CRITICAL AREAS REPORT AND BUFFER AVERAGING PLAN

ORCAS MOON COTTAGES
KIRKLAND, WASHINGTON

Enclosure 14

Prepared For:
ORCAS MOON, LLC

Prepared By:
TALASAEA CONSULTANTS, INC.

21 July 2016
(Revised 9 November 2017)

Critical Areas Report and Buffer Averaging Plan

Orcas Moon Cottages Kirkland, Washington

Prepared For:
Orcas Moon, LLC
P.O. Box 2710
Redmond, Washington 98073

Prepared By:
Talasaea Consultants, Inc.
15020 Bear Creek Road NE
Woodinville, Washington 98077
(425) 861-7550

21 July 2016
(Revised 9 November 2017)

EXECUTIVE SUMMARY

PROJECT NAME: Orcas Moon Cottages

CLIENT: Orcas Moon, LLC

SITE LOCATION: Property is northwest of the intersection of 20th Avenue and 5th Street and south of Forbes Creek Drive (aka NE 106th Street) in Kirkland, Washington. The Public Land Survey System location of the property is the southwest ¼ of Section 32, T26N, R5E, Willamette Meridian.

PROJECT STAFF: Bill Shiels, Principal; Ann Olsen, Senior Project Manager; David R. Teesdale, Senior Wetlands Ecologist, Matt Wagner, Landscape Designer

FIELD SURVEY: Site was evaluated, and critical areas delineated on 8 and 19 April 2016, 21 December 2016, and on 4 October 2017.

DETERMINATION: The Orcas Moon Cottages property is located within a City of Kirkland Primary Basin (Forbes Creek). Three wetlands (Wetlands A, B, and D) and five streams (Streams 1, 2, 3, 4, and 5) were identified on the Orcas Moon Property. One wetland (Wetland C) was identified offsite to the west of the property. The onsite wetlands were all rated as City of Kirkland Type 3 wetlands. The offsite wetland was rated as a City of Kirkland Type 2 wetland. Type 2 wetlands within a Primary Basin have a 75-foot standard buffer. Type 3 wetlands within a Primary Basin have a 50-foot standard buffer. The streams were rated as City of Kirkland Class B waters. Class B waters within a Primary Basin have a 60-foot standard buffer.

HYDROLOGY: Hydrology for Wetlands A, C, and D is provided by shallow groundwater seepage on a slope. Hydrology for Wetland B is supported entirely by stream flow from Stream 4, which is supported by Wetland C.

SOILS: Three soil types are mapped on the property. These are Kitsap silt loam (2 to 8 percent slope), Kitsap silt loam (15 to 30 percent slope), and Indianola loamy fine sand (4 to 15 percent). These soils are not listed as hydric by the National Technical Committee on Hydric Soils.

VEGETATION: Vegetation within Wetland A is a mixture of sparse herbaceous and scrub-shrub species, with a significant portion of bare soil present. Species include skunk cabbage (*Lysichiton americanus*), piggyback plant (*Tolmiea menziesii*), slough sedge (*Carex obnupta*), field and tall horsetail (*Equisetum arvense* and *E. telmateia*), lady fern (*Athyrium filix-femina*), salmonberry (*Rubus spectabilis*), and young red alder (*Alnus rubra*). Vegetation within Wetland B includes American brooklime (*Veronica americana*), lady fern, piggyback plant, and slough sedge. Vegetation within Wetland C is mostly scrub-shrub species, comprised predominantly of salmonberry, lady fern, skunk cabbage, slough sedge, and red alder.

PROPOSED DEVELOPMENT: The Client proposes to develop the Orcas Moon Project as a cottage unit development. Fifteen (15) units of cottages will be constructed in two separate groups on the property. Spreading the development out into two different groups allows the project to maximize the buildable area outside of steep slope zones. The two cottage unit groups will be arranged around rain gardens, which will handle all stormwater runoff from paved parking and foot trail systems as well as from rooftop runoff.

The proposed development will not directly impact wetlands or streams on the subject property. However, it will be necessary to reduce the critical areas buffers by one-third as allowed by Kirkland Zoning code. This is permitted under KMC §90.60(2)(a) and §90.100(1)(a) for buffer averaging. Approximately 24,100 sf of buffer will be reduced. Approximately 28,870 sf of additional buffer will offset the approximately 24,100 sf of buffer lost for a net gain of approximately 4,760 sf of buffer area. The additional buffer area is equal in functions and services to the buffer areas being reduced. Approximately 21,260 sf of the added buffer will be enhanced by removal of non-native, invasive species and replanting with a variety of native trees and shrubs. No work within the steeply sloped ravines is being proposed at this time due to concerns of creating unstable earth conditions.

There will be no loss of habitat function of existing wetlands or streams onsite resulting from the proposed development plan. The proposed buffer averaging plan will provide additional buffer area to offset the

reduction in buffer width. Enhancement plantings will ensure that the functions and services of the replacement buffer will exceed those of the buffer area lost through reduction.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Chapter 1. INTRODUCTION

1.1 Report Purpose

This report is the result of a critical areas study of the Orcas Moon Cottages property (referred to hereinafter as "Project Site" or "Site). The Site is located within the Forbes Creek basin of Kirkland (**Figure 1**). The purpose of this report is to identify, categorize, and describe existing site conditions, such as wetlands, streams, or other critical habitats, and their respective buffers. The report has been prepared to comply with the requirements of Kirkland Municipal Code Chapter 90 – Drainage Basins.

This report will provide and describe the following information:

- General property description;
- Methodology for critical areas investigation;
- Results of critical areas background review and field investigation; and
- Regulatory review.

1.2 Statement of Accuracy

Critical areas characterizations and ratings were conducted by trained professionals at Talasaea Consultants, Inc., and adhered to the protocols, guidelines, and generally accepted industry standards available at the time the work was performed. The conclusions in this report are based on the results of analyses performed by Talasaea Consultants and represent our best professional judgment. To that extent and within the limitation of project scope and budget, we believe the information provided herein is accurate and true to the best of our knowledge. Talasaea does not warrant any assumptions or conclusions not expressly made in this report, or based on information or analyses other than what is included herein.

Chapter 2. GENERAL PROPERTY DESCRIPTION AND LAND USE

2.1 Project Location

The Project Site is located northwest of the intersection of 20th Avenue and 5th Street in the City of Kirkland, Washington (**Figure 2**). The Site extends northward from 20th Avenue to Forbes Creek Drive. The Site includes two tax parcels: Parcel A (3890100055), and Parcel B (3890100050). The Site encompasses approximately 7.1 acres. The Public Land Survey System location of the Site is southwest ¼ of Section 32, T26N, R5E, Willamette Meridian.

2.2 General Property Description

The Site is currently undeveloped and forested with second-growth mixed coniferous and deciduous trees. The topography of the Site is moderately sloped with five ravines extending generally in a north-south orientation. The Site generally slopes downward from 20th Avenue to Forbes Creek Drive.

2.3 Land Use and Zoning

The Site is zoned RS-12.5 or Single Family Residential. The Site is currently undeveloped. However, a single-family residence and an associated outbuilding did exist on Parcel A prior to 1936 (date of earliest aerial photo available). It appears on

this aerial image that some sort of small farming operation occurred on the Site's northeastern corner. Most of the Site's eastern half appears to have been cleared of forest vegetation. The residence was still visible on aerial images as of 1952, but no agricultural activities were occurring on the Site. The area that appeared cleared of trees in the 1936 aerial image is now growing back as forest. This residence was removed from Parcel A by 1977 (the date of the next small-scale aerial image), although its driveway is still present.

Currently, properties to the northeast and south of the Site are developed as single-family residential. Properties to the west and southeast of the Site are currently undeveloped. A majority of the undeveloped land in the vicinity of the Site is currently managed as City of Kirkland parks.

Chapter 3. METHODOLOGY

The critical areas analysis of the Site involved a two-part effort. The first part consisted of a preliminary assessment of the Site and the immediate surrounding area using existing published environmental information. This information includes:

1. Wetland and soils information from resource agencies;
2. Critical areas information from the City of Kirkland and King County;
3. Orthophotography and LIDAR imagery; and,
4. Relevant studies completed or ongoing in the vicinity of the Site.

The second part consisted of site investigations where direct observations and measurements of existing environmental conditions were made. Observations included plant communities, soils, hydrology, and stream conditions. This information was used to help characterize the site and define the limits of critical areas onsite and offsite for regulatory purposes (see **Section 3.2 – Field Investigation** below).

3.1 Background Information Reviewed

Background information from the following sources was reviewed prior to field investigations:

- US Fish and Wildlife Service (USFWS) Wetlands Online Mapper (National Wetlands Inventory) (U.S. Fish and Wildlife Service) (www.wetlandsfws.er.usgs.gov/wtlnds/launch.html);
- Natural Resources Conservation Service, Web Soil Survey (Natural Resources Conservation Service) (www.websoilsurvey.nrcs.usda.gov/app);
- Natural Resources Conservation Service National Hydric Soils List by State (Natural Resources Conservation Service) (www.soils.usda.gov/use/hydric/lists/state.html);
- City of Kirkland GIS database (City of Kirkland, 2015);
- King County GIS database (King County 2015);
- King County iMap online mapping program (King County);

- LIDAR data from King County GIS (2006);
- Orthophotography from Earth Explorer (2016);
- WDFW Priority Habitats and Species (PHS) Database on the Web (Washington State Department of Fish and Wildlife) (wdfw.wa.gov/mapping/phs); and
- Washington Department of Natural Resources Natural Heritage GIS database, 2015;
- Fish usage data from SalmonScape (http://apps.wdfw.wa.gov/salmonscape/map.html); and
- StreamNet (http://www.streamnet.org/data/interactive-maps-and-gis-data/)

3.2 Field Investigation

The Site was evaluated, and critical areas delineated on 8 and 19 April 2016, 21 December 2016, and 4 October 2017. The boundaries of wetlands and the ordinary high water mark (OHWM) of streams were flagged in the field for later professional surveying.

The wetland delineation utilized the routine approach described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (U.S. Army Corps of Engineers, 2010). The ordinary high water mark (OWHM) for any streams found on the Site was determined and delineated using the methodology described by Washington State Department of Ecology's "*Determining the Ordinary High Water Mark on Streams in Washington State"* (Olson and Stockdale 2010). Wetlands and streams were classified according to City of Kirkland Municipal Code, Chapter 90 – Drainage Basins.

Plant species were identified according to the taxonomy of Hitchcock and Cronquist (Hitchcock, *et al*. 1969). Taxonomic names were updated, and plant wetland status was assigned according to *North American Digital Flora: National Wetland Plant List, Version 2.4.0* (Lichvar, *et al*. 2012). Wetland classes were determined using the U.S. Fish and Wildlife Service's system of wetland classification (Cowardin, *et al*. 1979). Vegetation was considered hydrophytic within a suspected wetland area if greater than 50% of the dominant plant species had a wetland indicator status of facultative or wetter (i.e., facultative, facultative wetland, or obligate wetland).

Wetland hydrology was determined based on the presence of hydrologic indicators listed in the Corps' Regional Supplement. These indicators are separated into Primary Indicators and Secondary Indicators. To confirm the presence of wetland hydrology, one Primary Indicator or two Secondary Indicators must be demonstrated. Indicators of wetland hydrology may include, but are not necessarily limited to; drainage patterns, drift lines, sediment deposition, watermarks, stream gauge data and flood predictions, historical records, visual observation of saturated soils, and visual observation of inundation.

Soils on the Site were considered hydric if one or more of the hydric soil indicators listed in the Corps' Regional Supplement were present. Indicators include: the

- presence of organic soils;
- reduced, depleted or gleyed soils, or
- redoximorphic features in association with reduced soils.

Wetlands were rated using the City of Kirkland's wetland rating system. The wetland datasheets are contained in **Appendix A**.

Chapter 4. RESULTS

4.1 Analysis of Existing Information

The following sources provided information on site conditions based on data compiled from resource agencies and local government. For the purposes of this report, the term "vicinity" will mean an area within ¼ mile of the Project Site.

4.1.1 USFWS Wetlands Online Mapper (National Wetlands Inventory)

The USFWS Wetlands Online Mapper maps six wetland units within the vicinity of the Site (**Figure 3**). No wetlands are indicated on or extending onto the site. Three of the wetlands are palustrine forested (one is indicated as palustrine forested/scrub-shrub), two are palustrine unconsolidated bottom, and one is a palustrine scrub-shrub wetland.

4.1.2 Natural Resources Conservation Service Web Soil Survey

Three soil types are mapped on the property (**Figure 4**). These are Kitsap silt loam (KpB, 2 to 8 percent slope), Kitsap silt loam (KpC, 15 to 30 percent slope), and Indianola loamy fine sand (InC, 4 to 15 percent).

The Kitsap series is made up of moderately well-drained soils that formed in glacial lake deposits, under a cover of conifers and shrubs. These soils are on terraces and strongly dissected terrace fronts. The surface layer and subsoil are very dark brown and dark yellowish brown silt loam.

The Indianola series is made up of somewhat excessively drained soils that formed under conifers in sandy, recessional, stratified glacial drift. These undulating, rolling, and hummocky soils are on terraces. These soils are generally brown, dark yellowish-brown, and light olive-brown loamy fine sand.

The Kitsap and Indianola soil series are not listed as hydric by the National Technical Committee on Hydric Soils.

4.1.3 StreamNet and SalmonScape GIS Databases

StreamNet and SalmonScape maintain data concerning the usage or potential usage of streams in the Pacific Northwest. Neither SalmonScape nor StreamNet map any fish species as utilizing any portion of the Site. StreamNet maps coho (*Oncorhynchus kisutch*) as utilizing Forbes Creek for rearing and migration. No other salmonid species are mapped within the vicinity of the Site.

SalmonScape maps four species utilizing or having the potential to utilize Forbes Creek. These are fall chinook (*O. tshawytscha*), coho, winter steelhead (*O. mykiss*), and sockeye (*O. nerka*). Coho are indicated as documented rearing. Sockeye are indicated

as documented presence. Both fall chinook and winter steelhead are indicated as modeled presence[1].

4.1.4 King County GIS Database

King County GIS does not map any critical areas on the Site. However, it does map some features within the vicinity of the Site (**Figure 5**). These features include two water bodies, two streams, a floodway, and a floodplain. One of the streams, which is identified as Forbes Creek, is associated with the floodway and floodplain. The second stream is unnamed on the King County GIS database.

4.1.5 City of Kirkland Critical Areas Map

The City of Kirkland does not map any wetlands on the Site (**Figure 6**). However, it does map two wetlands in the vicinity of the Site. One wetland is located near the southwest property corner on an adjacent parcel. The other wetland is associated with Forbes Creek to the north of the Site.

The City of Kirkland also maps five streams on the Site and Forbes Creek to the north of the property. At least four more streams are mapped on properties to the east and west of the Site.

Finally, the City of Kirkland maps a floodplain and floodway in the general vicinity of Forbes Creek.

4.2 Analysis of Existing Site Conditions

Two wetlands and five streams were identified during our evaluation of the Site (see **Figure 7** and **Sheet W1.0**). An additional wetland was identified off-site to the west, but was not delineated. It was, however, rated using the City of Kirkland's wetland rating system (Plate 26).

