

**SR 203 Novelty Hill Road/NE 124<sup>th</sup> St. Vicinity Roundabout;  
(MP 12.46 to MP12.79) Mitigation Site  
WIN # A20311C**

**USACE NWP (23) 200201098**

**Northwest Region**

**2010 MONITORING REPORT**

**Wetland Assessment and Monitoring Program**

*Issued March 2011*



**Environmental Services Office**

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# SR 203 Novelty Hill Road/NE 124<sup>th</sup> St. Vicinity Roundabout Mitigation Site

**USACE NWP (23) 200201098**



General Site Information		
<b>USACE NWP 23 Number</b>	200201098	
<b>WIN Number</b>	A20311C	
<b>Mitigation Location</b>	Intersection of SR 203 and 124 <sup>th</sup> Street south of Duvall, King County	
<b>LLID Number</b>	1219891477089	
<b>Construction Date</b>	2004-2005	
<b>Monitoring Period</b>	2006-2015	
<b>Year of Monitoring</b>	5 of 10	
<b>Area of Wetland Project Impacts</b>	0.71 acre	
<b>Type of Mitigation</b>	Wetland Establishment	Wetland Enhancement
<b>Area of Mitigation</b>	1.33 acres	0.08 acre
<b>Type of Mitigation</b>	Stream Buffer Enhancement	Buffer Establishment
<b>Area of Mitigation</b>	1.03 acres	1.74 acres

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## Summary of Monitoring Results and Management Activities (2010)

Performance Standards (Year 5)	2010 Results <sup>1</sup>	Management Activities
Wetland Hydrology	Mostly Present	
50 percent aerial cover of native facultative (FAC) or wetter woody species in the wetland	90% cover	
35 percent aerial cover of native woody species in the upland buffer	85% cover	
Less than 15 percent cover King County noxious weeds and non-native invasive species in the wetland	Less than 5 %	Manual control of invasive and noxious weeds in June and herbicide application in August 2010.
65 percent aerial cover of native shrubs in the stream buffer	90%	
Less than 15 percent cover of King County noxious weeds in riparian area	53% cover (CI <sub>80%</sub> = 48-62%)	Herbicide application in August 2010.

## Report Introduction

This report summarizes Year-5 and Year-10 monitoring activities at the State Route (SR) 203 Novelty Hill Road Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site success. Monitoring activities included vegetation surveys, photo-documentation and assessments of wetland hydrology. Hydrology was observed in March and April of 2010 and the vegetation standards were addressed on July 26<sup>th</sup> and 27<sup>th</sup>, 2010.

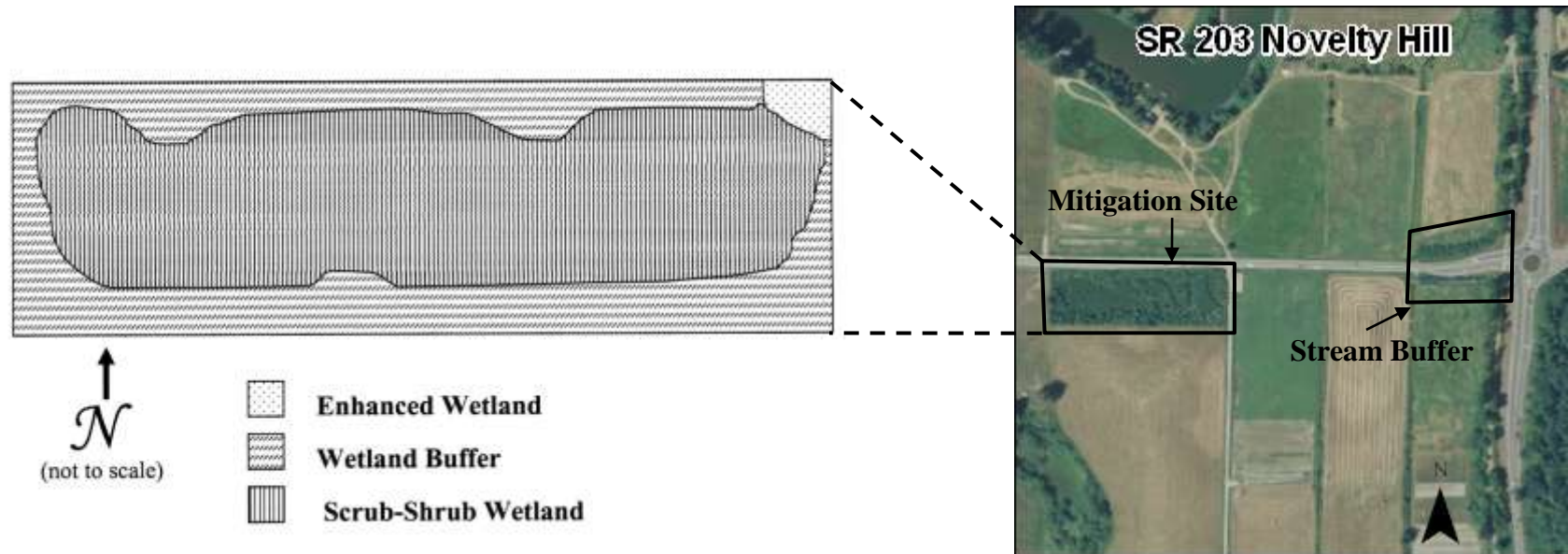
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<sup>1</sup> Estimated values are presented with their corresponding statistical confidence interval. For example, 53% (CI<sub>80%</sub> = 48-62% cover) means we are 80% confident that the true aerial cover value is between 48% and 62%.

## What is the SR 203 Novelty Hill Road Mitigation Site?

This 5.6-acre mitigation site (Figure 1) provides mitigation to compensate for the loss of 0.71 acre of wetlands due to road improvements along SR 203. The site is split into two mitigation areas as shown below. This site is located in the Snoqualmie River floodplain, within the same sub-basin as the project impacts. The wetland mitigation site provides wildlife habitat, flood flow alteration and water quality improvement functions.

Two streams paralleling NE 124<sup>th</sup> Street were relocated to accommodate roadway widening. To compensate for impacts to the stream, 1.03 acres of stream buffer were enhanced along the relocated stream channel, on either side of the roadway.



**Figure 1 Site Sketch**

The SR 203 Novelty Hill Road Mitigation Site includes an established (formerly called created) scrub-shrub wetland surrounded by wetland buffer. An enhanced wetland area is located in the northeast corner of the site. The enhanced stream buffer is located a quarter-mile east of the mitigation site.

## **What are the performance standards for this site? (Year-5)**

### Performance Standard 1

The wetland creation area will be saturated at or near the surface or ponded for at least 30 consecutive days between March 1 and October 31 in years when rainfall meets or exceeds the 30-year average.

### Performance Standard 2

Native facultative or wetter woody species will achieve 50 percent aerial cover. Native colonizing woody vegetation will be included in this coverage calculation.

### Performance Standard 3

Native upland buffer woody species will achieve 35 percent aerial cover. Native colonizing woody vegetation will be included in this coverage calculation.

### Performance Standard 4

Non-native invasive species on the King County Noxious weeds List, such as reed canarygrass, non-native blackberries, Scot's broom, Japanese knotweed, and thistle will not exceed 15 percent aerial coverage in forested wetland community.

### Performance Standard 5

Aerial coverage of native shrubs in the stream buffer creation areas should be a minimum aerial coverage of 65 percent.

### Performance Standard 6

Non-native invasive species on the King County noxious weeds list are not greater than 15 percent of the aerial coverage within the planted riparian area.

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 4 shows the planting plan (Cooley 2003). Appendix 5 shows the as-built (Anderson 2005).

