



October 1, 2013

Windward Real Estate Services, LLC  
335 Park Place Center, Suite G111  
Kirkland, WA 98033

RE: City of Kirkland / Watershed Company review comments for 9757 (9900) 124<sup>th</sup> Avenue NE.

This letter and the accompanying Buffer Mitigation Plan for Cedarbrook Short Plat prepared by *Acre Environmental Consulting, LLC* and dated September 30, 2013 Revision #1 are intended to provide the additional information requested by the Watershed Company in their September 25, 2013 comment letter for the above site (Watershed Company Reference Number: 100714.17). The recommendations provided by the Watershed Company in their comment letter are included below in bold italics and descriptions of how the recommendations were addressed are in plain text.

September 25, 2013 Watershed Company Recommendations:

***1. Propose pervious sidewalk pavement.***

To ensure that impervious areas within the buffer are not increased as required by KZC 90.20.4, the applicant has agreed to use pervious pavement to construct the 640 square feet of sidewalk proposed within the buffer.

***2. Increase the diversity of proposed tree species and reduce the number of red alder trees.***

To increase the diversity of tree species within the buffer, big leaf maple and bitter cherry have been added to the proposed tree plantings. The quantity of red alder has been reduced to a total of forty-seven. The accompanying bond quantity worksheet has been revised to reflect these changes.

**3. Propose using 1-gallon container stock in place of 4-inch pots; reduce overall groundcover quantities.**

All 4-inch pots have been replaced with 1-gallon container stock and the overall quantity of groundcover has been reduced as requested. This is described in detail in the Buffer Mitigation Plan for Cedarbrook Short Plat prepared by *Acre Environmental Consulting, LLC* and dated Revision 1, September 30, 2013. The accompanying bond quantity worksheet has been revised to reflect these changes.

**4. Use either performance standards or success criteria but not both.**

The success criteria have been removed and the recommendations incorporated in to the performance standards.

**5. Substitute a plant species diversity performance standard instead of a survival standard in Years 3-5.**

A plant species diversity standard of three native tree species, three native shrub species, and two native species of groundcover has been included in to Performance Standard 1, for Years 3 through 5.

**6. Include monitoring, performance standards and contingency requirements for the level spreader stormwater outfalls.**

In the *Project Success and Compliance* section of the revised mitigation plan, a fourth performance standard has been added. This performance standard requires that stormwater released from the dispersion trenches does not cause channelization or erosion downstream of the trenches. These areas are required to be assessed during each of the ten monitoring visits. The *Contingency Plan* section of the revised mitigation plan has been expanded to address corrective measures should erosion occur downstream of the dispersion trenches.

**7. Incorporate a requirement for a timer operated temporary irrigation system supplied by the municipal water system for the development.**

A requirement for a timer operated, temporary above ground irrigation system connected to the municipal water system has been included in the *Planting Notes* section of the Buffer Mitigation Plan for Cedarbrook Short Plat prepared by *Acre Environmental Consulting, LLC* and dated Revision 1, September 30, 2013.

**8. Clarify the monitoring schedule to stipulate site visits, memos, and reports in each of the five monitoring years.**

The Project Monitoring Program has been revised to specify that ten total site visits will occur with one maintenance memo and one monitoring report to be submitted in each of the five years of monitoring. This is described in detail in *Project Monitoring Program* section of the Buffer Mitigation Plan for Cedarbrook Short Plat prepared by *Acre Environmental Consulting, LLC* and dated Revision 1, September 30, 2013.

**9. Add the split rail fence and signage to the work sequence and provide a detail drawing.**

Installation of the split rail fence and signs has been addressed in the *Buffer Enhancement* section of the Buffer Mitigation Plan for Cedarbrook Short Plat prepared by *Acre Environmental Consulting, LLC* and dated Revision 1, September 30, 2013. Detail drawings for both the fence and signs have been provided on Sheet W-1 of the above plan.

**10. Include provisions to import or amend topsoil as needed.**

In the *Buffer Enhancement* section of the Buffer Mitigation Plan for Cedarbrook Short Plat prepared by *Acre Environmental Consulting, LLC* and dated Revision 1, September 30, 2013, the applicant is proposing to amend the soils in the area occupied by the chicken coop with approximately six inches of quality compost.

