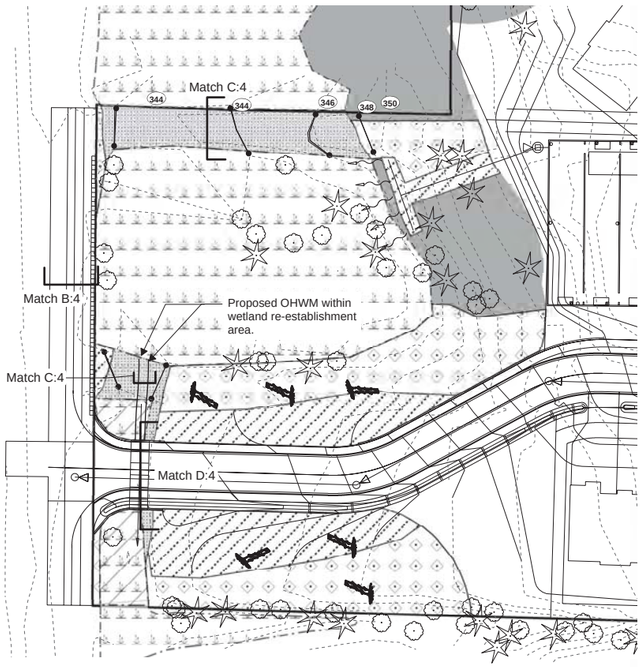
BRIDLESTONE ESTATES

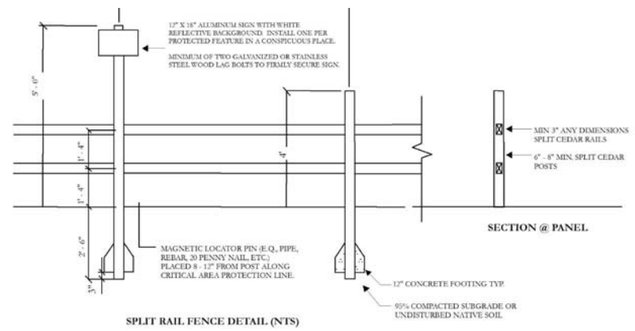
KING COUNTY, WASHINGTON
PORTION OF SECTION 16, TOWNSHIP 25 NORTH, RANGE 5 EAST, W.M.

LARGE WOODY DEBRIS PLACEMENT & MITIGATION GRADING



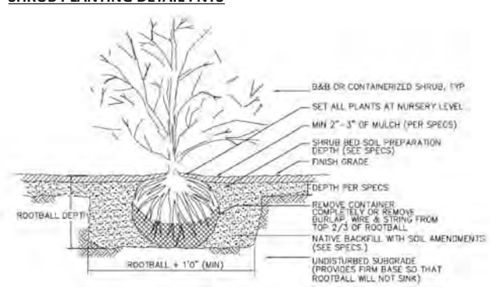
WETLAND BUFFER FENCE OR BARRIER

Upon project completion, the applicant shall install between the upland boundary of all wetland buffers and the developed portion of the site, either 91) a permanent 3 to 4 foot - tall split rail fence; or (2) permanent planting of equal barrier value; or (3) equivalent barrier, as approved by the planning official. Installation of the permanent fence or planted barrier must be done by hand where necessary to prevent machinery from entering th ewetlnad or its buffer.

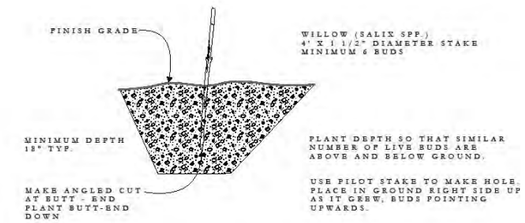


SPLIT RAIL FENCE DETAIL (NTS)