4.2.1 Wetlands

4.2.1.1 Wetland A

Wetland A is an approximately 5,900 sf wetland located near the southwestern corner of the Site (Parcel A). It appears to have been created by a slump in the recent past, based on the age of the alders growing within Wetland A. The wetland is a slope wetland that provides hydrology for one of the five onsite streams.

Vegetation within Wetland A consists primarily of skunk cabbage (*Lysichiton americanus*), piggyback plant (*Tolmiea menziesii*), slough sedge (*Carex obnupta*), field and tall horsetail (*Equisetum arvense* and *E. telmateia*), lady fern (*Athyrium filix-femina*), salmonberry (*Rubus spectabilis*), and young red alder (*Alnus rubra*).

Wetland A was rated using the City of Kirkland's wetland rating system. The wetland scored 26 points, which satisfies the criteria for characterization as a Type 2 wetland. Type 2 wetlands located within a Primary Basin (Forbes Creek) have a 75-foot standard buffer. Wetland buffers may be modified through buffer averaging, provided that the

[1] "Modeled presence" indicates that physical parameters of a particular stream may support the presence of a salmonid species, but no actual documentation of their presence exists.

minimum buffer width at any one point is not less than 50 feet and that the total area of the averaged buffer is not less than the area of the standard buffer.

4.2.1.2 Wetland B

Wetland B is a very small (approximately 170 sf) wetland that formed within an old concrete cistern. The cistern is constructed within the ravine for one of the onsite streams (Stream 4) and may have provided water for the residence that existed on Parcel A. Over time, this cistern has silted in and wetland vegetation has become established. Vegetation in Wetland B consists of American brooklime (*Veronica americana*), lady fern, piggyback plant, and slough sedge.

Wetland B scored 17 points using the City of Kirkland wetland rating system. This satisfies the criteria for characterization as a Type 3 wetland. Type 3 wetlands located within a Primary Basin have a 50-foot standard buffer. Wetland buffers may be modified through buffer averaging, provided that the minimum buffer width at any one point is not less than 33 feet and that the total area of the averaged buffer is not less than the area of the standard buffer.

4.2.1.3 Wetland C (Off Site)

Wetland C is a slope wetland that is located to the west of the southwest property corner. This wetland was not delineated since it resides off property. However, we estimate its size to be approximately 6,200 sf. Vegetation consists predominantly of salmonberry, lady fern, skunk cabbage, slough sedge, and red alder. Wetland C is the headwaters of one of the onsite streams (Stream 4).

Wetland C scored 25 points using the City of Kirkland wetland rating system. This satisfies the criteria for characterization as a Type 2 wetland. Type 2 wetlands located within a Primary Basin have a 75-foot standard buffer. Due to the location of this wetland, buffer averaging will likely not be possible.

4.2.1.4 Wetland D

Wetland D is a small (235 sf) slope wetland located within the southern portion of the right-of-way for Forbes Creek Drive. Vegetation within the wetland is managed through periodic mowing. However, a small patch of slough sedge (*Carex obnupta*) was discernable.

Wetland D scored 13 points using the City of Kirkland Wetland rating system. This satisfies the criteria for characterization as a Type 3 wetland. Type 3 wetlands located within a Primary Basin have a 50-foot standard buffer. Wetland buffers may be modified through buffer averaging, provided that the minimum buffer width at any one point is not less than 33 feet and that the total area of the averaged buffer is not less than the area of the standard buffer.

4.2.2 Streams

4.2.2.1 Stream 1

Stream 1 starts at the outfall of a stormwater pipe located on the north side of 20th Avenue (see **Figure 7** and **Sheet W1.0**). The stream flows onto the Site at the

southeast property corner and flows in a northerly direction for approximately 70 feet. Then, the stream flows off property to the east. The stream channel is in a deeply incised ravine that extends from the stormwater outfall.

Stream 1 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the total area of the reduced buffer is not less than the area of the standard buffer.

4.2.2.2 Stream 2

Stream 2 starts at the outfall of two stormwater pipes located on the north side of 20th Avenue, approximately 170 feet west of the stormwater outfall for Stream 1. As with Stream 1, Stream 2 flows within a deeply incised ravine. The stream flows aboveground for approximately 390 feet where it flows into a buried pipe. The pipe extends to the northeast for approximately 160 feet. The outfall of this pipe is within the channel for Stream 5.

Stream 2 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the total area of the reduced buffer is not less than the area of the standard buffer. There is no buffer requirement for the piped portion of Stream 2. However, stream buffers are measured in all directions from culvert ends.

4.2.2.3 Stream 3

Stream 3 starts near the southwest corner of the Site in an area of a previous soil slump (the same slump that likely created Wetland A). There are at least three pipe outfalls mapped to the south of the headwaters of Stream 3. As with Stream 1 and 2, the pipes carry stormwater from the development to the south of 20th Avenue. Stream 3 begins as two separate seeps and one overland runoff from a stormwater pipe. The three headwater branches coalesce towards the northern tip of Wetland A. At this point, the combined stream flows in a deeply incised ravine for approximately 220 feet. The stream then enters a buried pipe that extends to the northeast for approximately 280 feet. The pipe then discharges into a roadside ditch along Forbes Creek Road.

Stream 3 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the area of the reduced buffer is not less than the area of the standard buffer. There is no buffer requirement for the piped portion of Stream 3. As stated in the discussion of Stream 2, stream buffers are measured in all directions from culvert ends.

4.2.2.4 Stream 4

The headwaters for Stream 4 are within Wetland C off property to the west. Stream 4 flows onto the Site approximately 130 feet north of the southwest property corner and flows within a deeply incised ravine for approximately 100 feet (this aboveground portion of Stream 4 includes Wetland B). At this point, the stream enters a buried pipe.

The pipe extends to the northeast for approximately 140 feet and discharges into a roadside ditch along Forbes Creek Road.

Stream 4 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the area of the reduced buffer is not less than the area of the standard buffer. There is no buffer requirement for the piped portion of Stream 4. As stated in the discussion of Stream 2, stream buffers are measured in all directions from culvert ends.

4.2.2.5 Stream 5

Stream 5 starts off property to the east. Prior to the development of subdivision along Forbes Creek Road adjacent to the east of the Site, Stream 5 did not flow onto the subject property. Stream 5 is collected offsite in a pipe and shunted westward along the south side of the aforementioned subdivision. This pipe discharges into a deeply incised ravine that flows in a westerly direction onto the Site, then flows in a northwesterly direction towards Forbes Creek Road. As previously mentioned, the piped portion of Stream 2 discharges into the onsite portion of the Stream 5 ravine.

Stream 5 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams in a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the area of the reduced buffer is not less than the area of the standard buffer.

Chapter 5. REGULATORY REVIEW

5.1 City of Kirkland Critical Areas Regulations

Wetlands and streams on the Site are subject to City of Kirkland critical areas regulations under Chapter 90 – Drainage Basins. The City of Kirkland currently uses its own wetland rating and water typing systems. The wetland rating system appears to be based on the Washington Department of Ecology's (WDOE) Washington State Wetland Rating System for Western Washington (1993), which is not comparable with the current WDOE Washington State Wetland Rating System for Western Washington (2014). Similarly, their method of water typing for streams is not comparable with the current or previous Washington Department of Natural Resources (WDNR) water typing system, which is promulgated in WAC 222-16-030 and 222-16-031.

Wetland buffers are determined based on the wetland's rating and whether it is located within a Primary Basin or a Secondary Basin. Primary Basins are defined as the basin that supports one of Kirkland's major stream systems. Similarly, stream buffers are based on the stream's class and whether it is located within a Primary Basin.

5.2 State and Federal Regulations

Wetlands and streams on the Site are subject to applicable State and Federal regulations. Wetland impacts are regulated at the Federal level by Sections 404 and 401 of the Clean Water Act. The U.S. Army Corps of Engineers (Corps) is responsible for administering compliance with Section 404 via the issuance of Nationwide or Individual Permits for any fill or dredging activities within wetlands under Corps

jurisdiction. Any project that is subject to Section 404 permitting is also required to comply with Section 401 Water Quality Certification, which is administered by the Washington State Department of Ecology (WDOE). No dredging or filling of wetlands is proposed for the current site development plan. Therefore, the project will not need to apply for any Section 404 Nationwide or Individual Permits or Section 401 Water Quality Certification.

Any work within, over, or under the Ordinary High Water Mark of a stream requires a Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (WDFW), pursuant to the State Hydraulic Code (Chapter 77.55 RCW).

Chapter 6. PROPOSED PROJECT

6.1 Project Description

Orcas Moon, LLC is proposing to develop the Orcas Moon property with 15 units of cottage housing (**Sheet W1.1**). Approximately 21 percent of the Site (approximately 65,790 sf of the approximately 308,650 sf Site) will be developed. The development area will be divided into two separate groups based on available land that is not constrained by steep slopes. For the purposes of this report, the groups will be called Group 1 and Group 2. Group 1 (approximately 41,120 sf) is located in the southwestern portion of the Site adjacent to 20th Avenue. Group 2 (approximately 24,670 sf) is located in the southeastern portion of the Site, also adjacent to 20th Avenue. Group 1 will include 9 cottage units, and Group 2 will provide 6 cottage units. Parking for Groups 1 and 2 will be provided through a mixture of covered and uncovered stalls. There will be one covered stall for every cottage unit. Access to the Group 1 and 2 cottage units will be provided by sidewalks from the parking areas.

The development plan will provide three open space areas for Group 1 and two open space areas for Group 2. In addition, approximately 193,750 sf of area will be dedicated as an NGPA. Approximately 22,158 sf of the dedicated NGPA will fulfill the protected area requirements per the City of Kirkland's Stormwater Drainage Manual. See Site Development Key map as shown on **Sheet W1.1**.

Two utility easements will be established on the Site to service the two development groups described previously. These easements will provide stormwater and sewer pipe routing to the northern portion of the property. The stormwater pipes will connect with a proposed stormwater vault adjacent to Forbes Creek Drive (this vault will be located outside of existing wetland and stream buffers). A new access road to the stormwater vault will be constructed over the existing driveway off of Forbes Creek Drive (the driveway to the residence depicted on the 1936 and 1952 aerial images). The sanitary sewer pipes will connect to an existing sewer main located in the roadway for Forbes Creek Drive.

As mentioned in **Section 4.2.2**, three of the five streams onsite flow into 12-inch pipes that carry flow across the northern half of the Site to the roadside ditch along Forbes Creek Drive. Drainage analyses of these pipes indicate that they are sufficiently sized to carry the anticipated stream flows. However, their relatively small size makes their

inlets susceptible to being plugged by debris. Streamflow has the potential to back up against the debris jams and flow overland, which can lead to soil erosion. The proposed development plan will prevent this from happening by installing trash racks on the opening of these pipes. The project's Covenants, Conditions, and Restrictions (CC&Rs) will require that biannual maintenance of the trash racks will occur to ensure the free-flow of stream water through the pipes.

6.2 Project Impacts

The project has been designed to avoid all direct impacts to wetlands and streams on the Site. However, it will be necessary to impact wetland and stream buffers in order to provide the required yard setbacks for the cottage units, construction of some of the parking areas, pedestrian paths and walkways, and required utilities (such as stormwater and sanitary sewer lines) (**Sheet W1.1**). Buffers will be reduced in these areas of impact and mitigated for using buffer averaging. In all, there will be several areas on the Site where reduction of buffer will occur. The proposed individual buffer reduction areas are described below.

Approximately 24,100 sf of buffer will be reduced in order to provide sufficient development area for the Site.

Buffer reduction with averaging is permitted under KZC §90.100(1)(a), which states:

> "Buffer averaging requires that the area of the buffer resulting from the buffer averaging be equal in size and quality to the buffer area calculated by the standards specified in KZC 90.90(1). Buffers may not be reduced at any point by more than one-third (1/2) of the standards in KZC 90.90(1). Buffer calculations shall only consider the subject property."

Within the reduced buffer areas, there will be approximately 3,410 sf of minor impacts resulting from utilities and trail construction. Trails are allowed within the outer ½ of a critical area buffer and are considered a minor improvement under §90.90(5), which states:

"Minor improvements may be located within the sensitive area buffers specified in subsection (1) of this section. These minor improvements shall be located within the outer one-half (½) of the sensitive area buffer, except where approved stream crossings are made. The Planning Official shall approve a proposal to construct a minor improvement within a sensitive area buffer if:

a) It will not adversely affect water quality;
b) It will not adversely affect fish, wildlife, or their habitat;
c) It will not adversely affect drainage or stormwater detention capabilities;
d) It will not lead to unstable earth conditions or create erosion hazards or contribute to scouring actions; and
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 open space or scenic vistas."

Code provisions for §90.90(5) and §90.100(1)(a) are discussed below (**Section 6.3**).

6.3 Proposed Buffer Averaging Plan

The proposed mitigation for the buffer reduction will be through buffer averaging. Sufficient area is available on the Site to provide meaningful buffer averaging. Several areas on the Site have been identified that will provide additional buffer area. The total area of buffer addition is approximately 28,870 sf for a net increase in buffer area of approximately 4,760 sf.

6.3.1 Agency Policies and Guidance

KZC §90.90(5), as stated previously in **Section 6.2**, states that minor improvements may be located within the outer one-half of a sensitive area buffer, provided that:

a) "It will not adversely affect water quality;

The proposed trails will be constructed using permeable paving material, such as wood chips or wood bark. The amount of buffer reduction resulting from the proposed trails is minimal compared to the total area of buffer reduction. No disturbance to vegetation or soils will occur between the trail and sensitive area that could result in potentially adverse alterations of water quality.

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

The trails will be constructed next to non-fish-bearing streams, so there will be no potential for an adverse effect to fish. The streams are located within relatively steep, well-vegetated ravines, which will both provide habitat for wildlife while protecting them from human-caused noise or stress. There should be no adverse effect to fish, wildlife, or their habitat resulting from the proposed trail construction.

c) It will not adversely affect drainage or stormwater detention capabilities;

All stormwater will be collected within the development footprint of the project and directed via stormwater pipes to a detention vault to be located near Forbes Creek Drive. The source of water for the onsite streams is discharged from stormwater pipes off of 20th Avenue. No development actions will occur that will affect the sources of water for the onsite streams, nor will the proposed trails likely affect these drainages.

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

The proposed trails will require minimal grading for construction and will be paved using permeable materials, such as wood chips or wood bark. Construction of the trails will take into consideration existing slope and topography so that they will not create unstable earth conditions or erosion hazards.

and

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 open space or scenic vistas."

It is unlikely that the proposed trails will create conditions that will affect the Site or other properties in the area. Additionally, the proposed trails will be unlikely to affect the City as a whole.

KZC §90.100(1)(a), as stated previously in **Section 6.2**, requires that the averaged buffer area be equal in size and quality to the standard buffer area. KZC §90.100(2) provides the framework for process review and decision criteria, stating:

"…Modification requests for averaging or reduction/enhancement of Class B stream buffers shall be considered by the Planning Official pursuant to Process 1, described in Chapter 145 KZC. …

An improvement or land surface modification shall be approved in a stream buffer only if:

a. 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 Site is located within the Forbes Creek Basin. Two wetlands are mapped by the Watershed Company report in the general vicinity of the Site. These are Forbes 1 and Forbes 3. Forbes 1 is described as being relatively high value, despite the amount of development pressure surrounding it. Forbes Creek flows through Forbes 1. Forbes 3, which is located north of Forbes Creek Drive and approximately 880 feet west of the Site, is described as low to moderate quality. An unnamed stream is mapped flowing through Forbes 3, crossing under Forbes Creek Drive, and connecting with Forbes Creek. No wetlands are mapped by the Watershed Company report on the Site. However, it appears that one stream was mapped on the Site. This stream appears to be roughly in line with Stream 2. No other information is provided concerning this stream.