**11. Require re-use of salvaged trees from on-site cleared areas and reduce the bond unit price accordingly.**

The original plan required the use of salvaged trees from the cleared areas of the site to be used for large woody debris material, and this requirement has not changed. The accompanying bond quantity worksheet has been revised to reflect this cost savings.

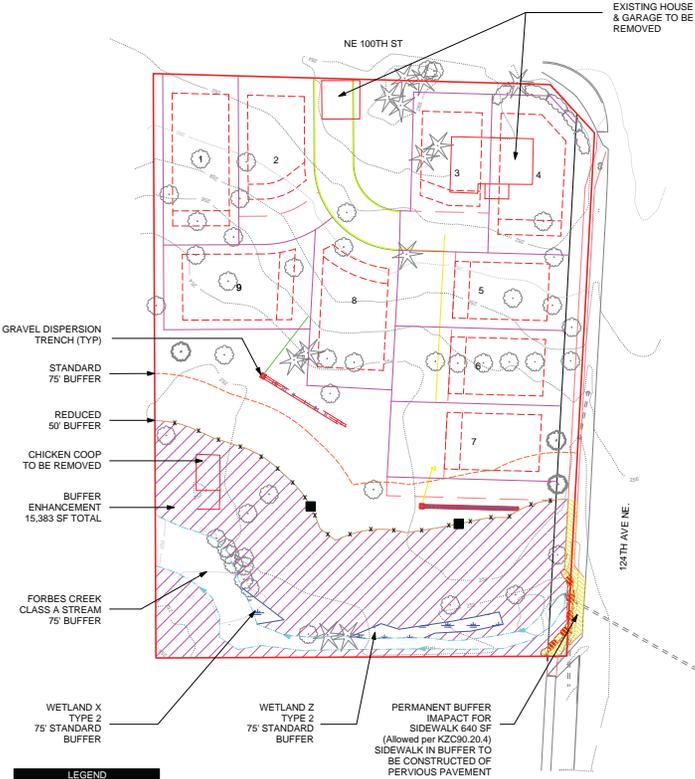
If there are any questions regarding this letter or the accompanying buffer mitigation plan, please contact me at 206.450.7746.

*Acre Environmental Consulting, LLC.*



Louis Emenhiser  
Owner / Principal Wetland Ecologist  
Professional Wetland Scientist #1680





**Introduction and Site Description**

On September 6, 2013 Acre Environmental Consulting visited the approximately 1.58-acre site located at 9900 124<sup>th</sup> Avenue NE in the City of Kirkland, Washington. The site is further located as a part of Parcel 00, Township 25N, Range 5E, W.M. The parcel number is 123850-0890. The purpose of this site visit was to assess the existing condition of the sensitive areas and associated buffer on the subject site to assist in preparing this buffer mitigation plan.

Access to this site is from the north via a gravel driveway that extends from 100<sup>th</sup> Street. The site has a south aspect, sloping towards a tributary of Forbes Creek (Class A Stream) and two associated Type 2 wetlands. A single-family residence and associated garage are located in the northwestern portion of the property. A chicken coop is located within the wetland and stream buffer in the southwestern part of the property. The majority of the property is occupied by maintained lawn (pasture with scattered trees). In the City of Kirkland, Class A streams receive 75-foot buffers while Type 2 wetlands in primary basins receive 75-foot standard buffers.

The wetlands and stream on the subject site were delineated by the Watershed Company on July 6, 2011. The Watershed Company also prepared an accompanying sensitive area study in the form of a letter dated July 13, 2011 and titled 9257 124th Ave. NE, Georgia Property-King County, parcel number 1238500890, Wetland & Stream Delineation Study. The Watershed Company Reference Number: 100714.17. The field delineation was subsequently revised by B & A Inc. in 2013. This delineation revision resulted in minor modifications to the on-site wetland boundary. Using the sensitive area study prepared by the Watershed Company to determine wetland and stream classifications and buffers, B & A Inc. prepared a letter dated March 26, 2013 and titled Wetland Delineation Amendment at 9257 124th Ave. NE, Georgia Property, King County parcel number 1238500890, which described the revision of the wetland and stream boundaries. B & A Inc. also prepared a conceptual buffer mitigation plan dated March 25, 2013 and titled Buffer Enhancement Reduction at 9257 124th Ave. NE, Georgia Property, King County parcel number 1238500890. To accommodate the proposed development as well as to increase the level of functions provided by the on-site wetland and stream buffer, the applicant is proposing to reduce the standard 75-foot wetland and stream buffer to 50 feet (1/3 of the standard buffer width) through buffer enhancement pursuant to KZC 90.60.2.a.2 and 90.100.B. This buffer mitigation plan is intended to supersede the March 25, 2013 buffer mitigation plan prepared by B & A Inc. as well as to provide the additional information requested by the Watershed Company in their July 30 and September 25, 2013 comment letters for the subject site (Watershed Company Reference Number: 100714.17).

