

## Appendix E - Project Site Implementation Plans

# South Fork Stillaguamish Big Trees Project Project Implementation Plans/As-builts

## <Cascade Park – LDS>

### Preliminary Site Assessment (PSA) summary

The majority of the canopy along the river front at Cascade Park consists of mature deciduous and conifers in the 78+ year age class consisting of POBA, ALRU, ACMA, PSME, THPL, PISI and TSHE. Deciduous species dominate the lower northwest terrace with conifer presence increasing towards the east and southeast on the upper terrace. Invasives are virtually nonexistent along the river front due to the persistent efforts of the property caretakers. Scattered individuals of RUBI were noted on site and were easily controlled. A small patch of POSP was also located near the 'beach' area and sprayed. The northeastern mid-section will be the targeted area for planting since this is where the canopy cover is sparsest. The upper terraces on either side of the property are well forested with a strong conifer component. One small 1/10 acre section of the southeastern upper terrace received planting.

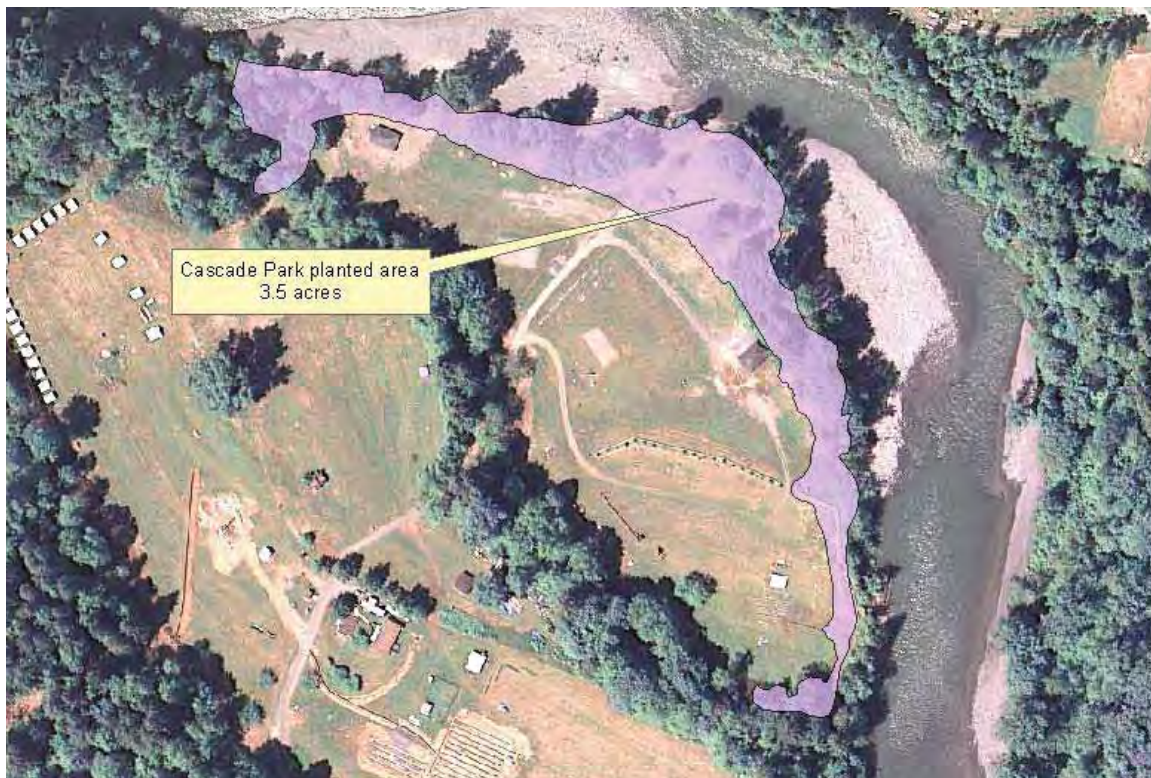


Figure 1: Cascade Park planted area

*Table 1: Age classes of existing canopy cover in proposed planting area*

CANOPY SPECIES	AGE CLASS	ACRES	DENSITY
	pre-1933	2.4	

*Table 2: Existing cover within 100' buffer*

COVER	TYPE	SPECIES	DENSITY	AREA (acres)
native canopy	deciduous			
	conifer			
	mixed c/d	ACMA		2.4
		ALRU		
		POBA		
		THPL		
		PSME		
		TSHE		
		PISI		
native shrub	sub-canopy	SYAL		2.4
		RUSP		
	open			
invasives	sub-canopy	RUAR		
		POSP		
	open			
nonnative	open	lawn/field		1.3
	sub-canopy			
land use	pasture			
	access road			
	dike			
	park/recreation			3.7
	cropland			

### *Floodplain*

The entire proposed project area lies within the 100 year flood plain.

### *Soils*

The majority of the proposed project site soils consist of Sultan silt loam which is suitable for all the species chosen to be installed. Areas comprised of riverwash are overlain with fine soil and were largely planted with more drought tolerant species such as PSME and PICO.

*Table 3: Soil Series with in 100' buffer area*

SERIES	AREA (acres)
riverwash	1
Sultan silt loam	2.4
Tokul gravelly loam	0.2
Tokul-Winston gravelly loam	0.1

*Topography*

The general site elevation is 60' with the southeastern end of the proposed project site reaching up to 80'. The slope throughout the mid portion of the site ranges from 0-12% with some small 25-50% transitional slopes between terraces at the northwest and southeast ends. The aspect along the northern riverfront faces north while the eastern riverfront faces east.

*Historic & current land use*

Cascade Park was previously a farm prior to its purchase by the Church of Latter-day Saints (LDS). LDS uses the property as a camping and recreational facility.

**Site Preparation Prescription**

Virtually no site preparation will be necessary aside from spot control of RUBI and POBO in the areas targeted for planting. Any invasive control was initiated Sep-Oct 2008.

*Site access*

Existing access roads will be sufficient to reach all portions of the project site.

*Invasive control*

*Table 4: Invasive control prescription*

SPECIES	AREA	METHOD	TREATMENT
RUBI	patch	herbicide/grubbing	glysophate 5%
POSP	patch	herbicide	glysophate 5%

*Stand thinning*

No stand thinning will be necessary

*Clearing*

No clearing will be necessary

## *Fencing*

No fencing will be necessary

## **Planting Prescription/As-built**

Five distinct polygons have been identified based on canopy cover, understory composition, soils and position relative to the river (Figure 2).

**Polygon 1** encompasses a mature deciduous dominated canopy of ACMA, POBA and ALRU. Since the park is well groomed there is a sparse understory of mostly SYAL with some RUSP. The soils are mostly riverwash.

**Polygon 2** consists of sunny open lawn a large portion of which has been given up for planting. The soils are mostly Sultan silt loam.