General recommendations provided in the Watershed Company report include improvements of stormwater treatment and detention, protection of existing wetlands and streams, wetland enhancements, and improving fish passage issues. Improving fish passage issues is beyond the scope of this project in that no streams with usable fish habitat exist on the Site. The proposed project will, however, utilize the best available technology for stormwater treatment and detention, which will address water quality and hydroperiod issues to a limited extent on Forbes Creek. No direct impacts to wetlands are being proposed, so there is no reason based in

the applicable code for enhancing onsite wetlands. Stream and wetland buffers will be maintained.

Recent comments provided by the Watershed Company made reference to Washington Department of Ecology (WDOE) guidelines that suggest that buffers on steep slopes should be increased to compensate for a reduced ability for steep slope areas to filter out pollutants. While we agree with the concept as outlined by WDOE, we also feel that it does not take into consideration current building standards and stormwater management. An increased buffer width would make sense if pollutants were able to flow off of the developed Site towards a wetland or stream. However, required stormwater infrastructure (curb, gutter, sidewalk, etc.) will capture all precipitation falling on the developed area and direct it towards the proposed stormwater system for the project. CC&R's will be established that will limit the use of fertilizers, herbicides, or pesticides on the project's greenscape. It is our contention, therefore, that increasing the width of the buffer on steep slope areas will not provide any appreciable protection to existing critical areas and is not needed.

The Adolfson report reiterates much of what was stated in the Watershed Company report, with the admonition to provide a "greater degree of protection" to wetlands and streams located within a Primary Basin compared to wetlands and streams located within Secondary Basins. The Site is located within a Primary Basin (Forbes Creek).

The Adolfson report recommends standard buffer widths and setbacks for wetlands and streams located in Primary Basins. Class B streams are recommended to have a 60-foot standard buffer. Class C streams are recommended to have a 35-foot standard buffer. Both of these widths are provided for by the proposed site development, except where buffer reduction through averaging is proposed.

Buffers for Type 2 and Type 3 wetlands located within a Primary Basin are suggested to be 75 feet and 50 feet, respectively. Both of these buffer widths are provided for by the proposed site development, except where buffer reduction through averaging is proposed. No direct modification of wetlands is proposed by the current site development plan.

Finally, the Adolfson report discusses Significant Habitat Areas. The report recommends that the City establish Wildlife Habitat Conservation Areas to protect known populations of Federally- and State-listed threatened or endangered species. The Site has not been designated as a Wildlife Habitat Conservation Area. However, it cannot be ignored that significant wildlife habitat potential is present onsite. The proposed site development plan protects a significant portion of the Site, including the areas with the highest value habitat (steeply sloped ravines and

associated wetlands and streams). Approximately 70-percent of the Site will remain undeveloped. This habitat is separated from the main Forbes Creek 1 habitat area by Forbes Creek Drive, but may still provide additional value for birds and other wildlife. Additionally, habitat connections to the undeveloped properties to the east and west will be maintained. These properties include Crestwoods Park to the east of the Site and Juanita Bay Park to the west (Juanita Bay Park also exists north of Forbes Creek Drive, but is separated from the Site by existing residential development).

b. It will not adversely affect water quality;

As stated for our evaluation of §90.90(5)(a), all stormwater will be collected within the development and directed via stormwater pipes to a stormwater detention vault to be constructed adjacent to Forbes Creek Drive. The proposed project will not adversely affect the quality of water within Wetland A or associated streams.

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

As stated in our evaluation of §90.90(5)(b), the proposed buffer reduction with averaging will not adversely affect fish, wildlife, or their habitat.

d. It will not have an adverse effect on drainage and/or stormwater detention capabilities;

As stated in our evaluation of §90.90(5)(c), hydrology for the onsite wetlands and streams is from stormwater discharge off of 20th Avenue. No work will occur that will alter this source of hydrology. Stormwater detention for the developed portion of the Site will be provided by a new stormwater detention vault. This vault will be sized in accordance with the City of Kirkland's stormwater design requirements.

e. It will not lead to unstable earth conditions or create an erosion hazard or contribute to scouring actions;

As stated in our evaluation of §90.90(5)(d), the proposed development will not affect areas of steep slopes, which could lead to unstable earth conditions. Grading and filling to create a level building area will be contained within structural walls. All stormwater will be collected onsite and discharged to a stormwater detention vault; no undetained stormwater will be allowed to leave the building envelope and flow onto the steep slope areas. The proposed project will not increase the amount of water currently flowing within the onsite stream channels, which could result in increased erosion or scouring actions. The boundaries of all proposed work will be contained within silt fencing and construction limits fencing.

No disturbance of soils or vegetation outside of the defined construction limits will occur.

f. It will not be materially detrimental to any other property or the City as a whole;

As stated in our evaluation of §90.90(5)(e), the proposed development will not be materially detrimental to any other property or the City as a whole. All construction-related work will be in accordance with the City's development regulations and best management practices.

g. Fill material does not contain organic or inorganic material that would be detrimental to water quality or to fish, wildlife, or their habitat;

Fill material will be locally sourced from clean material and approved by the City prior to placement. It will not contain organic or inorganic pollutants that could affect fish, wildlife, or their habitats. Best management practices (i.e., silt fencing, straw bales, coir logs, etc.) will be used to prevent any fill material from leaving the development envelope.

h. All exposed areas are stabilized with vegetation normally associated with native stream buffers, as appropriate;

At the conclusion of construction work, all exposed earth shall be revegetated with native trees, shrubs, and herbaceous plant species suitable for use within stream and wetland buffers associated with slopes where applicable. Other areas, where trees and shrubs are not specified for planting, will be seeded with a native grass species to stabilize exposed soil. Construction and silt fencing shall remain in place until the native vegetation is sufficiently mature to stabilize and protect previously disturbed earth. Construction and silt fencing shall be removed when vegetation maturity has been adequately demonstrated.
and

i. There is no practical or feasible alternative development proposal that results in less impact to the buffer."

The proposed site development plan, including the proposed buffer averaging plan, represents the minimum impact to buffers that still allows for an economic development of the property in accordance with City of Kirkland development codes and guidelines.

6.3.2 Proposed Site Mitigation – Buffer Averaging

The areas proposed for buffer addition are currently well vegetated and similar in plant species composition and plant density to the areas of proposed buffer reduction. The functions and services provided by the lost buffer area will be compensated by the functions and services provided by the additional buffer areas. However, the existing

shrub vegetation within the areas of buffer reduction and buffer addition includes areas of non-native blackberries, including areas of steep slopes (e.g., the ravines containing Streams 2 and 3). Physical removal of blackberries and their root balls within the steep slope areas will likely result in the types of unstable earth conditions the development and mitigation plan must avoid per KZC §90.90(5)(e). We propose that the steep slope areas adjacent to the development be left alone at this time. Other areas with significantly shallower slopes will benefit from the physical removal of blackberries and their root balls.

The proposed buffer addition areas will be enhanced by the installation of large woody material (down logs, root balls and stumps, bat boxes, and bird nesting boxes) and enhancement planting with a variety of native trees and shrubs after physical removal of blackberry. Large woody debris will be salvaged from areas cleared for development. While such enhancement planting is not specifically required under KZC §90.100(1)(a), we believe that the proposed enhancement planting of the added buffer area will provide better habitat value compared to the habitat provided by the buffer area proposed for reduction. The proposed buffer addition areas outside of the steep slope areas will be restored after the removal of non-native invasive species by replanting with a variety of native trees and shrubs (See **Sheet W3.0** for planting typicals).

Approximately 3,410 sf of buffer will be temporarily impacted for the construction of the soft-surface trail, trash rack installation, and other utility improvements. These impacts will be mitigated by restoring the original topography of the impacted area, loosening compacted soils, and replanting with a variety of native trees and shrubs.

6.4 Mitigation Design Elements

Enhancement of the additional buffer area will be accomplished by:

- grubbing out non-native plant species;
- replanting grubbed areas with native species;
- installation of habitat improvement material, such as large woody debris, bird nesting boxes, and bat boxes;
- providing temporary irrigation for the newly installed plants
- providing fertilizer and mulch around newly planted material; and
- protecting the reduced and added buffer areas with critical area fences and signage.

These elements are described in detail below.

6.4.1 Grubbing Non-native Species

A considerable portion of the understory of the site is vegetated predominantly by non-native, invasive species, including Himalayan blackberry (*Rubus armeniacus*) and non-native knotweeds (*Polygonum cuspidatum* or *P. sachalinense*) (see **Sheet W2.0**). The knotweed is located primarily in the northeastern corner of the Site. These species tend to reduce the diversity of understory species by outcompeting more desirable native shrub species and by creating a monoculture that provides reduced habitat potential for wildlife. The approximately 22,595 sf area set aside as NGPA per the Stormwater

Manual will not be grubbed to maintain soil stability in that area. Additionally, the onsite ravines will not be grubbed to prevent creating unstable earth conditions in accordance with KZC §90.90(5)(d).

The largest area to be treated is approximately 22,595 square feet and contains minor patches of invasive species such as Himalayan blackberry, laurel cherry, English ivy, and English holly. These patches are to be located and removed by hand. A smaller, 4,565 square foot area is similar in character, but the invasive species are intermixed with dense native shrubs. These patches will be cleared of non-native species to the extent practicable while avoiding the removal of the intermixed native species (such as salmonberry). Native species that are damaged or removed as a result of the removal of the non-native species shall be replaced. Areas with dense patches of non-native invasive species may require mechanical grubbing. Areas requiring mechanical grubbing will be restored by planting with a variety of native trees and shrubs. A mulch ring at a minimum thickness of three inches will be placed around all planted material. This mulch ring will help prevent certain non-native or aggressive plant species from becoming re-established.

Buffer areas disturbed during construction will be restored to original contours. All construction debris and trash shall be removed from the buffer area. Compacted soils shall be loosened and topsoil restored or replaced. Non-native invasive species still present will be removed and the disturbed area replanted with a variety of native trees and shrubs.

6.4.2 Habitat Enhancement

The wildlife habitat value of the critical areas buffers will be enhanced by placement of down logs and stumps, brush piles (for small birds), and placement of bat roosting boxes and bird nesting boxes. The structure provided by these natural elements is beneficial for a variety of naturally occurring wildlife.

Snags will be installed in areas that are subject to grading activities, providing important wildlife opportunities. Bird nest boxes and bat boxes will be installed on the snags to provide nesting or roosting opportunities on the edge of open areas. See Detail 1 on **Sheet W2.0**.

6.4.3 Conceptual Planting Design

Plant species were chosen for a variety of qualities, including:

- adaptation to specific water regimes;
- value to wildlife;
- value as a physical or visual barrier;
- patterns of growth (structural diversity); and
- aesthetic values.

Native species were chosen to increase both the structural and species diversity of the mitigation areas, thereby increasing the value of the area to wildlife for food and cover.

Plant materials will consist of a combination of one- and two-gallon container trees, shrubs, and groundcovers.

The proposed planting plan (**Sheet W3.0**) provides three different planting typicals. These typicals were designed based on the existing vegetative conditions and levels of potential construction-related disturbances. Planting quantities and densities are based on the density recommendations of the King County Mitigation Guidelines, with the exception of suggested tree and large shrub densities. Tree and large shrub densities are approximately 30 percent of the recommended densities in the King County Guidelines. This reduced density takes into account the existing tree and shrub densities on the subject property.

Plant materials shall consist of one- and two-gallon container trees and shrubs. See **Sheet W3.0** for proposed tree, shrub, and groundcover quantities.

6.4.4 Temporary Irrigation System

The Client shall water plants immediately upon planting, then provide manual watering or a temporary irrigation system to prevent plant mortality and ensure proper plant establishment. Plants shall receive a minimum of approximately 1-inch of water every week (0.5 inches every 3 days) during the dry season, generally June 15th to October 15th) for the first two years after planting. Watering amounts may need to be increased during prolonged periods of hot, dry weather.

6.5 Fertilizer

The Client shall fertilize all trees and shrubs with a slow-released general-purpose granular fertilizer or slow-release tablets at manufacturer's specified rate at the time of planting.

6.5.1 Mulch

A full 3 inches of medium bark mulch (after settling) shall be around all installed plants and on any disturbed open soil areas. Mulch shall be derived from fir, pine, or hemlock species, and shall not contain trash, rocks, or other debris that may be detrimental to plant growth.

6.5.2 Fence and Signage

A 2-board critical areas fence shall be installed at the final critical areas boundary, following site preparation, planting, and mulching. On the fence, signs shall be provided per the requirements of the City of Kirkland. Location and details of the fence and signage will be provided.

Chapter 7. CONSTRUCTION SEQUENCING

7.1 Mitigation Construction Sequence

The following provides the general sequence of activities anticipated to be necessary to complete this mitigation project. Some of these activities may be conducted concurrently as the project progresses.

1. Conduct a site meeting between the Contractor, Talasaea Consultants, and the Owner's Representative to review the project plans, work areas, staging/stockpile areas, and material disposal areas.
2. Survey clearing/grading limits.
3. Flag existing trees and other vegetation to remain.
4. Install silt fencing, tree protection fencing (if required), and any other erosion and sedimentation control BMPs necessary for work in the project areas.
5. Complete site grading, retaining wall, and dispersion trench installation in buffer areas per civil site development plans.
6. Grub out invasive species in buffer areas as shown on clearing and grubbing plan.
7. Install habitat features (snags, down logs, and stumps).
8. Mulch all graded/grubbed buffer areas.
9. Construct soft surface trail from 20th Avenue northward to Forbes Creek Drive.
10. Complete site cleanup and install plant material as indicated on the planting plan.

7.2 Post-Construction Approval

Following mitigation construction completion, Talasaea Consultants shall notify the City in writing to request a final site inspection for final construction approval. Once the City has approved of the mitigation construction, the monitoring period shall commence.

7.3 Post-Construction Assessment

Once construction is approved by the City, a qualified wetland ecologist or biologist from Talasaea Consultants shall conduct a post-construction assessment. The purpose of this assessment will be to establish baseline conditions at Year 0 of the required monitoring period. A Baseline Assessment report including “as-built” drawings will be submitted to the City. The as-built plans will identify and describe any changes in planting or other features in relation to the original approved plan.

Chapter 8. MONITORING PLAN

8.1 Reporting

The reports will include: 1) Project Overview, 2) Mitigation Requirements, 3) Summary Data, 4) Maps and Plans, and 5) Conclusions. If the performance criteria are met, monitoring for the City will cease at the end of year five, unless objectives are met at an earlier date and the City accepts the mitigation project as successfully completed.

Table 1. Projected Schedule for Performance Monitoring and Maintenance Events

Year	Date	Maintenance Review	Performance Monitoring	Report Due to Agencies
Year 0, As-built and Baseline Assessment	Winter 2018	X	X	X
1	Spring 2019	X	X	
	Fall 2019	X	X	X
2	Spring 2020	X	X	
	Fall 2020	X	X	X
3	Spring 2021	X		

	Fall 2021	X	X	X
4	Spring 2022	X		
	Fall 2022	X	X	X
5	Spring 2023	X		
	Fall 2023	X	X	X*

*Obtain final approval to facilitate bond release from the City of Kirkland (presumes performance criteria are met).