**Buffer Enhancement**

To accommodate the proposed development as well as to increase the level of functions provided by the on-site wetland and stream buffer, the applicant is proposing to reduce the standard 75-foot wetland and stream buffer to 50 feet (1/3 of the standard buffer width) through buffer enhancement pursuant to KZC 90.60.2.a.2 and 90.100.B. The buffer proposed to be enhanced is 15,490 square feet in size and is dominated by maintained lawn / pasture with patches of Himalayan blackberry and scattered trees. A chicken coop, approximately 240 square feet in size is located in the northern portion of the buffer and is proposed to be removed. Buffer enhancement is proposed to consist of removing the chicken coop and all invasive species and planting native trees, shrubs, and groundcover. Plant quantities and spacing were determined using the King County Critical Areas Mitigation Guidelines. All proposed species are native to the Puget Sound region and are included on the Kirkland Plant List. These have been selected for their benefits to wildlife, and have proven successful on past mitigation projects. While removing invasive species, care shall be taken not to harm any existing native trees or shrubs. Following removal of the chicken coop, but prior to installation of the mitigation plantings, soils in the area occupied by the coop will be amended with a quality compost mix, spread to a depth of approximately six inches. During planting, the compost will be partially incorporated in to the underlying soil.

Buffer Enhancement - (15,383 square feet)

Common Name	Latin Name	Size	Spacing	Quantity
Big leaf maple	<i>Acer macrophyllum</i>	2 gallon	9'	47
Red alder	<i>Alnus rubra</i>	2 gallon	9'	47
Bitter cherry	<i>Prunus emarginata</i>	2 gallon	9'	47
Douglas fir	<i>Pseudotsuga menziesii</i>	2 gallon	9'	47
Cadberry	<i>Quercus catesbeiana</i>	1 gallon	6'	144
Noddy rose	<i>Rosa nutkana</i>	1 gallon	6'	144
Snowberry	<i>Symphoricarpos albus</i>	1 gallon	6'	144
Oregon grape	<i>Berberis nervosa</i>	1 gallon	6'	144
Sisal	<i>Gaultheria shallon</i>	1 gallon	6'	144
Sword fern	<i>Polystichum munitum</i>	1 gallon	6'	144

Following installation of the above mitigation plantings, a split rail fence shall be installed along the perimeter of the 50-foot reduced buffer as depicted on this plan. A total of two Environmentally Sensitive Areas (ESAs) shall be affixed to this fence in the locations shown on this plan (fence and sign details are included on this sheet).

**Large Woody Debris**

To improve habitat values for wildlife within the subject wetland and stream buffer, as well as to comply with KZC 90.60.2.a.2 and KZC 90.100.b, the applicant is proposing to install a minimum of two snags and four pieces of stemmed woody debris within the buffer. Material to be used for snags and woody debris should be salvaged from the cleared areas of the site and should be approved by the project biologist prior to installation. Large woody debris shall consist of logs from Douglas fir (*Pseudotsuga menziesii*) or Western red cedar (*Thuja plicata*). Snags should be as large as possible, but a minimum of twelve inches in diameter and thirty feet long. Approximately one third (1/3) of the log should be retained in the ground and the remaining two thirds to serve as the snag. Rostering slits should be installed in the upper portion of these snags to provide habitat for bats and songbirds. The slits should be oriented to the south and should be at least eight inches deep, one or more inches wide, and angled sharply upward. Branches on the snags should be retained as perches for birds. Downed woody debris should be as large as possible, but a minimum of ten inches in diameter and ten feet long. If root wads are available, they should be set aside for this purpose. Installation of the snags and downed woody debris should be completed prior to installation of the buffer enhancement plantings, and should be supervised by the project biologist or other qualified person.