SHRUB PLANTING DETAIL : NTS

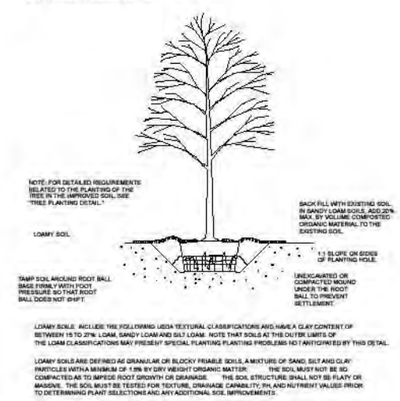


WILLOW STAKE PLANTING DETAIL : NTS



TREE PLANTING DETAIL : NTS

INTERNATIONAL SOCIETY OF ARBORICULTURE

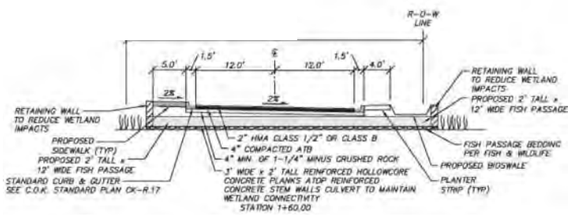


LARGE WOODY DEBRIS: 6 PIECES

SYMBOL	QUANTITY	DESCRIPTION / SIZE
	6	MINIMUM 12 - FEET IN LENGTH & 20 INCH DIAMETER ROOT BALL PREFERRED BUT NOT REQUIRED

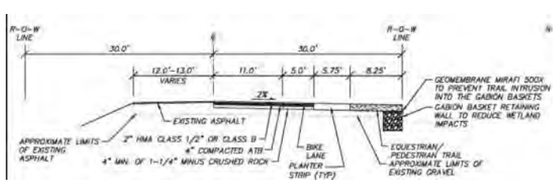
Match A:4

Access Road Cross Section (From Triad Civil Plans Sheet 9 of 14)

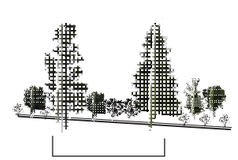


Match B:4

116th Road Frontage Improv. Cross Section (From Triad Civil Plans Sheet 9 of 14)



Match C:4



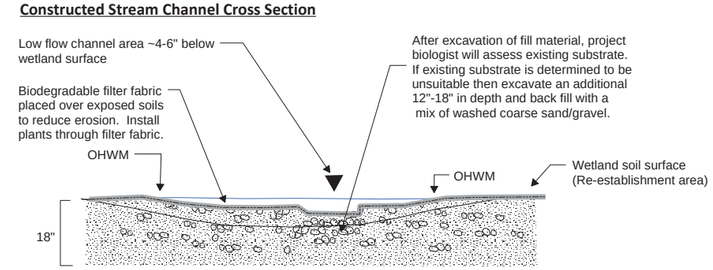
Wetland Re-estabilshement Area

WETLAND RE-ESTABLISHMENT GRADING

Grading for the wetland re-establishment will follow the intent of the proposed grading within this plan. Field changes, where necessary, will occur with the approval of the project biologist.

Match D:4

Constructed Stream Channel Cross Section



0 25 50 Feet

1 inch = 50 feet

CITY OF KIRKLAND PLANNING AND COMMUNITY DEVELOPMENT

APPROVED FOR CONSTRUCTION

BY: _____

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DATE	REVISION	BY
08/20/15	City/TWC comments	KJL
09/17/15	City/TWC comments	KJL
11/6/15	City/TWC comments	KJL

APPLICANT:

KLN CONSTRUCTION, INC.
19000 33RD AVE W, SUITE 200, LYNNWOOD, WA 98036
PHONE: 425-778-4111

CERTIFIED ARBORIST ISA
Kyle Legare PN-5876A

Wetland Solutions, Inc.
18220 3rd Ave NE
Arlington, WA 98223
P: 360-652-8010
E: Kyle@WetlandSolutions.net

