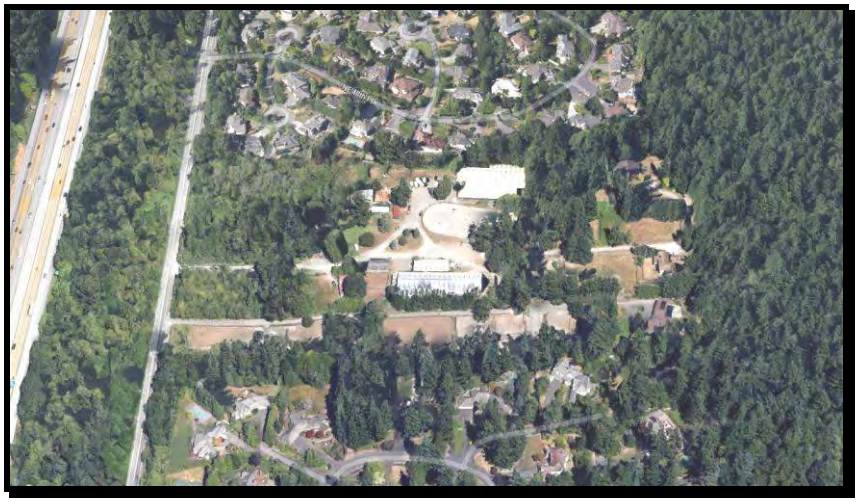
CRITICAL AREAS REPORT AND MITIGATION PLAN

BRIDLESTONE ESTATES

4626 116TH AVE NE
KIRKLAND, WASHINGTON 98125

TAX ID: 162505-9017, 162505-9021, 162505-9022, 162505-9031, 162505-9034



Prepared By:

Wetland Solutions, Inc.
Environmental Consultants

Kyle Legare
Wetland Ecologist/Certified Arborist/CESCL
18820 3rd Ave NE
Arlington, WA 98223

Phone: (425) 308-4628

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Executive Summary

The purpose of this document is to satisfy the City of Kirkland regulations that requires a Critical Areas Study according to KZC 90.40. The purpose of this report is to provide a conceptual mitigation plan for proposed critical area and buffer impacts associated with the project. A detailed mitigation planting plan (sheets M-1 to M-6) has been completed and should be reviewed in conjunction with this report.

The proposed 17.6 -acre project is a 35-lot 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. 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.

Three wetlands were identified as a result of this work referred to as Wetlands A, B, and C for the purposes of this report. 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 this 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. Buffer impacts are limited to the access road and stormwater outfall. A total of 47,628 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 4,762 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.

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1.0 Introduction

The proposed Bridlestone Estates Project is a 35 – Lot residential sub-division located within the City of Kirkland. A wetland delineation and critical area study was completed by Wetland Resources, Inc. in February 2013. This was followed by a Wetland/Stream Delineation Report Review completed by the Watershed Company in March 2013. Five recommendations were provided in the review letter that included revisions to wetland field data forms, wetland connections, and wetland boundaries. These revisions have been applied to the proposed project and are reflected in the information included in this mitigation plan.

Applicant:
KLN Construction, Inc.
19000 33rd Ave W, Suite 200
Lynnwood, WA 98036

1.1 Purpose

The purpose of this document is to satisfy the City of Kirkland regulations that requires a Critical Areas Study according to KZC 90.40. The purpose of this report is to provide a conceptual mitigation plan for proposed critical area and buffer impacts associated with the project. A detailed mitigation planting plan (sheets M-1 to M-6) has been completed and should be reviewed in conjunction with this report.

1.2 Statement of Qualifications

Kyle Legare has eleven years of experience working as a wetland ecologist in the northern Puget Sound area in over twenty different local jurisdictions as well as working with state and federal agencies. This work has included successfully completing wetland delineations, mitigation planting plans, mitigation installation management and monitoring, habitat management plans, wildlife studies, JARPA submittals, and project management. Kyle is also a Certified Arborist with the International Society of Arboriculture with a TRAQ endorsement and a Certified Erosion and Control Lead. He has nearly two years of experience as a water quality specialist for Island County, co-managing the surface water quality monitoring program in support of the local critical areas regulations and managing the Pollution Identification and Correction Program for Island County.

1.3 Statement of Accuracy and Assumptions

The information contained herein is, to our knowledge, correct and accurate. It should be recognized that the establishment of stream and wetland boundaries is an inexact science. Streams are subject to weather patterns, in addition to upstream and downstream activities. Wetlands are, by definition, transition areas, and wetland boundaries often change with time. The presence of wetland indicators may also vary depending on the time of year. Additionally, individual professionals may disagree on the precise location of wetland boundaries or the functions and values of a wetland. All stream and wetland boundaries, classifications, and buffer widths should be considered subject to change until reviewed and approved by the appropriate regulatory agencies with jurisdiction. The applicant intends to obtain jurisdictional approval before completing final site plans and/or beginning construction activities. Within the limitations of schedule, budget, and scope-of-work, we warrant that this study was conducted in accordance with generally accepted environmental science practices, including the technical guidelines and criteria in effect at the time of this study. The results and conclusions of this report represent the authors' best professional judgment based upon the information available to the

by the project proponent and information obtained during the course of this study. No other warranty, expressed or implied, is made.

1.4 Proposed Development Project

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, and sensitive area protection areas.

1.4.1 Description of the Development Site

The proposed project is a residential subdivision that is located at 4626 116th Ave NE, Kirkland, Washington. The project includes an assemblage of five existing parcels currently zoned RS 35 that account for 17.6-Acres and include Tax ID numbers:

Tax ID	Size (Acres)	Current Zone
• 162505-9017	2.99	RS 35
• 162505-9021	3.66	RS 35
• 162505-9022	4.83	RS 35
• 162505-9031	4.95	RS 35
• 162505-9034	1.17	RS 35

The entire site is located within WRIA 8 and the Yarrow Creek sub-basin. The site is located in Northern King County, within the jurisdiction of the City of Kirkland (see Figure 1, Vicinity Map). 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.

The subject parcels have been previously developed with single family residences, accessory buildings, driveways, and associated utilities. The west-central portion of the site has been used for equestrian purposes with fenced pasture, riding areas, and paddocks visible from aerial photography and verified through site investigations (see Appendix A for survey overlay with aerial photography). The remaining site area is either lawn or mixed forest. The mixed forest within the upland area appears to be second or third growth trees, with Douglas fir representing the dominant species.

Figure 1: Vicinity map for the project site.

2.0 Methods and Definitions

2.1 Office Research

The analysis of the resources on the subject property and associated off-site area includes preliminary office research and site-specific investigations with respect to existing vegetation communities, hydrology patterns, and soils. Public resource documents have been reviewed to provide initial site information regarding hydrology, soils, and vegetation. Sources include:

- **Aerial photographs**: USGS, 2002; Google Earth Imagery, 2007-2012, City of Kirkland 2014.
- **Topographic maps**: City of Kirkland two foot contour isolines, retrieved July 22, 2014. City of Kirkland GIS Services.
- **Soil Survey of King County Area, Washington**: USDA, Natural Resource Conservation Service (NRCS), Current web soil survey; Soil Survey Geographic Database for King County Area (wa663).

- **NWI, City of Kirkland Sensitive Areas Map**: U.S. Fish & Wildlife Service, 2003; National Wetlands Inventory (NWI) website, US Department of the Interior, Fish & Wildlife Service, St. Petersburg, FL; City of Kirkland, 2013, Sensitive Areas Map.
- **Hydrology Map**: City of Kirkland, Sensitive Areas Map, July 9, 2013.
- **Salmonscape Fish Distribution Maps:** Washington Department of Fish and Wildlife, Salmonscape website. Retrieved August 18, 2015.

2.2 Site Investigation

Wetland Resources, Inc. completed a wetland delineation of the five parcels in February 2013. The Watershed Company, Inc. provided a third party review of this work in March 2014, documenting their findings and recommendations a wetland/stream delineation report review letter. The wetland delineation report, rating forms and associated wetland determination forms completed by Wetland Resources, Inc. These documents are on file at the City of Kirkland and should be reviewed in conjunction with this report. Wetland and stream determinations were made based on the following criteria.

2.2.1 Wetland Determination

When all three parameters (vegetation, hydrology, and soils) have been examined at an observation point, a wetland determination can be made. A positive determination requires that all three parameters be positive for a wetland area to be present. If any one of the three is not positive, the observation point is not within a wetland. If all three parameters are met at all observation points, then the entire area is a wetland. If one or more parameters are not met at some observation points, then some of the area is wetland and some is not, and the boundary must be determined by additional sampling.

Site investigations were conducted to examine the presence or absence of hydric soils, wetland hydrology, and hydrophytic vegetation following the methodology described in the *Interim Regional supplement to the corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (ACOE, 2010). Hydric soils when identified were described using the *field Indicators of Hydric soil sin the United States* (USDA, 2010). Wetland categories were rated using the *Department of Ecology's Washington State Wetland Rating System for Western Washington* (Hruby, 2004). Critical areas within 300' of the property line were assessed using available natural resource maps and visually in the field when possible. Photos were taken that were representative of each critical area and its buffer, when identified.

2.2.2 Stream Determination

The determination for the presence or absence of any streams on-site was completed based on the water typing criteria in the WAC 222-16-030 and KZC 90.30(16), which includes: channel width, gradient, substrate type, flow, impoundment, fish, diversion, and other factors.

3.0 Results

The following is a summary of the results of both the office research and on-site investigation. The wetland and stream delineation was completed in February 2013 by Wetland Resources, Inc. The Watershed Company provided a third party wetland/stream delineation report review in March 2013.

Kyle Legare of KLN Construction completed multiple site visits in fall/winter 2013 to 2014 and in the summer of 2014 to assess current site conditions, which included existing vegetation, general topography, habitat features, and existing structures were also noted at this time. Representative site photographs are included in Appendix A.

3.1 Background Research

The National Wetlands Inventory (NWI) and the City of Kirkland sensitive areas map identify two wetland units on the subject site and one immediately south of the site. A stream segment that parallels 116th Ave NE on the east side of the road flowing from north to south has been mapped on the subject property. The stream is identified as a fish bearing water by both the Washington Department of Fish and Wildlife and the City of Kirkland. The City of Kirkland map indicates the stream segment on and immediately upstream and downstream of the subject site as fish bearing. The newly updated WDFW Salmonscape indicates that the entire reach of Yarrow Creek up to NE 60th Street has salmonids present.

Three soil map units have been mapped on-site by the NRCS; (AgC) Alderwood gravelly sandy loam, 6-15% slopes, (AgD) Alderwood gravelly sandy loam, 15-30% slopes, and (No) Norma sandy loam (see Figure 4). These soil map units have components that meet the criteria for hydric soils, with Norma sandy loam specifically being a poorly drained soil.

Aerial photography (1936, 1990, 2002, 2011, and 2014) was used to assess historical and current land cover. Two homes appear to have been present on the subject property in 1936, with approximately 50% of the site area being cleared. It also appears that there were two access driveways across Wetland B. The Yarrow Creek channel can vaguely be seen running parallel to 116th Ave NE.