**Grass Seeding**

Any disturbed soil in sensitive areas or buffers shall be seeded to the recommended grass seed mixtures below, or similar approved mixtures.

Common Name	Latin Name	lbs/1,000 s.f.
Tall fescue	<i>Festuca arundinacea</i>	0.4
Colonial bentgrass	<i>Agrostis tenuis</i>	0.4
Annual ryegrass	<i>Lolium multiflorum</i>	0.5
Red clover	<i>Trifolium repens</i>	0.2

**Project Success and Compliance**

**Goals and Objectives of the Proposed Mitigation:** The primary goals of the proposed mitigation are as follows:

1. Increase the water quality and habitat functions within the buffer;
2. Remove non-native, invasive vegetation from the mitigation area;
3. Increase the quantity and diversity of native vegetation within the on-site wetland and stream buffers; and
4. Allow for responsible residential development and associated infrastructure, while maintaining the ecological functions provided by the subject site.

**Performance Standards:**

**Performance Standard 1:** There shall be 100 percent survival of all the plantings after Year 1 or the installation contractor shall replace the material. The results of this assessment shall be included in both the maintenance memos and the annual reports. If erosion is discovered, the applicant will coordinate with the City of Kirkland and/or their representative to determine appropriate corrective measures.

**Performance Standard 2:** There shall be a minimum of 30 percent cover of woody species (shrub and tree canopy layers considered together) in the buffer after the first year post-installation, and a minimum of 50 percent cover by woody material after the third year post-installation, and a minimum of 80 percent cover by woody material after the fifth year post-installation. Naturally occurring, native plants shall be included in the calculation of vegetation cover.

**Performance Standard 3:** There shall be no more than 10 percent cover of weedy/invasive species in the mitigation areas at any time throughout the monitoring period.

**Performance Standard 4:** Stormwater shall be released from the dispersion trenches in a manner that does not cause channelization or erosion downstream of the trenches. At each monitoring visit, the dispersion trenches and adjacent areas shall be assessed to determine if erosion is occurring. The results of this assessment shall be included in both the maintenance memos and the annual reports. If erosion is discovered, the applicant will coordinate with the City of Kirkland and/or their representative to determine appropriate corrective measures.

If the project meets all of the criteria for success at the end of the five-year monitoring period, no further mitigation will be required and the financial guarantee will be returned to the applicant in full. If the definition of success is not met for any reason at the end of the five-year monitoring period, the maintenance and monitoring period will be extended for one year at a time until the site meets the stated performance standards. If the definitions of success and the accompanying performance standards are met in less than five years, the monitoring may be terminated and the bond released at that point. This mitigation plan and the accompanying maintenance and monitoring will not be considered fully complete until written confirmation is received from the City of Kirkland.

**Project Monitoring Program**

- Requirements for monitoring project:
1. Initial compliance/s-build report.
  2. Semi-annual site inspection (twice yearly in the spring and fall) for each monitored year throughout the five (5) year monitoring period (ten total site visits).
  3. Five annual maintenance memos (one report submitted in the fall of each monitored year).
  4. Five annual reports (one report submitted in the fall of each monitored year).

**Criteria for Success:** Upon completion of the proposed mitigation project, an inspection by a qualified professional will be made to determine plant compliance. A compliance report will be prepared by the qualified biologist and supplied to the City of Kirkland within 30 days after the completion of planting. The monitoring period will begin once the City receives written notification confirming the mitigation plan has been implemented and City staff inspects the site and issues approval of the installation.

A qualified professional will perform condition monitoring of the plantings semi-annually in the spring and fall during throughout the monitoring period. A memo containing recommendations for maintenance will be submitted to the City of Kirkland and other agencies with jurisdiction after the spring inspection for each monitored year. A written report describing the monitoring results will be submitted to the City of Kirkland and other agencies with jurisdiction after the fall inspection for each monitored year. Final inspection will occur five years after completion of this project, or when the definitions of success confirming the mitigation plan has been implemented and City staff inspects the site and issues approval of the installation.