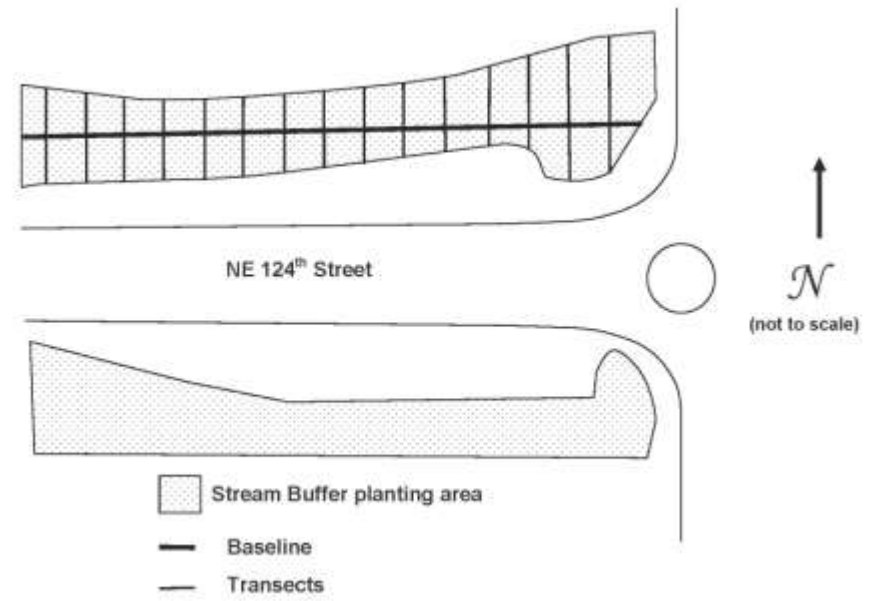
## How were the performance standards evaluated?

WSDOT staff collected hydrology data using methods described in the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997) (Performance Standard 1). Six permanent hydrology pit locations were established in Year-1 of monitoring and recorded on a map (Appendix 3, Figure 3). During each monitoring visit, visual observations are made to determine the extent of inundation and surface saturation. Depth and location of standing water is recorded. At each pit location, in the absence of inundation or surface saturation, subsurface observations are made.

To evaluate standards for vegetative cover in the wetland, upland buffer, stream buffer, and invasive cover in the wetland, qualitative estimates were made (Performance Standards 2, 3, 4, and 5). Photographs were taken from photo point locations to illustrate vegetation structure as it pertains to the performance standards and desired functions.

To evaluate invasive species cover in the stream buffer, the point intercept method was used (Performance Standard 6). Only the north side of the road was sampled due to access issues (Figure 2). A 95 meter baseline was established parallel to the road and 23 transects were randomly placed perpendicular to the baseline.

For additional details on the methods, see Appendix 2 of this report or view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).



**Figure 2 Riparian Buffer Sampling Design (2010)**

## Is this Site a Success?

The site is performing differently in each of the two mitigation areas identified in Figure 1. The wetland mitigation area has a ten year planned monitoring period, and the stream buffer area has a five year planned monitoring period.

### Wetland Mitigation Area

The wetland mitigation site is successful in relation to vegetation standards. The site achieves all of the Year-5 and the Year-10 vegetation standards for a second year in a row (See Appendix 3, Table 6 for Year-10 standards and results). The species identified on the planting plan are present and the cover values outlined in the performance standards have been exceeded. The hydrology standard has not been consistently achieved in all intended areas. A delineation is planned for the spring of 2011.

Many of the intended functions are being supported by the established wetland. Wildlife habitat with high woody vegetation cover is illustrated in the results section of the report. Over the monitoring period, several species of birds were observed onsite and on the perch pole (Appendix 3, Table 5) as well as evidence of coyote, small mammals, and tree frogs. The monitoring team has observed flood flow alteration and vegetation structure to provide water quality improvement in the wetland during hydrology visits early in the growing season (Appendix 3, Table 2). Whole sections of the forested wetland remain inundated for extended periods of time, storing water and allowing sediment and nutrients to settle.

### Stream Buffer

Despite high cover of reed canarygrass (*Phalaris arundinacea*), the stream buffer plantings are achieving the Year-5 woody cover standards. High water flow has not inhibited woody shrubs from becoming established in the stream corridor. Functions of wildlife habitat and contaminant buffering are being provided by increased shrub cover, and overhanging vegetation.

The invasive species standard for the stream buffer is not being achieved due to high cover of reed canarygrass. Management of reed canarygrass in this area has focused on supporting successful native plant establishment, and is successful in that regard. Achieving the 15 percent threshold for the non-native invasive species on the King County Noxious Weeds List is not likely since the stream buffer on both sides of the road is contiguous with large fields of reed canarygrass. The presence of reed canarygrass in the stream buffer has not inhibited the growth of native shrub species and provides the benefit of increased water quality by trapping sediments.

Limited annual weed control has occurred since the sites were established. Initial high survival of woody species combined with vigorous growth lead to the high amount of cover we see today. This likely limited the amount of weed control needed in the wetland mitigation area of the site.

Results for Performance Standard 1  
(Wetland Hydrology):

Monitoring records from March and April, 2010 indicate that wetland hydrology is present in most intended areas (Appendix 3, Table 2). Pit locations three through six were inundated during all three site visits (Photo 1). Pit locations one and two were either just above the 12 inches required or just below it for all three visits. The antecedent weather conditions show that the average precipitation in February was well below the 30 year average for that area and the March 11<sup>th</sup> visit occurred right before a rainfall event (Appendix 3, Tables 3, 4). This may explain why the March 11<sup>th</sup> visit did not meet this performance standard.

Results for Performance Standard 2  
(The wetland shall have 50% aerial cover of native FAC or wetter species):

Overall cover of FAC and wetter native woody vegetation is qualitatively estimated at 90 percent cover. All species observed display vigorous growth (Photo 2). The dominant species in the wetland include willows (*Salix* spp.), black hawthorn (*Crataegus douglasii*), and twinberry honeysuckle (*Lonicera involucrata*). Plant height ranges from approximately two meters to 15 meters tall.



**Photo 1**  
**Inundation in the wetland (March 2010)**



**Photo 2**  
**Woody cover in the wetland (July 2010)**

Results for Performance Standard 3

(The buffer shall have 35% aerial cover of native upland woody species):

Cover of native woody species in the upland buffer is qualitatively estimated at 85 percent. All species display vigorous growth. Dominant species observed include redosier dogwood (*Cornus sericea*), red elderberry (*Sambucus racemosa*), and thimbleberry (*Rubus parviflorus*). Plant height in this zone ranges from approximately one meter to 15 meters tall. (Photo 3)

Results for Performance Standard 4

(Non-native invasive species shall not exceed 15% aerial cover in the forested wetland):

Cover of non-native invasive species in the forested wetland is qualitatively estimated at less than five percent. Most invasive species are encroaching from the edge of the site in the buffer. Species observed in the wetland include reed canarygrass (*Phalaris arundinacea*), Himalayan blackberry (*Rubus armeniacus*), and thistles (*Cirsium spp.*).

Results for Performance Standard 5

(The stream buffer shall have 65% aerial cover of native shrubs):

Woody cover in the stream buffer is qualitatively estimated at 90 percent. Dominant species include redosier dogwood (*Cornus sericea*), and willows (*Salix spp.*) at approximately six meters tall. There is evidence of flooding (drift deposits) but this has not affected the shrub growth in this area.

Results for Performance Standard 6

(Non-native invasive species shall not exceed 15% aerial cover in the planted riparian area):

The invasive species observed in this area is reed canarygrass (*Phalaris arundinacea*) as the stream buffer area is bordered by large fields of this grass. The north side of NE 124<sup>th</sup> street was monitored quantitatively for invasive species. Cover is at 53% (CI<sub>80%</sub> = 48-62%). Although woody cover is very high in this area, reed canarygrass is scattered throughout the understory. The south side of the road stream buffer area is very similar to the north, but was inaccessible due to a solid four foot tall drift deposit through the middle of the planting strip (Photo 4 – next page). The drift deposits are made up of fine silt and dead reed canarygrass debris.



**Photo 3**  
**Woody cover in the wetland buffer (July 2010)**



**Photo 4**  
**Tall drift deposit in stream buffer – south side of the road (July 2010)**

### **What is planned for this site?**

A delineation of this wetland is planned for spring, 2011 to confirm the desired acreage and hydrology is present on site. If the delineation shows that hydrology and wetland acreage are present in the intended areas, early closeout will be pursued. Weed control at the mitigation site is planned for the 2011 growing season. Due to the high amount of woody cover, the amount of invasive species remains low in the wetland area. The region is committed to maintaining the site and keeping the amount of non-native invasive species cover to a minimum in the wetland mitigation area and to maintain woody cover in the stream buffer.