Since 1990, land use on the site appears to have remained much the same. There appears to be an increase in overall canopy cover associated with the maturation of existing vegetation over the 24 year period. The livestock paddocks, arenas, barns, and associated accessory buildings were present in the 1990 photographs and are largely unchanged today.

3.2 On-site Critical Areas Determination

A wetland/stream delineation was completed in February 2013 by wetland Resources, Inc. At that time all wetland boundaries were marked in the field and professionally surveyed. The Watershed Company, Inc. completed a wetland delineation review in March 2013. Five recommendations were provided in the review letter that included:

1. Expand the delineated boundary of Wetland A. *This was completed in the field by Kyle Legare and subsequently surveyed.*
2. Revise the wetland field data form for Wetland A to score less than 22 points, qualifying for a Type 3 wetland. *The form has been revised and the corresponding information is reflected in this report and on all plan sheets.*
3. Depict the southern wetland unit as Wetland C and note as a separate unit. *This has been noted in this report.*
4. Update the wetland delineation map to show corrections to Wetlands A and C. *Both wetland areas have been revised and are called out correctly on the Sensitive Areas Map.*

5. If any direct wetland impacts are proposed, the applicant is advised that Ecology wetland rating forms will be required for state and Federal permitting. *Wetland fill will be required for the proposed access road and therefore Ecology wetland rating forms will be provided for the state and Federal permit application.*

Three wetlands were identified as a result of this work referred to as Wetlands A, B, and C for the purposes of this report. The following is a summary of the identified wetlands in regards to physical characteristics, existing functions and values, and regulatory requirements, which are used to help consider mitigation measures. The delineation report should be reviewed for details regarding methodology, rating forms, and conclusions.

3.2.1 Wetland A Determination Summary

Wetland A is located along the north property line in the eastern portion of the site. The wetland was identified as a small depressional system (2,620 SF on-site) that flows from northeast to southwest. Based on further review and data from the topographic survey, the wetland may be classified as a slope system with the outfall located at the lowest point of the wetland area. This does not affect the rating of the wetland and is only offered as additional information regarding the system.

Hydric Soil Assessment
Soils samples were assessed and reported in the delineation report completed by Wetland Resources, Inc. Soils within the wetland boundary displayed a chroma 1 matrix within the upper 6 inches followed by a horizon with 10YR 5/4 loamy sand with redoximorphic features present.

Hydrology Assessment
Saturation to the surface, shallow ponding, and surface runoff hydrologic indicators were observed within the delineated wetland boundaries during KLN's follow – up site visit in January 2014. The hydrology appears to be a result of shallow groundwater and subsurface flow with surface flow draining to the southwest and into an existing culvert. The eastern wetland boundary near the north property line is at an elevation of 410 FT and continues downhill to 400 FT near the existing culvert. There is a natural drainage feature extending off-site flowing from northeast to southwest.

Hydrophytic Vegetation Assessment
Vegetation throughout the majority of the wetland area on and off site is dominated by salmonberry, creeping buttercup, red alder, black cottonwood, and some Himalayan blackberry. This vegetation transitions quickly within the buffer area to big leaf maple and Douglas fir canopy cover.

Existing Functions and Values
Wetland A provides moderate overall functions and values based on the size, location, and condition of the wetland system. Wetland A provides very good habitat and refuge for local wildlife. The wetland corridor connects to the Bridle Trails State Park, which is forested with mature trees and shrubs. The wetland provides low to moderate stormwater control functions, with limited area available for storage and detention. Wetland A provides moderate to high water quality improvement functions based on the opportunity (surface runoff received residential and agricultural sources) and ability to filter and infiltrate water with the existing vegetation and soil characteristics.

Regulatory Requirements

The wetland received an overall score of 21 points using the City of Kirkland's Wetland Field Data Form, which qualifies for a Type 3 wetland. Type 3 wetlands require a standard 50 – foot buffer in primary basins per KZC 90.45(1). Structures shall be set back at least 10 - feet from the designated or modified wetland buffer (KZC 90.45(2)).

3.2.2 Wetland B Determination Summary

Wetland B is a large depressional system located along the west property line of the subject site. The wetland is approximately 2.4 – Acres in total area including off-site area, with 41,216 SF of wetland area located on the subject property. The wetland is bounded by topography to the east, access driveways to the south, existing development to the north, and 116th Ave NE to the west. Yarrow Creek flows south through the western portion of the wetland area, providing for the conveyance of surface water from the wetland area.

Hydric Soil Assessment
Soils within the wetland were reported as having a chroma 1 A horizon followed by a sandy loam chroma 2 B horizon.

Hydrology Assessment
Saturation to the surface, shallow ponding, a high water table hydrologic indicators were observed within the delineated wetland boundaries during multiple site visits made by KLN staff in the fall and winter 2013/2014. Yarrow Creek enters the wetland unit near the northwest corner of the City owned parcel adjacent to the Bridlestone Estates assemblage. The wetland likely provides hydrologic input for Yarrow Creek.

Hydrophytic Vegetation Assessment
The wetland is forested with a mix of black cottonwood, red alder, Pacific willow, Scouler's willow, Douglas spiraea, salmonberry, skunk cabbage, water parsley, and giant horsetail. These species were observed throughout the wetland and represent dominant cover.

Existing Functions and Values
Wetland B provides moderate to high overall functions and values based on the size, location, and condition of the wetland system. Some of the existing factors that negatively influence the functions and values include the lack of a functional buffer along the western boundary and fragmentation from existing access driveways through the wetland.

Regulatory Requirements
The wetland qualifies for a Type 2 wetland. Type 2 wetlands require a standard 75 – foot buffer in primary basins per KZC 90.45(1). Structures shall be set back at least 10 - feet from the designated or modified wetland buffer (KZC 90.45(2)).

3.2.3 Wetland C Determination Summary

Wetland C is located in the southwest corner of the site and was originally included as part of the Wetland B unit. The wetland is now identified as a separate unit based on the wetland delineation review completed by The Watershed Company, Inc. and includes 3,792 SF of area on-site. The wetland is a slope system that is associated with Yarrow Creek. Wetland C extends off-site to the south (see Appendix A for approximate location) flowing along 116th Ave NE.

Hydric Soil Assessment
Soils within the wetland were reported as having a chroma 1 A horizon followed by a sandy loam chroma 2 B horizon.

Hydrology Assessment
Saturation to the surface and runoff was observed throughout both the on and off-site portions of Wetland C during fall and winter 2013/2014 site visits completed by KLN staff. Yarrow Creek is a perennial stream that flows from north to south through the wetland.

Hydrophytic Vegetation Assessment
The on-site portion of Wetland C is dominated by reed canary grass, creeping butter cup, and three weeping willows. The off-site portion of the wetland is also located adjacent to 116th Ave NE, however is dominated by black cottonwood, red alder, Pacific willow, salmonberry, creeping buttercup, and water parsley.

Existing Functions and Values
Wetland C provides low to moderate overall functions and values based on the size, location, and condition of the wetland system. Some of the existing factors that negatively influence the functions and values include the lack of a functional buffer along the western boundary, fragmentation from existing access driveways through the wetland, and encroachment from equestrian activities to the east. The majority of buffer area on-site has been severely impacted from past clearing and grading and current livestock use.

Regulatory Requirements
The wetland qualifies for a Type 2 wetland. Type 2 wetlands require a standard 75 – foot buffer in primary basins per KZC 90.45(1). Structures shall be set back at least 10 - feet from the designated or modified wetland buffer (KZC 90.45(2)).

3.2.4 Stream (Yarrow Creek) Determination Summary

One stream (Yarrow Creek) was identified and flagged on the western portion of the site flowing from northeast to north to south through the site by Wetland Resources, Inc. The stream has been mapped by the City of Kirkland, with the on-site reach identified as a Class A. The stream is perennial and has been mapped by both WDFW and the City of Kirkland as being fish bearing, which meets the requirements for a Class A Stream per KZC 90.30(4). Class A streams require a standard 75-foot buffer with a 10-building setback per KZC 90.90(1).

The stream corridor has been degraded by land development throughout the majority of the stream segment. The stream continues south through the City of Bellevue and eventually drains to Lake Washington. The stream flows through urbanized areas and adjacent to paved roadways, with limited areas of native vegetation. The stream segment immediately north of the subject site has been piped along 116th Ave NE.

3.2.5 Stream and Wetland Buffer Assessment

Overall, the on-site buffers are vegetated with either a mixed overstory of black cottonwood and red alder with an understory of salmonberry and Himalayan blackberry or are maintained as lawn or pasture for horses. The enhancement of the buffer areas for Wetland B and C will include the installation of native trees and shrubs that include plants that are considered pioneering species or display faster than

average growth rates. These biotic characteristics will help the plants compete with invasive plant cover and reach a closed native canopy system vegetation community. In addition, a dense planting scheme will be employed to create a physical barrier that will help minimize encroachment into the buffer.

3.3 Off-Site Critical Areas

Yarrow Creek and associated Wetlands B and C continue off-site to the north and south. Wetland A extends off-site to the north and northeast. The off-site areas have been identified on the critical area map in Appendix A. These areas appear to be largely defined by the existing topography. Additional wetland areas have been observed on the west side of 116th Ave NE adjacent to the subject site. No other wetland or streams have been mapped within 300-feet of the subject site.

4.0 Proposed Development Activities

The proposed residential development has been designed to avoid and/or 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. Buffer impacts are limited to the access road and stormwater outfall structure. A total of 47,628 SF of wetland area is located on the subject site. Per KZC 90.55(2) no more than 10 percent of the total wetland area or 4,762 SF for the project site, may be modified. The specific proposed impacts are discussed in the following sections.

4.1 Impacts Associated with New Access Road and Road Frontage

A new access road is proposed to be constructed on the subject site to serve the proposed development. The road will connect to 116th Ave NE in the southwest corner of the subject site and will result in permanent wetland and buffer impacts, as well as impacts to the stream channel.

The access road (including stormwater management) will have 1,253 SF of permanent wetland fill, 2,448 SF of wetland paperfill, 7,900 SF of permanent buffer impact, and 10,878 SF of temporary buffer impact. The temporary buffer impact will occur in areas that do not have any existing native woody vegetation. These areas are currently used as horse pasture or are part of the existing paved driveway. A retaining wall is proposed along the road section that crosses Wetland C to help reduce wetland and stream impacts.

The location of the new road is primarily influenced by the City's interpretation of KZC 90.55(2), which states that *no land surface modification shall occur and no improvement* shall be located in a Type 2 wetland, except as provided in KZC 90.55(a), which further states that the modification shall not affect more than 10 percent of the wetland on the subject property. To stay under 10 percent of the total wetland area (including paperfill) affected by the project, the access road was located south of the existing paved access road and further into Wetland C. This provides the opportunity to restore buffer area for the wetland, provides additional wetland re-establishment, and provides a minimum 50 – foot buffer for Wetland B. The larger buffer will help increase local functions and values to Wetland B through the re-establishment of a diverse native vegetation community.