BRIDLESTONE ESTATES

MITIGATION DETAILS AND GRADING

ENGINEER: ROY LEWIS

CONTACT: CHER ANDERSON

JOB NO: 1410

DATE: 05/11/2015

DRAWN BY: KJL

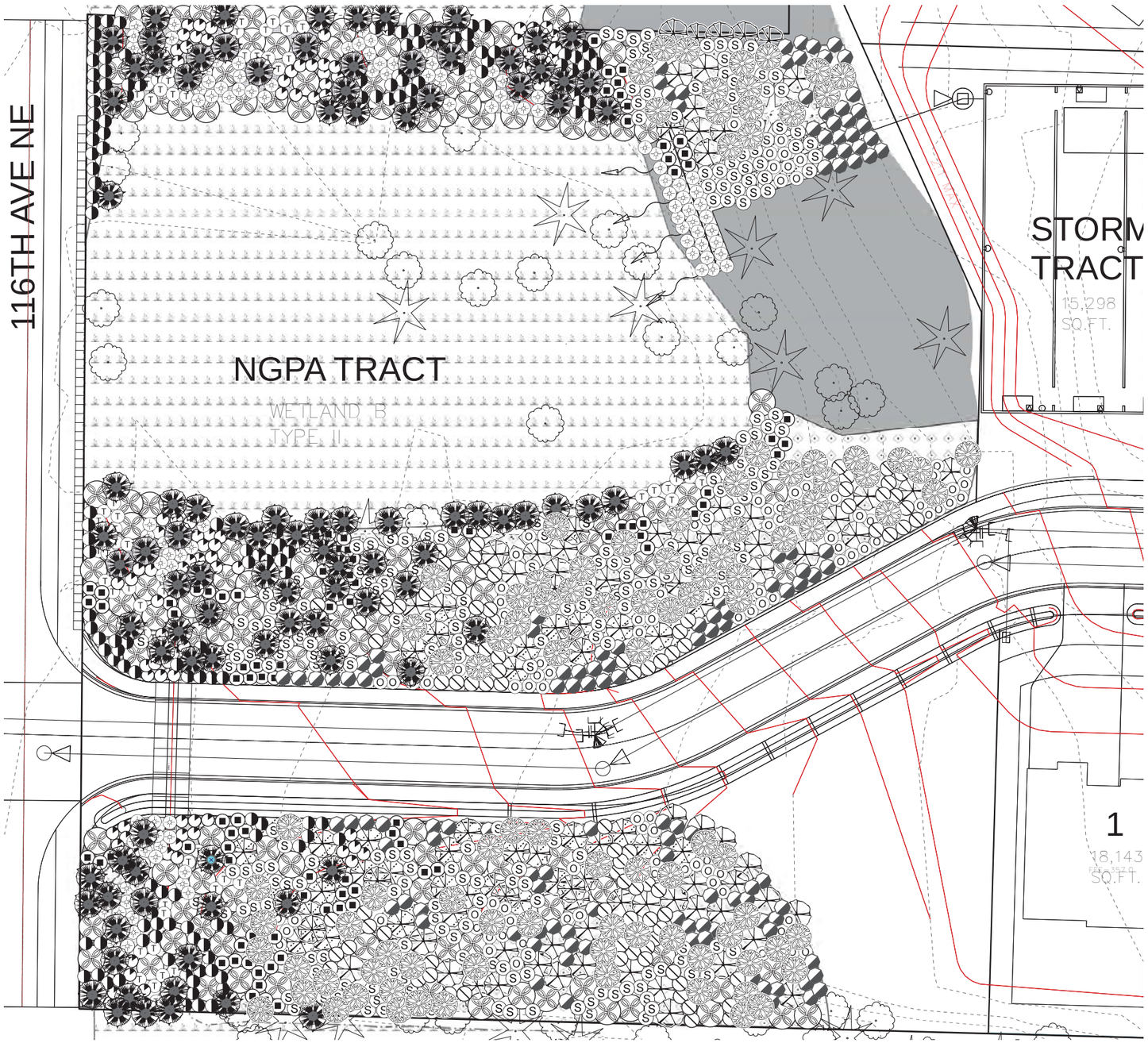
CHECKED BY: CA

SHEET

M-4 OF 6

BRIDLESTONE ESTATES

KING COUNTY, WASHINGTON
PORTION OF SECTION 16, TOWNSHIP 25 NORTH, RANGE 5 EAST, W.M.



PLANT SCHEDULE

TREES: 446 TOTAL

SYMBOL	QUANTITY	BOTANICAL / COMMON	SIZE / COMMENT
	108	ACER MACROPHYLLUM / BIG LEAF MAPLE	1 1/2" CALIPER / 6' HT MINIMUM
	104	PICEA SITCHENSIS / SITKA SPRUCE	6' HT / FULL TO BASE
	108	PSEUDOTSUGA MENZIESII / DOUGLAS FIR	6' HT / FULL TO BASE
	126	THUJA PLICATA / WESTERN RED CEDAR	6' HT / FULL TO BASE