**Vegetation Monitoring:** Sampling points or transects will be established for vegetation monitoring and photo points will be established from which photos will be taken throughout the monitoring period. Photographs shall be taken from the same photo points during each subsequent monitoring visit to provide visual documentation of the evolution of the mitigation areas over time. Permanent sampling points must be identified on the mitigation site plans in the first monitoring report.

**Maintenance**

The mitigation areas will require periodic maintenance to remove undesirable species and replace plant mortality. Maintenance may include, but will not be limited to, removal of competing grasses and invasive species (by hand), mulching, replanting with larger plant material, species substitution, fertilization, soil amendments, and/or irrigation. If channelization or erosion downstream of the dispersion trenches is noted, erosion control measures including, but not limited to additions of plants or grass seed, installation of geotextiles, re-design of the dispersion trench, or other corrective measures determined by the site engineer and approved by the City.

**Contingency Plan**

If 20% of the plants are severely stressed during any of the inspections, or it appears 20% may not survive, additional plantings of the same species may be added to the planting area. Elements of a contingency plan may include, but will not be limited to: more aggressive weed control, pest control, mulching, replanting with larger plant material, species substitution, fertilization, soil amendments, and/or irrigation. If channelization or erosion downstream of the dispersion trenches is noted, erosion control measures including, but not limited to additions of plants or grass seed, installation of geotextiles, re-design of the dispersion trench, or other corrective measures determined by the site engineer and approved by the City.

**Planting Notes**

Wetland and buffer mitigation projects are typically more complex to install than can be described in plans. Careful monitoring by a professional wetland scientist for all portions of this project is strongly recommended. Timing and sequencing is important to the success of this type of project. Plant in the early spring or late fall. Order plants from a reputable nursery. Care and handling of plant materials is extremely important to the overall success of the project. All plant materials recommended in this plan should be available from local and regional sources, depending on seasonal demand. Some limited species substitution may be allowed, only with the agreement of the consulting wetland professional.

The plants shall be arranged with the appropriate numbers, sizes, species, and distribution to achieve the desired vegetation coverage. The actual placement of individual plants shall mimic natural, asymmetric vegetation patterns found on similar undisturbed sites in the area.

Colored surveyors ribbon, or other approved marking device shall be placed next to each planted tree and shrub to assist in locating the plants while removing the competing non-native vegetation and to assist in monitoring the plantings.

Wood chips or other suitable material shall be placed for mulching in the planting areas. Any existing vegetation is to be removed from a two-foot diameter area at each planting site. Mulch is to be placed in this two-foot diameter area at a depth of three to four inches. A four-inch diameter ring around the base of each plant shall be kept free of mulch.

Water should be provided during the dry season (July 1 through October 15) for the first two years after installation to insure plant survival and establishment. A temporary above ground irrigation system connected to the municipal water system shall provide water. This system shall be attached to a timer and adjusted so that water is applied at a rate of 1 inch of water per week for year one and 1 inch per week during year two. An inspection during the Year one, spring monitoring visit will be conducted to ensure that the mitigation has established.

**Required Financial Guarantee**

The City of Kirkland requires a performance bond or other financial guarantee in order to ensure that the proposed mitigation efforts meet the performance standards outlined in this report. Pursuant to KZC Chapter 90.145, a performance or maintenance bond is required to assure that all work or actions are satisfactorily completed or maintained in accordance with the approved plans, specifications, permits or approval requirements, and applicable regulations, and to assure that all work or actions not satisfactorily completed or maintained will be corrected to comply with approved plans, specifications, requirements, and regulations to restore environmental damage or degradation, protect fish and wildlife habitat and protect the health, safety, and general welfare of the public. The security for performance shall be for a period of five years and the amount of the performance security equals 125 percent of the of the estimated cost, as approved by the Planning Office, of conformance to plans, specifications, and permit or approval requirements under this chapter, including corrective work and compensation, enhancement, mitigation, maintenance, and restoration of sensitive areas.