8.2 Monitoring Methods

Vegetation monitoring methods may include counts; photo-points; random sampling; sampling plots, quadrats, or transects; stem density; visual inspection; and/or other methods deemed appropriate by the permitting agencies and the biologist/ecologist. Vegetation monitoring components shall include general appearance, health, mortality, colonization rates, percent cover, percent survival, volunteer plant species, and invasive weed cover.

Permanent vegetation sampling plots, quadrats, and/or transects will be established at selected locations to adequately sample and represent all of the plant communities within the mitigation project areas. The number, exact size, and location of transects, sampling plots, and quadrats will be determined at the time of the baseline assessment.

Percent areal cover of woody vegetation (forested and/or scrub-shrub plant communities) will be evaluated through the use of point-intercept sampling methodology. Using this methodology, a tape will be extended between two permanent markers at each end of an established transect. Trees and shrubs intercepted by the tape will be identified, and the intercept distance recorded. Percent cover by species will then be calculated by adding the intercept distances and expressing them as a total proportion of the tape length.

The established vegetation sampling locations will be monitored and compared to the baseline data during each performance monitoring event to aid in determining the success of plant establishment. Percent survival of shrubs and trees will be evaluated in a 10-foot-wide strip along each established transect. The species and location of all shrubs and trees within this area will be recorded at the time of the baseline assessment and will be evaluated during each monitoring event to determine percent survival.

8.3 Photo Documentation

Locations will be established within the mitigation areas from which panoramic photographs will be taken throughout the monitoring period. These photographs will document general appearance and relative changes within the plant communities. Review of the photos over time will provide a semi-quantitative representation of the success of the planting plan. Vegetation sampling plot and photo-point locations will be shown on a map and submitted with the baseline assessment report and yearly performance monitoring reports.

8.4 Wildlife

Birds, mammals, reptiles, amphibians, and invertebrates observed in the mitigation areas (either by direct or indirect means) will be identified and recorded during scheduled monitoring events, and at any other times observations are made. Direct observations include actual sightings, while indirect observations include tracks, scat,

nests, song, or other indicative signs. The kinds and locations of the habitat with the greatest use by each species will be noted, as will any breeding or nesting activities.

8.5 Water Quality and Site Stability

Water quality will be assessed qualitatively unless it is evident there is a serious problem. In such an event, water quality samples will be taken and analyzed in a laboratory for suspected parameters. Qualitative assessments of water quality include:

- oil sheen or other surface films,
- abnormal color or odor of water,
- stressed or dead vegetation or aquatic fauna,
- turbidity, and
- absence of aquatic fauna.

Observations will be made of the general stability of slopes and soils in the mitigation areas during each monitoring event. Any erosion of soils or slumping of slopes will be recorded and corrective measures will be taken.

8.6 Goals, Objectives, and Performance Standards

This section of the critical areas report addresses the mitigation goals (including requirements of the City of Kirkland and how they are planned to be met), as well as the related objectives and performance standards to which the project is expected to meet. These are described in detail below.

8.6.1 Mitigation Goals

The goal of the mitigation plan is to enhance the functions and services provided by the areas proposed for buffer addition. This will be accomplished through the removal of garbage and construction-related debris, removal of non-native invasive plant species, replanting with a variety of native trees and shrubs, and installation of habitat features such as large woody debris, bird nesting boxes, and bat boxes. The total area of buffer addition will be no less than 28,870 sf, which will offset the proposed buffer reduction of no greater than 24,100 sf.

8.6.2 Mitigation Objectives and Performance Standards

The success of the proposed buffer enhancement plan will be evaluated through the following objectives and performance standards. Mitigation monitoring will be performed by a qualified biologist.

Objective A: Create structural and plant species diversity in the added buffer area.

Performance Standard A1: *At least five (5) species of desirable native woody plants will be present in the added buffer area during the monitoring period. Percent survival of planted woody material must be 100 percent at the end of Year 1 (per contractor warranty), and at least 80 percent for each subsequent year of the monitoring period.*

Objective B: Create additional habitat within the added buffer area.

Performance Standard B1: *Large woody debris, consisting of softwood logs, stumps, and root wads, shall be placed within the added buffer area. A minimum of nine (9) pieced of large woody debris will be placed.*

Performance Standard B2: *Bird nesting boxes and bat boxes shall be installed within the added buffer area. No fewer than two bird nesting boxes and two bat boxes shall be installed. The presence of these boxes shall be verified during each monitoring event.*

Objective C: Limit the amount of non-native and invasive species in the added buffer area.

Performance Standard C1: *After construction and for the entirety of the monitoring period, non-native, invasive species shall be maintained at levels below 20 percent cover throughout the added buffer area. Non-native, invasive species include, but are not limited to, Scot's broom, Himalayan and evergreen blackberry, hedge bindweed, exotic knotweeds, and creeping nightshade.*

Chapter 9. MAINTENANCE AND CONTINGENCY

Regular maintenance reviews will be performed according to the schedule presented in **Table 1.** Projected Schedule for Performance Monitoring and Maintenance Events to address any conditions that could jeopardize the success of the mitigation project. Following maintenance reviews by the biologist or ecologist, required maintenance on the Site will be implemented within ten (10) business days of submission of a maintenance memo to the maintenance contractor and permittee.

Established performance standards for the project will be compared to the yearly monitoring results to judge the success of the mitigation. If, during the course of the monitoring period, there appears to be a significant problem with achieving the performance standards, the permittee shall work with the permitting agencies to develop a Contingency Plan in order to get the project back into compliance with the performance standards. Contingency plans can include, but are not limited to, the following actions: additional plant installation, erosion control, modifications to hydrology, and plant substitutions of type, size, quantity, and/or location. If required, a Contingency Plan shall be submitted by December 31st of any year when deficiencies are discovered.

The following list includes examples of maintenance (M) and contingency (C) actions that may be implemented during the course of the monitoring period. This list is not intended to be exhaustive, and other actions may be implemented as deemed necessary.

- During year one, replace all dead woody plant material (M).
- Water all plantings at a rate of 1" of water every week between June 15 – October 15 during the first two years after installation, and for the first two years after any replacement plantings (C & M).
- Replace dead plants with the same species or a substitute species that meet the goals and objectives of the mitigation plan, subject to Talasaea and agency approval (C).

- Re-plant area after the reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.) (C).
- After consulting with City staff, minor excavations, if deemed to be more beneficial to the existing conditions than currently exists, will be made to correct surface drainage patterns (C).
- Remove/control weedy or non-native invasive plants (e.g., Scot's broom, reed canarygrass, Himalayan blackberry, purple loosestrife, Japanese knotweed, etc.) by manual or chemical means approved by permitting agencies. Use of herbicides or pesticides within the mitigation area would only be implemented if other measures failed or were considered unlikely to be successful, and would require prior agency approval. All non-native vegetation must be removed and disposed of off-site. (C & M).
- Weed all trees and shrubs to the dripline and provide 3-inch deep mulch rings 24 inches in diameter for shrubs and 36 inches in diameter for trees (M).
- Remove trash and other debris from the mitigation areas twice a year (M).
- Selectively prune woody plants at the direction of Talasaea Consultants to meet the mitigation plan's goal and objectives (e.g., thinning and removal of dead or diseased portions of trees/shrubs) (M).
- Repair or replace damaged structures including weirs, signs, fences, or bird boxes (M).

Chapter 10. FINANCIAL GUARANTEE

Financial guarantee in the form of a performance or maintenance bond will be required per KZC §90.145, which states:

“The Planning Official shall require a performance or maintenance bond, a performance or maintenance security, a perpetual culvert maintenance agreement, and/or a perpetual landscape maintenance agreement, as determined to be appropriate by the Planning Official, to ensure compliance with any aspect of this chapter or any decision or determination made pursuant to this chapter.

1. Performance or Maintenance Bond or Security Requirement – The performance or maintenance security required by the Planning Official shall be provided in such forms and amounts as the Planning Official deems necessary to assure that all work or actions are satisfactorily completed or maintained in accordance with the approved plans, specifications, permit or approval requirements, and applicable regulations, and to assure that all work or actions not satisfactorily completed or maintained will be corrected to comply with approved plans, specifications, requirements, and regulations to restore environmental damage or degradation, protect fish and wildlife habitat and protect the health, safety, and general welfare of the public.
2. Form of Performance Security – The performance security shall be a surety bond obtained from companies registered as surety in the state or certified as acceptable sureties on federal bonds. In lieu of a surety bond, the Planning Official may allow

alternative performance security in the form of an assignment of funds or account, and escrow agreement, an irrevocable letter of credit, or other financial security device in an amount equal to that required for the surety bond. The surety bond or other performance security shall be conditioned on the work being completed or maintained in accordance with requirements, approvals, or permits; on the site being left or maintained in a safe condition; and on the site and adjacent or surrounding areas being restored in the event of damages or other environmental degradation from development or maintenance activities conducted pursuant to the permit or approval.

3. Amount of Performance Security – The amount of the performance or maintenance security shall be 125 percent of the estimated cost, as approved by the Planning Official, of conformance to plans, specifications, and permit or approval requirements under this chapter, including corrective work and compensation, enhancement, mitigation, maintenance, and restoration of sensitive areas. In addition, an administrative deposit shall be paid as required in KZC 175.25. All bond or performance security shall be submitted in their original form with original signatures of authorization.
4. Administration of Performance Security – If during the term of the performance or maintenance security, the Planning Official determines that conditions exist which do not conform with plans, specifications, approval or permit requirements, the Planning Official may issue a stop work order prohibiting any additional work or maintenance until the condition is corrected. The Planning Official may revoke the performance or maintenance security, or a portion thereof, in order to correct conditions that are not in conformance with plans, specifications, approval or permit requirements. The performance or maintenance security may be released upon written notification by the Planning Official, following final site inspection or completion, as appropriate, or when the Planning Official is satisfied that the work or activity complies with permits or approved requirements.
5. Exemptions for Public Agencies – State agencies and local government bodies, including school districts, shall not be required to secure the performance or maintenance of permit or approval conditions with a surety bond or other financial security device. These public agencies are required to comply with all requirements, terms, and conditions of the permit or approval, and the Planning Official may enforce compliance by withholding certificates of occupancy or occupancy approval, by administrative enforcement action, or by any other legal means."

Chapter 11. SUMMARY

The Orcas Moon Cottages property is an approximately 7.1-acre assemblage of two tax lots, located in Kirkland, Washington. The property is currently undeveloped and forested. Two wetlands and five streams were identified and delineated on the property. One wetland was identified off property to the west. Orcas Moon, LLC proposes to development of 15 units of cottage housing on the property. The units will be constructed in two groups across the property to take advantage of limited relatively level areas. Approximately 2 acres of the 7-acre Site will be developed. The remaining portion (approximately 73 percent of the total Site size) will remain in its natural state.

In order for the project to meet specific design standards and economically-feasibility, it will be necessary to reduce stream and wetland buffers adjacent to the development areas. Buffer reductions of up to 1/3rd of the standard buffer width are allowed under City of Kirkland Zoning Code. Mitigation for the proposed buffer reduction will be provided through buffer averaging. Sufficient area is available onsite to offset the proposed buffer reduction.

Temporary impacts to buffers will occur during the construction of the soft-surface trail and various utilities. Areas of temporary buffer impact will be mitigated through the restoration of the original (pre-impact) topography and replanting with a variety of native trees and shrubs.

While buffer enhancement is not specifically required where the functions and values of the added buffer area are equal to or greater than the functions and values of the buffer being reduced, the project will still provide habitat improvements. Enhancement will include the removal of non-native, invasive species, installation of habitat features (large woody debris, bird nesting boxes, and bat boxes), and enhancement planting with a variety of native trees and shrubs. The proposed site development plan will not directly impact wetlands or streams onsite.

Chapter 12. REFERENCES

City of Kirkland, 2016. Chapter 90 – Drainage Basins. Retrieved from http://www.codepublishing.com/wa/kirkland.html.

Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service.

Google Earth. 2016. *Google Earth.* https://www.google.com/earth/.

Hitchcock, C. Leo, Arthur Cronquist, Marion Owensby, and J. W. Thompson. 1969. *Vascular Plants of the Pacific Northwest.* Seattle: University of Washington Press.

Iowa State University. 1995. *Hydric Soils of Washington State.* U.S. Department of Agriculture, Natural Resources Conservation Service.

King County. 2010. *GIS Database.* Accessed mo da, year. <http://www.kingcounty.gov/operations/GIS/GISData.aspx>.

Lichvar, R.W. 2012. *The National Wetland Plant List.* ERDC/CRREL TR-12-11, Hanover, NH: U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory. http://acwc.sdp.sirsi.net/client/search/asset:asset?t:ac=$N/1012381.

Munsell Color. 1988. *Munsell Soil Color Charts.* Grand Rapids, Michigan: X-RiteCorp.

Natural Resources Conservation Service. 2012. *National Technical Committee for Hydric Soils - Hydric Soils List.* http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

Olson, P, and E Stockdale. 2008. *Determining the Ordinary High Water Mark on Streams in Washington State.* Olympia: Washington Department of Ecology.

Reed, P. B. 1988. *National List of Plant Species that Occur in Wetlands: Northwest (Region 9).* Report 88, USF & WS Biol.Update.

Reed, P. B. 1996. *Supplement to National List of Plant Species that Occur in Wetlands (Region 9). National Wetlands Inventory.* US Fish and Wildlife Service.

Soil Survey Staff. 2013. *Web Soil Survey.* December. Accessed September 2014. http://websoilsurvey.nrcs.usda.gov/.

StreamNet. 2016. "StreamNet Mapper." *StreamNet.* Accessed July 2016. http://map.streamnet.org/website/bluesnetmapper/viewer.htm.

U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*

(Version 2.0). U. S. Army Corps of Engineers, Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Department of Agriculture. 1991. *Hydric Soils of The United States.* Washington, DC: Soil Conservation Service.

U.S. Department of the Interior, Fish and Wildlife Service. year. *National Wetlands Inventory Map.* Washington D.C., month day.

United States Geological Service. 2014. *EarthExplorer.* http://earthexplorer.usgs.gov/.

Washington State Department of Fish and Wildlife. 2016. *Salmonscape.* Accessed July 2016. wdfw.wa.gov/mapping/salmonscape/index.html.

Figures

Property Location: 400 Block of Forbes Creek Drive. T26N, R5E, Section 32, Willamette Meridian.