SHRUBS: 1,077 TOTAL

SYMBOL	QUANTITY	BOTANICAL / COMMON	SIZE / COMMENT
	139	CORNUS SERICEA / RED OSIER DOGWOOD	1 GALLON - 18" HT / SP
O	106	HOLODISCUS DISCOLOR / OCEANSPRAY	1 GALLON - 18" HT / SP
T	93	LONICERA INVOLUCRATA / TWINBERRY	1 GALLON - 18" HT / SP
	93	PHYSOCARPUS CAPITATUS / PACIFIC NINEBARK	1 GALLON - 18" HT / SP
	129	ROSA NOOTKANA / NOOTKA ROSE	1 GALLON - 18" HT / SP
S	229	RUBUS SPECTABILIS / SALMONBERRY	1 GALLON - 18" HT / SP
	92	SALIX LASIANDRA / PACIFIC WILLOW	1 GALLON - 18" HT / SP
	105	SALIX SCOULERIANA / SCOULER'S WILLOW	1 GALLON - 18" HT / SP
	91	SYMPHORICARPOS ALBUS / SNOWBERRY	1 GALLON - 18" HT / SP

Legend

- Wetland
- Wetland Re-Establishment
- Wetland Enhancement
- Buffer Restoration
- Buffer Enhancement
- Buffer

0 10 20 40 Feet
1 inch = 20 feet

CITY OF KIRKLAND PLANNING AND COMMUNITY DEVELOPMENT

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BRIDLESTONE ESTATES
MITIGATION PLANTING PLAN

ENGINEER: ROY LEWIS
CONTACT: CHER ANDERSON
JOB NO: 1410
DATE: 05/11/2015
DRAWN BY: KJL
CHECKED BY: CA

SHEET
M-5 OF 6

BRIDLESTONE ESTATES

KING COUNTY, WASHINGTON
PORTION OF SECTION 16, TOWNSHIP 25 NORTH, RANGE 5 EAST, W.M.

Project Summary

The purpose of this plan is to satisfy the City of Kirkland regulations that requires a Critical Areas Study and mitigation plan according to KZC 90.40. The proposed project is a 35 – lot residential subdivision of five existing parcels that total 17.6 – Acres. The applicant is requesting a rezone from RS 35 to RS 12.5. All existing equestrian facilities including the paddocks, stables, and arenas will be removed during initial clearing and grading of the site. The new development will include the installation of utilities, sanitary sewer, stormwater management facilities, tree protection areas, sensitive area protection areas, and road frontage improvements.

The proposed project is a residential subdivision that is located at 4626 116th Ave NE, Kirkland, Washington. The site is located in Section 16 of Township 25N, Range 5E in the southeastern corner of the City of Kirkland. The site is bordered by single family residential development to the north and south, 116th Avenue NE to the west, and Bridle Trails Park to the east.

Three wetlands were identified as a result of this work referred to as Wetlands A, B, and C for the purposes of the mitigation plans. The Watershed Company, Inc. completed a wetland delineation review in March 2013. Five recommendations were provided in the review letter, which have been addressed in the conceptual mitigation report.

The proposed residential development has been designed to avoid and minimize impacts to critical areas and associated buffers to the greatest extent practicable. Proposed impacts where unavoidable have been located in areas that were previously disturbed and have lower existing functions and values. Impacts to wetland and stream areas are limited to the required access road to the site and road frontage improvements along 116th Ave NE. Buffer impacts are limited to the access road. A total of 47,760 SF of wetland area is located on the subject site. Per KZC 90.55(2) no *land surface modification* can occur in more than 10 percent of the total wetland area or 4,776 SF for the project site, may be modified.

The proposed mitigation for the wetland and buffer impacts associated with development activities includes a combination of wetland re-establishment, enhancement, restoration, and buffer enhancement. The proposed mitigation measures meet or exceed the ratios outlined in KZC 90.55. It is expected that there will be an overall increase in local functions and values as a result of the proposed mitigation measures. The addition of trees and shrubs, along with the re-establishment of wetland area will provide greater stormwater control and biological support functions.

Goals, Objectives, and Performance Standards

Goal 1: Increase the habitat and water quality improvement functions within a portion of the western wetland area on the subject site.

Objective 1: Re-establish 6,173 SF of wetland area by removing old fill material and installing native trees and shrubs.

Objective 2: Enhance 2,610 SF of wetland area by removing invasive plant cover and installing native trees and shrubs.