**Polygon 3** lies within a mixed deciduous/conifer stand of ACMA, POBA, ALRU, TSHE, THPL and PSME with a sparse SYAL and RUSP understory. The soils are mostly Sultan silt loam.

**Polygon 4** falls along the partly shady open western edge of polygon 3 and is dominated by lawn grass. The soils are mostly Sultan silt loam.

**Polygon 5** sits on the upper most terrace under the canopy of mature conifers and ACMA at the toe of the slope. The soils are Tokul-Winston gravelly loam



**2009**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2010**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2011**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2012**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**<Site A>**

**Preliminary Site Assessment (PSA) summary**

*Existing cover*

Site A lies along the southerly bank of the South Fork of the Stillaguamish River just southeast of the city of Arlington where the river makes a near 90° turn from north to west. The restoration site on the property encompasses a 100' buffer zone from the bank-full width along the entire riverfront of the property (Figure 1). The buffer encompasses younger POBA/ALRU (13-37 year age class) dominated canopy along the northern riverfront as well as and mixed deciduous/conifer canopy (mostly 56-37 year age class) consisting of POBA, ALRU, THPL, PISI, TSHE, ABGR and PSME along the eastern riverfront (Table 1).



**Figure 1: Site A project site**

*Table 1: Age classes of existing canopy cover in proposed planting area*

<b>CANOPY SPECIES</b>	<b>AGE CLASS</b>	<b>ACRES</b>
ACMA, THPL, PSME, PISI, ABGR, TSHE, ALRU, POBA	pre-1933	0.5
ACMA, THPL, PSME, PISI, ABGR, TSHE, ALRU, POBA	1933-1955	0.8
ACMA, THPL, PSME, PISI, ABGR, TSHE, ALRU, POBA	1955-1974	3.6
ALRU, POBA	1974-1998	3.0

Table 2: Existing cover within proposed planting area

<b>COVER</b>	<b>TYPE</b>	<b>AREA (acres)</b>	<b>SPECIES</b>	
<i>native shrub</i>	sub-canopy	7.9	SYAL	
			PHCA	
			RUSP	
			COSE	
			SARA	
			COCO	
			ROPI	
			SASI	
			FRPU	
			LOIN	
			ACCI	
			RUPA	
			open	
<i>invasives</i>	sub-canopy	1.5	RUBI	
			<0.1	POSP
			<0.1	CIAR
			open	
<i>land use</i>	pasture			
	access road			
	dike			
	park/recreation			
	cropland			

*Floodplain*

All of the proposed planting are lies within the 100 year flood plain.

*Soils*

Soil Series with in proposed planting area

<b>SERIES</b>	<b>AREA (acres)</b>
riverwash	6.1
Pilchuck loamy sand	1.8

## *Topography*

The site is overall level with 0-8% slopes over most of planting area, 15-40% slopes along banks, and no predominant aspect. Seasonal flood events have created much microtopography through sediment (mostly sand) deposition.

## *Historic & current land use*

The project area has as far as aerial photograph records show always been floodplain forest in various stages of development with no timber harvesting, grazing or farming.

## **Site Preparation Prescription**

### *Site access*



**Figure 2: Access gates (green stars) and trails (yellow bands) at Site A**

Access to the project site is through three gates through the north-central end of the pastures. Note: ELECTRIFIED fences and gates! From the third gate a 6' wide trail was cleared by Snohomish County Roads Maintenance in Spring 2009 for ATV and crew access. In summer 2010 the Washington Conservation Corps (WCC) crews cut a 6' wide back-line access trail at the 100' buffer edge along the entire length of the planting

area. (Figure 2) Trails will be maintained as necessary in the future to allow for monitoring and maintenance access.

*Invasive control*

Significant RUBI presence was mainly localized to the eastern edge of the project site in the southern half of polygon 2 and northern tip of polygon 3 (Figure 3). RUBI was densest in areas of sparse canopy just north of the main northwest-southwest back channel. All major patches of RUBI were brushcut to promote re-growth accessible to backpack spraying. POSP patches were sprayed in late summer 2009 and 2010 by Snohomish County Noxious Weed Control.

*Table 4: Invasive control prescription*

<b>SPECIES</b>	<b>AREA (acres)</b>	<b>METHOD</b>	<b>TREATMENT</b>
RUBI	1.5	spray, grub	5% glyphosate in late summer; follow up with triclopyr/aminopyralid in early summer the following year
POSP	small patches	Spray, injection	5% glyphosate + 1% imazapyr in late summer

*Stand thinning*

No thinning was required during site preparation for planting. Areas dominated by ALRU and POBA may require later thinning to release trees into the canopy after 3-5 years or longer.

*Clearing*

Clearing was only done for trails and in summer 2010 to prepare small open areas of RUBI for subsequent spraying.

*Fencing*

No fencing was required for this project.

## **Planting Prescription/As-built**

Three distinct polygons that divide the restoration area roughly into thirds have been identified based on canopy cover, understory composition, soils and position relative to the river (Figure 2).

**Polygon 1** consists of mostly 13-37 and some 56-37 year age class POBA/ALRU canopy with a mixed native shrub understory dominated by SYAL and RUSP experiences seasonal sand deposition. The soils are riverwash.

**Polygon 2** at the inside bend in the river supports a mixed deciduous/conifer canopy of POBA, ALRU, THPL, TSHE, PISI, PSME and ABGR in mostly the 56-37 year age class with scattered individuals in the 56-78 year age class and some canopy gaps with 13-37 year age class POBA. The understory is a highly diverse native understory mix of shrubs. Seasonal flood deposition of sand occurs here as well. The soils are also riverwash.

**Polygon 3** encompasses the highest elevation area of the site and is a mosaic of POBA, THPL, TSHE, PISI, and PSME in mostly the 37-56 and 56-78+ year age classes with patches of 13-37 year age class POBA in canopy gaps. The soils are Pilchuck loamy sand. Little sand deposition occurs here.