The combination of permanent fill and paper fill is 3,952, which is 8.3% of the total wetland area on-site. The area of Wetland C located on-site has been historically degraded through clearing, grading, channelization, and regular impacts from livestock (see Appendix A for photographs). The 7,900 SF of buffer will be permanently impacted from the new road alignment and stormwater bioswale treating road runoff.

In addition, 251 SF of Wetland B will be permanently impacted along 116th Ave NE for the construction of the required equestrian path. The frontage improvement area outside of the wetland fill has been previously converted to roadside gravel shoulder. This area is considered buffer area and therefore not included in the buffer impact calculation. Rock gabion baskets have been proposed along the frontage improvements north of the proposed access road, extending north to the existing gravel driveway. The purpose of the gabion baskets is to eliminate the need to grade out the fill slope and reduce overall wetland/buffer impacts. The gabion baskets will tie into the proposed retaining wall for associated with the new access road. Again, the combination of the gabion baskets and retaining wall helps reduce wetland and buffer impacts associated with the project.

The proposed stream crossing has been revised to include a 12-foot wide hollowcore plank by 2 – foot tall box with reinforced concrete walls that will be placed under the new road and in line with the existing stream channel. The location of the hollowcore plank was revised to maintain the existing channel, while still providing adequate conveyance and connectivity to critical areas. The size and volume of the proposed crossing was redesigned to meet Washington Department of Fish and Wildlife design criteria for fish passage and flow volumes. The proposed design will be a substantial upgrade to the existing undersize culvert that is under the current road alignment. The size of the proposed hollowcore plank crossing will help increase the opportunity for both fish and wildlife movement along the stream/wetland corridor. The designed stream crossing allows for native stream substrate to remain in place, avoiding or reducing impacts to the existing stream condition.

4.1.1 Wetland Modification Review Criteria per KZC 90.55

Kirkland Zoning Code 90.55 requires an assessment of the following criteria prior to allowing for any wetland land surface modification. The following is a summary of how each criterion is met through the proposed development activities and mitigation measures.

a. It will not adversely affect water quality;

The proposed project will likely result in a net improvement of water quality (nutrients, bacteria, temperature) for both the on-site wetlands and stream. Existing conditions include the presence of active horse pasture immediately adjacent to Wetlands A, B, and C, which provide a potential source for fecal coliform, nitrogen, and phosphorus. These water quality parameters are commonly found to be sources of water quality impairment per state water quality standards. The proposed project will eliminate this source input from the surface and shallow sub-surface water draining towards the on-site wetlands. Additionally, the enhanced buffer will provide greater water quality improvement functions, filtering and reducing surface water turbidity created from overland flow over the existing gravel driveway and overgrazed pasture areas.

b. It will not adversely affect fish, wildlife, or their habitat;

No adverse impacts to fish, wildlife, or associated habitat is expected from the proposed development. The proposed mitigation measures that include wetland re-establishment, wetland enhancement, and buffer enhancement as well as relocation of existing roadways should result in a net increase in habitat

and biological support functions and values. The proposed access road will be located at least 50-feet south of the boundary of Wetland B, which will provide additional buffer habitat and screening functions than what is currently available on-site. The relocation of the stream channel away from 116th Ave NE will also help increase noise and visual screening functions. The enhancement of the wetland and buffer areas will also provide vegetative cover for wildlife movement/migration on-site.

c. It will not have an adverse effect on drainage and/or storm water detention capabilities;
The proposed wetland mitigation will result in a net increase in wetland area and thereby increase available stormwater storage area. Specific stormwater runoff calculations have been completed and provided to the City.

d. It will not lead to unstable earth conditions or create an erosion hazard or contribute to scouring actions;
No erosion hazard or scouring action is anticipated as a result of the proposed development activities. No steep slopes or erosion hazard areas have been identified within or adjacent to the proposed impact areas. Standard best management practices will be implemented during site construction to minimize short term impacts. Regular sampling in accordance with an approved stormwater pollution prevention plan and construction stormwater general permit will occur to monitor surface water quality during construction activities.

e. It will not be materially detrimental to any other property or the City as a whole;
The proposed mitigation measures for the entire project should result in an increase to both aesthetic and habitat support functions for the subject property and for upstream and downstream properties connected to the existing riparian corridor.

f. It will result in land surface modification of no more than ten (10) percent of the wetland on the subject property;
The proposed wetland impacts are limited to 1,504 SF of permanent fill and 2,448 SF of wetland paperfill. Combined the total impact is 3,952 SF or 8.3% of the total wetland area on-site. Actual land surface modification will result in 1,504 SF of wetland area or 3.2% of the on-site area.

g. Compensatory mitigation is provided in accordance with the table in subsection (4) of this section;
The proposed compensatory mitigation measures will exceed the required mitigation outlined in the table within KZC 90.55(4). This will include 6,173 SF of wetland re-establishment, 2,610 SF of wetland enhancement, 10,878 SF of buffer restoration, and 18,675 SF of wetland buffer enhancement.

h. Fill material does not contain organic or inorganic material that would be detrimental to water quality or fish and wildlife habitat;
Because the purpose of the proposed fill is for new road construction, the fill material will be required to meet engineering specifications for sub-grade. This will not include organic material, nor any material that would be detrimental to water quality and wildlife habitat.

i. All exposed areas are stabilized with vegetation normally associated with native wetlands and/or buffers, as appropriate; and
All exposed soils during construction activities will be stabilized in accordance with the Surface Water Pollution Prevention Plan (SWPPP). The wetland, stream, and buffer areas located adjacent to the

proposed roadway will be either restored or enhanced with native vegetation as part of the mitigation measures (please see the associated mitigation planting plan, M-1 to M-6 for planting locations).

j. There is no practicable or feasible alternative development proposal that results in less impact to the Type 2 wetland and its buffer.

The proposed site design has minimized impacts to wetlands and associated buffers to the greatest extent practicable. The existing roadway will be shifted south to create a larger buffer for Wetland B. The proposed permanent wetland impact will occur in the most degraded wetland area on-site. The proposed road is necessary to provide access to the proposed development area.

4.1.2 Wetland Buffer Modification Review Criteria per KZC 90.60

Kirkland Zoning Code 90.60 requires an assessment of the following criteria prior to allowing for any buffer land surface modification. The following is a summary of how each criterion is met through the proposed development activities and mitigation measures. An improvement or land surface modification shall be approved in a wetland buffer only if:

1) It is consistent with *Kirkland's Streams, Wetlands and Wildlife Study* (The Watershed Company, 1998) and the *Kirkland Sensitive Areas Regulatory Recommendations Report* (Adolfson Associates, Inc., 1998);

The referenced document above identifies a number of existing problems (as identified in 1998), opportunities, and management recommendations for the Yarrow Creek Basin. Some of these included issues with fish passages, improving wildlife corridors, removing invasive vegetation, removing non-point water quality sources, improving buffer and instream habitat. The proposed project will remove the existing northern access road and culverts and re-establish wetland area. Mitigation measures will also re-establish a native plant community in the southwest corner of the project site. This will expand the potential wildlife corridor and cover and provide a better connection to the wetland area north of the proposed access road. Water quality leaving the site should improve due to the removal of non-point pollution sources associated with the presence of the horses.

2) It will not adversely affect water quality;

No adverse effect to water quality is expected from the proposed buffer modification. The proposed project will require the permanent protection of all wetland and buffer areas on the subject property. Additionally, mitigation measures will help re-establish wetland area and enhance existing wetland and buffer area. The mitigation areas on the subject site are currently used as horse pasture and have existing driveways bisecting them. Removing the non-point pollution source from horse manure should have a positive impact on surface water quality draining the area. The addition of a native plant community within will also help increase water quality improvement functions.

3) It will not adversely affect fish, wildlife, or their habitat;

The proposed compensatory mitigation is anticipated to result in a net increase in fish and wildlife habitat on-site and downstream. The re-establishment of a native vegetation community will help increase local habitat support functions including foraging, roosting, and shading.

4) It will not have an adverse effect on drainage and/or storm water detention capabilities;

The proposed project activities will not have an adverse effect on drainage or stormwater detention capabilities. The establishment of wetland and buffer area with native plant cover in place of over-

grazed pasture and lawn areas will help provide increased water quality improvement functions as well as increase stormwater attenuation.

5) It will not lead to unstable earth conditions or create an erosion hazard;
No erosion hazard or scouring action is anticipated as a result of the proposed development activities. No steep slopes or erosion hazard areas have been identified within or adjacent to the proposed impact areas.

6) It will not be materially detrimental to any other property or the City as a whole;
The proposed mitigation measures for the entire project should result in an increase to both aesthetic and habitat support functions for the subject property and for upstream and downstream properties connected to the existing riparian corridor.

7) Fill material does not contain organic or inorganic material that would be detrimental to water quality or to fish, wildlife, or their habitat;
Because the purpose of the proposed fill is for new road construction, the fill material will be required to meet engineering standards for sub-grade. This will not include organic material, nor any material that would be detrimental to water quality and wildlife habitat.

8) All exposed areas are stabilized with vegetation normally associated with native wetland buffers, as appropriate; and
All exposed soils during construction activities will be stabilized following the Surface Water Pollution Prevention Plan (SWPPP). The wetland, stream, and buffer areas located adjacent to the proposed roadway will be either restored or enhanced with native vegetation as part of the mitigation measures (please see the associated mitigation planting plan, M-1 to M-6 for planting locations).

9) There is no practicable or feasible alternative development proposal that results in less impact to the buffer.
The proposed site design has minimized impacts to wetlands and associated buffers to the greatest extent practicable. The existing roadway will be shifted south to create a larger buffer for Wetland B. The proposed permanent wetland impact will occur in the most degraded wetland area on-site. The proposed road is necessary to provide access to the proposed development area and has been minimized to the greatest extent practicable.

4.1.3 Stream Culvert Review Criteria per KZC 90.115

Kirkland Zoning Code 90.115 regulates the placement of culverts within stream channels. KZC states "Culverts are not permitted in streams except as specified in [this] section. The Planning Official shall review and decide upon an application to place a stream in a culvert under an access drive, driveway, or street. Decisions made under this subsection may be appealed in accordance with KZC 90.160.
The Planning Director will review and decide upon proposals to place streams in culverts, other than as specified above, using Process I, described in Chapter 145 KZC. A stream shall be allowed to be put in a culvert only if:" the following items are met. Additionally, the applicant has applied for a HPA through the Washington Department of Fish and Wildlife, which will also be reviewed for adequate fish passage, sizing, and potential impacts.

1. Placing the stream in a culvert is necessary to provide required vehicular, pedestrian, or utility access to the subject property. Convenience to the applicant in order to facilitate general site design shall not be considered; and

The proposed hollowcore plank span (12' x 2') is necessary for the new access road that will service the development. Due to the length and orientation of the on-site wetlands and stream channel, the crossing of the stream is unavoidable. The proposed crossing design minimizes impacts to the greatest extent feasible, while still providing fish passage and adequate flood volume.