N

Reference: GIS parcel, road, watercourse, and water body data from City of Kirkland, 2015.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 – Fax (425)861-7549

FIGURE 1

VICINITY MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 1000 ft

DATE 6 NOV 2017

REVISED

1

512

N

Reference: GIS parcel and road data from City of Kirkland, 2015.
Aerial image 2012 from Earth Explorer, downloaded 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 2

SITE MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE
1 in : 200 ft

DATE
6 NOV 2017

REVISED

2

Reference: GIS parcel and road data from City of Kirkland, 2015. National Wetlands Inventory GIS data from USFWS, 2012. Aerial image 2012 from Earth Explorer, downloaded 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 3

NWI MAP - KIRKLAND QUADRANGLE
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

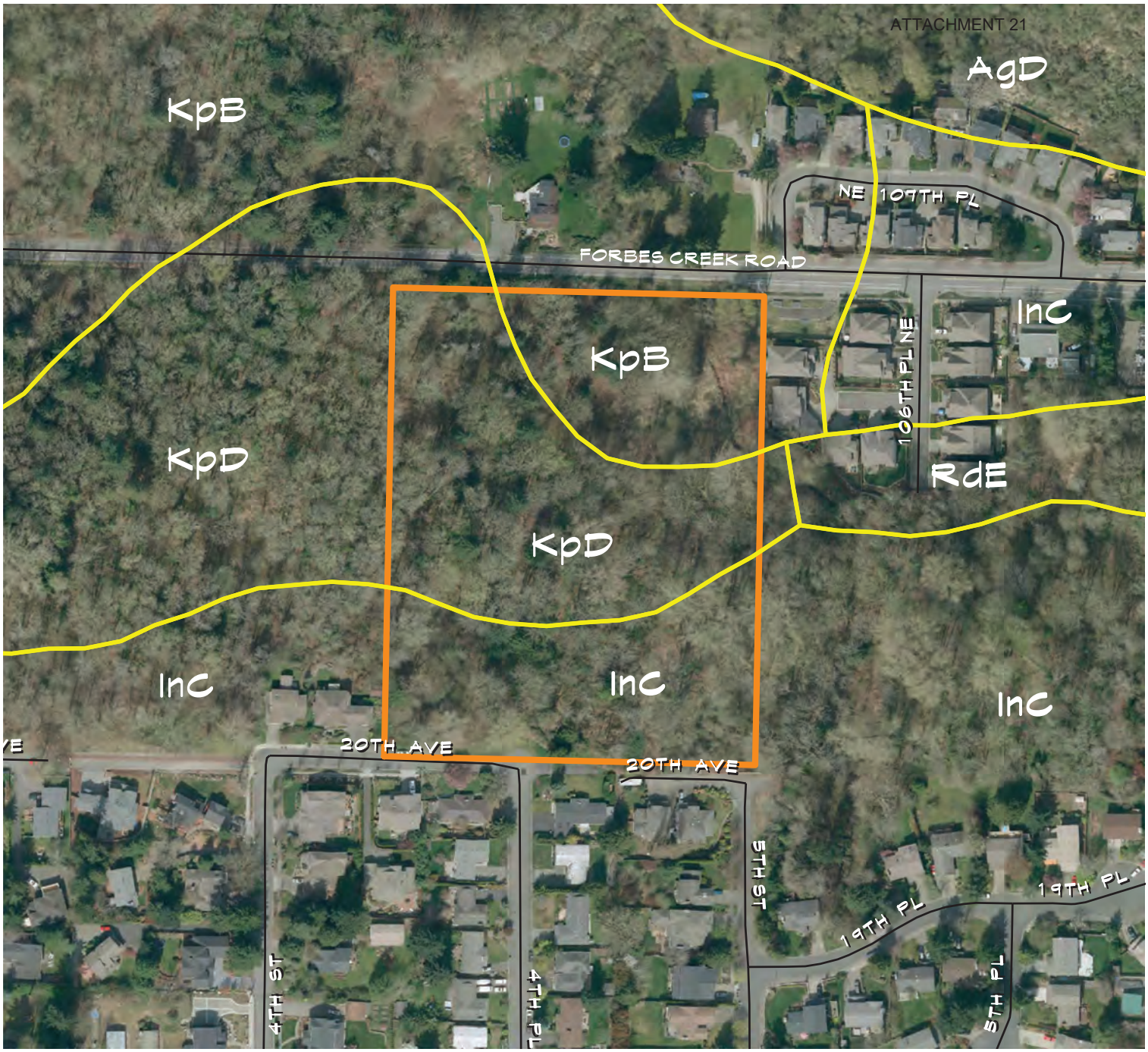
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 6 NOV 2017

REVISED

3



SOIL KEY

AgD - Alderwood gravelly sandy loam, 15 to 30 percent slope
InC - Indianola lomay sand, 5 to 15 percent slope
KpB - Kitsap silt loam, 2 to 8 percent slope
KpD - Kitsap silt loam, 15 to 30 percent slope

N

Reference: GIS parcel, road, and soil GIS data from City of Kirkland, 2015. Aerial image 2012 from Earth Explorer, downloaded 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 4

NRCS SOILS DATA
(from City of Kirkland)
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

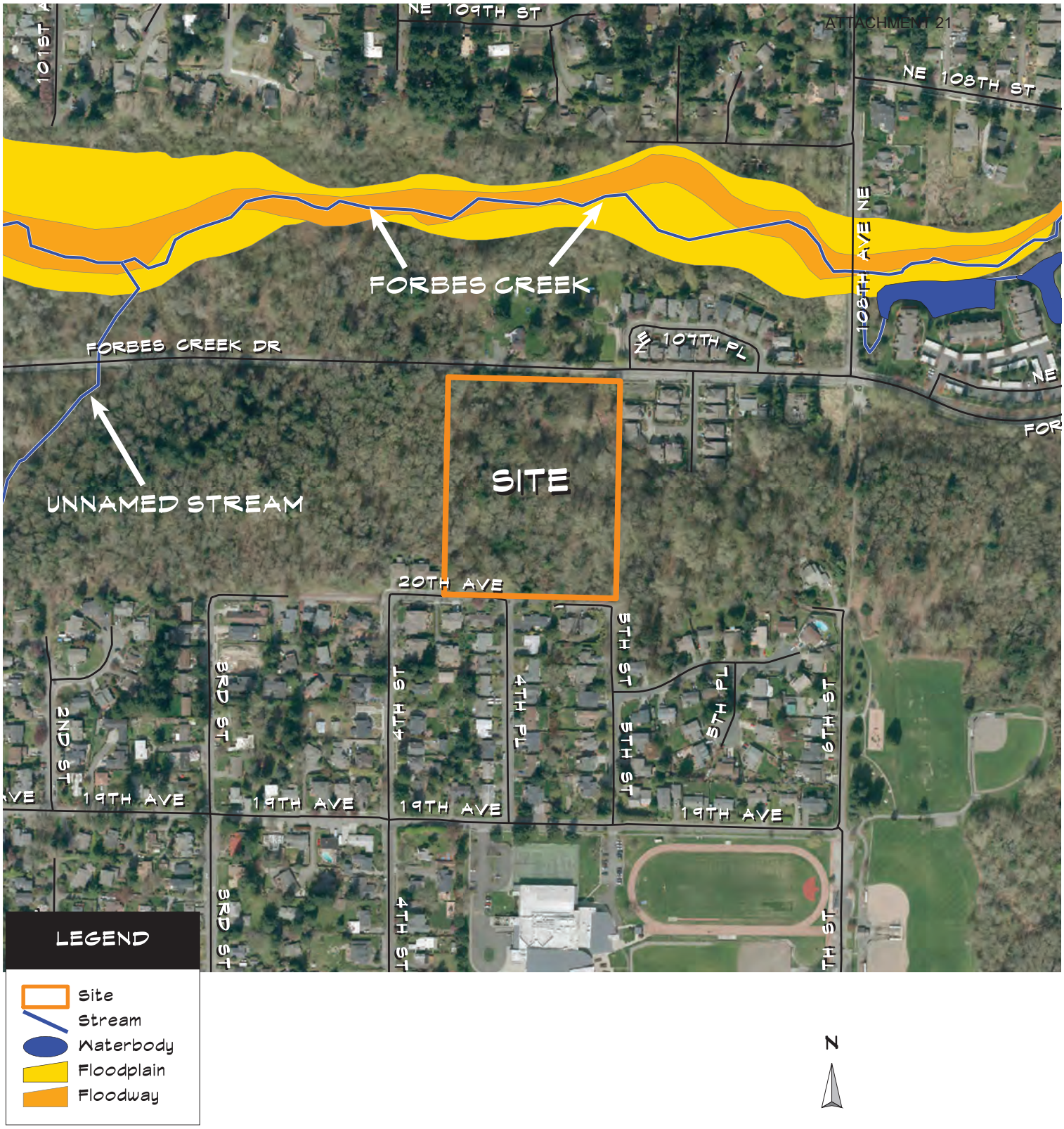
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 200 ft

DATE 6 NOV 2017

REVISED

4



Reference: GIS parcel and road data from City of Kirkland, 2015. Stream, water body, floodway, and floodplain data from King County GIS, 2015. Aerial image 2012 from Earth Explorer, downloaded 2016

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 5

KING COUNTY CRITICAL AREAS
GIS DATA
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

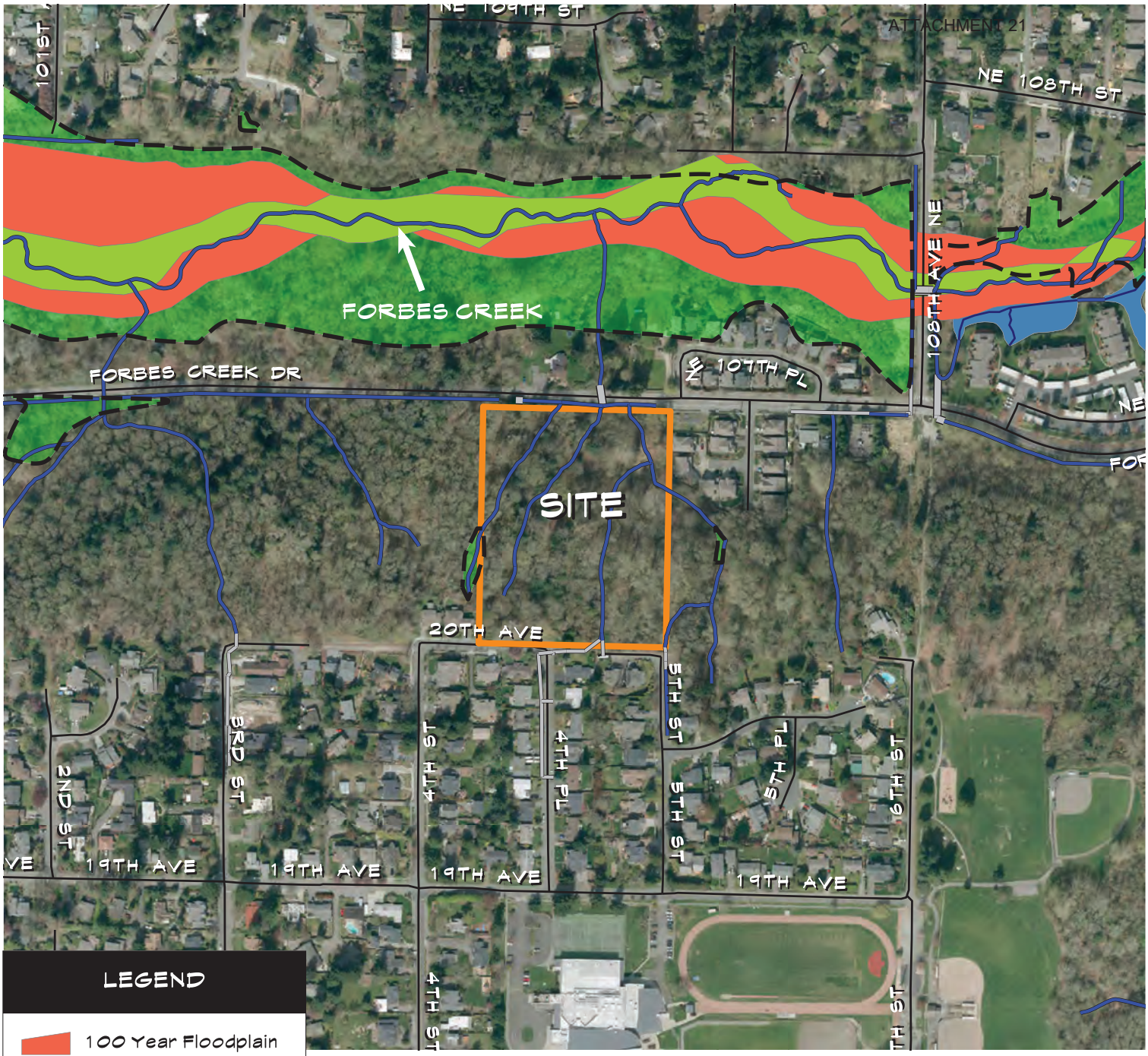
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 6 NOV 2017

REVISED

5



Reference: GIS parcel, road, stream, wetland, water body, floodplain, and floodway data from City of Kirkland, 2015. Aerial image 2012 from Earth Explorer, 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 6

CITY OF KIRKLAND CRITICAL AREAS GIS DATABASE
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 6 NOV 2017

REVISED

6

See also Sheet W 1.0.

N

Reference: GIS parcel and wetland data from City of Kirkland, 2015.
Surveyed stream and wetland data provided by Blueline Group, 2016.
Aerial image 2012 from Earth Explorer, downloaded 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 7

WETLAND AND STREAM MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 100 ft

DATE 6 NOV 2017

REVISED

7

Appendix A

City of Kirkland Wetland Rating Forms (Plate 26)

TYPE 3/8B
wetland A

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 2

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from	Acres	Point Value	Points

choices

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

		# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area		1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre		2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	X	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area	X	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area	X	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3

NONE

Emergent	1-2	=	1	Forested	1-2	=	1
	3-4	=	2		3-4	=	2
	>4	=	3		>4	=	3

4. Structural diversity.

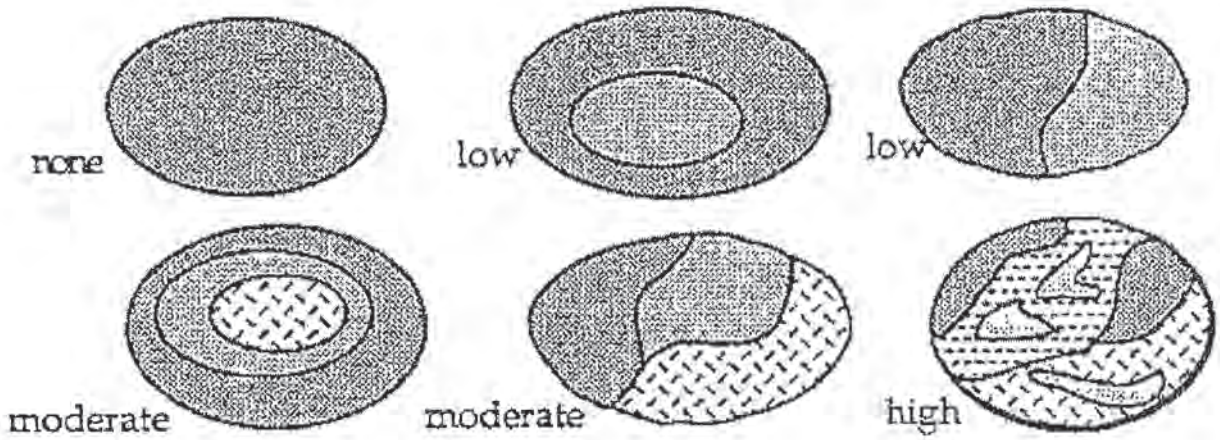
If the wetland has a forested class, add 1 point for each of the following attributes present:

