

**I-405/I-5 to SR169 Stage 1 Widening Stream
(Renton Stage 1) Mitigation Site**

USACE NWP (23) 200600097

Northwest Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

Issued March 2011



**Washington State
Department of Transportation**

Environmental Services Office

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I-405/I-5 to SR 169 Stage 1 Widening Stream (Renton Stage 1) Mitigation Site

USACE NWP (23) 200600097



General Site Information				
USACE NWP 23 Number	200600097			
Mitigation Location	Multiple locations within the cities of Renton and Tukwila			
LLID Number	1222329474660			
Construction Date	2008-2009			
Monitoring Period	2010-2020			
Year of Monitoring	1 of 10			
Area of Project Impact	Wetland	Buffer	Stream Channel Impacts	Stream Shading Impacts
	1.61 acre	4.96 acre	0.07 acre	0.27 acre
Type of Mitigation	Urban Forest Planting		Understory Planting	
Area of Mitigation¹	1.7 acre		0.24 acre	

¹The 1.61 acres of wetland impact are being mitigated for with 1.3945 credits from the Springbrook Creek Wetland and Habitat Mitigation Bank. The actual urban forest planting (2.22 acres) and understory planting areas (0.59) are higher than the USACE required acres in the table.

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Summary of Monitoring Results and Management Activities (2010)

Performance Criteria ²	2010 Results ³	Management Activities
Performance Standards (Stream Mitigation Site)		
Bankfull width/depth and wetted width/depth ratio will be maintained with 80% of the reference reach data	Unknown	
100% survival of native woody species	91% woody survival	2011 fall plant replacement.
Invasive cover across all planting zones	Qualitatively estimated at 5%	Ongoing weed control.
Count and map all habitat features at Springbrook Creek	14 root-wads and 6 rock features present	
Permit Requirements (Gilliam Creek Understory and Urban Forest Riparian Planting Areas)		
100% survival of native woody species	West Panther Creek - 88% woody survival Green River- 95% woody survival Gilliam Creek- 81% (CI _{80%} = 80-83% cover)	
Invasive cover across all planting zones	Qualitatively estimated: West Panther Creek- 30% invasive cover Green River- 5% invasive cover Gilliam Creek- 3% invasive cover	Ongoing weed control.
Japanese Knotweed will not be present, discovery requires implementation of eradication methods (All mitigation areas)	West Panther Creek- Absent Green River- Present Gilliam Creek- Present Springbrook Creek- Present	Ongoing weed control.
HPA: 80% survival of planted native woody species (Panther and Springbrook Creek)	See above for results	2011 fall plant replacement.

² Performance Standards apply to Springbrook Creek stream mitigation site, permit requirements apply to both Springbrook Creek stream mitigation site as well as 2.22 acres of urban forest riparian plantings and 0.59 acres of understory plantings located on Gilliam Creek, West Panther Creek, and the Green River.

³ Estimated values are presented with their corresponding statistical confidence interval. For example, 81% (CI_{80%} = 80-83% cover) means we are 80% confident that the true aerial cover value is between 80% and 83%.

Report Introduction

This report summarizes first-year (Year-1) monitoring activities at the Interstate (I) 405/ I-5 to SR 169 Stage 1 Widening (Renton Stage 1) 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. Evaluations of vegetative performance occurred on the 30th and 31st of August 2010.

What is the I-405 Renton Stage 1 Stream Mitigation Site?

This stream mitigation site, Springbrook Creek (Figure 1), will remove a box culvert creating natural stream bed of 160 linear feet and 9,000 square feet. This site was created to compensate for impacts to stream channel, shading, and stream buffer due to road improvements along I-405 and SR 167. The created side channel and enhanced riparian plantings are designed to provide habitat improvement opportunities of increased riparian diversity of trees and shrubs, create high quality pools in the side channel, increase potential for year-round off-channel rearing, and provide large woody debris revetment along the side channel. An additional 2.22 acres of urban forest riparian plantings and 0.59 acre of understory plantings are located on Gilliam Creek, West Panther Creek, and the Green River.