Figure 3: Site A planting polygons

Table 5: PLANT SCHEDULE

SPECIES	#	STOCK	SPACING
<i>POLYGON 1-3 ~ 344,120 FT<sup>2</sup></i>			
<i>TREES</i>			
PICO	25	4'- 6'	15'
PIMO	25	1'-3'	15'
PISI	100	4'- 6'	15'
THPL	250	6'-8', 4'- 6'	15'
ABGR	150	4'- 6'	15'
PSME	100	4'- 6'	15'
TSHE	50	4'- 6'	15'

**Implementation Schedule: Tables 6-9**

**2010**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2011**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2012**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**< Country Charm Natural Area >**

**Preliminary Site Assessment (PSA) summary**

*Existing cover*

The Country Charm Natural Area property, now owned by the city of Arlington, lies inside the first major bend of the South Fork Stillaguamish immediately east of the North and South Fork confluence (Figure 1). The proposed restoration sites on the property lie in three discontinuous areas. The largest and western most area encompasses an area dominated by 100% RUBI cover for nearly 30 years and remnant deciduous forest comprised ALRU, POBA and ACMA in the 77+ year age class. The northeasterly extension of this area lies within a floodplain forest dominated by 35-12 year old POBA and ALRU. Two isolated potential planting areas lie to the east. The northerly one encompasses a developing 35-12 year old POBA/ALRU floodplain forest on an actively aggrading bar. The other falls on an aggrading terrace with 35-12 year old POBA/ALRU floodplain forest at the north end and on older 77+ year old mixed deciduous forest to the south. RUBI occurs throughout the proposed planting area especially along the western edge of the main field where it has had 100% cover for nearly 30 years. Invasive POSP, PHAR and CYSC occur in scattered patches throughout the proposed planting area.



**Figure 1: Proposed Country Charm project sites**

*Table 1: Age classes of existing canopy cover in proposed planting area*

CANOPY SPECIES	AGE CLASS	ACRES	DENSITY
ACMA, ALRU, POBA	pre-1933	2.5	12.5/acre
	1933-1955		
ACMA, ALRU, POBA	1955-1974	0.3	
ALRU, POBA	1974-1998	4.4	
	1998-2007		

*Table 2: Existing cover within proposed planting area*

COVER	TYPE	AREA (acres)	SPECIES
<i>native shrub</i>	sub-canopy	7.2	RUSP
			SYAL
			PHCA
			COSE
			ROPI
			SARA
			COCO
			LOIN
			PYFU
	open		
<i>invasives</i>	sub-canopy		RUAR
			PHAR
	open		RUAR
			PHAR
			CYSC
			CIAR
<i>land use</i>	pasture		
	access road		
	dike		
	park/recreation		
	cropland		

*Floodplain*

All of the proposed planting are lies within the 100 year flood plain.

*Soils*

*Table 3: Soil Series with in proposed planting area*

SERIES	AREA (acres)
Puyallup fine sandy loam	4.8
riverwash	4.1
Sultan silt loam	2

## *Topography*

Much of the western proposed planting area has a gentle 2-14% grade and a north to northwesterly aspect. The grade flattens to 0-10% and the aspect changes to the northeast along the northernmost portion. The isolated sections to the east both have 0-10% slopes and north to northwesterly aspects. All of the proposed planting areas lie between 70'-80' in elevation.

## *Historic & current land use*

The 1933 aerials show the land was in agricultural production at that time. The property was purchased by the current owner in the 1950s and maintained as a pasturage and production dairy until the late 1990s. Since the closing of the dairy the fields have been in hay/green chop production. About 2.2 acres of the area proposed to be planted has subjected to long term cultivation and lies along the western edge of the property. Most of this was abandoned to RUBI 30 years ago. Country Charm Natural Area was previously private property recently sold to the city of Arlington.

## **Site Preparation Prescription**

### *Site access*

A paved stretch of county road gives way to a private dirt road that allows access to the northeastern and western edges of the pasture. A bridge over Eagle Creek has been newly installed (10/02/2009). The bridge is now the only passage over Eagle Creek to the northeastern extension of the proposed planting area. The understory within the 50' buffer has been cleared northeast of Eagle Creek from the bridge to the river to allow easier access for site preparation, planting, monitoring & maintenance for both the Eagle Creek and Country Charm projects. Eagle Creek itself is dry and passable most of the year (April-November) and can serve as an access route by foot. Access to the isolated eastern proposed planting areas has not been established.

### *Invasive control*

The site has already been prepped for planting within the western planting area with RUBI mowing in September 2008, follow-up brush cutting, and repeat herbicide applications during summer 2009. The NE understory was determined in October 2009 after cutting a path to the river to be completely dominated by RUBI and has been slated to be cleared. Snohomish County Roads Maintenance has been contracted to mow the NE understory within 8' of the creek to preserve the mature native shrubs dominating the river bank. The isolated eastern sites have yet to be assessed for invasive control since planting those areas was canceled due an engineered log jam project.

*Table 4: Invasive control prescription*

SPECIES	AREA (acres)	METHOD	TREATMENT
RUBI	3.4	mowing; herbicide	early summer - triclopyr/aminopyralid; late summer - glysophate
PHAR	0.5	mowing; herbicide	late summer - glysophate
CYSC	scant	pulling, cutting	

### *Stand thinning*

No stand thinning in preparation for planting is necessary for the western planting area. The northern floodplain forest portion may require later thinning to release trees into the canopy after 3-5 years. The isolated eastern sites have yet to be assessed for thinning.

### *Clearing*

The western proposed planting areas have been mowed and treated with herbicide and are ready to plant. The isolated eastern sites have yet to be assessed for clearing.

### *Fencing*

No fencing will be necessary for this project.

## **Planting Prescription/As-built**

Seven distinct polygons have been identified based on canopy cover, understory composition, soils and position relative to the river (Figure 2).

**Polygon 1** encompasses the open portion of the site formerly dominated by RUBI between the narrow band of canopy cover along the eastern bank of South Fork Stillaguamish and the edge of the hay field. There are occasional patches of riparian shrubs such as SARA, SYAL, PYFU and PHCA. The soils are sandy loam. A native grass mix was recommended for erosion control, invasive suppression and soil stability since the site lies along the immediate riverbank and RUBI control had exposed large expanses of bare soil. The seed mix was broadcast in fall 2009 and spring 2010 and has established successfully along with nonnative pasture grasses and forbs.

**Polygon 2** comprises the narrow band of mature 77-55 year age class ALRU, ACMA and POBA along the eastern bank edge of South Fork Stillaguamish . There is a patchy

understory of ROPI, PHCA, COSE, SYAL, SARA, RUSP and other riparian shrubs mixed with RUBI. The soils are sandy loam and riverwash.

**Polygon 3** is a small section of the planting area that lies beneath a power line right-of-way containing a few riparian shrubs including SASI and SYAL near the river bank. The soils are silty loam. Because it is a utility ROW only shrubs have been planted here.

**Polygon 4** lies on the northeastern edge of the western planting area beneath 35-12 year age class POBA and ALRU. The understory consists of dense RUBI interspersed with small patches of RUSP, PHCA, COCO, ROPI, COSE and other riparian shrubs. The soils are silty loam. NOT PLANTED DUE TO ENGINEERED LOG JAM PROJECT.