Performance Standards for Objective 1

i) Survival of planted trees and shrubs will be a minimum of 80% after two years. Staged survivability requirements include:
- 100% survivability after Year 1
- Year 2 survivability is at 80%
- Years 3-5 - A minimum of four native tree species and four shrub species will each comprise >10% cover within wetland enhancement and re-establishment areas

Evaluation Method: Transect sampling, visual inspection

ii) Native tree and shrub canopy cover percentages (including volunteers) during the monitoring period will be:
- 20% or greater at the end of Year 1
- 40% or greater at the end of Year 3
- 80% or greater at the end of Year 5

Evaluation Method: Quadrat sampling

Alternative Method: Line-intercept method

iii) Invasive and non-native species will have 10% or less aerial coverage within the mitigation areas. Weeds include but are not limited to Japanese knotweed, Himalayan blackberry, and Scot's broom.

Evaluation Method: Quadrat sampling

Alternative Method: Line-intercept method

iv) Wetland re-establishment areas shall have saturation between soil surface and 12 inches depth from March 1 through May 15.

Evaluation Method: Weekly visits for at least six weeks during early spring (usually beginning in March) to verify depth of surface or subsurface hydrology.

v) Wetland re-establishment areas shall have greater than 80% plant composition of FAC, FACW or OBL species.

Evaluation Method: Transect sampling, visual inspection

vi) Soils within wetland re-establishment areas shall have at least 30% organic matter by bulk density at the time of mitigation plant installation.

Evaluation Method: Verified by invoices

Contingency:
- Substitute species that are more suited to local conditions for species that had high mortality (> 80%)
- Irrigate at regular intervals during the growing season to reduce transplant stress
- Promote optimum growth by removing competing vegetation in plant pits
- Replant with stock that propagates quickly
- Re-grade to increase or decrease elevation to achieve wetland hydrology

Goal 2: Increase the habitat and water quality improvement functions within portions of the western wetland buffer area on the subject site.

Objective 1: Enhance 18,675 SF of buffer area removing invasive plant cover and installing native trees and shrubs.

Performance Standards for Objective 1

i) Survival of planted trees and shrubs will be a minimum of 80% after five years. Staged survivability requirements include:
- 100% survivability after Year 1
- Years 2-4 survivability is at a level to meet 80% by the end of Year 4
- 80% at the end of Year 5

Evaluation Method: Transect sampling, visual inspection

ii) Native tree and shrub canopy cover percentages (including volunteers) during the monitoring period will be:
- 20% or greater at the end of Year 1
- 40% or greater at the end of Year 3
- 80% or greater at the end of Year 5

Evaluation Method: Quadrat sampling

Alternative Method: Line-intercept method

iii) Invasive and non-native species will have 10% or less aerial coverage within the mitigation areas. Weeds include but are not limited to Japanese knotweed, Himalayan blackberry, and Scot's broom.

Evaluation Method: Quadrat sampling

Alternative Method: Line-intercept method

Contingency:
- Substitute species that are more suited to local conditions for species that had high mortality (> 80%)
- Irrigate at regular intervals during the growing season to reduce transplant stress
- Promote optimum growth by removing competing vegetation in plant pits
- Replant with stock that propagates quickly

Goal 3: Restore the habitat and water quality improvement functions within the portions of wetland buffer disturbed for road construction and stormwater management facilities.

Objective 1: Restore 10,878 SF of buffer area impacted by grading activities by installing native trees and shrubs.

Objective 2: Restore 1,400 SF of buffer area by installing native vegetation and removing and invasive plant species.

Performance Standards for Objectives 1 & 2

i) Survival of planted trees and shrubs will be a minimum of 80% after five years. Staged survivability requirements include:
- 100% survivability after Year 1
- Years 2-4 survivability is at a level to meet 80% by the end of Year 4
- 80% at the end of Year 5

Evaluation Method: Transect sampling, visual inspection

ii) Native tree and shrub canopy cover percentages (including volunteers) during the monitoring period will be:
- 20% or greater at the end of Year 1
- 40% or greater at the end of Year 3
- 60% or greater at the end of Year 5

Evaluation Method: Quadrat sampling/Alternative Method: Line-intercept method

iii) Invasive and non-native species will have 10% or less aerial coverage within the mitigation areas. Weeds include but are not limited to Japanese knotweed, Himalayan blackberry, and Scot's broom.