2. The applicant submits a plan prepared by a qualified professional approved by the Planning Official that shows the culvert and implementation techniques that meet the following criteria:

a. There will be no adverse impact to water quality;

The re-establishment of wetland area and enhancement of wetland and buffer areas on-site should help improve water quality over time. The installation of the hollowcore plank crossing is an upgrade to an existing culvert that is present under the south access driveway on the site. The new crossing will improve the connection between Wetlands B and C and help convey the Yarrow Creek channel. The proposed crossing will be a substantial improvement for water conveyance and fish access.

b. There will be no adverse impact to fish, wildlife, and their habitat;

The proposed hollowcore plank crossing is not anticipated to have an adverse impact on fish, wildlife, or associated habitat. The proposed wetland re-establishment, stream crossing, and buffer enhancement will result in an increase in native plant cover and connectivity to other wetlands. The size of the new stream crossing provides better access and opportunity for fish movement within the riparian corridor.

c. There will be no increase in the velocity of stream flow, unless approved by the Planning Official to improve fish habitat;

The proposed mitigation and grading plans increase the sinuosity of the existing stream channel, which should help mimic natural conditions. This should also help ensure that the velocity of the stream flow will not increase. Specific flow calculations have been completed by Triad Associates in response to review comments.

d. There will be no decrease in flood storage volumes;

The proposed compensatory mitigation includes approximately 6,173 SF of wetland re-establishment, which should actually increase flood storage volume. Additionally, the proposed culvert will increase the channel area that currently exits under the paved driveway.

e. Neither the installation, existence, nor operation of the culvert will lead to unstable earth conditions or create erosion hazards or contribute to scouring actions; and

The proposed culvert installation and associated development activities will follow engineering standards and best management practices. The proposed culvert is not anticipated to lead to unstable earth conditions or increased erosion.

f. Neither the installation, existence, nor operation of the culvert will be detrimental to any other property or to the City as a whole.

The proposed road with associated stream crossing will not be materially detrimental to any other property in the subject area. The proposed road will replace two existing driveways used to access the property and therefore open space area adjacent to 116th Ave NE will increase. The compensatory

mitigation area will increase net wetland area, buffer quality, and stream channel length on the subject site, which should result in an overall improvement of local functions and values associated with these critical areas.

4.1.4 Impacts Associated with Stormwater Bioswale

Kirkland Zoning Code 90.45(4)(a)-(h) regulates water quality facilities within wetland buffers. The following items (a) through (h) are taken directly from KZC with a written response regarding how the project meets each provision.

a. It will not adversely affect water quality;

The proposed bioswale is proposed and designed to treat stormwater runoff prior to any water reaching critical areas. Stormwater runoff is currently flowing untreated into the wetland and buffer areas. The proposed bioswale is not anticipated to adversely affect water quality.

b. It will not adversely affect fish, wildlife, or their habitat;

The impact from the footprint of the bioswale will be mitigated by substantially enhancing the wetland/stream buffer on-site. The removal of horses within the buffer, re-establishment of a diverse native plant community, and treatment of stormwater will help increase local functions and values. The proposed bioswale is not anticipated to adversely affect fish, wildlife, or habitat.

c. It will not adversely affect drainage or storm water detention capabilities;

The installation of the bioswale should not have any adverse effect on drainage or stormwater detention capabilities on-site. The installation of a bioswale will also improve the existing stormwater drainage system.

d. It will not lead to unstable earth conditions or create erosion hazards or contribute to scouring actions;

The installation of the bioswale is not anticipated to result in any unstable earth conditions or erosion hazards. The King County Surface Water Design Manual (KCSWDM) sets clear design guidelines to prevent any unstable earth conditions. The KCSWDM states that design stormwater velocities shall be less than 3 feet per second in order to prevent erosion and/or unstable earth conditions. However, our design produces little to no stormwater velocity (less than 0.01 feet per second).

e. It will not be materially detrimental to any other property in the area of the subject property or to the City as a whole, including the loss of significant <u>open space</u> or scenic vistas;

The establishment of a wetland and stream protection area will restore native open space on the subject site. The re-establishment of a diverse native plant community will result in an increase in functions and values that will benefit both on-site and adjacent downstream landowners. The location of the bioswale immediately adjacent to the proposed access road will help provide a transition into the wetland and stream protection area. No impact to scenic vistas is anticipated.

f. The existing buffer is already degraded as determined by a qualified professional;

As discussed in the critical areas study and mitigation plan, the existing buffer is degraded. The on-site buffer has a paved driveway and fenced horse pasture, with no tree and shrub vegetation present. The horse pasture is overgrazed and provides little to no functional support for the adjacent wetland and stream area.

g. Its installation would be followed immediately by enhancement of an area equal in size and immediately adjacent to the affected portion of the buffer; and
The entire remaining wetland/stream buffer on-site will be enhanced by removing existing fencing, and installing native trees, shrubs, and woody debris. The buffer enhancement area will be more than twice the size of the impact area.

h. Once installed, it would not require any further disturbance or intrusion into the buffer.
After the installation of the bioswale, no further disturbance or intrusion to the adjacent buffer will be necessary.

4.1.5 Impacts Associated with Stormwater Outfall

The proposed stormwater management system includes a vault located outside of the eastern buffer for Wetland B. The outfall for the vault has been designed to be piped through a portion of the buffer and discharged through a level spreader near Wetland B, which result in 1,400 SF of temporary buffer impact. The pipe system design is consistent with Plate 25 "Piped Systems within Buffer Setbacks) in the Kirkland Zoning Code. Kirkland Zoning Code 90.45 states that "Surface discharge of storm water through wetland buffers and buffer setbacks is required unless a piped system is approved pursuant to this section. Storm water outfalls (piped systems) may be located within the buffer setback specified in subsection (2) of this section (90.45) and within the buffers specified in subsection (1) of this section only when the Public Works and Planning Officials both determine, based on a report prepared by a qualified professional under contract to the City and paid for by the applicant, that surface discharge of storm water through the buffer would clearly pose a threat to slope stability, and if the storm water outfall will not:

a. Adversely affect water quality;
The proposed stormwater outfall is not anticipated to adversely affect water quality. The quality and volume of water discharging will be managed by the proposed detention system in accordance with local and state standards.

b. Adversely affect fish, wildlife, or their habitat;
The temporary buffer impacts associated with the proposed stormwater outfall will be fully restored through the installation of native vegetation. The outfall location is located in an area that is currently colonized with some invasive vegetation (primarily Himalayan blackberry). The invasive plant cover will be removed and maintained in this area as part of the mitigation measures. The proposed outfall is not anticipated to have an adverse effect on fish, wildlife, or associated habitat areas.

c. Adversely affect drainage or storm water detention capabilities;
No adverse effect to drainage or stormwater detention capabilities is anticipated from the proposed stormwater outfall. The location of the outfall has been placed to help provide recharge to Wetland B and the associated stream and avoid destabilization of adjacent slopes.

d. Lead to unstable earth conditions or create erosion hazards or contribute to scouring actions; and
No erosion hazard or scouring action is anticipated as a result of the proposed development activities. No steep slopes or erosion hazard areas have been identified within or adjacent to the proposed impact areas. Standard best management practices will be implemented during site construction to minimize short term impacts. Regular sampling in accordance with an approved stormwater pollution prevention plan and construction stormwater general permit will occur to monitor surface water quality during

construction activities. The piped system will convey stormwater over slopes to a level spreader discharge area where slopes flatten out.

e. Be materially detrimental to any other property in the area of the subject property or to the City as a whole, including the loss of significant open space or scenic vistas.
The proposed stormwater outfall will be fully restored by removing any invasive plant species and installing native vegetation. The proposed restoration will be in conjunction with the larger mitigation project that includes wetland and buffer enhancement and wetland re-establishment.

4.2 Assessment of Probable Cumulative Impacts to Critical Areas

Cumulative impacts to critical areas and their associated buffers for the proposed project can be difficult to assess on a small scale. Impacts associated with this project are limited to a new access road and road improvements being constructed adjacent to existing critical areas. The buffer impact is relatively minor and should not result in a decrease in functional value to the stream corridor or wetland area.

The on and off-site riparian corridor immediately adjacent to the project site varies from good to poor condition based on the presence of culverts, road crossings, and existing development. The biological and structural diversity that is expected to result from the proposed mitigation measures will help to maintain current functions and values.

4.3 Alternative Analysis

A variety of development alternatives exist for the subject property. For the purposes of this section this includes (1) no development (2) reduced building density (less than the proposed 35) single family residences) or (3) revised lot layout. For the first option, the existing residences, equestrian facilities, and accessory buildings would remain. There would be no new utilities, stormwater management facilities, or associated site development activities. With this option, the proposed wetland and buffer impact would not occur, however the untreated surface water runoff from the horse pastures and areas would still occur. In addition, both access roads would be left in place and the current activities within the buffer areas would continue.

A reduction in building density would result in fewer homes on the subject site. This could include fewer building lots, however this will not result in less buffer or critical area impacts because the access road would still be required and the footprint would remain the same.

A revised lot layout would also not result in less critical area impacts because of the required access road. Multiple site layouts have been developed to reach the current version. The different layouts were created with the purpose of reducing impacts to critical areas and associated buffers and to retain as many significant trees as practicable.

4.4 Mitigation Sequencing Assessment

The applicant for the proposed project has gone through multiple iterations of the site plan layout, with the intent to reduce impacts to existing significant trees and critical areas. The size and shape of the site in relation to critical areas and associated buffers and existing grade influence the lot layout, stormwater discharge area, and road locations. This has included a thorough analysis of stormwater management options and site design revisions.

4.5 Consistency with Kirkland's Streams, Wetlands and Wildlife Study

Wetlands B and C are identified as Yarrow 3 in the Watershed's Company 1998 final report. The report identifies opportunities to restore and enhance the functions and features of the basin, which include but are not limited to removal of non-native vegetation, correction of fish passage problems, improvement of habitat in the roadside channel along 116th Avenue NE, and removing debris piles and garbage from the southeast corner of wetland Yarrow 3. All four of these opportunities will be implemented as part of the mitigation efforts on the Bridlestone Estates development project. The mitigation will include removal of any non-native vegetation within the identified areas in conjunction with the installation of native trees and shrubs.

4.6 Proposed Mitigation

The proposed mitigation for the wetland and buffer impacts associated with development activities includes a combination of wetland re-establishment, enhancement, restoration, and buffer restoration and enhancement. The proposed mitigation measures meet or exceed the ratios outlined in KZC 90.55. The temporary impact and restoration areas have not been identified on these plans because they are preliminary and conceptual.

4.6.1 Proposed Mitigation for New Access Road

Mitigation for the impacts associated with the new access road meets the requirements outlined in KZC 90.55(4). Approximately 6,173 SF of wetland area will be re-established by removing old fill material associated with the existing driveways. The majority of the re-establishment area will be located within the existing gravel driveway that access the north portion of the site. The stream channel within the wetland areas north or south of the wetland re-establishment area is not well defined. A constructed channel detail has been included in the mitigation plans to account for low flow conditions, however during the wetter months it is expected that the wetland will be either occasionally or seasonally inundated.

The remaining re-establishment areas will be located immediately north and south of the proposed access road. On the north side of the road the area will be graded to remove existing fill and the associated culvert. A stream channel will be constructed in this area, which will include the placement of cobble and coarse gravel in the bed. On the south side of the road, a small wetland re-establishment area will be created in conjunction with the installation of the hollowcore plank stream crossing. The re-establishment will match the existing grades of Wetland C and will help provide a natural transition from wetland/stream channel to adjacent uplands.