**Polygons 5-7** are located at the eastern edge of the property and have not been assessed for site preparation and planting. Polygon 5 lies in a developing 35-12 year age class POBA and ALRU floodplain forest on a bar. Polygons 6 & 7 are contiguous. Polygon 6 is also a developing floodplain forest on a terrace and polygon 7 is the older riparian forest above it. No planting or invasive control has happened in these areas. NOT PLANTED DUE TO ENGINEERED LOG JAM PROJECT.



**Figure 2: Country Charm proposed planting polygons**



**Figure 3: Actual planted area Country Charm property; 6 acres**



**2010**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2011**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2012**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**<Site B>**

**Preliminary Site Assessment (PSA) summary**

*Existing cover*

Site B is a private property that lies along the south bank of the South Fork Stillaguamish. The pre-existing forest cover is dominated by 77+ year old ACMA, ALRU, POBA with a few mature PISI and THPL. A livestock exclusion fence has been installed along the southern border of the site than defines the 5.7 acre planting area. A 0.7 acre *Lysichiton americanum* (skunk cabbage) – *Athyrium felix-femina* (ladyfern) (LYAM/ATFF) depressional wetland lies under a mixed ALRU/THPL/PISI/TSHE canopy within the project area towards the eastern end of the property (Figure 1).



**Figure 1: Site B project site**

*Table 1: Age classes of existing canopy cover in proposed planting area*

<b>CANOPY SPECIES</b>	<b>AGE CLASS</b>	<b>ACRES</b>
ACMA, THPL, PISI, ALRU	pre-1933	5.4
ALRU	1933-1955	0.3

Table 2: Existing cover within proposed planting area

COVER	TYPE	AREA (acres)	SPECIES
<i>native shrub</i>	sub-canopy	5.7	SYAL
			ACCI
			RUPA
			RUSP
			COSE
			ROPI
			OECE
			FRPU
	open		
<i>invasives</i>	sub-canopy	sparse	RUBI
	open		RUBI
<i>land use</i>	pasture	0.4	
	access road		
	dike		
	park/recreation		
	cropland		

*Floodplain*

All of the proposed planting are lies within the 100 year flood plain.

*Soils*

Table 3: Soil Series with in proposed planting area

SERIES	AREA (acres)
Norma loam, hydric	1.7
Ragnar fine sandy loam, 0-8% slopes	4.4

*Topography*

The proposed project area lies between 100-120' in elevation and is roughly divided between steep forested 20-45 degree slopes with a strong northeasterly aspect and flat pasture edge with 0-6 degree slopes.

### *Historic & current land use*

1933 aerial photographs show that Site B has been in continuous agricultural production since that time. Currently the property consists of pasturage and hay production for small herd of cattle and a team of horses.

### **Site Preparation Prescription**

#### *Site access*

The property lies at the very end of Stehr Road. A well maintained unpaved road leads from the entrance gate to the barn and gravel parking area just above the western pasture. Equipment can be driven across the pastures with care. There is an access gate to the western pasture from the gravel parking area and from the western pasture there are two gates into the project area at either end of the livestock exclusion fence. There is also a gate into the central pasture near the intersection of the dividing fence and the livestock exclusion fence near the river. The central pasture also has two gates at either end in the livestock exclusion fence. Passage from the central pasture to the eastern pasture is blocked by a wetland. Access to the eastern pasture is best from the gate beside the barn and bird house through the horse paddock and then through another gate into the upper central pasture. A 6' wide wet trail from here leads to the eastern pasture. This area stays wet throughout the summer and care should be taken driving equipment through there. Inside the livestock exclusion fence a 10' access path has been left between the fence and the first row of plantings to allow for equipment access.

#### *Invasive control*

RUAR was brush cut throughout the project site May-July 2009 followed by application of 5% glysophate in September 2009. Small scattered individuals of RUAR in the western pasture were grubbed out manually. A small patch of POSP at a drainage outlet between the western and central pasture was sprayed by Snohomish County Noxious Weed Control in September 2009. Follow up spot herbicide application will be needed especially in the eastern pasture area where the RUAR was the densest.

*Table 4: Invasive control prescription*

<b>SPECIES</b>	<b>AREA (acres)</b>	<b>METHOD</b>	<b>TREATMENT</b>
RUAR	0.8	brush cutting & herbicide	5% glysophate – July & Sep
POSP	small patch	herbicide	imazapyr 1%?

### *Stand thinning*

No stand thinning will be necessary for installation. Some thinning of smaller deciduous tree stems around installed trees may be considered in 3-5 years, especially around the wetland in the eastern pasture.

### *Clearing*

RUAR was cleared in May/June 2009 to clear the way for fence installation and in preparation for herbicide application later in the summer. Small patches of SYAL, RUSP and other understory shrubs may need to be cleared for understory planting along the forested bank slope.

### *Fencing*

Fence installation was completed in two phases. 3445' of 5 strand barbed wire was installed along the entire river front of the property with 8' access gates at either end of each of the three pastures.

### **Planting Prescription/As-built**

Four distinct polygons have been identified based on canopy cover, understory composition, soils and position relative to the river (Figure 2).

**Polygon 1** consists of the portions of the project site that are open pasture with little or no slope. Soils are Ragnar fine sandy loam.

**Polygon 2** encompasses the shaded transition area between Polygons 1 and 3 with little or no slope and sparse SYAL and ROPI cover mixed with grass. Soils are Ragnar fine sandy loam.

**Polygon 3** lies along the 25-40% slopes on the immediate bank of the river encompassing 78+ year age class ACMA, POBA, ALRU, THPL and PISI with a dense understory of SYAL, RUSP, ROPI, COCO, and ACCI. Soils are Ragnar fine sandy loam.

**Polygon 4** describes the area between the fence line and the wetland dominated by 78+ year age class THPL, PISI and ALRU canopy. RUSP predominates in the shrub layer with significant RUBI along the fence line. Soils are hydric Norma loam.



**2010**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2011**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2012**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**<Site C>**

**Preliminary Site Assessment (PSA) summary**

*Existing cover*

Site C is a private property that lies along the north bank of the South Fork Stillaguamish (Figure 1). The proposed restoration site on the property runs along the property's entire riverfront 2/3rds of which lies under power line right-of-ways (ROWs). The project site was dominated by RUBI with a few individual trees in the 37-13 year age class and scattered mature PHCA, SASI, ACCI and SYAL shrubs.



**Figure 1: Site C project site**

*Table 1: Age classes of existing canopy cover in proposed planting area*

CANOPY SPECIES	AGE CLASS	ACRES
ACMA, ALRU, POBA, SALU	1974-1998	<0.1

*Table 2: Existing cover within proposed planting area*

COVER	TYPE	AREA (acres)	SPECIES
<i>native shrub</i>	sub-canopy	0.2	PHCA
			SASI
			ACCI
			COSE
			SYAL
			ROPI
	open		
<i>invasives</i>	sub-canopy		
	open		
<i>land use</i>	pasture		
	access road		
	dike		
	park/recreation		
	cropland		

*Floodplain*

All of the proposed planting are lies within the 100 year flood plain.