# Appendix 1 – Goals and Performance Standards

The following excerpt is from the *SR 203 Novelty Hill Road/NE 124<sup>th</sup> St. Vicinity Roundabout; (MP12.46 to MP12.79) Final Wetland and Stream Mitigation Plan* (WSDOT 2003). The performance criteria addressed this year are identified in **bold** font.

## GOALS AND OBJECTIVES

The goal of this compensatory mitigation plan is to replace lost wetland acreage and functions as a result project constructions. Thus, this mitigation effort intends to create 1.33 acres of palustrine wetland with plantings of native vegetation to achieve forested and scrub-shrub wetland as mitigation for the loss of 0.71 acre of palustrine emergent and scrub-shrub wetland. Enhancement of 0.08 acre of existing emergent wetland with scrub-shrub wetland plant species will also be implemented. Wetland buffer enhancement will include creating 1.74 acres of upland shrub and forested habitat.

Enhancement of 1.03 acres of existing herbaceous stream buffer with riparian shrub habitat will be included in the mitigation plan.

The created wetland is anticipated to provide the following functions:

- Wildlife habitat (increasing available shrub and tree cover and providing additional habitat structures);
- Flood flow alteration (increasing the floodplain storage capacity of the Snoqualmie River floodplain); and
- Water quality improvement (increasing the area of vegetated wetland that potentially intercepts sediment and contaminants).

The enhanced stream buffer is anticipated to provide similar functions as the created wetland with the additional benefit of increased fish habitat.

- Wildlife/fish habitat (increasing stream channel complexity, increasing available shrub cover, overhanging vegetation, and potential food source enhancement-dissolved organic matter)
- Contaminant buffering/increased water quality (increasing the area of vegetated riparian area that potentially intercepts sediment and contaminants; increasing the stream canopy cover thereby reducing water temperatures).

The only wetland/buffer function that will not be monitored as a measurable function of the wetland mitigation is fish/wildlife habitat.

## **Specific Goals and Objectives**

The goals, objectives and performance standards for this wetland mitigation project are listed below.

Mitigation Goal 1: Create 1.33 acres of scrub-shrub wetland from an upland area adjacent to an existing emergent wetland within the Snoqualmie River floodplain.

Objective 1: Excavate the existing upland area to a depth of 42 ft to match elevations of existing, adjacent wetlands, as well as capture and detain precipitation, floodwaters, and surface run-off.

Objective 2: Re-vegetate this 1.33 acres area with facultative or wetter native trees and shrub species.

Mitigation Goal 2: Enhance 1.74 acres of upland buffer surrounding the wetland mitigation area.

Objective 1: Plant native tree and shrub species throughout this 1.74 acres upland buffer area.

Mitigation Goal 3: Enhance 0.08 acre of existing disturbed emergent wetland.

Objective 1: Increase plant diversity and structure within the existing wetland and reduce the amount of non-native species in the wetland.

Mitigation Goal 4: Enhance wildlife habitat with the installation of wildlife habitat features.

Objective 1: Install one perch post for raptor use, three rock piles, eight brush piles, and one bat box.

Objective 2: Wildlife cover and forage available for birds and mammals should increase substantially within the mitigation area with the planting of wetland and buffer vegetation.

Mitigation Goal 5: Enhance 1.03 acres of existing degraded herbaceous stream buffer.

Objective 1: Increase plant diversity and structure within the existing degraded herbaceous buffer, reducing invasive plant species, and increasing overall stream cover.

## **PERFORMANCE STANDARDS**

Success of the mitigation plan will be evaluated by the achievement of desired performance standards that evaluate the overall success of the mitigation. WSDOT will document the following on-site conditions as indicators that functions presented in the Mitigation Goals and Strategies section are being performed by the mitigation site. The functions to be provided include wildlife

habitat for passerine birds, raptors, reptiles, small mammals, and bats; increased fish habitat; flood/stormwater storage, and water quality improvement.

The performance standards for Mitigation Goal 1 will be met with the hydrology performance standard. The vegetation performance standards will apply to Mitigation Goals 1, 2, 3, and 4. Performance Standards from Mitigation Goal 4 will be met following construction and installation of the proposed habitat features. A separate section discusses success standards for Mitigation Goal 5, riparian vegetation monitoring.

## Hydrology

**The wetland creation area will be saturated at or near the surface or ponded for at least 30 consecutive days between March 1 and October 31 in years when rainfall meets or exceeds the 30-year average.**

## Wetland Vegetation

The minimum survival and cover percentages are listed below for each monitoring period:

Year 1:

- All tree and shrub vegetation installed in the wetland creation and buffer creation areas should have 100 percent survival one year following installation. If dead plantings are replaced then standard will be met.
- Non-native invasive species listed on the King County Noxious Weeds list, [such as reed canarygrass (*Phalaris arundinacea*), non-native blackberries (*Rubus* sp.), Scot's broom (*Cytisus scoparius*), Japanese knotweed (*Polygonum cuspidatum*), and thistle sp. (*Cirsium* sp.)] will not exceed 15 percent aerial coverage in forested and scrub-shrub wetland communities.
- Aerial coverage of grass seed applied in the graded areas should be a minimum of 80 percent coverage at full germination.

Year 3:

- Native facultative or wetter woody species will achieve 30 percent aerial cover. Native colonizing woody vegetation will be included in this coverage calculation.
- Native upland buffer woody species will achieve 25 percent aerial cover. Native colonizing woody vegetation will be included in this coverage calculation.

- Non-native invasive species listed on the King County Noxious Weeds list, (such as reed canarygrass, non-native blackberries, Scot's broom, Japanese knotweed, and thistle sp.) will not exceed 15 percent aerial coverage in forested and scrub-shrub wetland communities.

**Year 5:**

- **Native facultative or wetter woody species will achieve 50 percent aerial cover. Native colonizing vegetation will be included in this coverage calculation.**
- **Native upland buffer woody species will achieve 35 percent aerial cover. Native colonizing woody vegetation will be included in this coverage calculation.**
- **Non-native invasive species on the King County Noxious Weeds list, such as reed canarygrass, non-native blackberries, Scot's broom, Japanese knotweed, and thistle will not exceed 15 percent aerial coverage in forested wetland community.**

**Year 7:**

- Native facultative or wetter woody species will achieve 65 percent aerial coverage. Native colonizing vegetation will be included in this coverage calculation.
- Native upland buffer woody species will achieve 50 percent aerial cover. Native colonizing woody vegetation will be included in this coverage calculation.
- Non-native invasive species on the King County Noxious Weeds list, such as reed canarygrass, non-native blackberries, Scot's broom, Japanese knotweed, and thistle will not exceed 15 percent aerial coverage in forested wetland community.

**Year 10:**

- **Native facultative or wetter woody species will achieve 80 percent aerial coverage. Native colonizing vegetation will be included in this coverage calculation.**
- **Native upland buffer woody species will achieve 65 percent aerial cover. Native colonizing woody vegetation will be included in this coverage calculation.**
- **Non-native invasive species on the King County Noxious Weeds list, such as reed canarygrass, non-native blackberries, Scot's broom, Japanese knotweed, and thistle will not exceed 15 percent aerial coverage in forested and scrub-shrub wetland communities.**

## Riparian Vegetation

### Year 1:

- All shrub vegetation installed in the stream buffer creation areas should have 100 percent survival one year following installation. If dead plantings are replaced then standard will be met.
- Non-native invasive species on the King County Noxious Weeds list are not greater than 15 percent aerial coverage within the planted riparian area.

### Year 3:

- All planted shrub vegetation should have 80 percent survival after three years installation.
- Aerial coverage of native shrubs in the stream buffer creation areas should be a minimum aerial coverage of 30 percent.
- Non-native invasive species on the King County Noxious Weeds list are not greater than 15 percent of the aerial coverage within the planted riparian area.