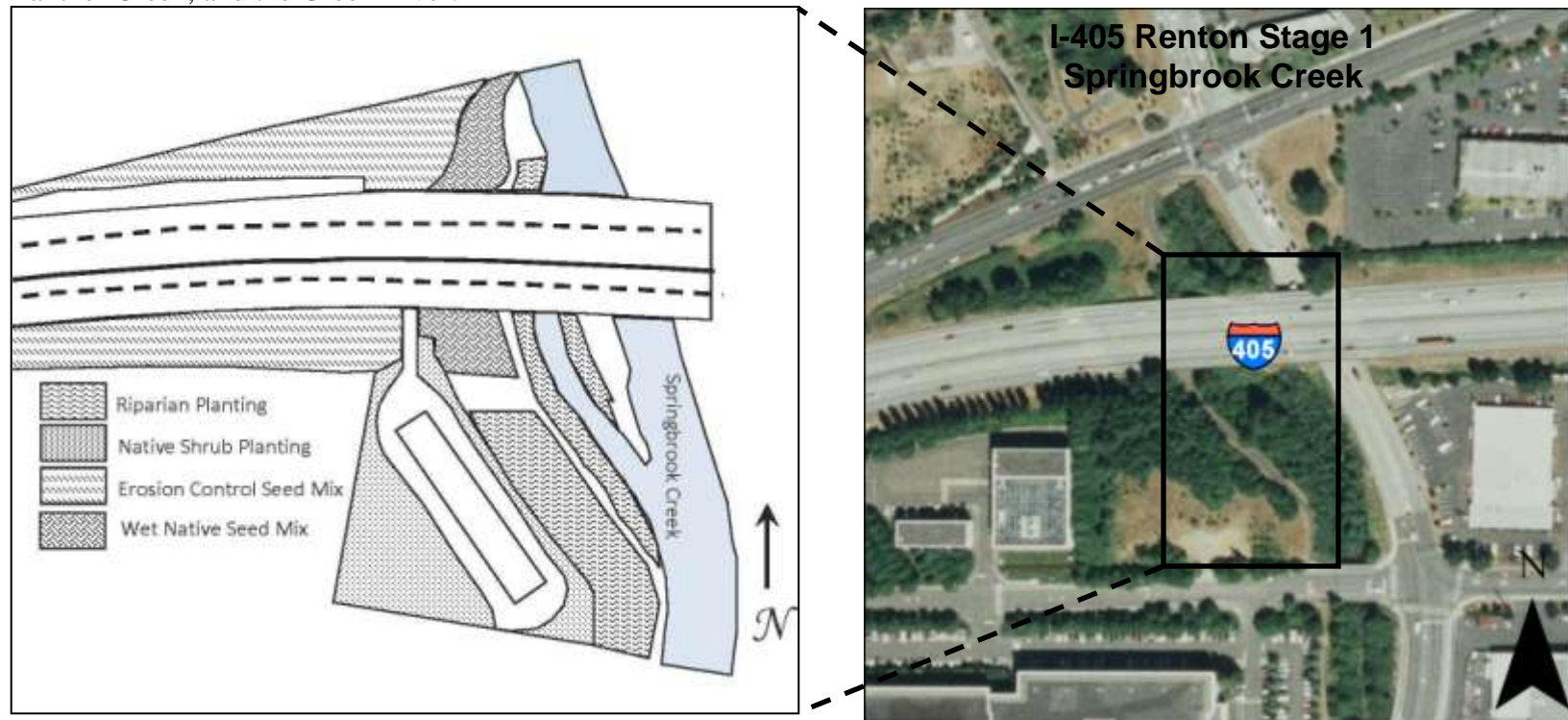


Figure 1 Site Sketch

What are the performance criteria for this site?

Performance Standard 1 (All mitigation areas)

Any dead plantings will be replaced by the design-builder after one year to maintain the 100 percent survival goal. If all dead woody species plantings are replaced, the success standard will be met.

Performance Standard 2 (All mitigation areas)

Reed canarygrass, purple loosestrife, Scot's broom, and Japanese knotweed will not exceed 20 percent aerial cover in the riparian restoration areas. If this cover threshold is exceeded, weed eradication or control measures will be implemented as part of a detailed contingency plan.

Performance Standard 3 (Springbrook Creek Mitigation Site)

Establish 160 linear feet of new channel, where the existing box culvert is located, with 3 boulder groups. Establish 290 linear feet of off-channel habitat in side channel with 14 pieces of LWD.

Performance Standard 4 (Springbrook Creek Mitigation Site)

The bankfull width/depth and wetted width/depth ratio will be maintained with 80 percent of the reference reach data. A reference reach will be identified and these data will be obtained during the final design of the proposed stream mitigation and proposed bridges.

Permit Requirement 1 (All mitigation areas)

Any dead plantings will be replaced by the design-builder after one year to maintain the 100 percent survival goal. If all dead woody species plantings are replaced, the success standard will be met.

Permit Requirement 2 (All mitigation areas)

Reed canarygrass, purple loosestrife, Scot's broom, and Japanese knotweed will not exceed 20 percent aerial cover in the riparian restoration areas. If this cover threshold is exceeded, weed eradication or control measures will be implemented as part of a detailed contingency plan.

Permit Requirement 3 (All mitigation areas)

Japanese Knotweed shall not be present at the Springbrook Creek stream mitigation site, the 1.7 acres of urban forest riparian planting, and the 0.24 acre Gilliam Creek understory plantings.

HPA (Panther Creek and Springbrook Creek)

80% survival of planted native woody species

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 2 shows the planting plan (WSDOT 2006).

How were the performance criteria evaluated?

To evaluate criteria for vegetative survival two separate methods were utilized. To evaluate survival at Springbrook Creek, West Panther Creek and the Green River a total count of live stems was compared to the total number of alive and dead stems combined (Performance Standard 1 and Permit Requirement 1). To evaluate survival at Gilliam Creek a 174-meter segmented baseline was placed on either side of the on-ramp to I-405 (Figure 2). Twenty-four 1-meter wide sampling transects were randomly placed perpendicular to the baseline. The unequal-area belt transect method was used to estimate survival of planted woody species (Permit Requirement 1). Qualitative aerial cover estimates for non-native, invasive species were completed at each of the four locations (Performance Standard 2, Permit Requirements 2 and 3). Photographs were taken to evaluate tree and shrub growth.

Habitat structures were counted at Springbrook Creek to ensure all bank logs and boulder clusters were present according to plan (Performance Standard 3).