In addition the re-establishment areas, all of the remaining area of Wetland C (2,610 SF) on-site will be enhanced by planting native trees and shrubs. This will help provide canopy cover over time for both the wetland and associated Yarrow Creek. A total of 18,675 SF of buffer areas that are maintained as horse pasture will be enhanced by removing existing fencing and planting native trees and shrubs. Additionally, 10,878 SF of existing buffer area that is also currently used as horse pasture or as an access road will be restored from grading activities by planting native trees and shrubs.

4.6.2 Proposed Mitigation for Stormwater Outfall

Mitigation for the temporary buffer impact associated with the installation of the stormwater outfall for the detention vault into the buffer of Wetland B includes the restoration of approximately 1,400 SF of buffer area. This area will be replanted with native shrubs and any invasive vegetation (primarily

Himalayan blackberry and Japanese knotweed) will be removed. A performance standard has been added to include annual monitoring of the outfall to ensure that point discharge, erosion, and/or channelization is not occurring as a result of the stormwater outfall.

4.6.3 Fencing

KZC 90.50 states: ”Prior to beginning development activities, the applicant shall install a 6-foot-high construction-phase chain link fence or equivalent fence, as approved by the Planning Official along the upland boundary of the entire wetland buffer with silt screen fabric installed per City standard, in a manner approved by the Planning Official. The construction-phase fence shall remain upright in the approved location for the duration of development activities.

Upon project completion, the applicant shall install between the upland boundary of all wetland buffers and the developed portion of the site, either (1) 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 the wetland or its buffer. A fence detail will be provided on the final mitigation planting plan.

4.7 Post-Construction Functions and Values Assessment

The proposed development has minimized impacts to critical areas and associated buffers to the greatest extent practicable. The intent of the proposed mitigation measures is to replace, restore, and ultimately increase local functions and values. The combination of wetland re-establishment and enhancement, along with buffer enhancement should result in an increase in functions and values associated with the wetland/stream buffer area.

The removal of invasive plant cover and addition of native trees and shrubs will help increase a variety of local functions and values including water quality improvement, reduction in surface water runoff reaching the stream, and biological support for local wildlife. The portion of buffer enhancement and wetland re-establishment immediately north and south of the proposed access road will see a substantial change in biological and structural diversity. These areas are currently either maintained as lawn along the road or are located within actively used pasture areas. The exclusion of regular disturbance (grazing and mowing) and addition of a dense native plant community will increase water quality improvement, stormwater control, and biological support functions.

The wetland re-establishment area located where the existing northern access driveway will provide a net increase of existing wetland area on-site. The mitigation measures in this area will provide an excellent opportunity to connect a fragmented habitat and remove regular disturbance. The existing gravel road bisects wetland area and limits habitat functions within this area. The road is also a conveyance of impaired surface water runoff that includes turbid water (observed during site investigations) and water that is likely high in nutrients (assumed) due to local sources.

The diversity of stem width and density will restore water quality improvement through filtration of surface water runoff. The presence of a large overstory with a sub canopy will also intercept precipitation and reduce erosion of the soil surface. Biological support functions will be increased by increasing the availability of nesting and refuge areas, as well as foraging opportunities within the buffer

area. The resulting forested cover will also help maintain noise and visual screening between the adjacent development and wetland interior.

Water temperature is a crucial environmental factor influencing the survival rates for salmonids. The reestablishment of a forested riparian corridor within Wetland C on-site will help shade the stream channel, keeping water temperatures lower during the warmer months.

The preservation of upland area with forested cover and a dense shrub canopy cover will also continue to provide water quality improvement for surface water draining towards Wetland B and Yarrow Creek. The upland area will continue to intercept and infiltrate precipitation falling on-site and filter any surface flow that occurs across the site. The dense vegetation will also continue to provide forage and refuge opportunities for local wildlife utilizing the riparian corridor.

Table 1: Wetland & Buffer Mitigation Summary Table

WETLAND & BUFFER MITIGATION SUMMARY												
			Critical Areas		**Buffer Area**		**Critical Area**			**Buffer Area**		
Wetland Name	Location on property	Impact Reason	Existing (SF)	Impacted (SF)	Existing (SF)	Impacted (SF)	Mit. Size (SF)	Mit. Type	Mit. Ratio	Mit. Size (SF)	Mit. Type	Mit. Ratio
C	SW Corner	New Access Road Crossing	3,792 (on-site)	1,253 (P)	NA	NA	5,012	Re-establishment	4:1	NA	NA	NA
				2,448 (PF)			2,610	Enhance-ment	1:1	NA	NA	NA
			NA	NA	26,379	7,900 (P)	NA	NA	NA	18,675	Enhance-ment	2.4:1
B						10,878(T)	NA	NA	NA	10,878	Restoration	1:1
	South of Lot 35	Stormwater outfall	27,593 (on-site)	NA	NA	1,400 (T)	NA	NA	NA	1,400	Rest-oration	1:1
	Frontage along 116th Ave	Equestrian Trail		251	NA	NA	1,161	Re-establishment	4:1	NA	NA	NA
			Total Permanent Wetland Impact: 1,504 SF 2,448 SF Paperfill		**Total Permanent Buffer Impact: 7,900 SF**		**Total Wetland Mitigation: 8,783 SF**			**Total Buffer Mitigation: 30,953 SF**		

Total On-site Wetland Area = 47,628 SF (10% = 4,762 SF)
Total Wetland Impact = 3,952 SF (Paperfill and Actual Fill)

5.0 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

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

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. A minimum of one PVC monitoring well will be installed in the wetland re-establishment areas that will allow for direct hand measurements of ground water during the monitoring visits.

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

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

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

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

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

5.1 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. If needed, the line intercept methodology may be employed as an alternative to quadrat sampling. 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 vegetation before construction takes place will be taken to provide a historical reference of onsite conditions.

5.2 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.

5.3 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.

5.4 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.

5.5 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. The performance bond is based off of the King County Critical Areas Mitigation Bond Quantity Worksheet and is included on the detailed mitigation planting plan (see Appendix B for worksheet).

6.0 Conclusions

KLN Construction has completed the site investigation and critical areas assessment for the subject property. Three wetland areas and one stream were identified on-site based on observed vegetation and soil conditions and primary and secondary indicators of hydrology. Impacts to critical areas have been minimized to the greatest extent practicable, however permanent and temporary wetland and buffer impacts are proposed to allow for the installation and construction of the new road access and for road frontage improvements adjacent to 116th Ave NE. Mitigation in the form of wetland re-establishment, and enhancement has been proposed to offset the project impacts.

This critical area determination should be considered subject to change until reviewed and approved by the appropriate regulatory agencies with jurisdiction.

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Appendix A: Natural Resource Maps and Site Photographs

Figure 2: 2002 USGS color aerial photograph of the subject property

Figure 3: 2012 aerial photograph of the subject site

Figure 4: Topographic map of the project site.

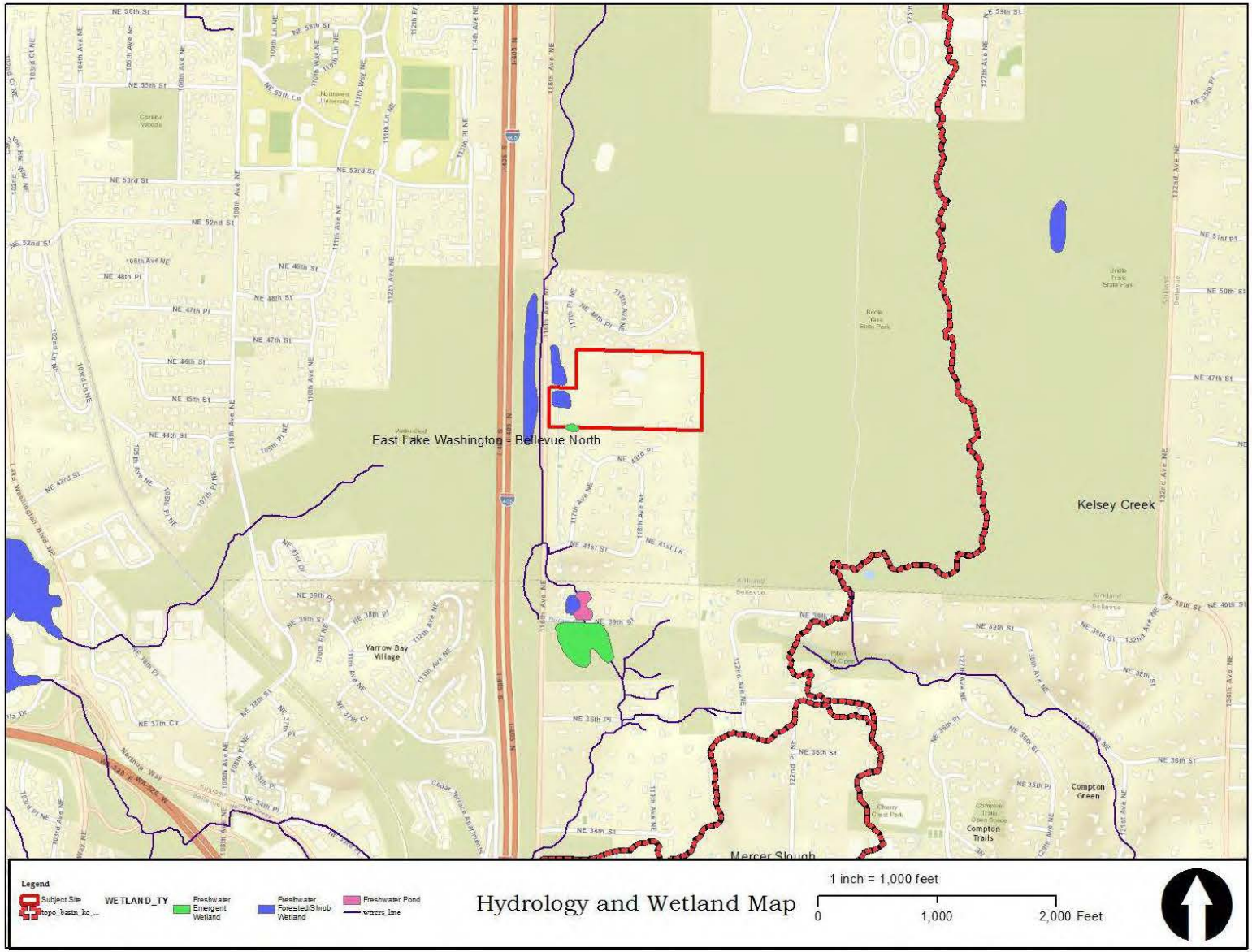


Figure 5: Watercourse and Wetland Map.