### Year 5:

- **Aerial coverage of native shrubs in the stream buffer creation areas should be a minimum aerial coverage of 65 percent.**
- **Non-native invasive species on the King County Noxious Weeds list are not greater than 15 percent of the aerial coverage within the planted riparian area.**

## MONITORING PLAN

All wetland creation and buffer creation areas will be monitored for a minimum of ten years at years 1, 3, 5, 7, and 10 with riparian buffer monitoring occurring each year for five years. It is recommended that formal monitoring procedures be performed in years one, three, five, seven, and ten beginning one year after Initial Acceptance of the mitigation construction and every year for five years for riparian planting areas. The site should be evaluated informally the summer following plant installation to evaluate survival rates and to document the presence of any non-native invasive species. A monitoring report will be submitted to the Corps of Engineers, Washington State Department of Ecology, King County, and other resource agencies for review and comment. Report submittals will occur for monitoring years one, three, five, seven, and ten. Successful mitigation will be measured by attainment of the performance standards described in this mitigation plan document. Monitoring will cease as soon as all performance standards have been attained.

# Appendix 2 – Methods

Qualitative estimates were used to determine woody cover in the wetland, upland buffer and stream buffer. Invasive species in the wetland was also estimated qualitatively. (Performance Standards 2, 3, 4, 5)

To assess invasive species standards in the stream buffer, a 95-meter baseline was established parallel to N.E. 124<sup>th</sup> Street. Twenty-three temporary sampling transects were placed perpendicular to the baseline using a systematic random sampling method (Figure 2). Aerial cover of invasive species in the stream buffer (Performance Standard 6) was assessed using the point intercept method. Twenty-three eight-meter point-line sample units (20 points each) were randomly positioned along the sampling transects in this zone.

Sample size analysis confirmed sufficient sampling had been completed based on site sampling objectives and the desired level of statistical confidence. The sample size equation shown here (below) was used to perform the analysis on data collected (Performance Standard 6). In this equation, the precision level (*B*) equals half the maximum acceptable confidence interval width multiplied by the sample mean.

$$n = \frac{(z)^2 (s)^2}{(B)^2}$$

*n* = unadjusted sample size  
*z* = standard normal deviate  
*s* = sample standard deviation  
*B* = precision level

WSDOT staff collected hydrology data using methods described in the Washington State Wetlands Identification Manual (Ecology 1997) (Performance Standard 1).

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

## Appendix 3 – Data Tables

Table 1 - Native Woody Species Observed on the Novelty Hill Mitigation Site (2010)

Scientific Name	Common Name	Wetland Indicator Status	Fruit and Seed Producers (Cooke 1997)
<i>Acer macrophyllum</i>	bigleaf maple	FACU	X
<i>Cornus sericea</i>	redosier dogwood	FACW	X
<i>Crataegus douglasii</i>	Black hawthorn	FAC	X
<i>Lonicera involucrata</i>	twinberry	FAC+	X
<i>Malus fusca</i>	Pacific crabapple	FACW	X
<i>Physocarpus capitatus</i>	Pacific ninebark	FACW-	
<i>Populus balsamifera</i>	black cottonwood	FAC	
<i>Rosa</i> spp.	roses		X
<i>Rubus parviflorus</i>	thimbleberry	FAC-	X
<i>Rubus spectabilis</i>	salmonberry	FAC+	X
<i>Sambucus racemosa</i>	red elderberry	FACU	X
<i>Salix sitchensis</i>	Sitka willow	FACW	X
<i>Spiraea douglasii</i>	hardhack	FACW	X
<i>Symphoricarpos albus</i>	snowberry	FACU	X

Table 2 - Hydrology Observations (2010)

Date	Surface Observations	Subsurface Observations	
1-Mar-10	Eastern 2/3 of wetland inundated (up to 7" near E. end) or saturated to the surface. Wetland gets gradually drier from E to W.	Pit 1	No standing water after 28 min. but saturation at 11" was observed.
		Pit 2	Standing water at 14.5" after 42 min. and saturation at 12".
		Pit 3	Inundated
		Pit 4	Inundated
		Pit 5	Inundated
		Pit 6	Inundated
11-Mar-10	Site was overall drier than the last visit even though it was raining during this visit. The rain made the ground surface wet, but the soil underneath was not saturated. The soil in pits 1 and 2 was clayey and very moist, but not all of the pore space was filled with water.	Pit 1	None
		Pit 2	None
		Pit 3	Inundated
		Pit 4	Inundated
		Pit 5	Inundated
		Pit 6	Inundated
6-Apr-10	There is a large area of inundation on site ranging from surface saturation to approximately 8" in deeper areas.	Pit 1	standing water at 13"
		Pit 2	standing water at 10.5"
		Pit 3	Inundated
		Pit 4	Inundated
		Pit 5	Inundated
		Pit 6	Inundated

Figure 3. Hydrology Pit Map

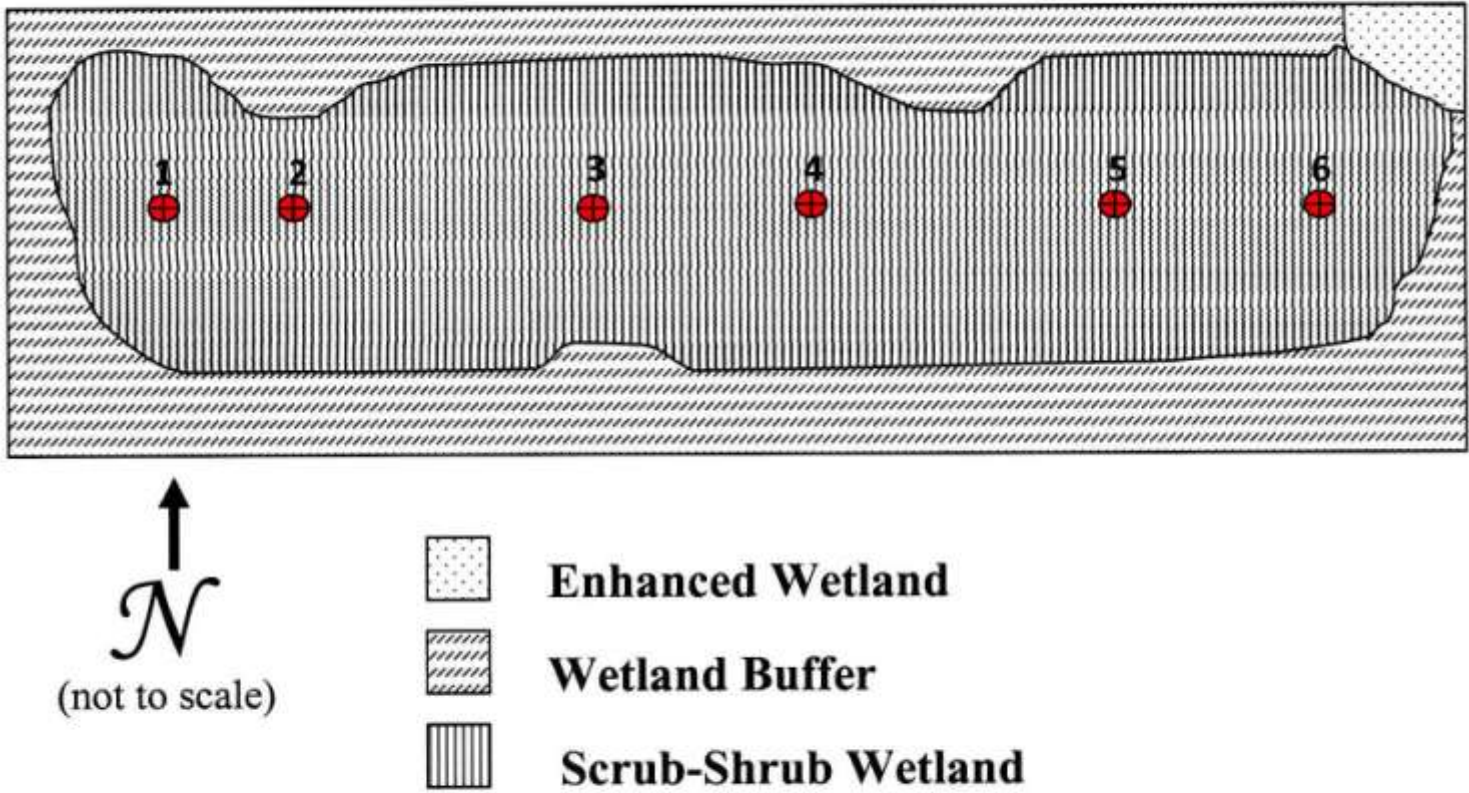


Table 3 – Precipitation graph from January 15 to April 15, 2010. Data recorded at KWADUVAL6 weather station in Duval, WA.