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

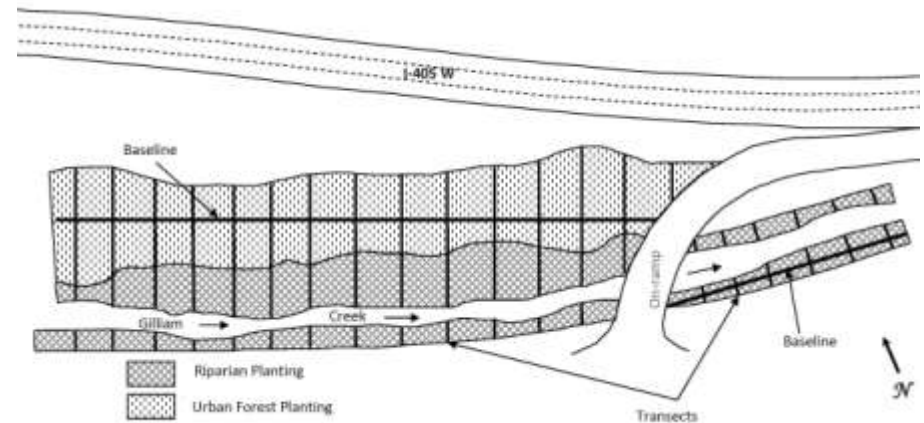


Figure 2 Site Sampling Design Gilliam Creek (2010)

How is the site developing?

Springbrook Creek Mitigation Site

This stream mitigation site is beginning to develop. The woody plantings on the west side of the pedestrian trail appear healthy and vigorous. Those adjacent to Springbrook Creek appear stressed and woody species establishment and growth in this zone has been slow; however there has been limited mortality. All bank logs and boulder clusters are present according to plan and invasive cover is low across the site.

West Panther Creek

The urban forest plantings at West Panther Creek are beginning to develop, however reed canarygrass seems to be competing with the woody plantings. The cover of reed canarygrass was above the performance standard and the site could benefit from extensive invasive control.

Gilliam Creek

Both the understory and the urban forest plantings are beginning to develop at Gilliam Creek. Invasive cover is low throughout the site, though Japanese Knotweed is present along the banks of the creek. Two areas on the north side of the creek could also benefit from a limited amount of woody re-planting.

Green River

The Green River planting area on the whole appears healthy and vigorous and exhibited a high survival of woody plantings. Japanese knotweed was present along the banks of the Green River, but invasive cover was low across the site.

Results for Performance Standard and Permit Requirement 1
(Any dead plantings will be replaced by the design-builder after one year to maintain the 100 percent survival goal):

Springbrook Creek

Survival of woody plantings at the Springbrook Creek planting area is 91 percent. The riparian plantings appear to be struggling and woody species establishment and growth in this zone has been slow. However, the plantings near the detention pond appear healthy and showed vigorous growth (Photo 1).

Gilliam Creek

Survival of woody specie plantings at the Gilliam Creek planting area is estimated at 81% (CI_{80%}= 80-83% cover). The north-central portion of the site west of the on-ramp exhibited high mortality and stress. Similarly, the central portion of the site east of the on-ramp exhibited high mortality. Both of these areas are located on the north side of Gilliam Creek.

Green River

Survival of native woody plantings at the Green River planting area is 95 percent. Overall the plantings appear healthy and are showing vigorous growth. Lewis' mock orange (*Philadelphus lewisii*) and snowberry (*Symphoricarpos albus*) exhibited signs of stress.

West Panther Creek

Survival of woody plantings at the Springbrook Creek planting area is 88 percent. There is high mortality in the south-western portion of the site. The vast majority of mortality occurred on unknowns specie(s), the only identifiable specie was western red cedar (*Thuja plicata*).

Results for Performance Standard and Permit Requirement 2
(Reed canarygrass, purple loosestrife, Scot's broom, and Japanese knotweed will not exceed 20 percent aerial cover in the riparian restoration areas):

Springbrook Creek

Aerial cover of Reed canarygrass, purple loosestrife, Scot's broom, and Japanese knotweed is qualitatively estimated at five percent. Japanese knotweed and Scot's broom along the creek should be removed to prevent further colonization. Himalayan blackberry (*Rubus armeniacus*) while not listed in the performance standard, is present on site as well.



Photo 1 – Springbrook Creek woody cover near detention pond (July 2010)

Gilliam Creek

Aerial cover of Reed canarygrass, purple loosestrife, Scot's broom, and Japanese knotweed is qualitatively estimated at three percent. Japanese knotweed along the creek should be removed to prevent further colonization. Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*), butterfly bush (*Buddleja davidii*), and Canada thistle (*Cirsium arvense*), while not listed in the performance standard, are present on site.

West Panther Creek

Aerial cover of Reed canarygrass, purple loosestrife, Scot's broom, and Japanese knotweed is qualitatively estimated at 30 percent. Treatment of reed canarygrass is recommended (Photo 2). Himalayan blackberry (*Rubus armeniacus*) and climbing nightshade (*Solanum dulcamara*), while not listed in the performance standard, are present on site.

Green River

Aerial cover of Reed canarygrass, purple loosestrife, Scot's broom, and Japanese knotweed is qualitatively estimated at five percent. Japanese knotweed along the river should be removed to prevent further colonization. Himalayan blackberry (*Rubus armeniacus*), climbing nightshade (*Solanum dulcamara*), butterfly bush (*Buddleja davidii*), field bindweed (*Convolvulus arvensis*), and common tansy (*Tanacetum vulgare*), while not listed in the performance standard, are present on site.



Photo 2- Reed canarygrass (*Phalaris arundinacea*), at West Panther Creek (July 2010)

Results for Performance Standard 3

(Establish 290 linear feet of off-channel habitat in side channel with 14 pieces of LWD):

All bank logs and boulder clusters are present according to plan (Photo 3).



Photo 3-Bank logs in Springbrook Creek (July 2010)

What is planned for this site?

Weed control will continue as needed and a partnership with the city of Renton is currently being sought to control Japanese Knotweed on the city owned properties adjacent to the mitigation sites. Planting will occur in the fall of 2011.