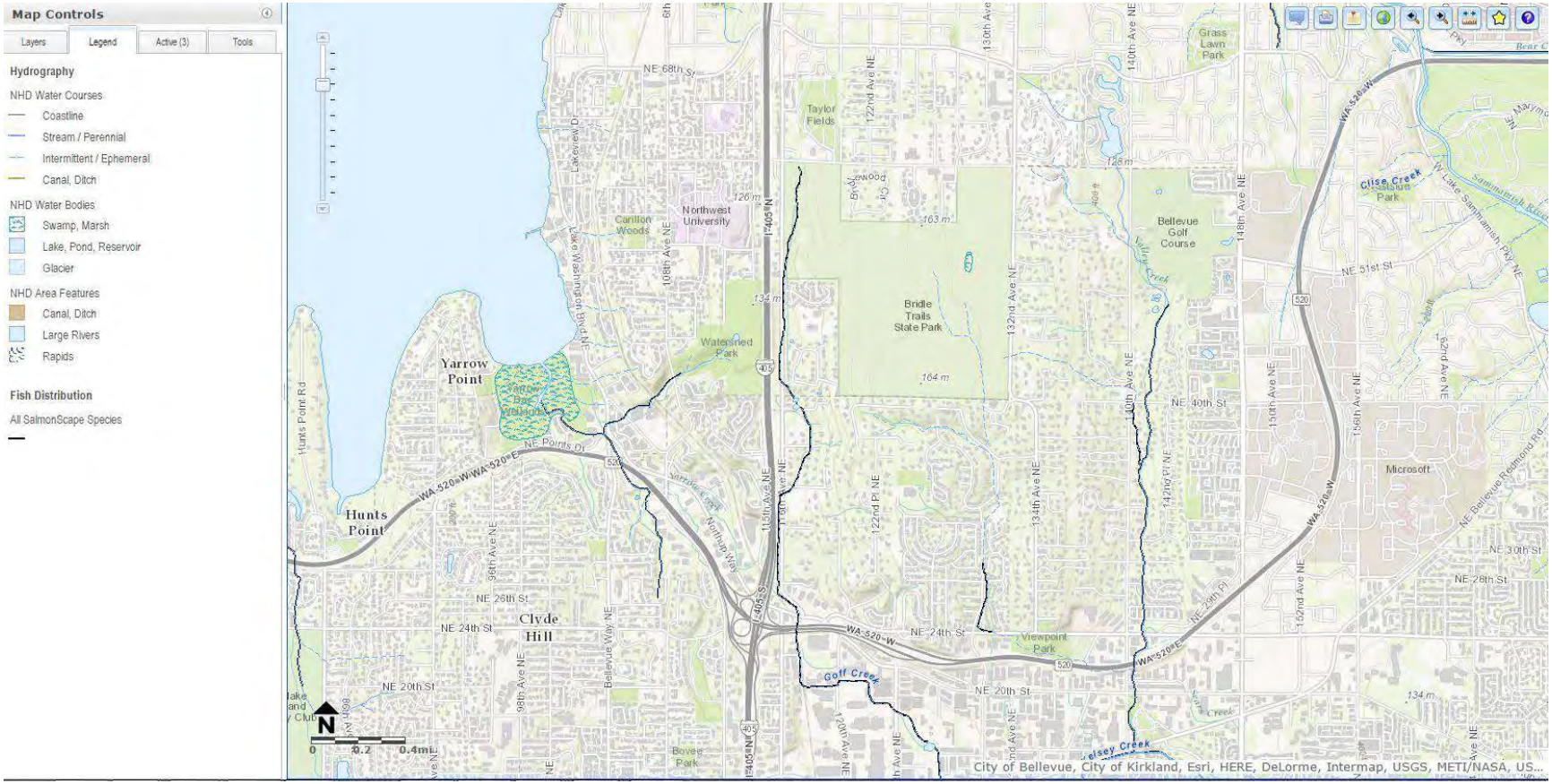


Figure 6: WFDW Salmonscape fish distribution map.

Figure 7: NRCS soil survey of the project area.

Figure 8: Existing conditions of Wetland A facing north off-site.

Figure 9: Existing vegetation gravel road bisecting Wetland B – wetland re-establishment area.

Figure 10: Existing vegetation community Wetland C facing north towards proposed road impact area.

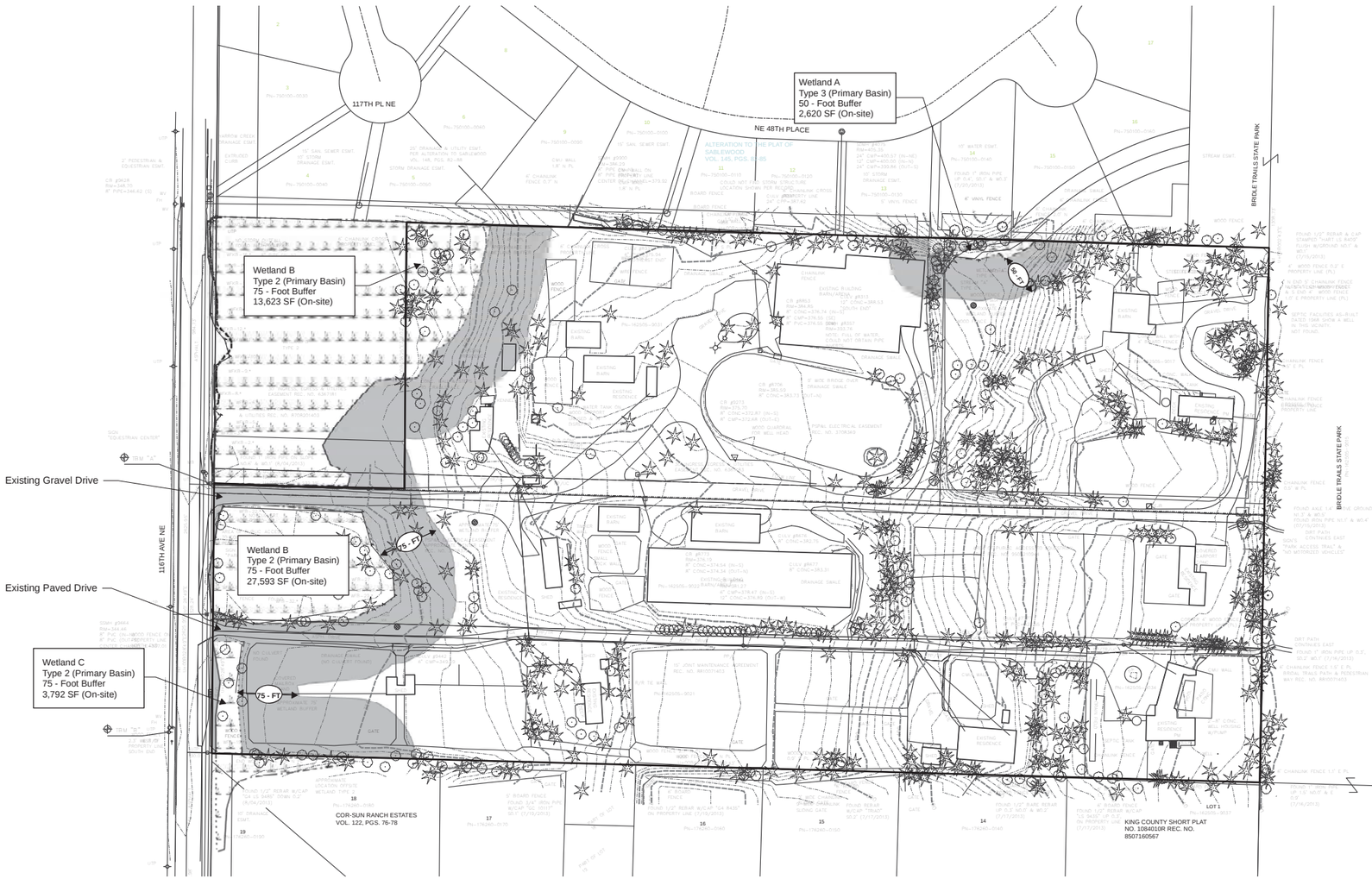
Figure 11: Existing vegetation community Wetland C facing south near proposed road impact area.

Figure 12: Off-site Wetland C connection.

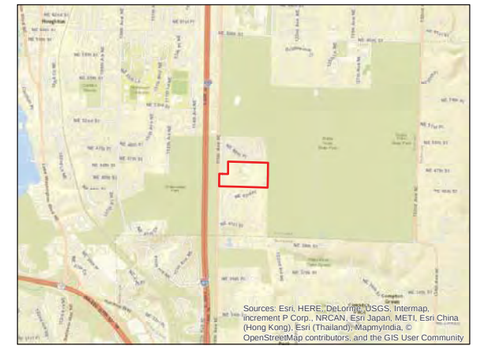
Figure 13: Existing road frontage conditions facing north along 116th Street

BRIDLESTONE ESTATES

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



Vicinity Map



SHEET INDEX

Sheet Number	Sheet Title
M-1	Existing Conditions
M-2	Proposed Impact Areas
M-3	Proposed Mitigation Areas
M-4	Mitigation Details & Grading
M-5	Mitigation Planting Plan
M-6	Mitigation Notes Page

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
DETAILED MITIGATION PLAN
EXISTING CONDITIONS

Legend

- Wetland
- Buffer

0 40 80 160 Feet
1 inch = 80 feet

Call 2 Working Days Before You Dig
1-800-424-5555
Utilities Underground Location Center