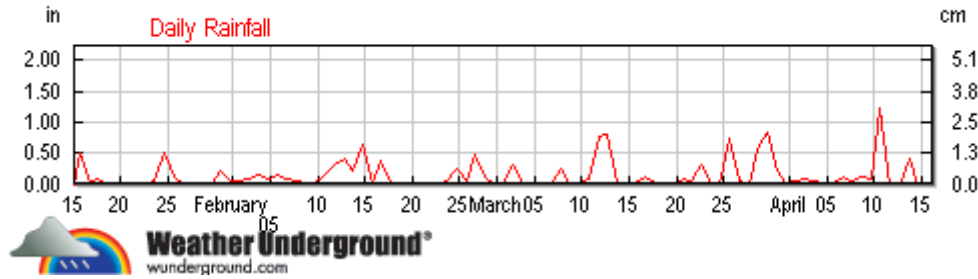


Table 4 – Comparison of 2010 monthly rainfall to 30 year averages. Monthly rainfall data recorded at KWADUVAL6 weather station and 30 year average data is from WETS Station: Snoqualmie Falls, WA7773.

	2010 precipitation (inches)	30 Yr. Average (inches)	30% chance will have	
			less than	more than
January	6.94	8.42	5.78	10.04
February	3.73	6.46	4.29	7.75
March	5.32	6.18	4.66	7.21

Table 5 - Bird species observed on site from 2007 to 2010.

American Robin ( <i>Turdus migratorius</i> )	wetland-independent
Song Sparrow ( <i>Melospiza melodia</i> )	wetland-independent
Steller’s Jay ( <i>Cyanocitta stelleri</i> )	wetland-independent
Rufous Hummingbird ( <i>Selasphorus rufus</i> )	wetland-independent
Killdeer ( <i>Charadrius vociferus</i> )	wetland-associated
Wilson's Snipe ( <i>Gallinago delicata</i> )	wetland-dependent
Western Tanager ( <i>Piranga ludoviciana</i> )	wetland-independent

Violet-green Swallow ( <i>Tachycineta thalassina</i> )	wetland-associated
Barn swallow ( <i>Hirundo rustica</i> )	wetland-associated
Red-tailed Hawk ( <i>Buteo jamaicensis</i> )	wetland-independent
Mallard ( <i>Anas platyrhynchos</i> )	wetland-dependent
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	wetland-associated
Willow Flycatcher ( <i>Empidonax traillii</i> )	wetland-associated
Savannah Sparrow ( <i>Passerculus sandwichensis</i> )	wetland-independent
Marsh Wren ( <i>Cistothorus palustris</i> )	wetland-dependent

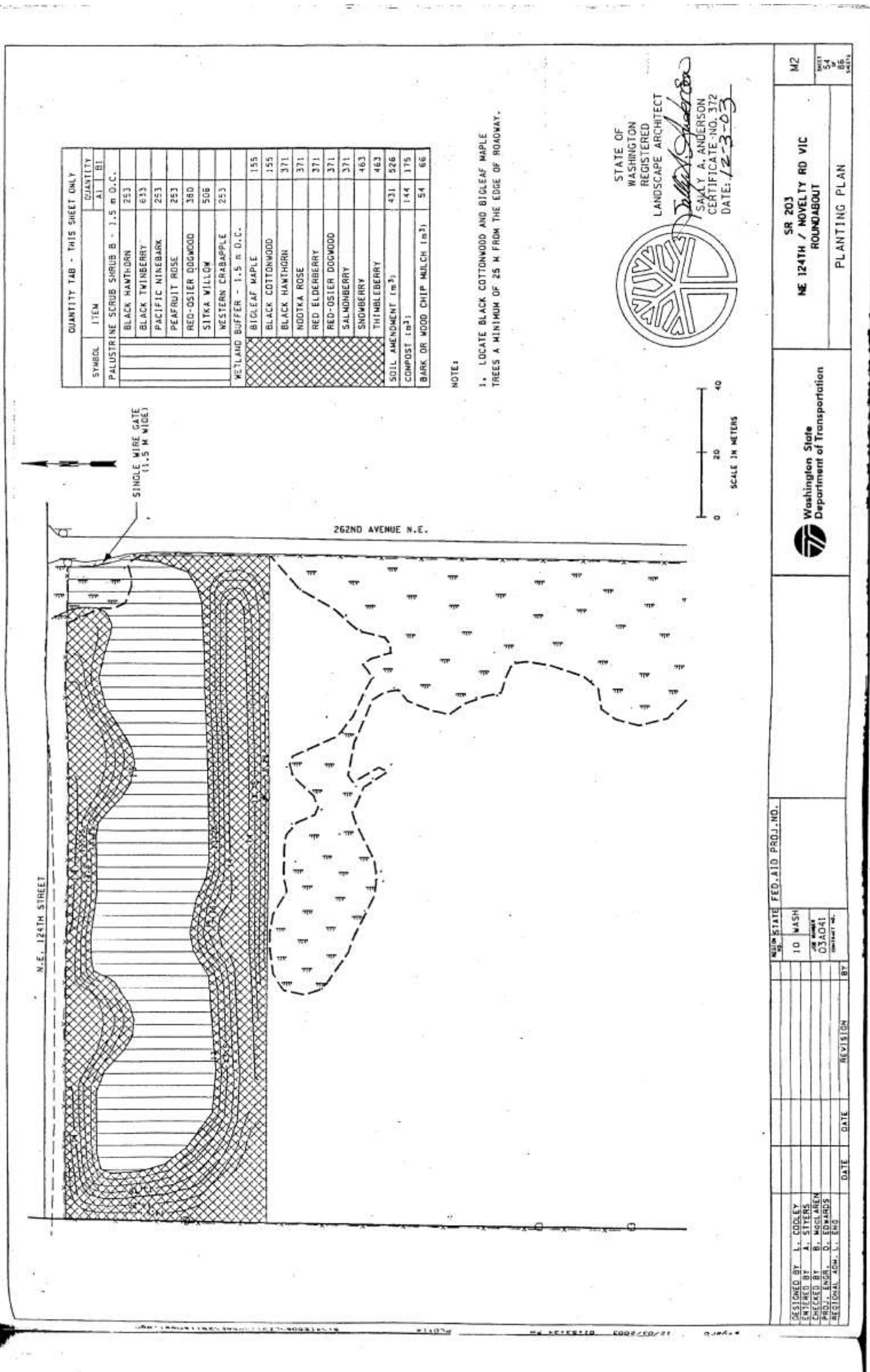
Table 6 – Final year (2015) Wetland Performance Standards and Monitoring Results

Performance Standards (applies to wetland mitigation area only)	2010 Results
Wetland Hydrology	Not entirely
80 percent aerial cover of native facultative (FAC) or wetter woody species in the wetland	90% cover
65 percent aerial cover of native woody species in the upland buffer	85% cover
Less than 15 percent cover King County noxious weeds and non-native invasive species in the wetland	Less than 5 %