Results for Performance Standard 3

(Bankfull width/depth and wetted width/depth ratio will be maintained with 80% of the reference reach data)

The performance standard was not monitored this year. The region has plans to conduct the measurements in the future.

Permit Requirement 3

(Japanese Knotweed shall not be present at the Springbrook Creek stream mitigation site, the 1.7 (2.22) acres of urban forest riparian planting, and the 0.24 (0.59) acre Gilliam Creek understory plantings):

Japanese knotweed (*Polygonum cuspidatum*) is present in each of the planting areas with the exception of West Panther Creek. As stated in USACE permit #200600097, if Japanese Knotweed is discovered during monitoring, eradication methods will be implemented immediately.

HPA Requirement (Panther Creek and Springbrook Creek)
(80% survival of planted native woody species)

See results for Performance Standard and Permit Requirement 1.

Appendix 1 – Performance Criteria

The following excerpt is from the *I-405/I-5 to SR 169 Stage 1 Widening Conceptual Stream Mitigation Plan* (WSDOT 2006). The performance criteria addressed this year are identified in **bold** font.

6.2 Goals, Objectives, Performance Measures, and Success Standards

The goal of the Springbrook Creek stream mitigation is to create a stable (in equilibrium) channel that mimics existing channel dimensions within an area that was formerly a concrete box culvert. This goal will be achieved by implementing the following measures:

- Removing the existing five-celled concrete box culvert under the I-405 bridge;
- Installing boulders in the main channel beyond the extent of the I-405 bridge(s), thus increasing habitat diversity in the main channel;
- Excavating the existing side channel to provide additional off-channel rearing and refugia opportunities;
- Installing LWD and rock substrates within the side channel to create pools with available cover; and
- Installing riparian plantings approved by King County Drainage District #1 beyond the extent of the two proposed I-405 bridges (includes proposed future I-405 improvements) to restore riparian habitats disturbed by construction of the stream enhancements and to increase habitat diversity along the western bank of the stream. The actions reflect the limitations set by King County Drainage District #1 which must maintain the main channel as part of the regional stormwater conveyance and flood control system. Specifically, the Drainage District limits the installation of any habitat structures within the main channel of Springbrook Creek under the I-405 bridge (because of concerns with future debris removal and maintenance); the placement of LWD along the main channel; and the installation of plant materials that have not been approved by the Drainage District.

6.2.1 Objective 1 - Stream Channel Creation and Enhancement

Additional habitat enhancement will also occur as a result of recontouring an existing side channel and providing in-stream habitat enhancements in the form of boulders and bank logs. WSDOT has developed stream-monitoring protocols, which would be implemented in years 1, 3, and 5. WSDOT proposes to collect reference reach data within the existing channel before the channel work occurs to provide information about the existing baseline.

Interim Performance Measures

Years 1 and 3:

- Establish 160 linear feet of new channel, where the existing box culvert is located, with 3 boulder groups.
- Establish 290 linear feet of off-channel habitat in side channel with 14 pieces of LWD.
- The bankfull width/depth and wetted width/depth ratio will be maintained within 80 percent of the reference reach data. A reference reach will be identified and these data will be obtained during the final design of the proposed stream mitigation and proposed bridges.

Success Standards

Year 5:

- Establish 160 linear feet of new channel, where the existing box culvert is located, with 3 boulder groups.
- Establish 290 linear feet of off-channel habitat in the side channel with 14 pieces of LWD.
- The bankfull width/depth and wetted width/depth ratio will be maintained within 80 percent of the reference reach data.

6.2.2 Objective 2 – Riparian Vegetation

The goal of the mitigation area is to reestablish vegetation along the west bank of the affected stream channel. The limits of the riparian planting area are identified on Figure 2. This area does not include portions of the mitigation site under current and future proposed bridge improvements as shown in Figure 2.

Interim Performance Measures

Year 1:

- **Plantings will be warranted by the design-builder for 100 percent survival for one year. The design-builder is the designer-contractor who is responsible for finalizing the mitigation plan design and roadway design, and for constructing the mitigation plan and roadway improvements. Any dead plantings will be replaced by the design-builder after one year to maintain the 100 percent survival goal. If all dead woody species plantings are replaced, the success standard will be met.**

Year 3:

- Native woody species (planted and volunteer) beyond the I-405 overcrossing will maintain a stem density of four plants per 100 square feet in replanted riparian areas.
- At least three native, non-invasive riparian species will achieve a minimum of 5 percent relative cover in the riparian planting areas by Year 3.

Years 1 and 3:

• Reed canarygrass, purple loosestrife, Scot's broom, and Japanese knotweed will not exceed 20 percent aerial cover in the riparian restoration areas. If this cover threshold is exceeded, weed eradication or control measures will be implemented as part of a detailed contingency plan.

Success Standards

Year 5:

- After five years, aerial cover of native woody species will be at least 60 percent in riparian planting areas.
- At least two native, non-invasive riparian species will achieve a minimum of 10 percent relative cover for each species in the riparian planting area.