CITY OF KIRKLAND PLANNING AND COMMUNITY DEVELOPMENT

APPROVED FOR CONSTRUCTION

BY: _____

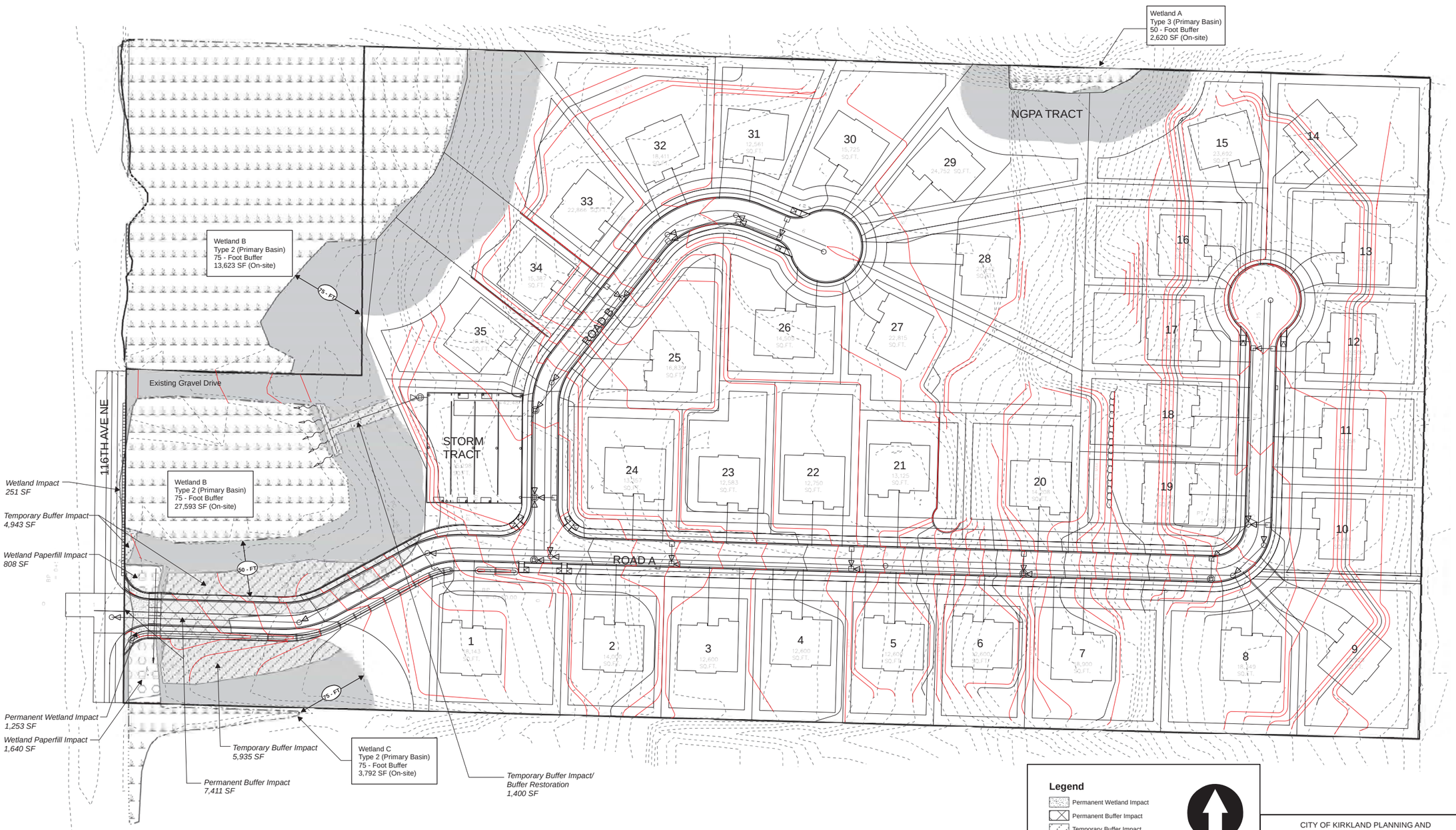
R/W PERMIT NO. _____

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

SHEET
M-1 of 6

BRIDLESTONE ESTATES

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



Legend

- Permanent Wetland Impact
- Permanent Buffer Impact
- Temporary Buffer Impact
- PaperFill
- Buffer
- Wetland
- Proposed Grading

0 25 50 100 Feet

1 inch = 50 feet

CITY OF KIRKLAND PLANNING AND COMMUNITY DEVELOPMENT

APPROVED FOR CONSTRUCTION

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

BRIDLESTONE ESTATES

DETAILED MITIGATION PLAN
PROPOSED IMPACT AREAS

ENGINEER: ROY LEWIS

CONTACT: CHER ANDERSON

JOB NO: 1410

DATE: 05/11/2015

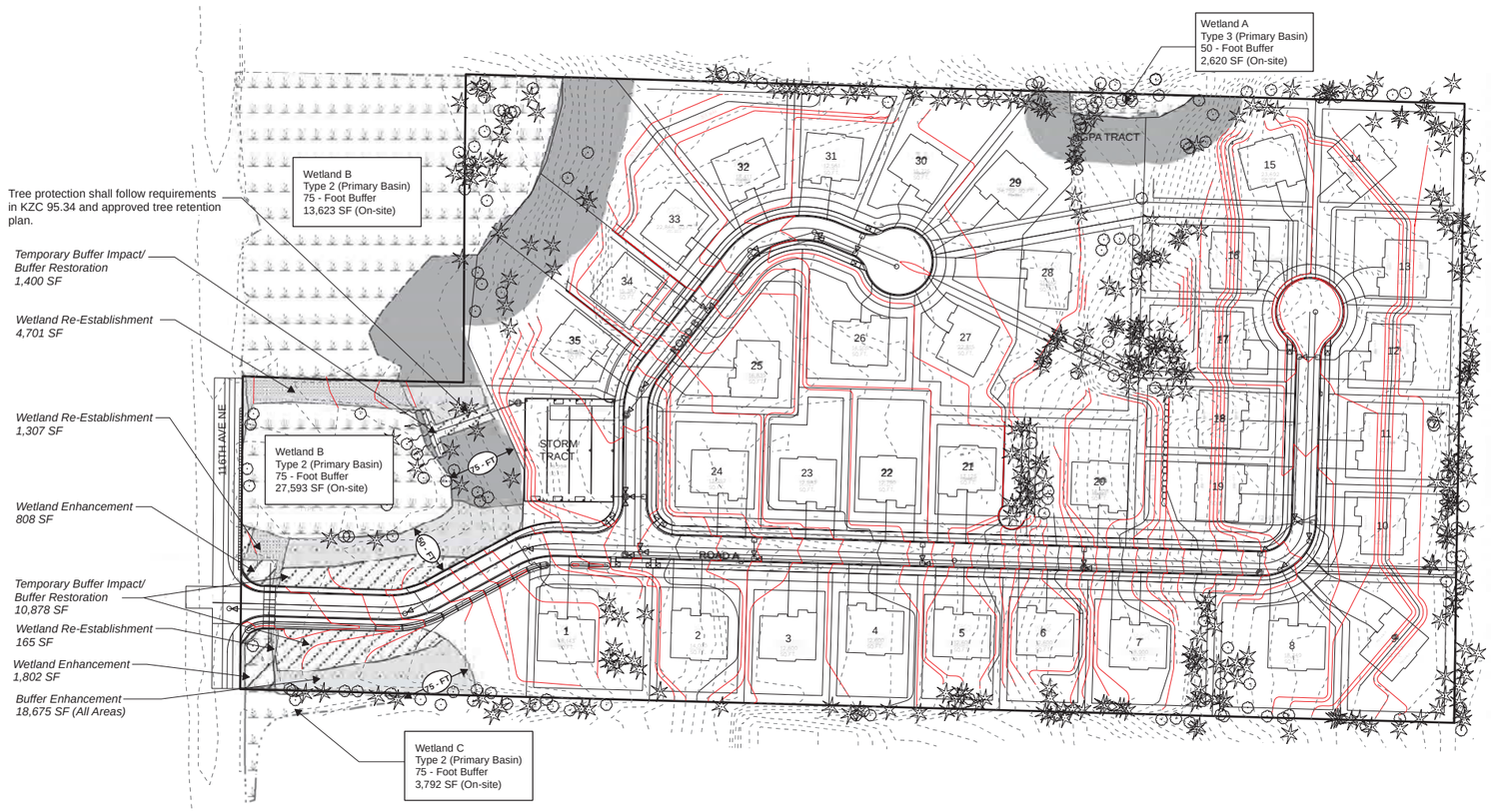
DRAWN BY: KJL

CHECKED BY: CA

SHEET
M-2 OF 6

BRIDLESTONE ESTATES

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



MITIGATION PLANTING AND MAINTENANCE NOTES

ALL TREES AND SHRUBS TO BE PLANTED AT A DEPTH ¾" HIGHER THAN THE LEVEL THAT THEY WERE GROWN IN THE NURSERY.

ALL TREES AND SHRUBS TO BE NURSERY GROWN. ANY COLLECTED STOCK SHALL BE FROM A SOURCE APPROVED BY THE PROJECT BIOLOGIST PRIOR TO DELIVERY.

IT IS PERMISSIBLE TO SUBSTITUTE BARE ROOT STOCK FOR THE APPROPRIATE SPECIES. BARE ROOT STOCK WILL BE ACCEPTABLE IF APPROVED BY THE PROJECT BIOLOGIST, INSTALLED IN THE APPROPRIATE SEASON, AND INSTALLED AT A RATIO OF 3:2.

AFTER PLANTING IMMEDIATELY SATURATE ALL PLANTING PITS TO ELIMINATE AIR POCKETS AND FACILITATE SETTLING OF THE BACK FILL MATERIAL.

USE EXISTING SOILS TO BACK FILL PLANTING PITS.

IF POOR SOIL OR DEBRIS IS ENCOUNTERED WHEN EXCAVATING PLANT PITS CONTACT THE PROJECT BIOLOGIST FOR ALTERNATIVE SOLUTIONS.

ALL TREES OVER 6' IN HEIGHT SHALL BE STAKED. TREE STAKES WILL BE 'BMC' TURNED LODGEPOLE PINE STAKES 6' IN HEIGHT DRIVEN TO REFUSAL. THE GUYING MATERIAL WILL BE 1" 'CHAINLOCK' INSTALLED PER MANUFACTURER'S SPECIFICATIONS.

APPLY FINE GROUND BARK MULCH TO AN AREA 36" IN DIAMETER AROUND ALL INSTALLED WOODY PLANTS.

ALL PLANTS SHALL BE MARKED WITH BIODEGRADABLE SURVEY FLAGGING TO FACILITATE FUTURE MONITORING.

HAND WATERING SHALL BE PERFORMED AS NEEDED FOR PLANT SURVIVAL UNLESS OTHERWISE NOTED ON PLANTING PLAN.

THE MAINTENANCE PROGRAM REQURIES MONTHLY VISITS DURING THE GROWING SEASON (MARCH THROUGH SEPTEMBER).

ALL NON-NATIVE / UNDESIRABLE PLANTS (HIMALAYAN BLACKBERRY, SCOTTS BROOM, REED CANARY GRASS, ETC.) THAT MAY INHIBIT THE GROWTH OF NEW PLANTINGS SHALL BE REMOVED FROM THE MITIGATION AREA.

THINNING OF VOLUNTEER NATIVE PLANTS (RED ALDER, COTTONWOOD, WILLOW, ETC.) THAT MAY INHIBIT THE GROWTH OF NEW PLANTINGS SHALL OCCUR AFTER CONSULTATION WITH THE PROJECT BIOLOGIST

THE BARK MULCHED AREAS SHALL REMAIN FREE OF WEEDS OR COMPETING PLANTS TO INSURE OPTIMUM GROWTH.

THE TREE STAKING MATERIAL SHALL BE MONITORED AND REMOVED WHEN APPROPRIATE.

SOIL AMENDMENTS

SOILS MUST BE DECONSOLIDATED TO A MINIMUM DEPTH OF 12" WHERE TREES OR SHRUBS ARE TO BE PLANTED.

TYPICALLY, SOILS MUST BE AMENDED WITH 2" OF COARSE SAND AND 4" OF VEGETATIVE COMPOST SPREAD OVER ENTIRE AREA.

IN BUFFER ENHANCEMENT AREAS SOIL SARE TO CONTAIN 20% ORGANIC MATTER BY BULK DENSITY.

IN WETLAND RE-ESTABLISHMENT AND ENHANCEMENT AREAS, SOILS ARE TO CONTAIN AT LEAST 30% ORGANIC MATTER BY BULK DENSITY.

IN ALL GRADED WETLAND MITIGATION AREAS, 6" OF STOCKPILED OR IMPORTED TOPSOIL SHALL BE PLACED OVER SUBGRADE.

IN WETLAND RE-ESTABLISHMENT AREAS, OVER – EXCAVATE 6" BELOW FINISHED ELEVATION SHOWN ON PLANS FOR LATER PLACEMENT OF 6" OF STOCKPILED OR IMPORTED TOPSOIL.