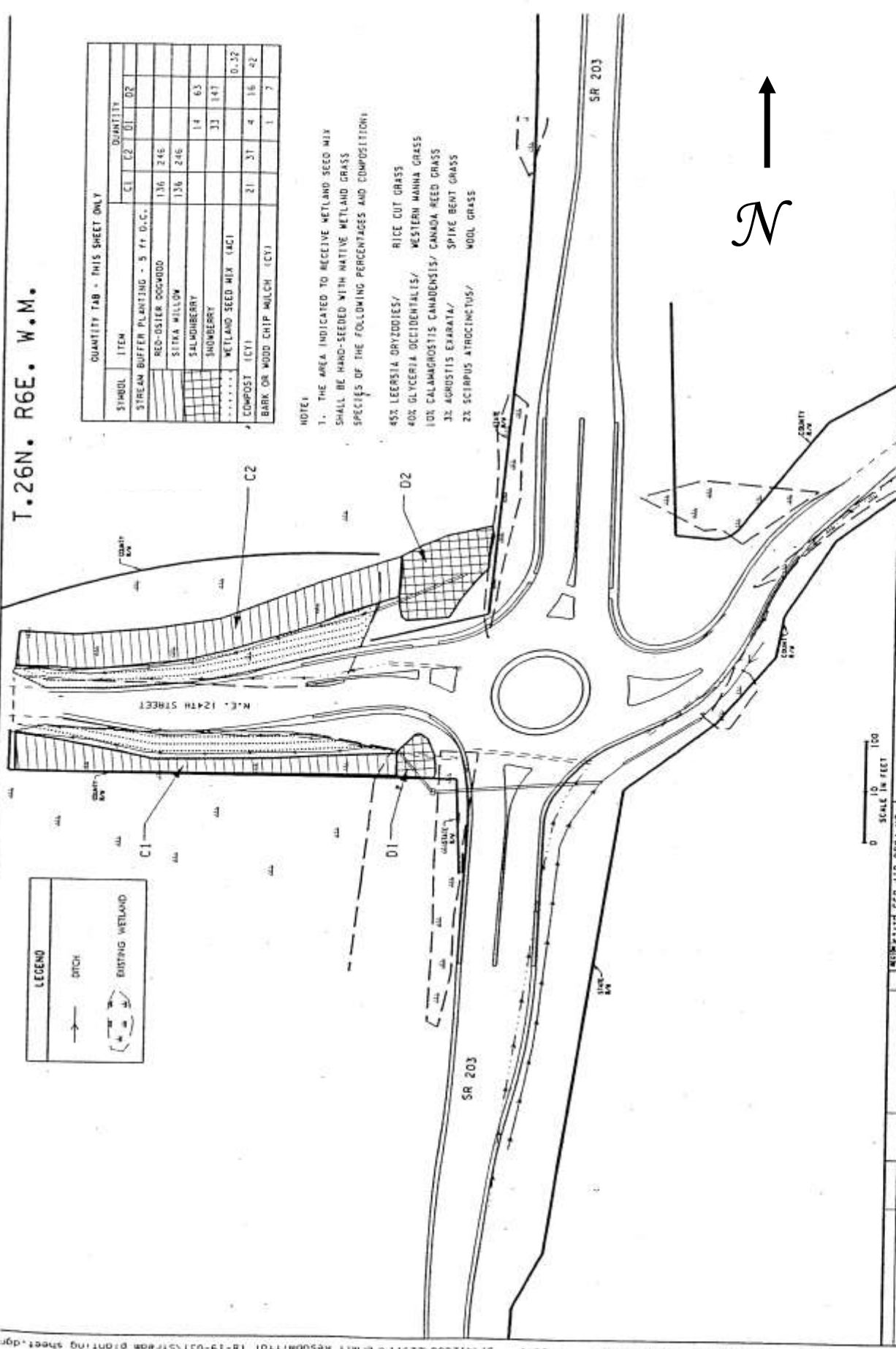
These performance standards were evaluated using the methods described in Appendix 2.

# Appendix 4 – Planting Plan

(Cooley 2003)



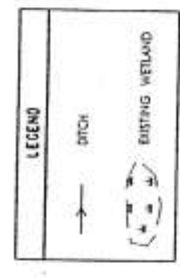
T.26N. R6E. W.M.



QUANTITY TAB - THIS SHEET ONLY

SYMBOL	ITEM	QUANTITY						
		C1	C2	D1	D2	W	W	
	STREAM BUFFER PLANTING - 5 FT D.C.							
	RED-Osier DOGWOOD	136		246				
	SITKA WILLOW	136		246				
	SALWBERRY			14	63			
	SHOEBERRY			33	147			
	WETLAND SEED MIX (ACI)							0.32
	COMPOST (CY)	21	31	4	16	42		
	BARK OR WOOD CHIP MULCH (CY)							

NOTE:  
 1. THE AREA INDICATED TO RECEIVE WETLAND SEED MIX SHALL BE HAND-SEEDED WITH NATIVE WETLAND GRASS SPECIES OF THE FOLLOWING PERCENTAGES AND COMPOSITION:  
 45% LEERSIA ORYZOIDES/ RICE CUT GRASS  
 40% GLYCERIA OCCIDENTALIS/ WESTERN MANNA GRASS  
 10% CALAMAGROSTIS CANADENSIS/ CANADA REED GRASS  
 3% AGROSTIS EXARATA/ SPIKE BENT GRASS  
 2% SCIRPUS ATROCACTUS/ WOOL GRASS



DESIGNED BY L. COOLEY  
 ENTERED BY A. STYERS  
 CHECKED BY B. MACLAREN  
 PROJ. ENGR. D. EDWARDS  
 REGIONAL ADMIN. S. L. ENG

WASH. STATE FED. AID PROJ. NO. 10 WASH. STATE PROJECT NO. 03A001 CONTRACT NO.

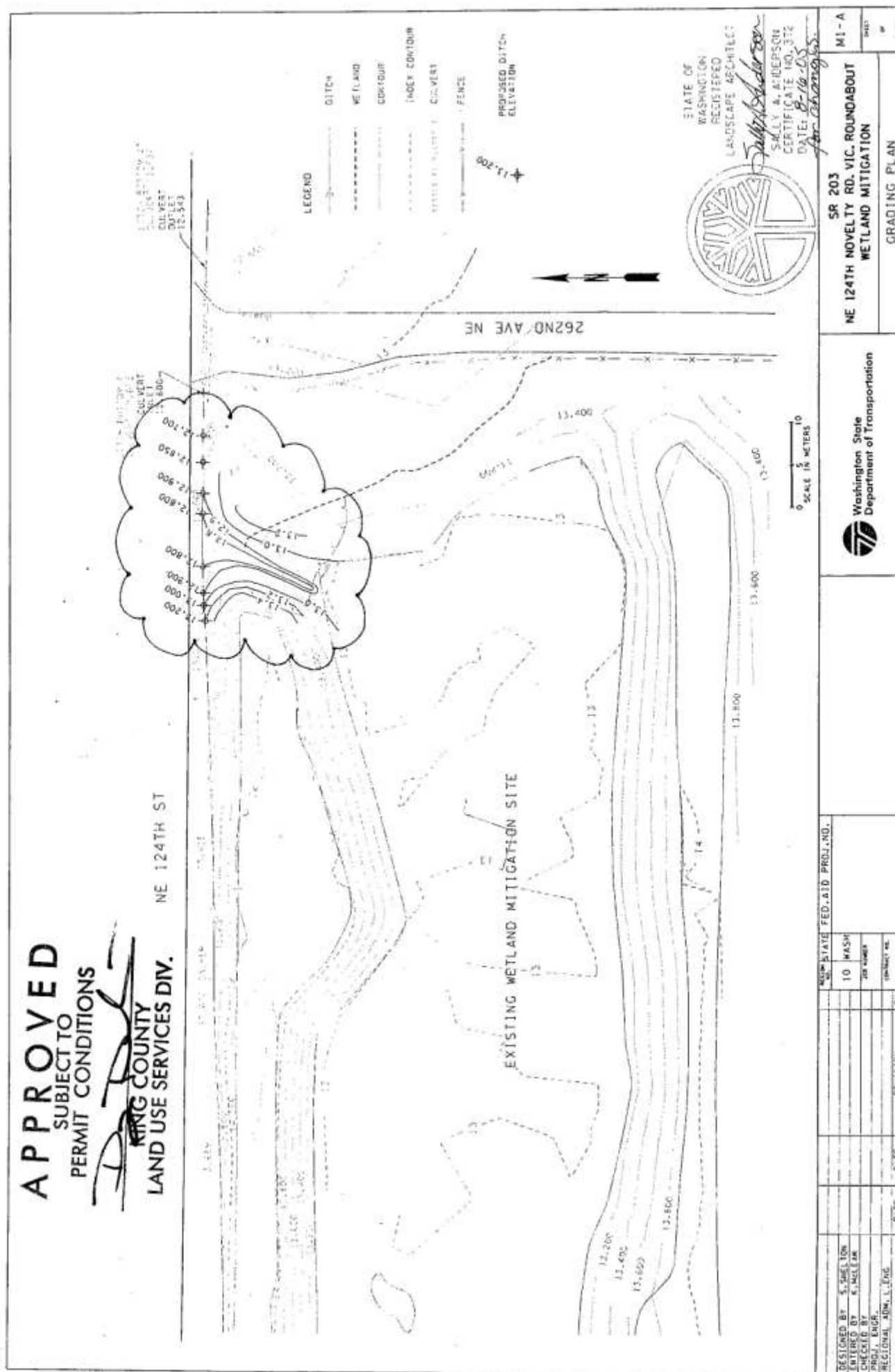
Washington State Department of Transportation