*Soils*

*Table 3: Soil Series with in proposed planting area*

SERIES	AREA (acres)
Sultan silt loam	0.6
riverwash	0.3

*Topography*

The planting area of the project site lies on mostly flat ground <5% slope and has a southerly aspect. The immediate river bank is largely armored and has 20-45% slopes.

### *Historic & current land use*

Prior to 1974 the project site was well away from the current river bank and part of cultivated fields/pasture. The site now lies along a narrow strip beneath power line ROWs between existing hay fields and the armored riverbank.

### **Site Preparation Prescription**

#### *Site access*

The site is accessed from Jordan road through a paved collective driveway to a dirt access road along the northwestern edge of a neighbor's property, down a slope to the lower pasture.

#### *Invasive control*

Nearly 95% of the site was covered in RUBI.

*Table 4: Invasive control prescription*

<b>SPECIES</b>	<b>AREA (acres)</b>	<b>METHOD</b>	<b>TREATMENT</b>
RUBI	0.8	herbicide	Glyphosate 5%

#### *Stand thinning*

Due to the sparse existing tree cover and power line ROW height restrictions no stand thinning will be necessary.

#### *Clearing*

Aside from the initial clearing of RUBI in preparation for herbicide application no clearing of the site was necessary.

#### *Fencing*

No fencing is necessary.

### **Planting Prescription/As-built**

Four distinct polygons have been identified based on canopy cover, understory composition, soils and position relative to the river (Figure 2). The main distinction is based on power line ROWs rather than site conditions which are uniform throughout the site.

**Polygon 1** is the westernmost section below a power line ROW. Only shrubs were installed.

**Polygon 2** comprises the largest section between power line ROWs that can receive trees.

**Polygon 3** makes up 2/3 of the project site and lies completely under a power line ROW. There are however a couple of existing trees that have been previously trimmed back by ROW maintenance crews.

**Polygon 4** lies along the edge of a POBA and SALU stand just outside the power line ROW.



**Figure 2: Site C planting polygons**

RUBI control completed in summer 2010 exposed substantial bare soil. Native grass seed mix was spread spring 2011 to reduce erosion. Plant installation was completed in February 2011.

**Table 5: PLANT SCHEDULE**

SPECIES	#	STOCK	SPACING
<i>POLYGONS 1-4 ~ 40,000 FT<sup>2</sup></i>			
<i>TREES</i>			
PISI	18	4'- 6'	15'
THPL	33	4'- 6'	15'
ABGR	13	4'- 6'	15'
<i>GRASSES</i>			
ELGL, FERO, HOBR, FERU*	20lb	seed	broadcast
<i>SHRUBS</i>			
COSE	75	2 gal	5'
LOIN	75	2 gal	5'
PHCA	75	2 gal	5'
SASI	75	2 gal	5'

\*ELGL=Elymus glaucus; FERO=Festuca roemerii; HOBR=hordeum brachyantherum; FERU=Festuca rubra ssp. fallax)

**Implementation Schedule: Tables 6-9**

**2009**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2010**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2011**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

2012

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**<River Meadows>**

**Preliminary Site Assessment (PSA) summary**

River Meadows is a Snohomish County park located SE of Arlington inside a sharp river bend along the eastern bank of the South Fork Stillaguamish. The proposed planting sites run 100' back from the entire river bank with the exception for an actively eroding portion along the western edge (Figure 1). The canopy of northern planting area varies gradually from mixed deciduous-conifer with a strong mature 78+ year age class THPL, TSHE, PSME, PISI component in the east through a purely deciduous 78-56 year age class POBA/ALRU/ACMA in the center then into mixed deciduous-conifer with a younger THPL and TSHE component along the west extent of the park. The southern planting area canopy is dominated by old growth 78+ year age class TSHE, THPL, and PISI as well as old-growth 77+ year old ACMA, ALRU and POBA. Invasive presence in the forest understory is surprisingly sparse with scattered RUBI patches in open areas along the river. 95% of the planting will be successional under planting of existing canopy accounting for current conifer presence.



**Figure 1: River Meadows project site**

*Existing cover*

*Table 1: Age classes of existing canopy cover in proposed planting area*

<b>CANOPY SPECIES</b>	<b>AGE CLASS</b>	<b>ACRES</b>
POBA, ALRU, ACMA, PISI, THPL, TSHE, PSME	pre-1933	7.2
POBA, ALRU, ACMA, PISI, THPL, TSHE, PSME	1933-1955	5.6
POBA, ALRU, ACMA, PISI, THPL, TSHE, PSME	1955-1974	2.3
POBA, ALRU, ACMA	1974-1998	0.2

*Table 2: Existing cover within proposed planting area*

<b>COVER</b>	<b>TYPE</b>	<b>AREA (acres)</b>	<b>SPECIES</b>
<i>native shrub</i>	sub-canopy	15.3	SYAL
			RUSP
			PHCA
			COSE
			ROPI
			OECE
			ACCI
			COCO
	open	0.1	RUSP
<i>invasives</i>	sub-canopy	patchy	RUBI
	open	<0.1	RUBI
<i>land use</i>	Open fields	1.4	
	access road		
	dike		
	park/recreation	16.7	
	cropland		

*Floodplain*

15.9 acres of the proposed planting area lies within the 100 year flood plain. 1.8 acres in the far northeastern part of the property lies above it.

## Soils

*Table 3: Soil Series with in proposed planting area*

SERIES	AREA (acres)
Pilchuck loamy sand	5.9
Puyallup fine sandy loam	0.5
Ragnar fine sandy loam	0.5
Sultan silt loam	9.1
Tokul-Winston gravelly loam	1.5

## Topography

Both the north and south proposed planting areas lie between 80' and 100' in elevation and have slopes between 0-15% except along bank drop-offs not targeted for planting. Given the gentle slopes in the plantable area there is no strong aspect throughout the planting area however there is a slight southwesterly aspect in the north and a slight northeasterly aspect in the south. There is one back channel that fills during high flow events that cuts through the western edge of the north planting area.

## Historic & current land use

Before being acquired by Snohomish County for a park in 1977, River Meadows was in agricultural production probably since the 1890s. Prior Native American settlement has been documented by the discovery of artifacts. Currently the park provides camp sites, yurts, and running & walking trails. It is also the site of the annual Stillaguamish powwow and Festival of the River.

## Site Preparation Prescription

### Site access

River Meadows is a County park open to the public and has access & service roads and trails throughout the park. The river bank trail running the length of the park is accessible by foot and 4 wheel utility vehicles and remains relatively dry year around. .