Evaluation Method: Quadrat sampling/Alternative Method: Line-intercept method

Performance Standard for Objective 2:

i) No point discharge, erosion, or channelization is to occur downstream of the stormwater outfall.

Evaluation Method: Visual Inspection during each monitoring visit

Contingency:
- Substitute species that are more suited to local conditions for species that had high mortality (> 80%)
- Irrigate at regular intervals during the growing season to reduce transplant stress
- Promote optimum growth by removing competing vegetation in plant pits
- Replant with stock that propagates quickly
- Modify stormwater outfall to reduce point discharge.

Goal 4: Preserve critical areas, buffers, and additional areas included as mitigation

Objective 1: Designate and sign the boundary of on-site wetlands, streams, and buffers as Protected Wetland Area

Performance Standards for Objective 1:

i) Permanent signs are installed according KZC

ii) Fencing installed around perimeter of buffer areas per KZC 90.50

Contingency: Replace or install missing signs as necessary

Evaluation Method: Sign inspection by engineer following installation or by the project biologist during the monitoring period

Monitoring

General

The monitoring period for this mitigation project will last for five years per KZC 90.55(4)(C)). After the completion of the Time Zero/As-built Report and subsequent Final Plat approval, the bond anniversary date will be set and the monitoring period shall begin. The mitigation sites will be monitored using standardized techniques and procedures described below for vegetation survival, vigor and growth of plant material, and the success of the mitigation plan overall. The monitoring strategy will include vegetation transects, vegetation quadrats, and photopoints unless otherwise approved by City Staff.

Vegetation Transects

Vegetation data will be collected within each mitigation area to help evaluate the success of the mitigation project. Transects will be established in each vegetation community during the Time Zero/As-built inspection to collect baseline monitoring data, however baseline data does not need to be included in the As-built Report. The number and length of the transects shall be determined in the field at the initiation of the monitoring program and shall be based on lengths that most accurately represent the composition of planted vegetation within the mitigation areas. A minimum of five transects shall be established within the mitigation planting areas. Total percent cover for trees, shrubs, and herbs (not including grasses) and percent cover for each individual species will be recorded in each quadrat.

Trees and shrubs that have been planted for the purpose of mitigation shall be visually evaluated to determine the rate of survival, health, and vigor of each plant within the sampling area, which will be recorded as Live, Stressed, Not found, and Dead during monitoring Years 1 and 2. For monitoring Years 3 through 5, plant species diversity and coverage will be recorded along each transect.

Vegetation Quadrats

Quadrats will be established at one or both ends of the transect, depending on site conditions, to monitor tree, shrub, herbaceous, and invasive percent cover; stakes, iron rebar, or other material will be situated so that each corner is clearly marked. Data collection will consist of species composition and percent cover, total percent plant cover, total percent woody cover (tree/shrub), total percent herbaceous cover (if applicable) for installed plants, as well as "volunteer" trees and shrubs. Percent cover of non-native/invasive plants such as Himalayan blackberry, scotch broom, reed canary grass will also be quantified. Quadrat number, location, and dimensions should be permanently recorded on the Transect PVC pipe. As an alternative to quadrat sampling, the line intercept monitoring method may be used. In addition to transect and quadrat sampling, the mitigation areas as a whole will be inspected and evaluated to generalize the overall level of success of the mitigation project.

Photopoints

Permanent photo points will be established using rebar and PVC pipe at locations representative of the mitigation project. Photographs will be taken from these photo points during each site visit to document the change over time of the mitigation site. These photos will provide indication of trends, current site conditions, and change over time and will be included in the yearly monitoring reports. An instruction sheet, with the direction and number of photographs to be taken, will be provided to allow continuity over time if monitoring personnel changes. In addition, photographs representing existing

Monitoring Schedule

An annual report describing and quantifying the level of success of the plan will be written and submitted to the City of Kirkland for review and approval. The monitoring strategy will consider, but is not limited to:

a) Plant species composition and cover values for vegetation in the planting areas
b) Survival rate of originally planted vegetation
c) Wildlife use
d) Indications of human disturbance

Time-Zero Report:

A Time Zero/As-built Report will be completed by the contractor and the consulting biologist when planting is finished. The Time-Zero Report will identify problems in obtaining materials, differences in sizes of materials than were originally called for, replacement materials, if necessary, and any other conditions that varied from the mitigation plan. If the installation is found to be significantly different from the prepared mitigation plan, the landscape contractor will be responsible for the creation of the As-built plan.