In an effort to determine the estimated cost of the installed mitigation project and future monitoring/maintenance costs associated with the project over a 5-year period, the King County Critical Areas Bond Ordinance Worksheet was completed, as requested by the Watershed Company. Please view the project-specific Bond Quantity Worksheet compiled by Acre Environmental Consulting, LLC which is attached to this report. For the calculations shown on the Bond Quantity Worksheet for this project, the bond amount required to be paid to the City of Kirkland equals \$45,304.30.

**Use of this Report**

This buffer enhancement plan is supplied to Windward Real Estate Services, LLC as a means of mitigating for buffer impacts as required by the City of Kirkland Sensitive Areas Regulations. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the regulations currently in effect. The work for this report has conformed to the standard of care employed by professional ecologists in the Pacific Northwest. No other representation or warranty is made concerning the work or this report. This report is based largely on readily obtainable conditions and, to a lesser extent, on field observations. No attempt has been made to determine hidden or concealed conditions. If such conditions arise, the information contained in this report may be changed based upon those conditions. Please note that Acre Environmental Consulting, LLC does not provide detailed analysis of other permitting requirements not discussed in this report (i.e. structural, drainage, geotechnical, or engineering requirements).

The laws applicable to Critical Areas are subject to varying interpretations. While Acre Environmental Consulting, LLC is a professional industry standards when completing this review, the information included in this report does not guarantee approval by any federal, state, and/or local permitting agencies. Therefore, all work on this property shall not commence until permits have been obtained from all applicable agencies.

Acre Environmental Consulting, LLC.

Acrc Job #: 19043  
Watershed Co. Ref #: 100714.17  
Drawn By: L. Emmerberg  
Date: 09/09/2013  
Revision No.: 1, 09/30/2013



PREPARED BY:  
Acre Environmental Consulting, LLC  
1717 25th Avenue NE  
Kirkland, WA 98033  
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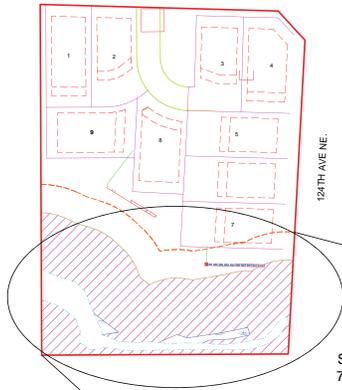
PREPARED FOR:  
Windward Real Estate Services, LLC  
335 Park Place Center, Suite G111  
Kirkland, WA 98033

**BUFFER MITIGATION PLAN**  
**CEDARBROOK SP**  
9757 124TH AVENUE NE  
KIRKLAND, WA 98033  
TAX PARCEL NO.: 123850-0890

**SHEET W-1**

OVERVIEW MAP NTS

NE 100TH ST

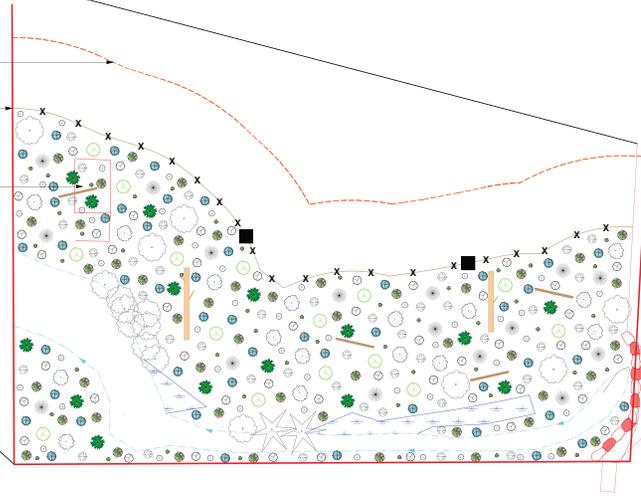


124TH AVE NE.