6.3 Monitoring Plan

To ensure the success of the mitigation plan, a five-year monitoring and management program will be implemented. The objective of this mitigation plan is to achieve the prescribed standards of success unless WSDOT, in consultation with the regulatory agencies, establishes replacement standards based on circumstances and conditions observed at the mitigation site. The installed vegetation community will be monitored during Years 1, 3, and 5. Prior to the first monitoring visit, an as-built plan will be prepared to document the implementation of the mitigation plan. Any changes to the approved mitigation plan that are required by field conditions present during plan implementation must be documented on the as-built plan. The monitoring period begins after the as-built plan has been approved by WSDOT and regulatory agencies. Following each year's monitoring visit, a report will be prepared detailing the findings of the visit. This report will be submitted by March 31 of the subsequent year. A total of three reports (following Years 1, 3, and 5) will be prepared. A brief qualitative evaluation will occur in the off years (Years 2 and 4). Unless particular issues are identified, the results from off-year monitoring will be summarized in the following formal reporting cycle. If issues are identified during off years, they will be addressed immediately, thus triggering potential contingency actions described below.

6.4 Contingency Plans

If the mitigation area fails to meet its performance standards during the monitoring period, a contingency plan will be developed by WSDOT on an as-needed basis in conjunction with the design-builder and the appropriate regulatory agencies to address site-specific issues. Although specific contingency measures cannot be developed until a problem is identified by the monitoring, contingency plan measures may include, but are not limited to:

- Replacement of in-stream habitat features;
- Replacement of streambed substrates;
- Restoration of failed bank areas;

- Plant substitutions of type, species, size, quantity, and/or location;
- Additional plant installation to address survival or cover problems;
- Watering or providing irrigation during unseasonably dry periods;
- Weeding and additional plant installation to address invasive weed cover;
- Regrading or modifications to the side channel to address habitat access problems;
- Erosion control;
- Providing fencing or plant guards around plants to prevent animal damage; and
- Providing fencing to prevent vandalism or other damage caused by humans.

In addition, implemented contingency plans will be described in the year-end monitoring report.

6.5 Mitigation Site Management

The mitigation area will be actively managed for five years following completion of construction. This will include at least one management or maintenance visit per year for five years following implementation of the restoration plan. Site management visits will occur during the growing season in May through July. The following tasks will be completed during these visits:

- During Years 1 and 2 the planting area, within a 2-foot radius of each installed plant, will be weeded by hand to remove any new shoots of non-native and/or invasive vegetation;
- During the Year 2 management visit, tree stakes shall be removed; and
- Additional management visits may also be required to respond to other monitoring recommendations by regulatory agencies

Permit Requirements

The following excerpt is from the *USACE Permit #200600097*.

f. The 1.7 acres of urban forest riparian plantings and 0.24 acre of Gilliam Creek understory plantings shall be monitored using the same interim performance measures for riparian vegetation described in the "I-405 Congestion Relief and Bus Rapid Transit Projects: Renton Nickel Improvement Project (I-405, I-5 to SR 169) Conceptual Stream Mitigation Plan" dated November 2006. Three additional interim performance measures are to be added:

- Year 5 - After five years, aerial cover of native woody species will be at least 25 percent in the urban forest riparian plantings.
- Year 7 - After seven years, aerial cover of native woody species will be at least 35 percent in the urban forest riparian plantings.
- Years 5 & 7 - Reed canarygrass, purple loosestrife, and Scot's broom will not exceed 20 percent aerial cover in urban forest riparian plantings and the Gilliam Creek understory plantings. If this cover threshold is exceeded, weed eradication or control measures will be implemented as part of a detailed contingency plan.

One additional success standard is to be added:

- Year 10 - After 10 years, aerial cover of native woody species will be at least 50 percent in the urban forest riparian plantings. At the Gilliam Creek understory planting site, plant survival will be at least 80 percent.

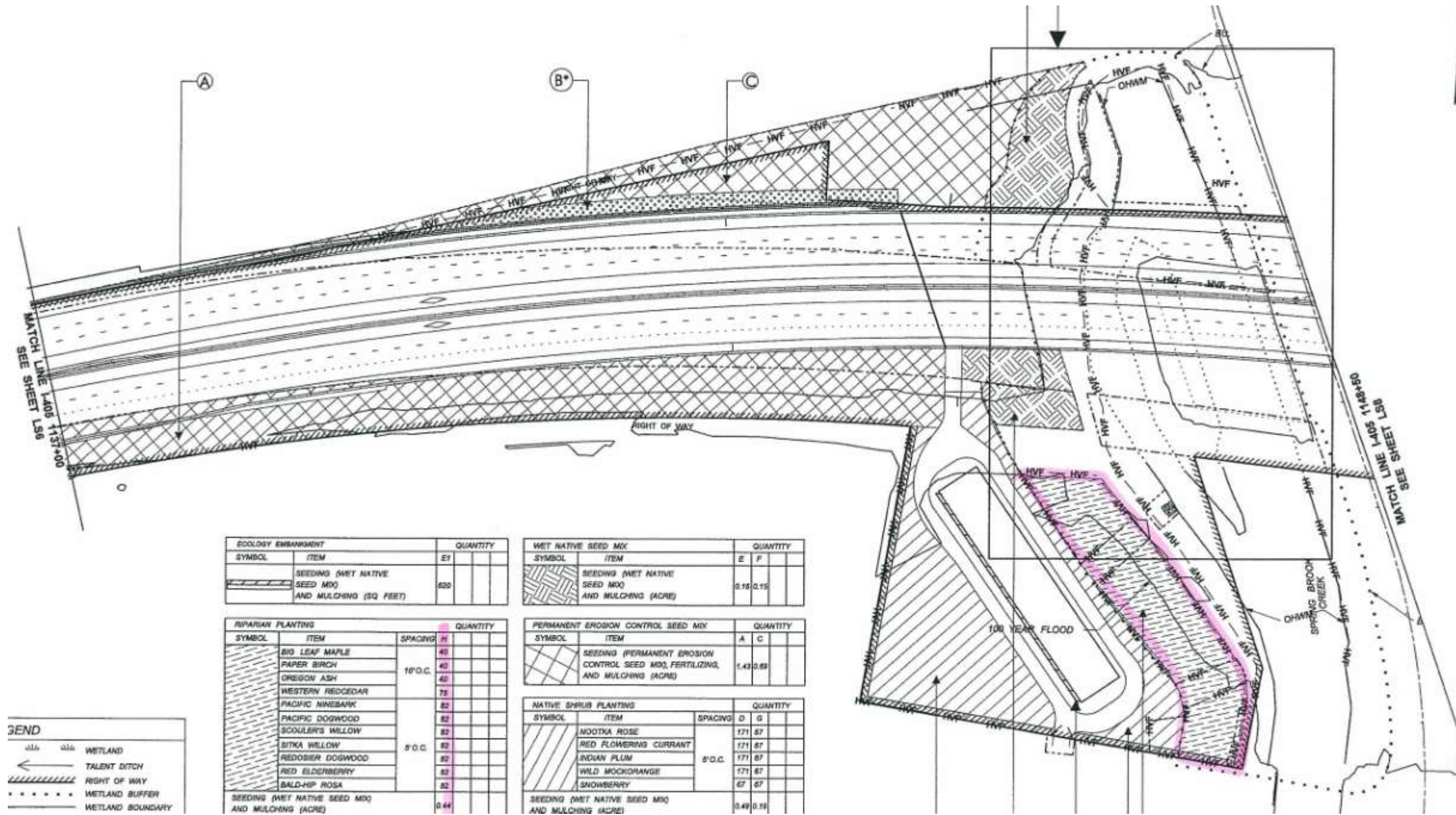
The monitoring results shall be included in the mitigation monitoring reports provided for the Springbrook Creek stream mitigation site through year 5. After year 5, monitoring reports shall be provided in year 7 and year 10.