SR 203 NOVELTY RD VIC ROUNDABOUT

STREAM BUFFER PLANTING PLAN

MM5 SHEET 1 OF 1

# Appendix 5 As-built Planting Plan



**APPROVED**  
SUBJECT TO  
PERMIT CONDITIONS

**DAKOTA COUNTY**  
LAND USE SERVICES DIV.

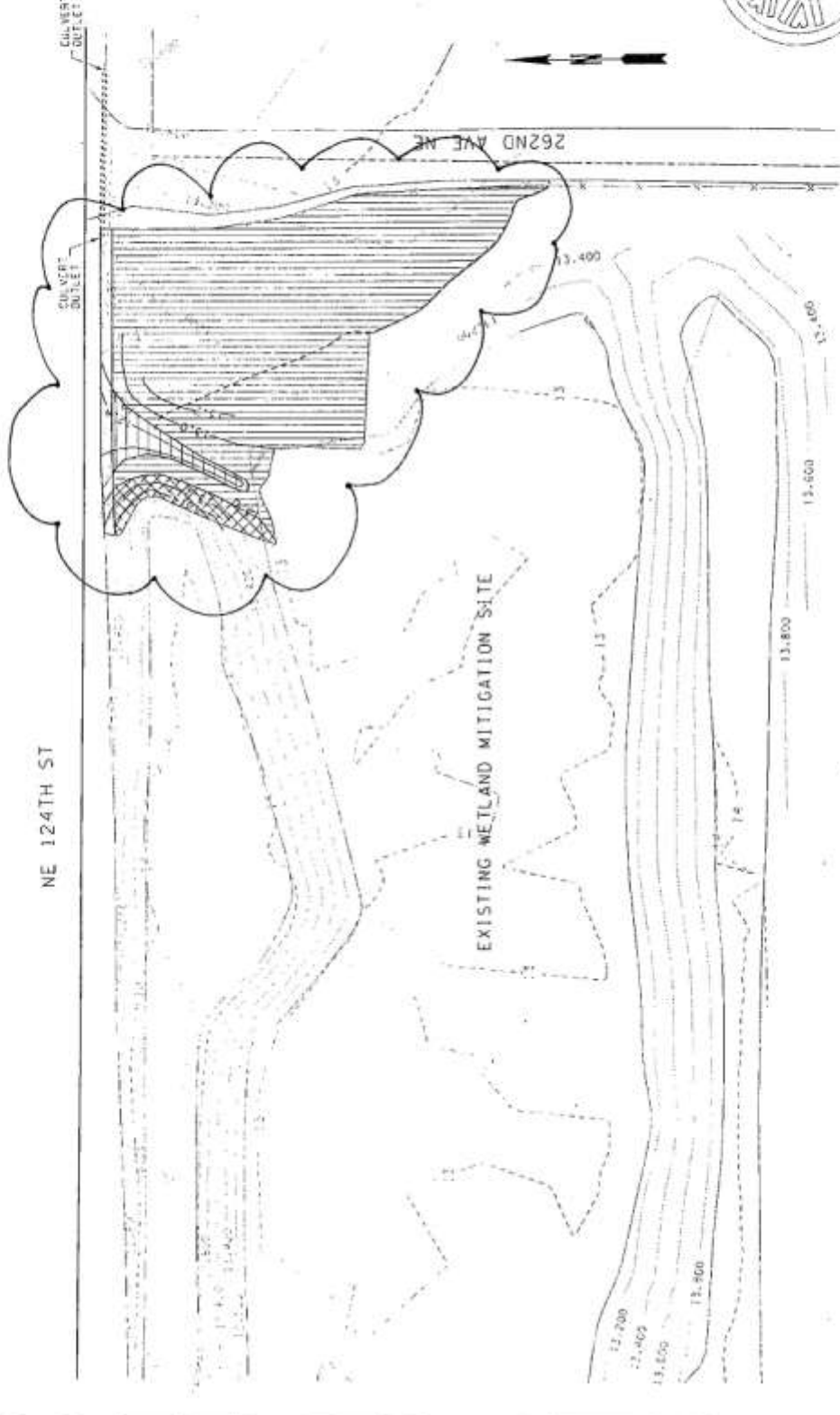
PROJECT # 08/11/2005 08148146 AM PL0112 S:\12005\12912\Change Order\m11ng MIT 031605.dgn

QUANTITY TAB - THIS SHEET ONLY

SYMS.	ITEM	QUANTITY
	PAULOWNIA SEEDS 3/8" - 1.5" D.C.	
	BLACK HEMLOCK	105
	PACIFIC REDWOOD	138
	RED-ALDER	75
	RED-OSIER DOGWOOD	105
	SITKA WILLOW	152
	WETLAND BUFFER - 1.5' W. D.C.	
	BLACK COTTONWOOD	3
	BLACK MANTLE	3
	WINDY HILL	2
	RED EMBERS	3
	RED-OSIER DOGWOOD	3
	SA. WOODS	3
	SHIMMER	2
	THIMBLEBERRY	2
	PAULOWNIA SEEDS - 1.5" D.C.	
	SLURRY CARRIAGE	5
	SLOUGH SEDGE	14
	SMALL-FRUITED BURRUSH	11
	WETLAND SEEDING	
		6034 SQ
	SOIL AMENDMENT 10%1	54
	COMPOST 10%1	18
	BANK OR WOOD CHIP MULCH (10%)	54

- LEGEND
- DITCH
  - WETLAND
  - CONTOUR
  - INDEX CONTOUR
  - CULVERT
  - FENCE

STATE OF WASHINGTON  
REGISTERED  
LANDSCAPE ARCHITECT  
*Sally A. Anderson*  
SALLY A. ANDERSON  
CERTIFICATE NO. 372  
DATE: 06/16/05  
*S. Anderson*



DESIGNED BY: S. SHELTON	NO. STATE	FED. AID PROJ. NO.
INTERED BY: R. MULLAW	10 WASH	
CHECKED BY: [blank]	CONTRACT	
PREP. ENG. [blank]	DATE	REVISION
DESIGNED BY: [blank]	DATE	REVISION