### Invasive control

The Phase 1 areas plated in November 2007 have been receiving regular clearing of encroaching RUBI, RUSP and other understory shrubs. Herbicide will be applied summer 2010 to strongly suppress recurrent RUBI patches.

*Table 4: Invasive control prescription*

SPECIES	AREA (acres)	METHOD	TREATMENT
RUBI	scattered, < 1 acre	brush cutting; herbicide application	glyphosate 5%

*Stand thinning*

No thinning will be necessary in order to install trees. Installed trees however may benefit from thinning in 3-5 years to release them into the canopy.

*Clearing*

Planting alleys were mowed in September 2008 by the Parks department through the SYAL/RUSP dominated understory of polygon 2 in the northern section of the park. These allowed for access for understory planting. Planting alleys were not mowed into the far eastern portion of polygon 2 (Figure 2) and may be necessary to plant. Large portions of polygon 3 (Figure 2) are likely open enough to allow for planting with limited spot clearing of 6' circles to plant.

*Fencing*

No fencing will be necessary for this project.

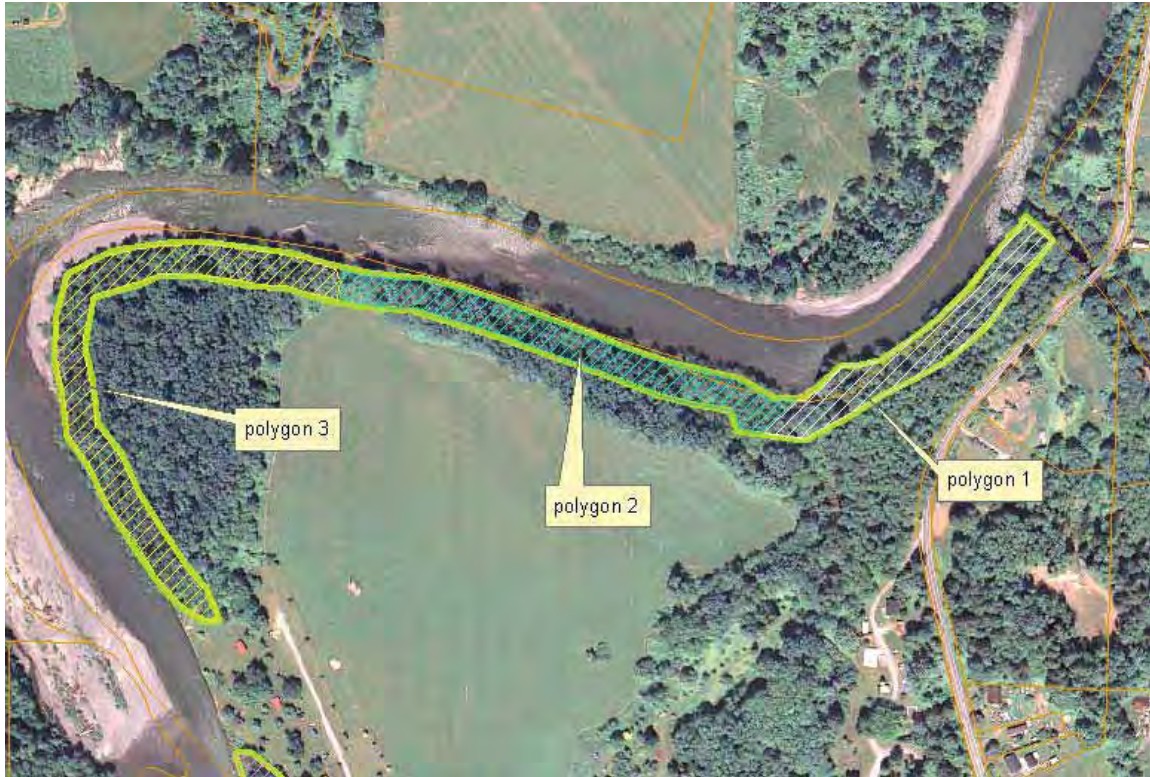
**Planting Prescription**

Seven distinct planting polygons have been identified at River Meadows based on canopy cover, understory composition, soils and previous preparation and planting (Figures 2 & 3).

**Polygon 1** lies on an upper terrace between the river to the north and Jim Creek to the east. It has not been fully surveyed however it known that it contains mature conifers some of which are likely in the 77+ year age class. As such supplemental planting may not be necessary.

**Polygon 2** encompasses the 77-55 year age class POBA/ALRU/ACMA stand where the planting alleys were mowed into mature SYAL/RUSP understory.

**Polygon 3** wraps from the north through the river bend to the southwest contains a mix of young conifers and mature 77-55 year age class POBA/ALRU/ACMA. Areas sufficiently stocked with conifers will be not be supplemented. One acre of Polygon 3 was lost due to bank erosion during the winter 2010/2011 floods.



**Figure 2: River Meadows planting polygons – north proposed planting area**

**Polygon 4** at the northern tip of the south planting area lies adjacent to camp sites, parking and park facilities. The existing canopy is mature 77+ age class mixed conifer/deciduous. There may be space for supplemental planting in scattered locations.

**Polygons 5 & 6** are two small unplanted open meadow areas within the phase 1 planting area. These were intentionally left unplanted so conifer species diversity could be increased at a later date.

**Polygon 7** is a monotypic patch of RUSP with a significant RUBI component at the very southern tip of the park. If it is to be planted, either planting alleys or complete mowing needs to be considered. Given the small area the effort required to plant it may not be worth the additional forest cover in an already well forested area. There is value in maintaining it as a RUSP patch for landscape scale diversity and as such may not be planted.

**Polygon 8** constitutes a narrow strip planted along the actively eroding bank near the main park facilities and was planted after the main site plantings. It does not appear on the original polygon maps. It is the open space that connects the northern and southern planting areas.