Baseline Data Collection

Permanent sampling points should be established and recorded during the Time Zero/As-built inspection to collect baseline monitoring data for total plant numbers, canopy cover, and photopoints. If baseline data collection is deferred to Year 1, plant counts and species composition may be incorrect compared with the actual installation and photo documentation cannot be adequately evaluated. Baseline information is only relevant for subsequent monitoring years and does not need to be included in the As-built Report.

Site Visits

Additional site visits may be necessary between the scheduled monitoring site visits, if problems are identified in the mitigation areas, to monitor actions taken by the responsible party.

Year 1-5:
Two site visits each year will be conducted for monitoring purposes, with the first visit occurring during spring in the form of a maintenance visit and formal monitoring visit during late summer/early fall (before leaf drop). Site visits in Year 1 will be completed to determine the initial survival of the shrubs and trees in the planting areas and if the site is meeting the performance standards. It will include a plant-by-plant inspection with a notation of any species that appear to be stressed, dead or delayed in initial growth. The responsible party will be notified of any problems identified within the mitigation areas. Photos will be taken of the site according to the established photo schedule. An on-site meeting between the monitoring biologist and the landscape maintenance contractor may be necessary to discuss additional maintenance requirements.

Site visit(s) in Years 3-5 will occur to determine minimum species diversity. A minimum of four native tree species and four shrub species will each comprise >10% cover within wetland enhancement and re-establishment areas.

The responsible party, landscape maintenance contractor and City of Kirkland will be notified of any dead plants that need replacement, additional plants needed to meet diversity standards, or other maintenance requirements.

If applicable, the first visit of Year 5 will be conducted to determine if the site is meeting the performance standards. The final visit will be in Year 5. At this time, the monitor will determine, with assistance from the appropriate regulatory agency, whether the site has met the performance standards and goals as identified in the Mitigation Plan. If it is determined that the site has met the goals, no additional work will be done. If it is determined that the site has not yet met the goals, a contingency plan meeting will be established between the developer, consulting biologist, contractor, monitor and appropriate regulatory agency, to modify the project so it will meet the performance standards. This could include additional plantings, replacement of plant species and/or an extension of the monitoring period.

Monitoring Reporting

Annual monitoring reports will be submitted to the developer and appropriate regulatory agency by the bonding anniversary date. The monitoring reports will include photographic documentation for each site visit, with photo descriptions and a plot-by-plot analysis of the vegetation sampling plots. The report will generalize the overall conditions and address the effectiveness of the Mitigation Plan in meeting the performance standards including the presence of wetland hydrology. If problems are identified within the mitigation areas during the spring site visits, the responsible party will be notified of the problems and actions to be taken in order to rectify the problems. Additional site visits may be required to ensure that the identified actions are implemented. If no action is taken to rectify the identified problems, the City of Kirkland will be notified of the problem, and apparent lack of response by the responsible party.

A final report will be completed by the bonding anniversary date of the final year and will include a summation and final analysis. If at that time, the performance standards have not been fully satisfied, but the monitor believes that the site is viable, growing and that the standards will be met, it should be noted. The final report will be the determination of whether the site is a success and whether the Maintenance Bond can be released.

Contingency Plan

If the mitigation plantings do not meet established performance goals for wetland hydrology, vegetative cover and plant survival, revisions to the plan will be made and implemented. Depending on the problems addressed, activities could include changes in soil or hydrologic conditions and/or the replanting of vegetation or modifying species selected for the initial planting. Specific Performance Standards have contingency options applied to them.

Performance Security

An assignment of funds or other financial guarantee shall be required to secure the mitigation plan. The financial guarantee shall be for 125 percent of the estimated completion costs of the mitigation plants and installation or as otherwise required by the City of Kirkland (KZC 90.145). The financial guarantee may only be released after the City has inspected the site, and the applicant's appropriate professional consultant has provided written confirmation that the mitigation installation, monitoring and performance standards have been met. If the performance standards have not been met, a contingency plan shall be implemented and must be successfully completed prior to the release of the financial guarantee.

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