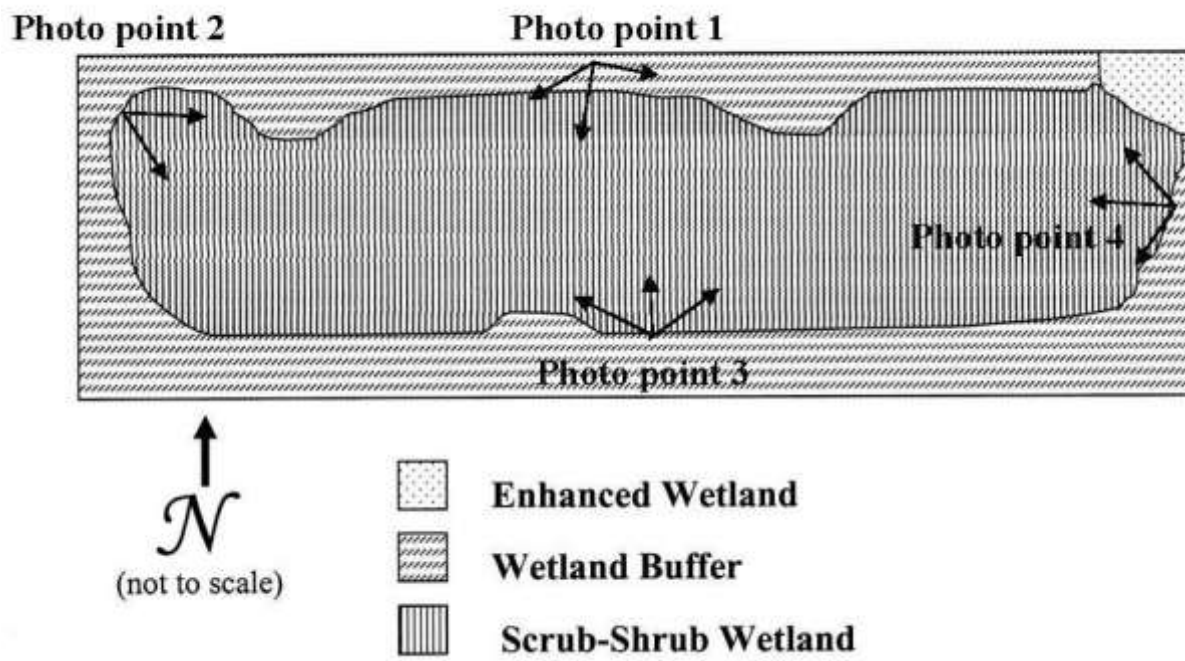
SR 203  
NE 124TH NOVELTY RD. VIC. ROUNDABOUT  
WETLAND MITIGATION  
PLANTING PLAN

M2-A  
SHEET 2 OF 2



# Appendix 6 – Photo Points

## Wetland Mitigation Area Photo Points



The photographs below were taken from permanent photo-points on July 27, 2010 and document current mitigation site development.



**Photo Point 1a**



**Photo Point 1b**



**Photo Point 2a**



**Photo Point 2b**



**Photo Point 3a**



**Photo Point 3b**



**Photo Point 3c**



**Photo Point 4a**

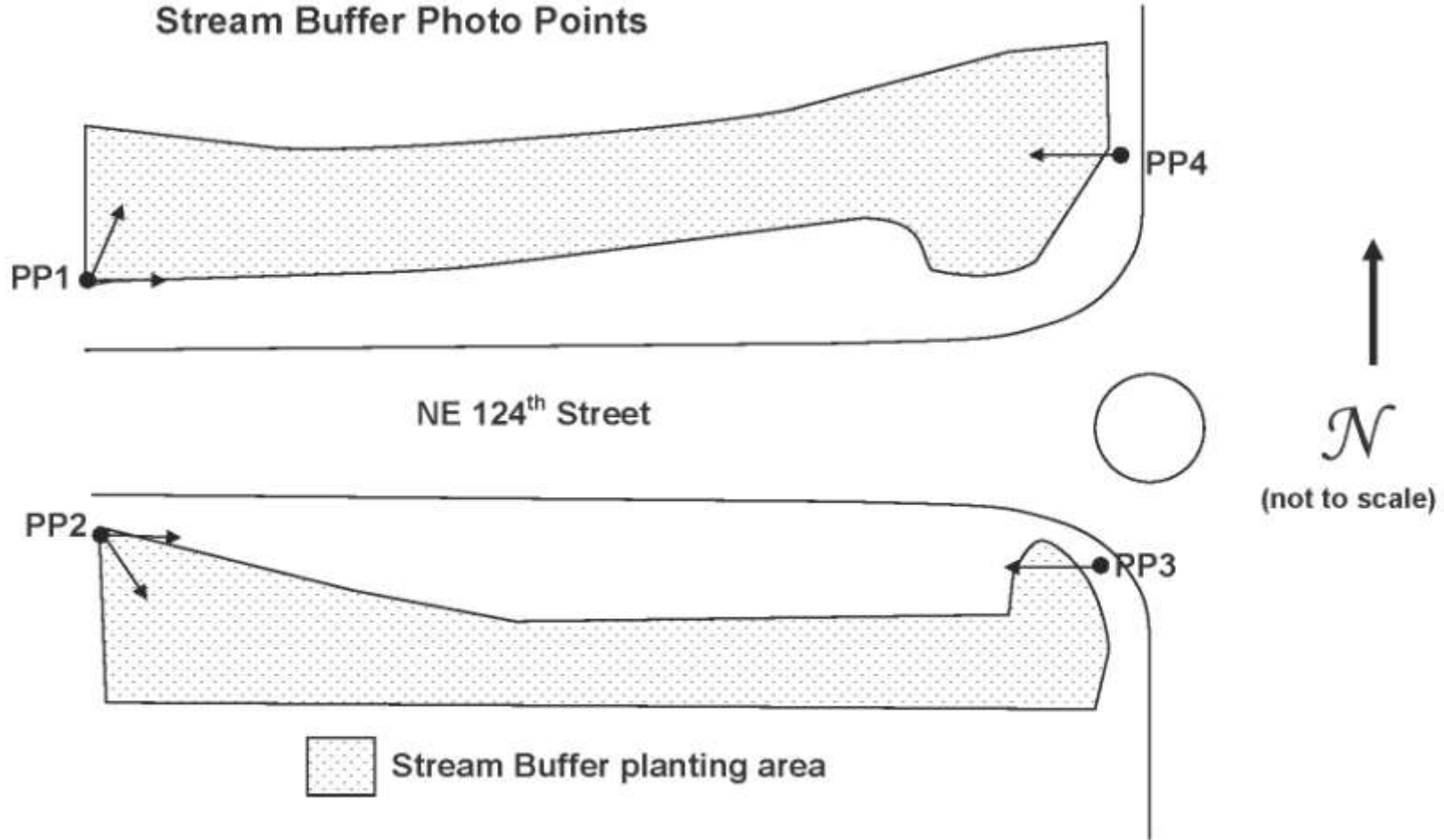


**Photo Point 4b**



**Photo Point 4c**

### Stream Buffer Photo Points





**SB Photo Point 1a**



**SB Photo Point 1b**



**SB Photo Point 2a**



**SB Photo Point 2b**



**SB Photo Point 3**



**SB Photo Point 4**

## Literature Cited

1. Anderson, Sally. 2005. SR 203 NE 124<sup>th</sup> St./Novelty Hill Road Vicinity Roundabout As-built Planting Plan. Washington State Department of Transportation, Northwest Region.
2. Cooke, S. S., (ed.). 1997. A Field Guide to the Common Wetland Plants of Western Washington and Northwestern Oregon. Seattle Audubon Society, Seattle, WA.
3. Cooley, L. 2003. SR 203 NE 124<sup>th</sup> St./Novelty Hill Road Vicinity Roundabout Conceptual Planting Plan. Washington State Department of Transportation, Northwest Region.
4. Ecology. See Washington State Department of Ecology.
5. United States Army Corps of Engineers. 2003. Department of the Army Permit Number 200301098.
6. Washington State Department of Ecology (Ecology). 1997. Washington State Wetlands Identification and Delineation Manual. Publication No.96-94, Olympia, WA.
7. Washington State Department of Transportation (WSDOT). 2003. Final Wetland and Stream Mitigation Report SR 203 Novelty Hill Road/NE 124<sup>th</sup> St. Vicinity Roundabout (MP 12.46 to MP 12.79) Washington State Department of Transportation Northwest Region Environmental Services.
8. 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>
9. Weather Underground [Internet]. 2010. Weather history data – Washington State weather stations. Available from: <http://www.wunderground.com/weatherstation/ListStations.asp?selectedState=WA&selectedCountry=United+States>  
  
WETS Station: SNOQUALMIE FALLS, WA7773  
<http://www.wcc.nrcs.usda.gov/ftpref/support/climate/wetlands/wa/53033.txt>