g. Japanese Knotweed shall not be present at the Springbrook Creek stream mitigation site, the 1.7 acres of urban forest riparian plantings, and the 0.24 acre Gilliam Creek understory plantings. If it is discovered during monitoring, eradication methods will be implemented immediately.

Appendix 2 – Planting Plan

(from planting plans 2008)

Springbrook Creek



ECOLOGY EMBANKMENT		QUANTITY	
SYMBOL	ITEM	E	F
[Symbol]	SEEDING (WET NATIVE SEED MIX)		
[Symbol]	AND MULCHING (SQ FEET)	520	

WET NATIVE SEED MIX		QUANTITY	
SYMBOL	ITEM	E	F
[Symbol]	SEEDING (WET NATIVE SEED MIX)		
[Symbol]	AND MULCHING (ACRE)	0.16	0.15

RIPARIAN PLANTING		QUANTITY	
SYMBOL	ITEM	SPACING	Q
[Symbol]	BIG LEAF MAPLE	10' O.C.	40
[Symbol]	PAPER BIRCH		40
[Symbol]	OREGON ASH		40
[Symbol]	WESTERN RED CEDAR	75'	75
[Symbol]	PACIFIC MINEBARK		82
[Symbol]	PACIFIC DOGWOOD	5' O.C.	82
[Symbol]	SCOULER'S WILLOW		82
[Symbol]	SITKA WILLOW		82
[Symbol]	REDOSIER DOGWOOD		82
[Symbol]	RED ELDERBERRY		82
[Symbol]	BALD-HIP ROSA		82
[Symbol]	SEEDING (WET NATIVE SEED MIX) AND MULCHING (ACRE)		0.44