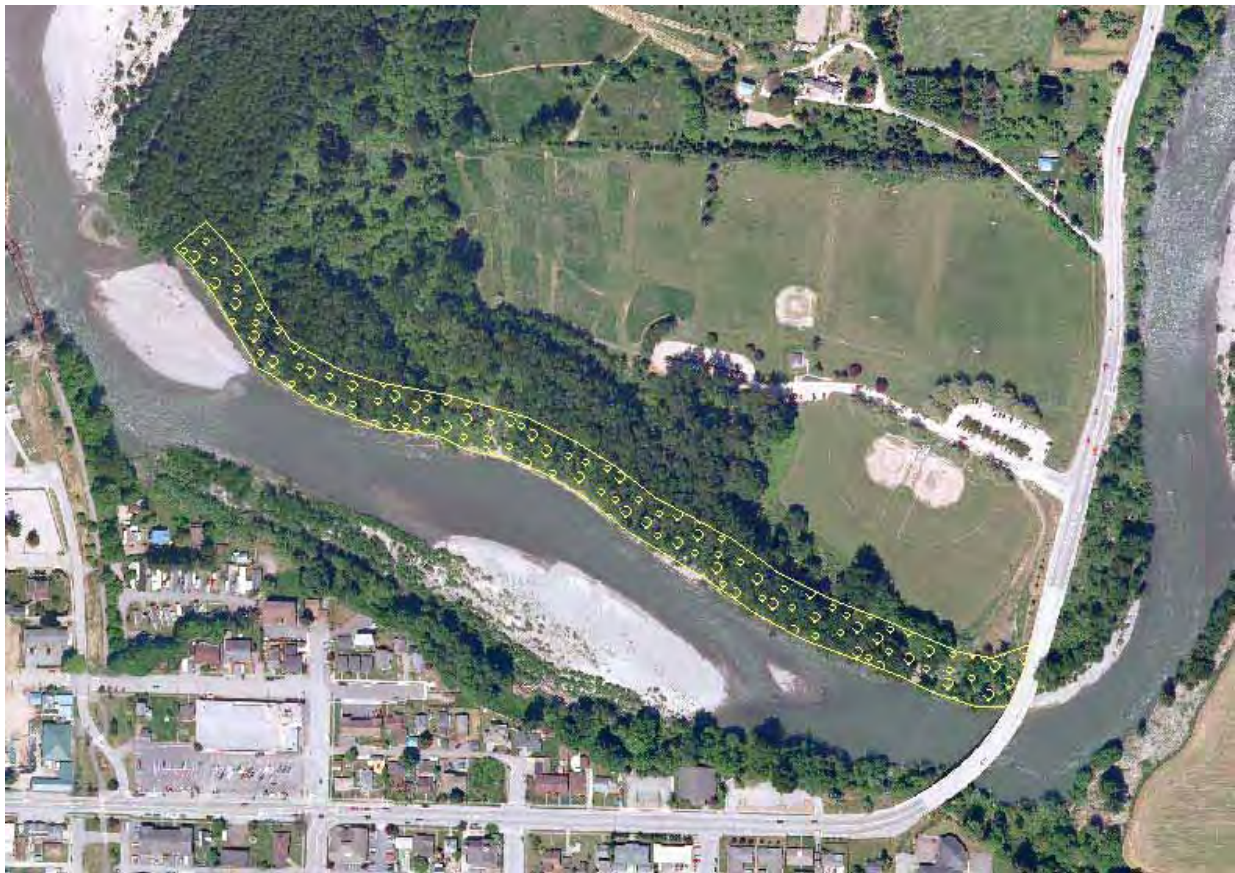


## <Twin Rivers>

### Preliminary Site Assessment (PSA) summary

#### *Existing cover*

Twin Rivers County Park lies at the confluence of the North Fork and South Fork of the Stillaguamish River (Figure 1). The proposed restoration site occupies a full 100' buffer and runs along the southern riverfront of the park to the west of State Route 530. The project site encompasses an area dominated by POBA, ACMA, THPL and ALRU in the 56-37 year age class with an understory dominated by SYAL with a strong presence of RUSP, OECE, COCO and occasional PHCA, COSE and RUPA. The northwestern corner of the site contains a stand of 13-37 year age class POBA and ALRU on a lower more frequently flooded terrace with little understory development. A disc golf course runs through the entire project area save the lower terrace.



**Figure 1: Twin Rivers project site – 5.6 acres**

Table 1: Age classes of existing canopy cover in proposed planting area

CANOPY SPECIES	AGE CLASS	ACRES
POBA, ACMA, ALRU, THPL	1955-1974	4.8
POBA, ALRU	1974-1998	0.8

Table 2: Existing cover within proposed planting area

COVER	TYPE	AREA (acres)	SPECIES
<i>native shrub</i>	sub-canopy	4.8	SYAL
			RUSP
			COCO
			OECE
			PHCA
			RUPA
			COSE
	open		
<i>invasives</i>	sub-canopy	2	RUBI
	open		
<i>land use</i>	pasture		
	access road		
	dike		
	park/recreation	5.6	
	cropland		

*Floodplain*

All of the proposed planting are lies within the 100 year flood plain.

## Soils

*Table 3: Soil Series with in proposed planting area*

SERIES	AREA (acres)
Puyallup fine sandy loam	5.5
Pilchuck loamy sand	<0.1
Sultan silt loam	<0.1
riverwash	<0.1

## Topography

The slopes throughout the project site vary between 0-15% with no particular aspect. Sediment deposits from seasonal floods have created small hillocks and ridges through the northwestern part of the site.

## Historic & current land use

While the park had been historically farm land since at least 1933 prior to purchase as a county park, the project site proper has been developing floodplain forest since 1955.

## Site Preparation Prescription

### Site access

The project site is easily accessed from the main parking lot off SR 530 from several points of entry into the disc golf trails. The disc golf trails then allow access throughout the forest understory.

### Invasive control

RUBI occurs in several localized patches in canopy gaps and as scattered individuals throughout the understory. Patches were brush cut in preparation for spraying the re-growth with herbicide. Scatter individuals were grubbed. A patch of HEHE and several individuals of ILAQ were manually removed when encountered.

*Table 4: Invasive control prescription*

SPECIES	AREA (acres)	METHOD	TREATMENT
RUBI	1	Brush cut, herbicide application, grubbed	Glyphosate 5%
ILAQ	<0.1	grubbed	
HEHE	<0.1	cut & cleared	

ILAQ=*Ilex aquifolium*; English holly

HEHE=*Hedera helix*; English ivy

### *Stand thinning*

The project site canopy consists of fairly mature POBA and will likely not require any thinning as the canopy will naturally open up through senescence.

### *Clearing*

No understory clearing was necessary. The understory was not too dense as to impede planting.

### *Fencing*

No fencing was required for this project.

## **Planting Prescription/As-built**

Two distinct polygons have been identified based on canopy cover, understory composition, soils and position relative to the river (Figure 2).

**Polygon 1** consists of the young 13-37 year age class stand of POBA at the west end of the site near the confluence with the North Fork. There is little understory shrub development here and no invasive presence. Soils are riverwash and this area experiences more frequent flooding being at a lower elevation than the rest of the site.

**Polygon 2** comprises the balance of the site forested by 56-37 year age class POBA, ALRU and ACMA with scattered older individuals likely older than 78 years. The soils are predominantly Puyallup fine sandy loam. Seasonal flooding has deposited large woody debris and ridges of sand and silt throughout the understory.