Trees >50′ tall	=	1
Trees 20′ to 49′ tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300'?	= 1
Are raptor nest(s) located within 300'?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	% X 0 =		=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	100 % X 4 =	400 x	2 =	800
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50'

By 2 if buffer width is 50-100'

By 3 if buffer width is >100'

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3 800

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area? = 5

Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area? = 3

Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor? = 1

Is the wetland and buffer completely isolated by development and/or cultivated agricultural land? = 0

10. Scoring

Add the scores to get a total: 26

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2

No = Type 3

 TAL-518B
wetland B

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 3

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from	Acres	Point Value	Points

choices

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

	# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area	1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre	2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area X	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3

none

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3

none

Emergent	1-2	=	1	Forested	1-2	=	1
	3-4	=	2		3-4	=	2
	>4	=	3		>4	=	3

none

4. Structural diversity.

If the wetland has a forested class, add 1 point for each of the following attributes present:

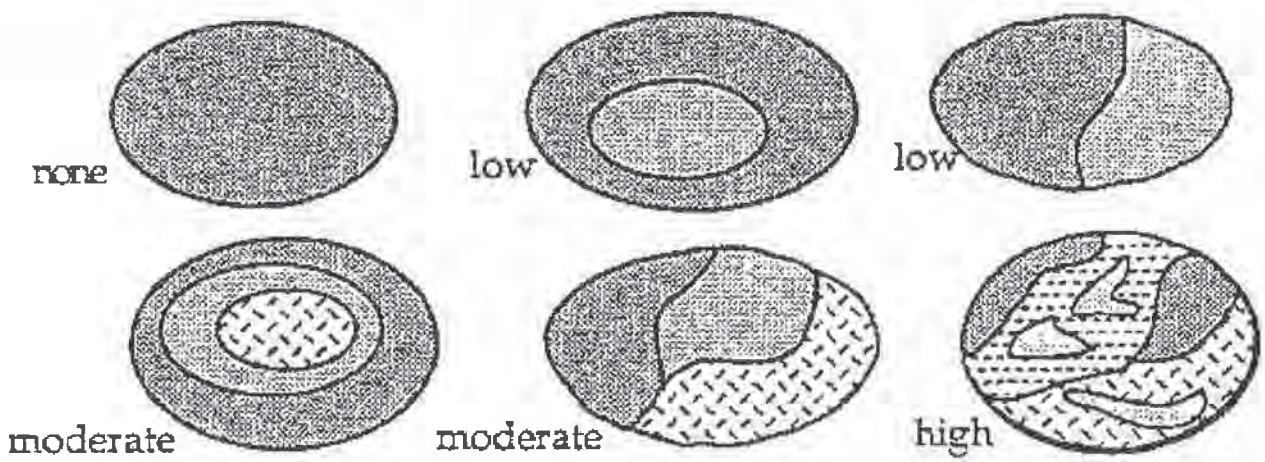
Trees >50′ tall	=	1
Trees 20′ to 49′ tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

none

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300′?	= 1
Are raptor nest(s) located within 300′?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	% X 0 =		=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	100 % X 4 =	400 x 3	=	1200
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50′

By 2 if buffer width is 50-100′

By 3 if buffer width is >100′

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4 1200

600-899 = 3

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area?	= 5
Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area?	= 3
Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor?	= 1
Is the wetland and buffer completely isolated by development and/or cultivated agricultural land?	= 0

10. Scoring

Add the scores to get a total: 17

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2

No = Type 3

TAL-518B
wetland C

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 2

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from	Acres	Point Value	Points

choices

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

		# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area		1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre		2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	X	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area		4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area	X	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3

none

Emergent	1-2	=	1
	3-4	=	2
	>4	=	3

Forested	1-2	=	1
	3-4	=	2
	>4	=	3

4. Structural diversity

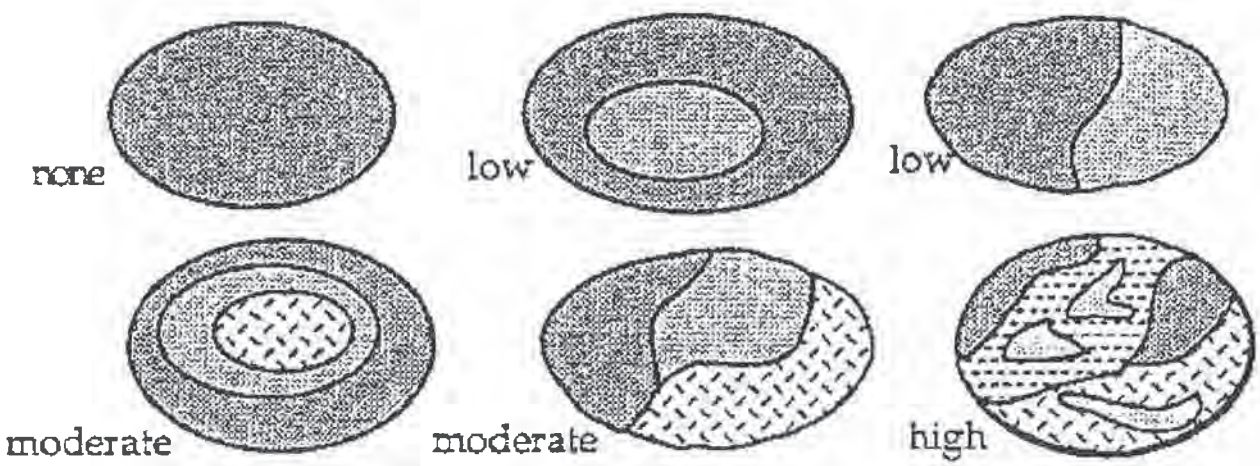
If the wetland has a forested class, add 1 point for each of the following attributes present

Trees >50′ tall	=	1
Trees 20′ to 49′ tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300′?	= 1
Are raptor nest(s) located within 300′?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	% X 0 =		=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	100 % X 4 =	400 X	2 =	800
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50′

By 2 if buffer width is 50-100′

By 3 if buffer width is >100′

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3 800

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area?	= 5
Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area?	= 3
Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor?	= 1
Is the wetland and buffer completely isolated by development and/or cultivated agricultural land?	= 0

10. Scoring

Add the scores to get a total: 25

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2 75' primary basin buffer

No = Type 3

TAL-5183
ATTACHMENT 21
Wetland D

Chapter 1. Plate 26 WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; No

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; No

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or No

e. The wetland contains state or federally listed threatened or endangered plant species. No

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from choices	Acres	Point Value	Points

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

	# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area	1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre	2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3
	NONE		

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3
	NONE		

Emergent	1-2	=	1	Forested	1-2	=	1
	3-4	=	2		3-4	=	2
	>4	=	3		>4	=	3

4. Structural diversity.

If the wetland has a forested class, add 1 point for each of the following attributes present:

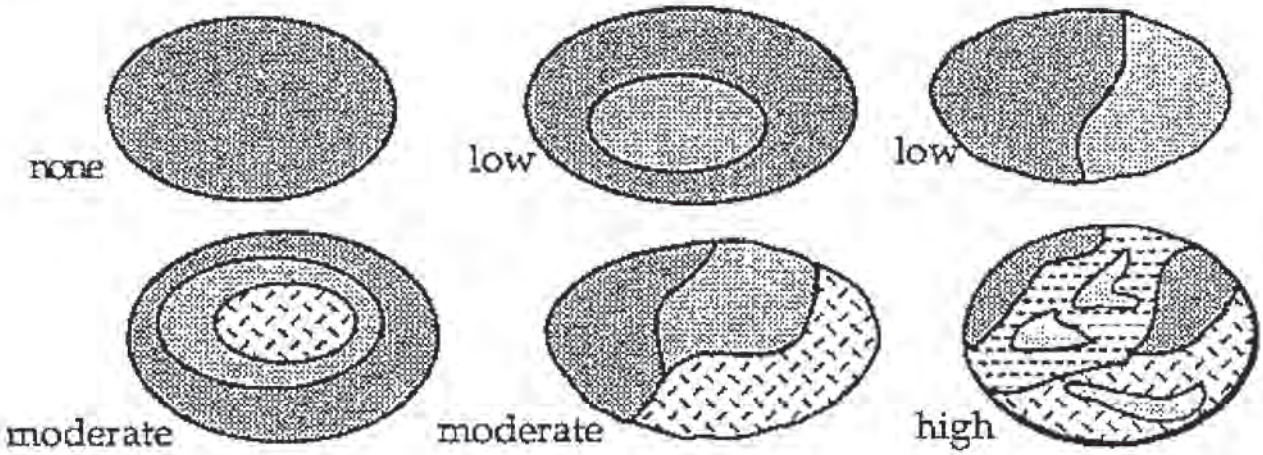
Trees >50' tall	=	1
Trees 20' to 49' tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

NONE

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300′?	= 1
Are raptor nest(s) located within 300′?	= 1 NONE
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	50 % X 0 =	0	=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	50 % X 4 =	200	x3 =	600
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50′

By 2 if buffer width is 50-100′

By 3 if buffer width is >100′

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area? = 5

Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area? = 3

Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor? = 1

Is the wetland and buffer completely isolated by development and/or cultivated agricultural land? = 0

10. Scoring

Add the scores to get a total: 13

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2

No = Type 3

APPENDIX B

CRITICAL AREAS MITIGATION PLAN SHEETS

Sheet W1.0. Existing Conditions Plan
Sheet W1.1. Proposed Site Plan, Impacts & Mitigation Overview
Sheet W2.0. Clearing, Grubbing, and Habitat Feature Plan
Sheet W3.0. Conceptual Planting Plan, Plant List, and Notes

APPENDIX C

DRAINAGE ANALYSIS FOR CAPACITY OF EXISTING PIPES TO CARRY ANTICIPATED STREAM FLOWS

Section 5 Conveyance Design

Conveyance analysis of the proposed storm drain system will be included with the final engineering submittal.

The existing 12" CMP culvert which collects drainage from development above 20th Ave and a portion of the project site was observed to overtop during a site visit by a consulting ecologist. The Blueline Group performed a conveyance analysis of the existing culvert to determine how the overtopping should be addressed. Upon analysis is was determined the existing pipe has enough capacity to convey the input flows. A trash rack is recommended for the culvert inlet in conjunction with regular maintenance of the pipe to maintain optimal flows.

EXISTING CULVERT CONVEYANCE

MANNING'S EQUATION; CAPACITY OF 12" CMP Pipe @ 15.3% = 7.54 cfs

$Q = 1.486/n * A * R^{2/3} * S^{1/2}$

n = roughness coefficient = **0.024**

A = cross sectional area of pipe = $\pi (D/2)^2 = \pi (1.00 \text{ ft}/2)^2 =$ **0.785**

R = wetted perimeter of pipe

$R^{2/3} = (D/4)^{2/3} = (1/4)^{2/3} =$ **0.397**

S = slope

$S^{1/2} = (0.153 \text{ ft/ft})^{1/2} =$ **0.391**

$Q = (1.486/0.024) * 0.785 * 0.397 * 0.391 =$ **7.54 cfs**

KCRTS INPUT FLOWS

Upstream Areas were determined using GIS data. A map of the input area is included on the following page. The 100-year input flows were calculated using KCRTS software and 15-minute timesteps.

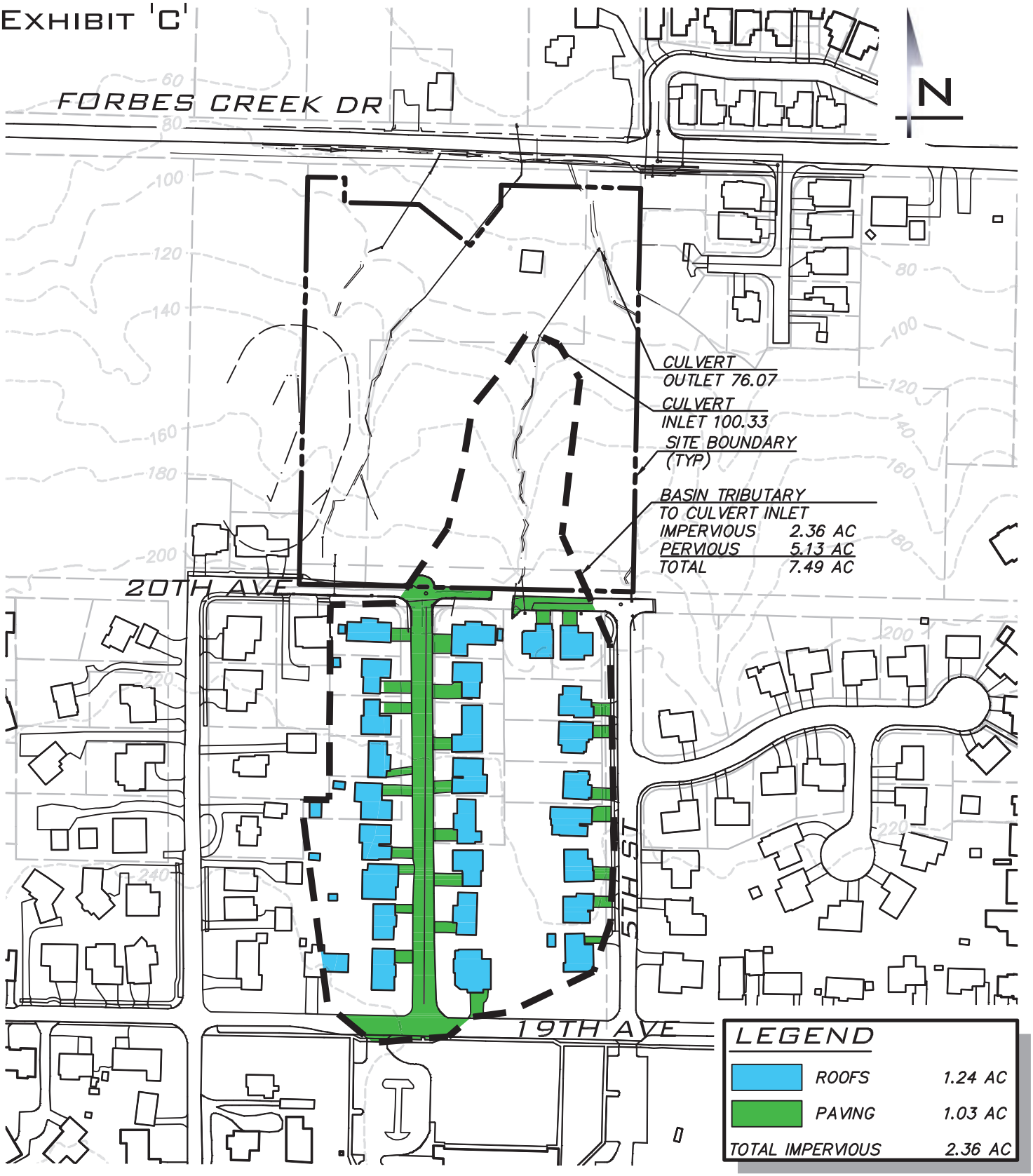
LAND COVER	AREA (AC)
ROOFTOPS	1.24
PAVING	0.97
PERVIOUS	4.85
TOTAL	7.06

STORM EVENT	FLOW (CFS)
2 YEAR	1.28
5 YEAR	1.69
10 YEAR	2.57
25 YEAR	3.25
50 YEAR	4.67
100 YEAR	5.38

Capacity Required	5.38 cfs
Capacity Provided	7.54 cfs

CULVERT TRIBUTARY EXHIBIT

EXHIBIT 'C'



Nov 07, 2017 – 1:37pm – User sturman
E:\Projects\12248\Dwg\Exhibits\12248 CULV TRIB.dwg

BLUELINE	SCALE 1" = 200'	CULVERT TRIBUTARY ORCAS MOON COTTAGES TECHNICAL INFORMATION REPORT	JOB NUMBER: 12-248
	PROJECT MANAGER TODD OBERG, PE		FIGURE: TRIB
	DESIGNED BY TC COLLERAN		
	DRAWN BY SAM TURMAN		
	PLOT DATE November 7, 2017	© 2017 THE BLUELINE GROUP	

CRITICAL AREAS REPORT AND BUFFER ENHANCEMENT PLAN

ORCAS MOON COTTAGES
KIRKLAND, WASHINGTON

Prepared For:
ORCAS MOON, LLC

Prepared By:
TALASAEA CONSULTANTS, INC.