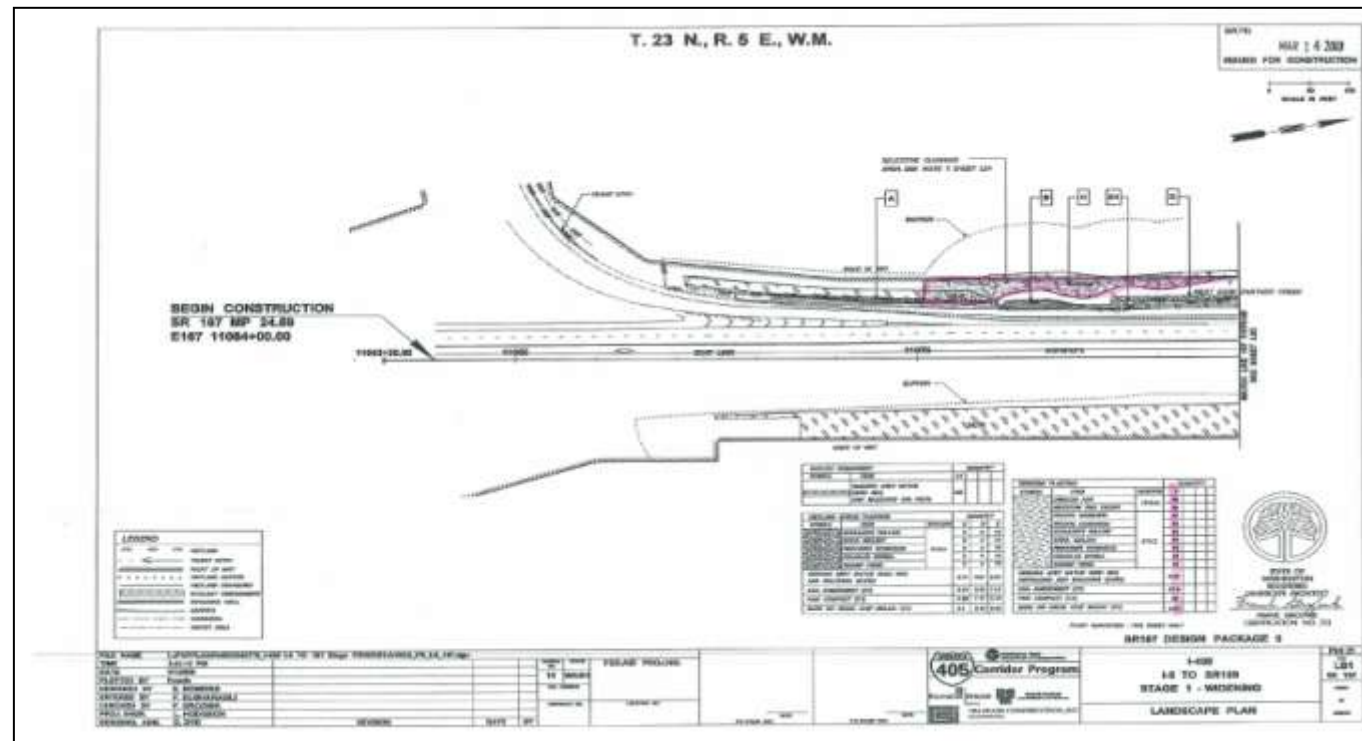
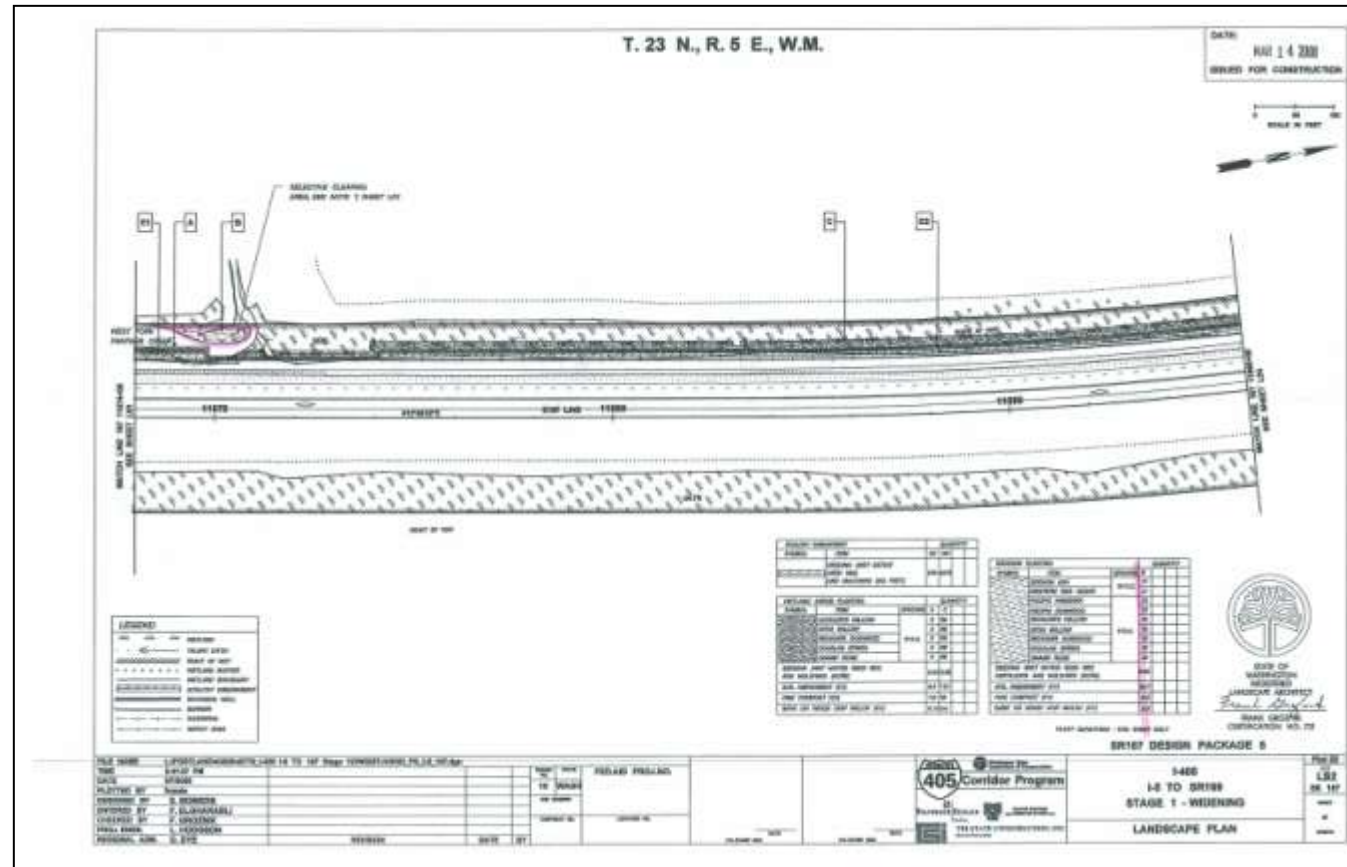
PERMANENT EROSION CONTROL SEED MIX		QUANTITY	
SYMBOL	ITEM	A	C
[Symbol]	SEEDING (PERMANENT EROSION CONTROL SEED MIX, FERTILIZING, AND MULCHING (ACRE))	1.43	0.69

NATIVE SHRUB PLANTING		QUANTITY	
SYMBOL	ITEM	SPACING	Q
[Symbol]	NOOTKA ROSE	8' O.C.	171
[Symbol]	RED FLOWERING CURRANT		171
[Symbol]	INDIAN PLUM	67'	171
[Symbol]	WILD MOCKORANGE		171
[Symbol]	SNOWBERRY		67
[Symbol]	SEEDING (WET NATIVE SEED MIX) AND MULCHING (ACRE)		0.49

LEGEND

[Symbol]	WETLAND
[Symbol]	TALENT DITCH
[Symbol]	RIGHT OF WAY
[Symbol]	WETLAND BUFFER
[Symbol]	WETLAND BOUNDARY

West Panther Creek



Appendix 3 – Photo Points

The photographs below were taken from permanent photo-points on August 30, 2010 and document current site development.