STANDARD  
75' BUFFER

REDUCED  
50' BUFFER

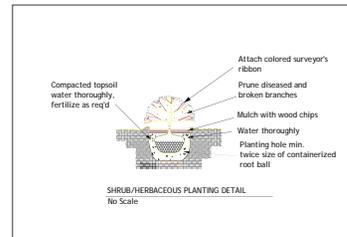
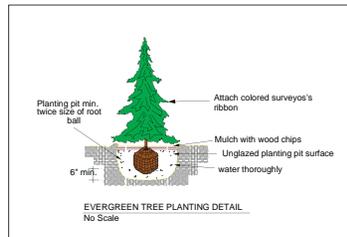
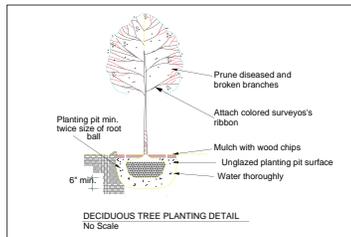
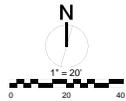
CHICKEN COOP  
TO BE REMOVED  
(Soils to be amended with  
6" of compost prior to  
planting)



124TH AVE NE.

**LEGEND**

- ESA SIGN
- x FENCE (Salt rail or other type as approved by Kirkland)
- DOWNED WOODY DEBRIS
- SNAGS
- Existing vegetation to remain.
- The following symbols represent clumps of three (3) like species.
  - *Acer macrophyllum*
  - *Alnus rubra*
  - *Prunus emarginata*
  - *Pseudotsuga menziesii*
  - *Oemleria cerasiformis*
  - *Symphoricarpos albus*
  - *Rosa nutkana*
  - *Berberis nervosa*
  - *Gaultheria shallon*
  - *Polystichum munitum*



Acre Job: 13043  
Washland Co. Ref # 100714.17  
Drawn By: L. Emerhiser  
Date: 05.09.2013  
Revision No. 1\_09.30.2013



PREPARED BY:  
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PREPARED FOR:  
Windward Real Estate Services, LLC  
335 Park Place Center, Suite G111  
Kirkland, WA 98033

**BUFFER PLANTING PLAN**  
**CEDARBROOK SP**  
9757 124TH AVENUE NE  
KIRKLAND, WA 98033  
TAX PARCEL NO. 123850-0890

SHEET W-2

**Critical Areas Mitigation  
Bond Quantity Worksheet**

C24 Web date: 11/30/2012

**Project Name:** Cedarbrook Short Plat      **Date:**10/01/13      **Prepared by:** Acre Env. Consulting, LLC  
**Project Number:**Watershed Ref # 100714. **Project Description:** Buffer reduction with enhancement  
**Location:**9900 124th Ave. NE Kirkland, WA      **Applicant:** Windward Real Estate Selp      **Phone:**

PLANT MATERIALS*						
Type	Unit Price	Unit	Quantity	Description	Cost	
PLANTS: Potted, 4" diameter, medium	\$5.00	Each			\$ -	
PLANTS: Container, 1 gallon, medium soil	\$11.50	Each	864		\$ 9,936.00	
PLANTS: Container, 2 gallon, medium soil	\$20.00	Each	188		\$ 3,760.00	
PLANTS: Container, 5 gallon, medium soil	\$36.00	Each			\$ -	
PLANTS: Seeding, by hand	\$0.50	SY			\$ -	
PLANTS: Slips (willow, red-osier)	\$2.00	Each			\$ -	
PLANTS: Stakes (willow)	\$2.00	Each			\$ -	
PLANTS: Stakes (willow)	\$2.00	Each			\$ -	
PLANTS: Flats/plugs	\$2.00	Each			\$ -	
* All costs include installation					<b>TOTAL</b>	<b>\$ 13,696.00</b>

INSTALLATION COSTS ( LABOR, EQUIPMENT, & OVERHEAD)						
Type	Unit Price	Unit	Quantity	Description	Cost	
Compost, vegetable, delivered and spread	\$37.88	CY			\$ -	
Decompacting till/hardpan, medium, to 6" depth	\$1.57	CY			\$ -	
Decompacting till/hardpan, medium, to 12" depth	\$1.57	CY			\$ -	
Hydroseeding	\$0.51	SY			\$ -	
Labor, general (landscaping)	\$40.00	HR	128.00		\$ 5,120.00	
Labor, general (construction)	\$40.00	HR			\$ -	
Labor, Consultant, supervising	\$55.00	HR	6.00		\$ 330.00	
Labor, Consultant, on-site re-design	\$95.00	HR			\$ -	
Rental of decompacting machinery & operator	\$70.00	HR			\$ -	
Sand, coarse builder's, delivered and spread	\$42.00	CY			\$ -	
Staking material (set per tree)	\$7.00	Each			\$ -	
Surveying, line & grade	\$250.00	HR			\$ -	
Surveying, topographical	\$250.00	HR			\$ -	
Watering, 1" of water, 50' soaker hose	\$3.62	MSF			\$ -	
Irrigation - temporary	\$3,000.00	Acre	0.35		\$ 1,050.00	
Irrigation - buried	\$4,500.00	Acre			\$ -	
Tilling topsoil, disk harrow, 20hp tractor, 4'-6" deep	\$1.02	SY			\$ -	
	\$25.00	HR			\$ -	
* All costs include delivery and installation					<b>TOTAL</b>	<b>\$ 6,500.00</b>