21 July 2016
(Revised 20 July 2018)

Critical Areas Report and Buffer Enhancement Plan

Orcas Moon Cottages Kirkland, Washington

Prepared For:
Orcas Moon, LLC
P.O. Box 2710
Redmond, Washington 98073

Prepared By:
Talasaea Consultants, Inc.
15020 Bear Creek Road NE
Woodinville, Washington 98077
(425) 861-7550

21 July 2016
(Revised 20 July 2018)

EXECUTIVE SUMMARY

PROJECT NAME: Orcas Moon Cottages

CLIENT: Orcas Moon, LLC

SITE LOCATION: Property is northwest of the intersection of 20th Avenue and 5th Street and south of Forbes Creek Drive (aka NE 106th Street) in Kirkland, Washington. The Public Land Survey System location of the property is the southwest ¼ of Section 32, T26N, R5E, Willamette Meridian.

PROJECT STAFF: Bill Shiels, Principal; Ann Olsen, Senior Project Manager; David R. Teesdale, PWS, Senior Wetland Ecologist, Alicia Bramble Schulz, Landscape Designer

FIELD SURVEY: Site was evaluated, and critical areas delineated on 8 and 19 April 2016, 21 December 2016, and on 4 October 2017.

DETERMINATION: The Orcas Moon Cottages property is located within a City of Kirkland Primary Basin (Forbes Creek). Three wetlands (Wetlands A, B, and D) and five streams (Streams 1, 2, 3, 4, and 5) were identified on the Orcas Moon Property. One wetland (Wetland C) was identified offsite to the west of the property. The onsite wetlands were all rated as City of Kirkland Type 3 wetlands. The offsite wetland was rated as a City of Kirkland Type 2 wetland. Type 2 wetlands within a Primary Basin have a 75-foot standard buffer. Type 3 wetlands within a Primary Basin have a 50-foot standard buffer. Four of the five streams were rated as City of Kirkland Class B waters. The fifth stream is rated as a City of Kirkland Class C water. Class B waters within a Primary Basin have a 60-foot standard buffer. Class C waters in a Primary Basin have a 35-foot standard buffer.

HYDROLOGY: Hydrology for Wetlands A, C, and D is provided by shallow groundwater seepage on a slope. Hydrology for Wetland B is supported entirely by stream flow from Stream 4, which is supported by Wetland C.

SOILS: Three soil types are mapped on the property. These are Kitsap silt loam (2 to 8 percent slope), Kitsap silt loam (15 to 30 percent slope), and Indianola loamy fine sand (4 to 15 percent). These soils are not listed as hydric by the National Technical Committee on Hydric Soils.

VEGETATION: Vegetation within Wetland A is a mixture of sparse herbaceous and scrub-shrub species, with a significant portion of bare soil present. Species include skunk cabbage (*Lysichiton americanus*), piggyback plant (*Tolmiea menziesii*), slough sedge (*Carex obnupta*), field and tall horsetail (*Equisetum arvense* and *E. telmateia*), lady fern (*Athyrium filix-femina*), salmonberry (*Rubus spectabilis*), and young red alder (*Alnus rubra*). Vegetation within Wetland B includes American brooklime (*Veronica americana*), lady fern, piggyback plant, and slough sedge. Vegetation within Wetland C is mostly scrub-shrub species, comprised predominantly of salmonberry, lady fern, skunk cabbage, slough sedge, and red alder.

PROPOSED DEVELOPMENT: The Client proposes to develop the Orcas Moon Project as a cottage unit development. Fourteen (14) units of cottages will be constructed in two separate groups on the property. Spreading the development out into two different groups allows the project to maximize the buildable area outside of steep slope zones. The two cottage unit groups will be arranged around rain gardens, which will handle all stormwater runoff from paved parking as well as from rooftop runoff.

The proposed development will not directly impact wetlands or streams on the subject property. However, it will be necessary to reduce the critical areas buffers by one-third as allowed by Kirkland Zoning Code (KZC). This is permitted under KZC §90.60(2)(b) and §90.100(1)(b) for buffer reduction with enhancement. Approximately 24,839 sf of buffer will be reduced and 25,166 sf of buffer will be enhanced through a combination of removal of non-native, invasive species, installation of large woody debris, and enhancement planting of native trees and shrubs. Enhancement work within the ravines where slopes exceed 40 percent will be limited due to concerns of creating unstable earth conditions. Instead, large woody debris will be used to create planting terraces in the steep slope areas. These planting terraces will be revegetated with native trees and shrubs.

There will be no loss of habitat function of existing wetlands or streams onsite resulting from the proposed development plan. The proposed buffer reduction with enhancement plan will provide improved buffer functions and habitat potential compared to existing conditions. Enhancement plantings and installation of large woody debris will ensure that the functions and services of the enhanced buffer will exceed those of the buffer area lost through reduction.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Chapter 1. INTRODUCTION

1.1 Report Purpose

This report is the result of a critical areas study of the Orcas Moon Cottages property (referred to hereinafter as "Project Site" or "Site). The Site is located within the Forbes Creek basin of Kirkland (**Figure 1**). The purpose of this report is to identify, categorize, and describe existing site conditions, such as wetlands, streams, or other critical habitats, and their respective buffers. The report has been prepared to comply with the requirements of Kirkland Zoning Code Chapter 90 – Drainage Basins.

This report will provide and describe the following information:

- General property description;
- Methodology for critical areas investigation;
- Results of critical areas background review and field investigation; and
- Regulatory review.

1.2 Statement of Accuracy

Critical areas characterizations and ratings were conducted by trained professionals at Talasaea Consultants, Inc., and adhered to the protocols, guidelines, and generally accepted industry standards available at the time the work was performed. The conclusions in this report are based on the results of analyses performed by Talasaea Consultants and represent our best professional judgment. To that extent and within the limitation of project scope and budget, we believe the information provided herein is accurate and true to the best of our knowledge. Talasaea does not warrant any assumptions or conclusions not expressly made in this report, or based on information or analyses other than what is included herein.

Chapter 2. GENERAL PROPERTY DESCRIPTION AND LAND USE

2.1 Project Location

The Project Site is located northwest of the intersection of 20th Avenue and 5th Street in the City of Kirkland, Washington (**Figure 2**). The Site extends northward from 20th Avenue to Forbes Creek Drive. The Site includes two tax parcels: Parcel A (3890100055), and Parcel B (3890100050). The Site encompasses approximately 7.1 acres. The Public Land Survey System location of the Site is southwest ¼ of Section 32, T26N, R5E, Willamette Meridian.

2.2 General Property Description

The Site is currently undeveloped and forested with second-growth mixed coniferous and deciduous trees. The topography of the Site is moderately sloped with five ravines extending generally in a north-south orientation. The Site generally slopes downward from 20th Avenue to Forbes Creek Drive.

2.3 Land Use and Zoning

The Site is zoned RS-12.5 or Single Family Residential. The Site is currently undeveloped. However, a single-family residence and an associated outbuilding did exist on Parcel A prior to 1936 (date of earliest aerial photo available). It appears on

this aerial image that some sort of small farming operation occurred on the Site's northeastern corner. Most of the Site's eastern half appears to have been cleared of forest vegetation. The residence was still visible on aerial images as of 1952, but no agricultural activities were occurring on the Site. The area that appeared cleared of trees in the 1936 aerial image is now growing back as forest. This residence was removed from Parcel A by 1977 (the date of the next small-scale aerial image), although its driveway is still present.

Currently, properties to the northeast and south of the Site are developed as single-family residential. Properties to the west and southeast of the Site are currently undeveloped. A majority of the undeveloped land in the vicinity of the Site is currently managed as City of Kirkland parks.

Chapter 3. METHODOLOGY

The critical areas analysis of the Site involved a two-part effort. The first part consisted of a preliminary assessment of the Site and the immediate surrounding area using existing published environmental information. This information includes:

1. Wetland and soils information from resource agencies;
2. Critical areas information from the City of Kirkland and King County;
3. Orthophotography and LIDAR imagery; and,
4. Relevant studies completed or ongoing in the vicinity of the Site.

The second part consisted of site investigations where direct observations and measurements of existing environmental conditions were made. Observations included plant communities, soils, hydrology, and stream conditions. This information was used to help characterize the site and define the limits of critical areas onsite and offsite for regulatory purposes (see **Section 3.2 – Field Investigation** below).

3.1 Background Information Reviewed

Background information from the following sources was reviewed prior to field investigations:

- US Fish and Wildlife Service (USFWS) Wetlands Online Mapper (National Wetlands Inventory) (U.S. Fish and Wildlife Service) (www.wetlandsfws.er.usgs.gov/wtlnds/launch.html);
- Natural Resources Conservation Service, Web Soil Survey (Natural Resources Conservation Service) (www.websoilsurvey.nrcs.usda.gov/app);
- Natural Resources Conservation Service National Hydric Soils List by State (Natural Resources Conservation Service) (www.soils.usda.gov/use/hydric/lists/state.html);
- City of Kirkland GIS database (City of Kirkland, 2015);
- King County GIS database (King County 2015);
- King County iMap online mapping program (King County);
- LIDAR data from King County GIS (2006);

- Orthophotography from Earth Explorer (2016);
- WDFW Priority Habitats and Species (PHS) Database on the Web (Washington State Department of Fish and Wildlife) (wdfw.wa.gov/mapping/phs); and
- Washington Department of Natural Resources Natural Heritage GIS database, 2015;
- Fish usage data from SalmonScape (http://apps.wdfw.wa.gov/salmonscape/map.html); and
- StreamNet (http://www.streamnet.org/data/interactive-maps-and-gis-data/).

3.2 Field Investigation

The Site was evaluated, and critical areas delineated on 8 and 19 April 2016, 21 December 2016, and 4 October 2017. The boundaries of wetlands and the ordinary high water mark (OHWM) of streams were flagged in the field for later professional surveying.

The wetland delineation utilized the routine approach described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (U.S. Army Corps of Engineers, 2010). The ordinary high water mark (OWHM) for any streams found on the Site was determined and delineated using the methodology described by Washington State Department of Ecology's "*Determining the Ordinary High Water Mark on Streams in Washington State"* (Olson and Stockdale 2010). Wetlands and streams were classified according to City of Kirkland Zoning Code, Chapter 90 – Drainage Basins.

Plant species were identified according to the taxonomy of Hitchcock and Cronquist (Hitchcock, *et al*. 1969). Taxonomic names were updated, and plant wetland status was assigned according to *North American Digital Flora: National Wetland Plant List, Version 2.4.0* (Lichvar, *et al*. 2012). Wetland classes were determined using the U.S. Fish and Wildlife Service's system of wetland classification (Cowardin, *et al*. 1979). Vegetation was considered hydrophytic within a suspected wetland area if greater than 50% of the dominant plant species had a wetland indicator status of facultative or wetter (i.e., facultative, facultative wetland, or obligate wetland).

Wetland hydrology was determined based on the presence of hydrologic indicators listed in the Corps' Regional Supplement. These indicators are separated into Primary Indicators and Secondary Indicators. To confirm the presence of wetland hydrology, one Primary Indicator or two Secondary Indicators must be demonstrated. Indicators of wetland hydrology may include, but are not necessarily limited to; drainage patterns, drift lines, sediment deposition, watermarks, stream gauge data and flood predictions, historical records, visual observation of saturated soils, and visual observation of inundation.

Soils on the Site were considered hydric if one or more of the hydric soil indicators listed in the Corps' Regional Supplement were present. Indicators include: the

- presence of organic soils;
- reduced, depleted or gleyed soils, or

- redoximorphic features in association with reduced soils.

Wetlands were rated using the City of Kirkland's wetland rating system. The wetland datasheets are contained in **Appendix A**.

Chapter 4. RESULTS

4.1 Analysis of Existing Information

The following sources provided information on site conditions based on data compiled from resource agencies and local government. For the purposes of this report, the term "vicinity" will mean an area within ¼ mile of the Project Site.

4.1.1 USFWS Wetlands Online Mapper (National Wetlands Inventory)

The USFWS Wetlands Online Mapper maps six wetland units within the vicinity of the Site (**Figure 3**). No wetlands are indicated on or extending onto the site. Three of the wetlands are palustrine forested (one is indicated as palustrine forested/scrub-shrub), two are palustrine unconsolidated bottom, and one is a palustrine scrub-shrub wetland.

4.1.2 Natural Resources Conservation Service Web Soil Survey

Three soil types are mapped on the property (**Figure 4**). These are Kitsap silt loam (KpB, 2 to 8 percent slope), Kitsap silt loam (KpC, 15 to 30 percent slope), and Indianola loamy fine sand (InC, 4 to 15 percent).

The Kitsap series is made up of moderately well-drained soils that formed in glacial lake deposits, under a cover of conifers and shrubs. These soils are on terraces and strongly dissected terrace fronts. The surface layer and subsoil are very dark brown and dark yellowish brown silt loam.

The Indianola series is made up of somewhat excessively drained soils that formed under conifers in sandy, recessional, stratified glacial drift. These undulating, rolling, and hummocky soils are on terraces. These soils are generally brown, dark yellowish-brown, and light olive-brown loamy fine sand.

The Kitsap and Indianola soil series are not listed as hydric by the National Technical Committee on Hydric Soils.

4.1.3 StreamNet and SalmonScape GIS Databases

StreamNet and SalmonScape maintain data concerning the usage or potential usage of streams in the Pacific Northwest. Neither SalmonScape nor StreamNet map any fish species as utilizing any portion of the Site. StreamNet maps coho (*Oncorhynchus kisutch*) as utilizing Forbes Creek for rearing and migration. No other salmonid species are mapped within the vicinity of the Site.

SalmonScape maps four species utilizing or having the potential to utilize Forbes Creek. These are fall chinook (*O. tshawytscha*), coho, winter steelhead (*O. mykiss*), and sockeye (*O. nerka*). Coho are indicated as documented rearing. Sockeye are indicated

as documented presence. Both fall chinook and winter steelhead are indicated as modeled presence[1].

4.1.4 King County GIS Database

King County GIS does not map any critical areas on the Site. However, it does map some features within the vicinity of the Site (**Figure 5**). These features include two water bodies, two streams, a floodway, and a floodplain. One of the streams, which is identified as Forbes Creek, is associated with the floodway and floodplain. The second stream is unnamed on the King County GIS database.