FILL SOILS POPROSED FOR USE WITHIN THE WETLAND MITIGATION AREAS SHALL BGE SUBMITTED TO THE GEOTECHNICAL ENGINEER FOR ANALYSIS AND APPROVAL PRIOR TO USE. FILL SOILS SHALL MEET THE CRITERIA OUTLINED IN THIS SECTION IN REGARDS TO COMPOSTITION AND MAKEUP.

GENERAL NOTES

SITE PREPARATION SHALL INCLUDE CLEARING AND GRUBBING OF ALL INVASIVE SPECIES ESPECIALLY HIMALYAN BLACKBERRY (RUBUS DISCOLOR). IMPACTS TO EXISTING NATIVE VEGETATION IS TO BE AVOIDED.

EXISTING NATIVE VEGETATION IS TO TAKE PRECEDENCE OVER LOCATIONS OF PROPOSED PLANTINGS.

PROPOSED PLANTINGS ARE TO BE LOCATED IN AREAS WHERE NATIVE VEGETATION IS SPARSE. CONTACT PROJECT BIOLOGIST REGARDING QUESTIONS ABOUT PROPOSED PLANTING LOCATIONS.

SUBSTITUTIONS ARE DISCOURAGED, HOWEVER CONTACT PROJECT BIOLOGIST IF ON THE GROUND CONDITIONS WARRANT CHANGES OR IF PLANT AVAILABILITY IS A PROBLEM.

CONTACT PROJECT BIOLOGIST IF THE SITE WORK IS DIFFERENT THAN SHOWN ON THE PLANTING PLAN OR POOR SOILS AND DEBRIS ARE DISCOVERED THAT REQUIRE CHANGES TO THE PLANTING PLAN.

THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE MITIGATION PLANTS DURING THE INSTALLATION AND UNTIL FINAL ACCEPTANCE BY THE OWNER'S REPRESENTATIVE.

THE LANDSCAPE CONTRACTOR SHALL WARRANTY ALL MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE TIME OF FINAL ACCEPTANCE.

DURING THE WARRANTY PERIOD THE LANDSCAPE CONTRACTOR WILL NOT BE RESPONSIBLE FOR PLANT DEATH CAUSED BY UNUSUAL CLIMATIC CONDITIONS, VANDALISM, THEFT, OR POOR MAINTENANCE PRACTICES.

IDENTIFICATION OF CLEARING LIMITS

PRIOR TO ANY CONSTRUCTION OR GRADING, A LICENSED SURVEYOR SHALL SURVEY, STAKE, AND CLEARLY MARK DISTURBANCE/CLEARING LIMITS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ACTUAL LOCATIONS OF VEGETATION TO BE SAVED.

RESTORATION OF DISTURBED AREAS

ANY CRITICAL AREAS DISTURBED DURING CONSTRUCTION ACTIVITIES THAT WERE NOT IDENTIFIED ON THE APPROVED MITIGATION PLAN WILL BE FULLY RESTORED TO THEIR ORIGINAL CONDITION BY PLANTING NATIVE TREES AND SHRUBS. THE CONTRACTOR SHOULD CONTACT THE PROJECT BIOLOGIST TO COORDINATE PLANT SPECIES SELECTION AND PLANTING LOCATIONS.

CLEAN - UP

THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF ALL CONSTRUCTION MATERIALS AND DEBRIS (I.E. SILT FENCING, STAKING, GARBAGE, ETC.) ON THE SITE FOLLOWING MITIGATION INSTALLATION.

MULCH

A THREE TO SIX INCH LAYER OF MULCH SHALL BE PLACED AROUND THE BASE OF EACH NEW TREE (36 INCH DIAMETER RING) AND SHRUB PLANTING (24 INCH DIAMETER RING) FOR EROSION, WEED CONTROL, AND MOISTURE RETENTION. ADDITIONAL MULCH MAY BE USED FOR WEED SUPRESSION IN AREAS WHERE EXISTING PLANT COVER IS DOMINATED BY INVASIVE PLANT SPECIES (I.E. HIMALAYAN BLACKBERRY, REED CANARYGRASS, ETC.).

SITE LOGGING/MULCH PRODUCTION

DURING SITE LOGGING AND CLEARING ANY NON-MARKETABLE DEBRIS (SMALL TREES AND BRANCHES) MAY BE GROUND UP AS COURSE WOOD MULCH AND USED LATER WITH THE MITIGATION PLANTINGS. CONTRACTOR WILL DETERMINE LOCATION OF MULCH STOCKPILE.

Legend

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

0 40 80 160 Feet
1 inch = 80 feet

CITY OF KIRKLAND PLANNING AND COMMUNITY DEVELOPMENT

APPROVED FOR CONSTRUCTION

BY: _____

R/W PERMIT NO. _____

DATE	REVISION	BY
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BRIDLESTONE ESTATES

DETAILED MITIGATION PLAN
PROPOSED MITIGATION AREAS

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

SHEET
M-3 OF 6

Appendix B: Performance Security Bond Worksheet

King County

Critical Areas Mitigation
Bond Quantity Worksheet

Project Name: BridleStone Estate **Date:** 17-Sep-15 **Prepared by:** Kyle Legare

Permit Number: **Applicant:** KLN Construction, Inc.

Location: 116th Ave NE **Phone #:** 425-778-4111

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	1077.00		$ 12,385.50
PLANTS: Container, 2 gallon, medium soil	$20.00	Each	446.00		$ 8,920.00
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			$ -
					$ -
					$ -
* All costs include installation				*TOTAL*	**$ 21,305.50**

INSTALLATION COSTS (LABOR, EQUIPMENT, & OVERHEAD)

Type	Unit Price	Unit			Cost
Compost, vegetable, delivered and spread	$37.88	CY	580.00		$ 21,970.40
Decompacting till/hardpan, medium, to 6" depth	$1.57	CY			$ -
Decompacting till/hardpan, medium, to 12" depth	$1.57	CY	1450.00		$ 2,276.50
Hydroseeding	$0.51	SY			$ -
Labor, general (landscaping)	$40.00	HR	80.00		$ 3,200.00
Labor, general (construction)	$40.00	HR			$ -
Labor: Consultant, supervising	$55.00	HR	40.00		$ 2,200.00
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	180.00		$ 7,560.00
Staking material (set per tree)	$7.00	Each			$ -
Surveying, line & grade	$250.00	HR	4.00		$ 1,000.00
Surveying, topographical	$250.00	HR	4.00		$ 1,000.00
Watering, 1" of water, 50' soaker hose	$3.62	MSF			$ -
Irrigation - temporary	$3,000.00	Acre	0.75		$ 2,250.00
Irrigation - buried	$4,500.00	Acre			$ -
Tilling topsoil, disk harrow, 20hp tractor, 4"-6" deep	$1.02	SY			$ -
					$ -
					$ -
				TOTAL	**$ 41,456.90**

HABITAT STRUCTURES*

ITEMS	Unit Cost	Unit			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			$ -
Logs w/ root wads, 16"-24" diam., 30' long	$460.00	Each	6.00		$ 2,760.00
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			$ -
Snags - on site	$50.00	Each			$ -
Snags - imported	$800.00	Each			$ -
					$ -
					$ -
* All costs include delivery				*TOTAL*	**$ 2,760.00**

EROSION CONTROL

ITEMS	Unit Cost	Unit			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	650.00		$ 2,600.00
Fence, silt	$1.60	LF	2500.00		$ 4,000.00
Jute Mesh	$1.26	SY			$ -
Mulch, by hand, straw, 2" deep	$1.27	SY			$ -
Mulch, by hand, wood chips, 2" deep	$3.25	SY	3000.00		$ 9,750.00
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	1.00		$ 3,000.00
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			$ -
					$ -
					$ -
				TOTAL	**$ 19,350.00**

GENERAL ITEMS

ITEMS	Unit Cost	Unit			Cost
Fencing, chain link, 6' high	$18.89	LF			$ -
Fencing, chain link, corner posts	$111.17	Each			$ -
Fencing, chain link, gate	$277.63	Each			$ -
Fencing, split rail, 3' high (2-rail)	$10.54	LF			$ -
Fencing, temporary (NGPE)	$1.20	LF	2100.00		$ 2,520.00
Signs, sensitive area boundary (inc. backing, post, install)	$28.50	Each	20.00		$ 570.00
					$ -
					$ -
				TOTAL	**$ 3,090.00**

OTHER

(Construction Subtotal) **$ 87,962.40**

ITEMS	Percentage of Construction	Unit			Cost
Mobilization	10%				$ 8,796.24
Contingency	30%				$ 26,388.72
				TOTAL	**$ 35,184.96**

MAINTENANCE AND MONITORING

Maintenance, annual					
Less than 1,000 sq.ft. and buffer impact only	$ 1.08	SF		(Includes monitoring)	$ -
Less than 1,000 sq.ft. with wetland or aquatic area impacts	$ 1.35	SF		(Includes monitoring)	$ -
Larger than 1,000 sq.ft. but < 0.5 acre -buffer impact only	$ 360.00	EACH		(8 hrs @ 45/hr)	$ -
Larger than 1,000 sq.ft. but < 0.5 acre with wetland or aquatic area impacts	$ 450.00	EACH		(10 hrs @ $45/hr)	$ -
Larger than 1,000 sq.ft. but < 0.5 acre -buffer impact only	$ 450.00	EACH		(12 hrs @ 45/hr)	$ -

Larger than 1,000 sq.ft. but < 1 acre with wetland or aquatic area impacts	$ 630.00	EACH	12.00	(14 hrs @ $45/hr)	$ 7,560.00
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area impacts	$ 1,600.00	DAY		(WEC crew)	$ -
Larger than 5 acres - buffer and / or wetland or aquatic area impacts	$ 2,000.00	DAY		(1.25 X WEC crew)	$ -
Monitoring, annual					
Larger than 1,000 sq.ft. but < 0.5 acre -buffer impact only	$ 720.00	EACH		(8 hrs @ $90/hr)	$ -
Larger than 1,000 sq.ft. but < 0.5 acre with wetland or aquatic area impacts	$ 900.00	EACH		(10 hrs @ $90/hr)	$ -
Larger than 0.5 acre but < 1.0 acre -buffer impact only	$ 900.00	EACH		(10 hrs @ $90/hr)	$ -
Larger than 0.5 acre but < 1.0 acre with wetland or aquatic area impacts	$ 1,080.00	EACH	10.00	(12 hrs @ $90/hr)	$ 10,800.00
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area impacts	$ 1,620.00	DAY		(18 hrs @ $90/hr)	$ -
Larger than 5 acres - buffer and / or wetland or aquatic area impacts	$ 2,400.00	DAY		(24 hrs @ $90/hr)	$ -
Maintenance and Monitoring Inspection (DDES), annual	$362.25	EACH	4.00	(2.5 hrs @ $144.90/hr)	$ 1,449.00
Maintenance and Monitoring Inspection (DDES), final	$579.60	EACH	1.00	(4 hrs @ $144.90/hr)	$ 579.60
				TOTAL	**$ 20,388.60**
				Total	**$143,535.96**