HABITAT STRUCTURES*						
ITEMS	Unit Cost	Unit	Quantity	Description	Cost	
Fascines (willow)	\$ 2.00	Each			\$ -	
Logs, (cedar), w/ root wads, 16"-24" diam., 30' long	\$1,000.00	Each			\$ -	
Logs (cedar) w/o root wads, 16"-24" diam., 30'	\$400.00	Each			\$ -	
Logs, w/o root wads, 16"-24" diam., 30' long	\$245.00	Each	1.00		\$ 245.00	
Logs w/ root wads, 16"-24" diam., 30' long	\$460.00	Each			\$ -	
Rocks, one-man	\$60.00	Each			\$ -	
Rocks, two-man	\$120.00	Each			\$ -	
Root wads	\$163.00	Each			\$ -	
Spawning gravel, type A	\$22.00	CY			\$ -	
Weir - log	\$1,500.00	Each			\$ -	
Weir - adjustable	\$2,000.00	Each			\$ -	
Woody debris, large	\$163.00	Each			\$ -	
Snags - anchored	\$400.00	Each	1.00		\$ 400.00	
Snags - on site	\$50.00	Each			\$ -	
Snags - imported	\$800.00	Each			\$ -	
					\$ -	
* All costs include delivery and installation					<b>TOTAL</b>	<b>\$ 645.00</b>

EROSION CONTROL						
ITEMS	Unit Cost	Unit	Quantity	Description	Cost	
Backfill and Compaction-embankment	\$ 4.89	CY			\$ -	
Crushed surfacing, 1 1/4" minus	\$30.00	CY			\$ -	
Ditching	\$7.03	CY			\$ -	
Excavation, bulk	\$4.00	CY			\$ -	
Fence, silt	\$1.60	LF	250.00		\$ 400.00	
Jute Mesh	\$1.26	SY			\$ -	
Mulch, by hand, straw, 2" deep	\$1.27	SY			\$ -	
Mulch, by hand, wood chips, 2" deep	\$3.25	SY	260.00		\$ 845.00	
Mulch, by machine, straw, 1" deep	\$0.32	SY			\$ -	
Piping, temporary, CPP, 6"	\$9.30	LF			\$ -	
Piping, temporary, CPP, 8"	\$14.00	LF			\$ -	
Piping, temporary, CPP, 12"	\$18.00	LF			\$ -	
Plastic covering, 6mm thick, sandbagged	\$2.00	SY			\$ -	
Rip Rap, machine placed, slopes	\$33.98	CY			\$ -	
Rock Constr. Entrance 100'x15'x1'	\$3,000.00	Each			\$ -	
Rock Constr. Entrance 50'x15'x1'	\$1,500.00	Each			\$ -	
Sediment pond riser assembly	\$1,695.11	Each			\$ -	
Sediment trap, 5' high berm	\$15.57	LF			\$ -	
Sediment trap, 5' high berm w/spillway incl. riprap	\$59.60	LF			\$ -	
Sodding, 1" deep, level ground	\$5.24	SY			\$ -	
Sodding, 1" deep, sloped ground	\$6.48	SY			\$ -	
Straw bales, place and remove	\$600.00	TON			\$ -	
Hauling and disposal	\$20.00	CY			\$ -	
Topsoil, delivered and spread	\$35.73	CY	4.50		\$ 160.79	
	\$17.00	CY			\$ -	
* All costs include delivery and installation					<b>TOTAL</b>	<b>\$ 1,405.79</b>

