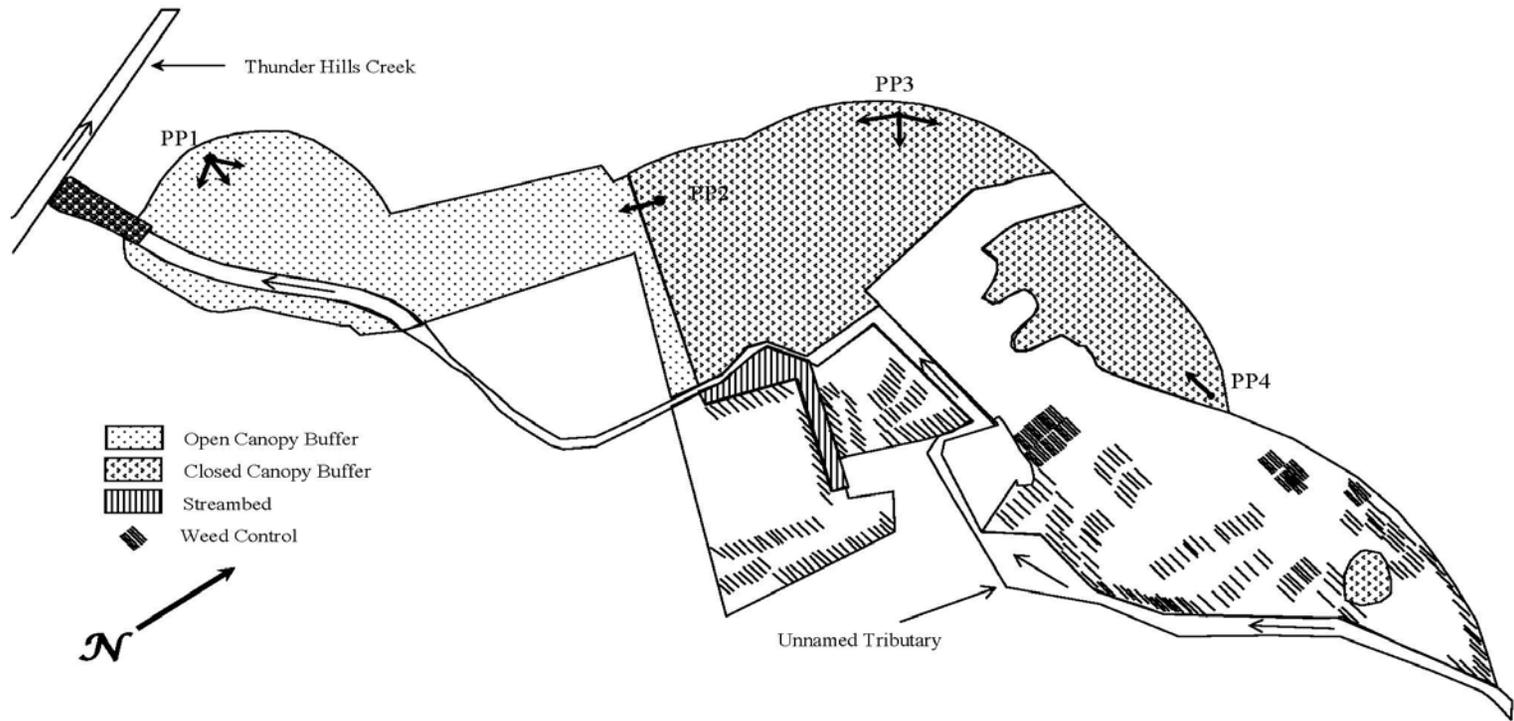
Photo Point 3b



Photo Point 3c



Photo Point 4



Literature Cited

1. [USACE] US Army Corps of Engineers. 2007. Department of the Army Nationwide Permit Number NWS-2007-1788-SOD.
2. [WDFW] Washington Department of Fish and Wildlife. 2008. Hydraulic Project Approval Permit Number 110878-2
3. [WSDOT] Washington State Department of Transportation. 2007. I-405 SR 515 Interchange Project Stream Mitigation Project. Seattle (WA): Washington State Department of Transportation, Northwest Region.
4. [WSDOT] Washington State Department of Transportation. 2011. I-405 SR 515 Interchange Project Stream Mitigation Project. As-built Planting Plan.
5. [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>