Photo Point 1a



Photo Point 1b

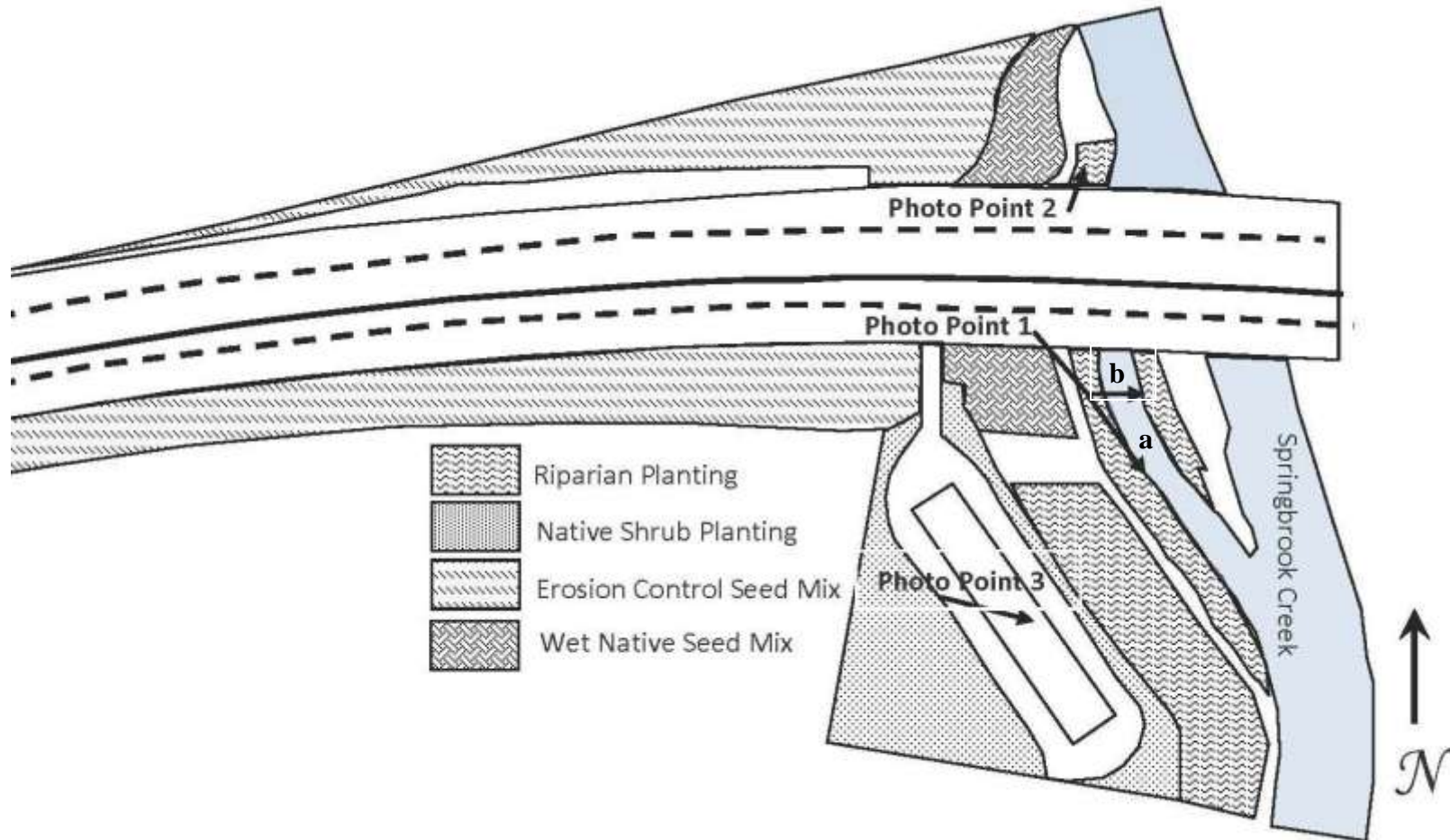


Photo Point 2



Photo Point 3

Photo Point Map



Literature Cited

1. Ecology. See Washington State Department of Ecology.
2. United States Army Corps of Engineers. 2007. Department of the Army Permit Number 200600097.
3. Washington State Department of Fish and Wildlife. 2006. Hydraulic Project Approval Permit Number 103998.
4. Washington State Department of Transportation (WSDOT).2006. I-405 Congestion Relief and Bus Rapid Transit Projects. Renton Nickel Improvement Project (I-405, I-5 to SR 169). Conceptual Stream Mitigation Plan
5. Washington State Department of Transportation (WSDOT).2008. I-405 Congestion Relief and Bus Rapid Transit Projects. Renton Nickel Improvement Project (I-405, I-5 to SR 169). Conceptual Stream Mitigation Plan. Planting Plans.
6. 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>