Figure 2: Twin Rivers planting polygons; polygon 1=35,340 ft<sup>2</sup>, polygon 2=216,160 ft<sup>2</sup>

Table 5: PLANT SCHEDULE

SPECIES	#	STOCK	SPACING
<i>POLYGON 1&amp; 2 ~ 251,500 FT<sup>2</sup></i>			
<i>TREES</i>			
ABGR	80	4'- 6'	15'
PISI	100	4'- 6'	15'
THPL	543	4'- 6'	15'
TSHE	80	4'- 6'	15'

**Implementation Schedule: Tables 6-7**

**2011**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**2012**

	J	F	M	A	M	J	J	A	S	O	N	D
site prep												
planting												
maintenance												
monitoring												

**Maintenance and Monitoring**

**Monitoring Plan**

*Table 1A: Monitoring Schedule*

	J	F	M	A	M	J	J	A	S	O	N	D
installed trees												
invasives												
native recruits												

*Metrics & Methods*

Installed trees

- Mortality – The entire project site will be assessed for mortality sometime during the growing season. Numbers and species will be noted as well as suspected causes such as herbivory, poor site conditions, improper planting, etc.
- Growth – Within the established 1/10 acre plots the diameter and height of each installed tree will be measured every other year after installation during the growing season.
- Density – The number of trees by species will be counted in each 1/10 acre monitoring plot every other year after installation during the growing season.

Invasives

- Cover – percent cover for each target species will be visually estimated using the Daubenmire cover class method within each of the 1/10 acre monitoring plots

every year during the growing season preferably in the late spring to assess maintenance needs for the summer with follow-up effectiveness monitoring after control implementation.

Native recruits

- Cover – percent cover for the dominant shrubs will be visually estimated using the Daubenmire cover class method within each of the 1/10 acre monitoring plots every other year after installation sometime during the growing season.
- Density – the number and species of recruited native tree species will be assessed every other year after installation in the 1/10 acre monitoring plots sometime during the growing season. Seedlings too numerous to count can be initially assessed as percent cover.

**Maintenance Plan**

*Table 2A: Maintenance tasks by month*

	J	F	M	A	M	J	J	A	S	O	N	D
tree replacement												
invasive control												
watering (1 <sup>st</sup> year post- install only)												
fertilizing (1 <sup>st</sup> year post- install only)												
mowing/brushcutting												
thinning												

*Methods*

Tree replacement

All dead trees will be replaced with suitable species of a similar size in the first year after installation. Wide spread first year mortality will trigger a closer evaluation of site conditions and species selection before replanting. Subsequent mortality of replacement trees will also trigger a re-evaluation.

Invasive control

For the given site conditions control methods will be employed that are the most efficient and least impactful to the installed trees and remnant native habitat. Any combination of mechanical and chemical control may be used as prescribed by project

manager. It is anticipated that spot spraying, brushcutting, mowing, and grubbing will be the most commonly used methods.

### Watering

Trees will be watered in the first growing season after installation on an as needed basis. Signs of water stress will be noted during seasonal site inspections and during periods of persistent high temperatures.

### Fertilizing

Trees will be fertilized in the first growing season after installation on an as needed basis. If the trees are observed to show signs of nutrient deficiency (chlorosis, stunting, altered morphology, etc.) fertilizer will be applied to address the diagnosed deficiency.

### Mowing/brushcutting

Competing vegetation, native or nonnative, will be cleared on an as needed basis from within 3' of each tree.

### Thinning

The successional strategy of conifer reforestation in riparian flood plains relies heavily on management of stand density. It is not anticipated that the installed conifers themselves will need to be thinned within the 10 year maintenance period. Volunteer deciduous trees such as red alder and black cottonwood may need to be thinned or completely cleared if they are crowding and/or overtopping the installed trees. It may be desirable depending on the site conditions to allow for a certain density of deciduous recruits to provide protective shade, soil stability, and organic matter to the soil. Trees installed under an existing deciduous canopy may benefit from thinning out nearby trees to open the canopy and encourage fuller more structurally stable growth. The earliest this should be considered is 3 years post-installation.

**Table 3A: Common Stillaguamish riparian native & invasive plant names**

<b>COMMON</b>	<b>SCIENTIFIC</b>	<b>4 LETTER CODE</b>
<b>NATIVE TREES</b>		
red alder	<i>Alnus rubra</i>	ALRU
black cottonwood	<i>Populus balsamifera</i>	POBA
big-leaf maple	<i>Acer macrophyllum</i>	ACMA
Douglas-fir	<i>Pseudotsuga menziesii</i>	PSME
Sitka spruce	<i>Picea sitchensis</i>	PISI
western hemlock	<i>Tsuga heterophylla</i>	TSHE
western red cedar	<i>Thuja plicata</i>	THPL
shore pine	<i>Pinus contorta</i>	PICO
western white pine	<i>Pinus monticola</i>	PIMO
bitter cherry	<i>Prunus emarginata</i>	PREM
Pacific dogwood	<i>Cornus nuttallii</i>	CONU
Pacific willow	<i>Salix lucida</i>	SALU
grand fir	<i>Abies grandis</i>	ABGR
<b>NATIVE SHRUBS/SMALL TREES</b>		
Pacific ninebark	<i>Physocarpus capitatus</i>	PHCA
red-twig dogwood	<i>Cornus sericea</i>	COSE
beaked hazelnut	<i>Corylus cornuta</i>	COCO
snowberry	<i>Symphoricarpos albus</i>	SYAL
twinberry	<i>Lonicera involucrata</i>	LOIN
clustered rose	<i>Rosa pisocarpa</i>	ROPI
salmonberry	<i>Rubus spectabilis</i>	RUSP
cascara	<i>Frangula purshiana</i>	FRPU
Pacific crabapple	<i>Pyrus fusca</i>	PYFU
Sitka willow	<i>Salix sitchensis</i>	SASI
Narrow-leaf willow	<i>Salix exigua</i>	SAEX
vine maple	<i>Acer circinatum</i>	ACCI
thimbleberry	<i>Rubus parviflorus</i>	RUPA
Douglas spiraea	<i>Spiraea douglasii</i>	SPDO
<b>INVASIVES</b>		
Himalayan blackberry	<i>Rubus bifrons</i>	RUBI
evergreen blackberry	<i>Rubus lacinatus</i>	RULA
knotweed	<i>Polygonum cuspidatum,</i> <i>P. sachalense, &amp; P. x</i> <i>bohemicum</i>	POSP
Canada thistle	<i>Cirsium arvense</i>	CIAR
Old man's beard	<i>Clematis vitalba</i>	CLVI
English ivy	<i>Hedera helix</i>	HEHE
English holly	<i>Ilex aquifolium</i>	ILAQ
reed canarygrass	<i>Phalaris arundinacea</i>	PHAR
Scot's broom	<i>Cytisus scoparius</i>	CYSC
butterfly bush	<i>Buddleja davidii</i>	BUDA