4.1.5 City of Kirkland Critical Areas Map

The City of Kirkland does not map any wetlands on the Site (**Figure 6**). However, it does map two wetlands in the vicinity of the Site. One wetland is located near the southwest property corner on an adjacent parcel. The other wetland is associated with Forbes Creek to the north of the Site.

The City of Kirkland also maps five streams on the Site and Forbes Creek to the north of the property. At least four more streams are mapped on properties to the east and west of the Site.

Finally, the City of Kirkland maps a floodplain and floodway in the general vicinity of Forbes Creek.

4.2 Analysis of Existing Site Conditions

Two wetlands and five streams were identified during our evaluation of the Site (see **Figure 7** and **Sheet W1.0**). An additional wetland was identified off-site to the west, but was not delineated. It was, however, rated using the City of Kirkland's wetland rating system (Plate 26).

4.2.1 Wetlands

4.2.1.1 Wetland A

Wetland A is an approximately 5,551 sf wetland located near the southwestern corner of the Site (Parcel A). It appears to have been created by a slump in the recent past, based on the age of the alders growing within Wetland A. The wetland is a slope wetland that provides hydrology for one of the five onsite streams.

Vegetation within Wetland A consists primarily of skunk cabbage (*Lysichiton americanus*), piggyback plant (*Tolmiea menziesii*), slough sedge (*Carex obnupta*), field and tall horsetail (*Equisetum arvense* and *E. telmateia*), lady fern (*Athyrium filix-femina*), salmonberry (*Rubus spectabilis*), and young red alder (*Alnus rubra*).

Wetland A was rated using the City of Kirkland's wetland rating system. The wetland scored 26 points, which satisfies the criteria for characterization as a Type 2 wetland. Type 2 wetlands located within a Primary Basin (Forbes Creek) have a 75-foot standard

[1] "Modeled presence" indicates that physical parameters of a particular stream may support the presence of a salmonid species, but no actual documentation of their presence exists.

buffer. Wetland buffers may be modified through buffer reduction with enhancement, provided that the minimum buffer width at any one point is not less than 50 feet.

4.2.1.2 Wetland B

Wetland B is a very small (approximately 120 sf) wetland that formed within an old concrete cistern. The cistern is constructed within the ravine for one of the onsite streams (Stream 4) and may have provided water for the residence that existed on Parcel A. Over time, this cistern has silted in and wetland vegetation has become established. Vegetation in Wetland B consists of American brooklime (*Veronica americana*), lady fern, piggyback plant, and slough sedge.

Wetland B scored 17 points using the City of Kirkland wetland rating system. This satisfies the criteria for characterization as a Type 3 wetland. Type 3 wetlands located within a Primary Basin have a 60-foot standard buffer. Wetland buffers may be modified through buffer reduction with enhancement, provided that the minimum buffer width at any one point is not less than 40 feet.

4.2.1.3 Wetland C (Off Site)

Wetland C is a slope wetland that is located to the west of the southwest property corner. This wetland was not delineated since it resides off property. However, we estimate its size to be approximately 6,200 sf. Vegetation consists predominantly of salmonberry, lady fern, skunk cabbage, slough sedge, and red alder. Wetland C is the headwaters of one of the onsite streams (Stream 4).

Wetland C scored 25 points using the City of Kirkland wetland rating system. This satisfies the criteria for characterization as a Type 2 wetland. Type 2 wetlands located within a Primary Basin have a 75-foot standard buffer.

4.2.1.4 Wetland D

Wetland D is a small (235 sf) slope wetland located within the southern portion of the right-of-way for Forbes Creek Drive. Vegetation within the wetland is managed through periodic mowing. However, a small patch of slough sedge was discernable.

Wetland D scored 13 points using the City of Kirkland Wetland rating system. This satisfies the criteria for characterization as a Type 3 wetland. Type 3 wetlands located within a Primary Basin have a 60-foot standard buffer. Wetland buffers may be modified through buffer reduction with enhancement, provided that the minimum buffer width at any one point is not less than 40 feet.

4.2.2 Streams

4.2.2.1 Stream 1

Stream 1 starts at the outfall of a stormwater pipe located on the north side of 20th Avenue (see **Figure 7** and **Sheet W1.0**). The stream flows onto the Site at the southeast property corner and flows in a northerly direction for approximately 50 feet. Then, the stream flows off property to the east. The stream channel is in a deeply incised ravine that extends from the stormwater outfall.

Stream 1 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 40 feet through buffer reduction with enhancement.

4.2.2.2 Stream 2

Stream 2 starts at the outfall of two stormwater pipes located on the north side of 20th Avenue, approximately 170 feet west of the stormwater outfall for Stream 1. As with Stream 1, Stream 2 flows within a deeply incised ravine. The stream flows aboveground for approximately 390 feet where it flows into a buried pipe. The pipe extends to the northeast for approximately 160 feet. The outfall of this pipe is within the channel for Stream 5.

Stream 2 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 40 feet through buffer reduction with enhancement. There is no buffer requirement for the piped portion of Stream 2. However, stream buffers are measured in all directions from culvert ends.

4.2.2.3 Stream 3

Stream 3 starts near the southwest corner of the Site in an area of a previous soil slump (the same slump that likely created Wetland A). There are at least three pipe outfalls mapped to the south of the headwaters of Stream 3. As with Stream 1 and 2, the pipes carry stormwater from the development to the south of 20th Avenue. Stream 3 begins as two separate seeps and one overland runoff from a stormwater pipe. The three headwater branches coalesce towards the northern tip of Wetland A. At this point, the combined stream flows in a deeply incised ravine for approximately 260 feet. The stream then enters a buried pipe that extends to the northeast for approximately 230 feet. The pipe then discharges into a roadside ditch along Forbes Creek Road.

Stream 3 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 40 feet through buffer reduction with enhancement. There is no buffer requirement for the piped portion of Stream 3. As stated in the discussion of Stream 2, stream buffers are measured in all directions from culvert ends.

4.2.2.4 Stream 4

The headwaters for Stream 4 are within Wetland C off property to the west. Stream 4 flows onto the Site approximately 110 feet north of the southwest property corner and flows within a deeply incised ravine for approximately 130 feet (this aboveground portion of Stream 4 includes Wetland B). At this point, the stream enters a buried pipe. The pipe extends to the northeast for approximately 140 feet and discharges into a roadside ditch along Forbes Creek Road. This ditch collects flows from Streams 2, 3 and 5 as well as Stream 4.

Stream 4 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 40 feet through buffer reduction with enhancement. There is no buffer

requirement for the piped portion of Stream 4. As stated in the discussion of Stream 2, stream buffers are measured in all directions from culvert ends.

4.2.2.5 Stream 5

Stream 5 starts off property to the east. Prior to the development of subdivision along Forbes Creek Road adjacent to the east of the Site, Stream 5 did not flow onto the subject property. Stream 5 is collected offsite in a pipe and shunted westward along the south side of the aforementioned subdivision. This pipe discharges into a deeply incised ravine that flows in a westerly direction onto the Site, then flows in a northwesterly direction towards Forbes Creek Road. As previously mentioned, the piped portion of Stream 2 discharges into the onsite portion of the Stream 5 ravine.

Stream 5 satisfies the criteria for categorization as a City of Kirkland Class C stream. Class C streams in a Primary Basin have a 35-foot standard buffer. This buffer may be reduced to 23.3 feet through buffer reduction with enhancement.

Chapter 5. REGULATORY REVIEW

5.1 City of Kirkland Critical Areas Regulations

Wetlands and streams on the Site are subject to City of Kirkland critical areas regulations under Chapter 90 – Drainage Basins[2]. The City of Kirkland currently uses its own wetland rating and water typing systems. The wetland rating system appears to be based on the Washington Department of Ecology's (WDOE) Washington State Wetland Rating System for Western Washington (1993), which is not comparable with the current WDOE Washington State Wetland Rating System for Western Washington (2014). Similarly, their method of water typing for streams is not comparable with the current or previous Washington Department of Natural Resources (WDNR) water typing system, which is promulgated in WAC 222-16-030 and 222-16-031.

Wetland buffers are determined based on the wetland's rating and whether it is located within a Primary Basin or a Secondary Basin. Primary Basins are defined as the basin that supports one of Kirkland's major stream systems. Similarly, stream buffers are based on the stream's class and whether it is located within a Primary Basin.

5.2 State and Federal Regulations

Wetlands and streams on the Site are subject to applicable State and Federal regulations. Wetland impacts are regulated at the Federal level by Sections 404 and 401 of the Clean Water Act. The U.S. Army Corps of Engineers (Corps) is responsible for administering compliance with Section 404 via the issuance of Nationwide or Individual Permits for any fill or dredging activities within wetlands under Corps jurisdiction. Any project that is subject to Section 404 permitting is also required to comply with Section 401 Water Quality Certification, which is administered by the Washington State Department of Ecology (WDOE). No dredging or filling of wetlands is proposed for the current site development plan. Therefore, the project will not need to

[2] The project is currently vested under City of Kirkland code as passed on 17 June 2014.

apply for any Section 404 Nationwide or Individual Permits or Section 401 Water Quality Certification.

Any work within, over, or under the Ordinary High Water Mark of a stream requires a Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (WDFW), pursuant to the State Hydraulic Code (Chapter 77.55 RCW).

Chapter 6. PROPOSED PROJECT

6.1 Project Description

Orcas Moon, LLC is proposing to develop the Orcas Moon property with 14 units of cottage housing (**Sheet W1.1**). Approximately 23 percent of the Site (approximately 71,220 sf of the approximately 309,162 sf Site) will be developed. The development area will be divided into two separate groups based on available land that is not constrained by steep slopes. For the purposes of this report, the groups will be called Group 1 and Group 2. Group 1 is located in the southwestern portion of the Site adjacent to 20th Avenue. Group 2 is located in the southeastern portion of the Site, also adjacent to 20th Avenue. Group 1 will include 9 cottage units, and Group 2 will provide 5 cottage units. Parking for Groups 1 and 2 will be provided through a mixture of covered and uncovered stalls. There will be one covered stall for every cottage unit. Access to the Group 1 and 2 cottage units will be provided by sidewalks from the parking areas.

Two utility easements will be established on the Site to service the two development groups described previously. These easements will provide stormwater and sewer pipe routing to the northern portion of the property. The stormwater pipes will connect with a proposed stormwater vault adjacent to Forbes Creek Drive (this vault will be located outside of existing wetland and stream buffers). A new access road to the stormwater vault will be constructed over the existing driveway off of Forbes Creek Drive (the driveway to the residence depicted on the 1936 and 1952 aerial images). Some buffer reduction with enhancement will be required for the construction of this access road. The sanitary sewer pipes will connect to an existing sewer main located in the roadway for Forbes Creek Drive.

As mentioned in **Section 4.2.2**, three of the five streams onsite flow into 12-inch pipes that carry flow across the northern half of the Site to the roadside ditch along Forbes Creek Drive. Drainage analyses of these pipes indicate that they are sufficiently sized to carry the anticipated stream flows. However, the inlet of a pipe conveying one of the streams has become clogged with debris in the past. Stream 2 will be daylighted in the future after the development of this project.

6.2 Project Impacts

The project has been designed to avoid all direct impacts to wetlands and streams on the Site. However, it will be necessary to impact wetland and stream buffers in order to provide the required yard setbacks for the cottage units, construction of some of the parking areas, and required utilities (such as stormwater and sanitary sewer lines) (**Sheet W1.1**). Buffers will be reduced in these areas of impact and mitigated for using

buffer enhancement. In all, there will be several areas on the Site where reduction of buffer will occur. The proposed individual buffer reduction areas are described below.

Approximately 24,839 sf of wetland and stream buffer will be reduced in order to provide sufficient development area for the Site. Wetland buffer reduction with enhancement is permitted under KZC §90.60(2)(a)(2). Stream buffer reduction with enhancement is permitted under KZC §90.100(1)(b). The language used by these two code references is the same, stating:

> "Buffers may be decreased through buffer enhancement. The applicant shall demonstrate that through enhancing the buffer (by removing invasive plants, planting native vegetation, installing habitat features such as downed logs or snags, or other means) the reduced buffer will function at a higher level than the standard existing buffer. A buffer enhancement plan shall at a minimum provide the following: (1) a map locating the specific area of enhancement; (2) a planting plan that uses native species, including groundcover, shrubs, and trees; and (3) a monitoring and maintenance program prepared by a qualified professional consistent with the standards specified in KZC §90.55(4). Buffers may not be reduced at any point by more than one-third (1/3) of the standards in KZC §90.45(1) for wetlands and KZC §90.90(1) for streams)."

Code provisions for KZC §90.60(2)(a)(2) and §90.100(1)(b) are discussed below (**Section 6.3**).

6.3 Proposed Buffer Reduction with Enhancement Plan

The proposed mitigation for the buffer reduction will be through buffer enhancement (**Sheet W1.1**). Steep slopes and loamy sand soils occur adjacent to the proposed development area. Based on the recommendation by the project's geotechnical engineer, we do not propose a complete removal of Himalayan blackberry within the buffer. Himalayan blackberry is a non-native, invasive species, but is currently providing valuable soil stabilization functions within the buffer. The work that would be required to effectively remove the blackberry, replant with native species, required irrigation, and required monitoring and maintenance would likely lead to unstable earth conditions. The potential for increased erosion and soil erosion resulting from such work is high in the steep slope areas[3].

We propose to enhance, at minimum, the outer 15 feet of the remaining buffer adjacent to the development through a combination of removal of non-native, invasive species, placement of large woody debris, and planting native species of trees and shrubs (**Sheet W3.0**). Enhancement plantings may extend further towards Stream 2 in select areas where the slope of the buffer is less than 40 percent.

We are proposing two different enhancement and planting strategies depending on the slope of the buffer. Where the slope of the buffer is less than 40 percent, enhancement planting will entail removal of non-native blackberry and dense replanting by native

[3] Technical Memorandum by Associated Earth Sciences, Inc., dated 25 June 2018 (**Appendix C**).

trees and shrubs. Buffers where the slope is greater than 40 percent will be selectively enhanced through the placement of large woody debris (LWD) to create planting benches (**Sheet W3.0**). The location of LWD to create the planting benches will be determined in the field by Talasaea Consultants. Non-native species will be removed from the upgradient side of the LWD placements. Native soil or high-quality imported topsoil will be placed on the upgradient side of the LWD placements and planted with native trees and shrubs.

The development area of the Site contains sufficient numbers of suitable trees that can be used to create the LWD placements. Tree species to be utilized will include Douglas fir, western redcedar, and black cottonwood trees that have a diameter of no less than 20 inches. We typically do not include cottonwoods for use as LWD due to their rapid decay rates. However, we believe that cottonwoods could be used to create functional nurse logs in a relatively rapid manner resulting in a demonstrable improvement in buffer habitat within the relatively short mitigation monitoring time frame. We propose creating planting pockets in the cottonwood logs that will be filled with well composted mulch and each pocket planted with western hemlock or red huckleberry seedlings (see details on **Sheets W2.0** and **W3.0**). Drainage for the planting pockets will be provided by a channel cut by chainsaw through the proposed nurse log.

6.3.1 Agency Policies and Guidance

The review processes and decisional criteria for requested modifications to wetland and stream buffers are essentially the same. KZC §90.60(2)(b) describes the review process and decisional criteria for wetland buffer modifications. KZC §90.100(2) describes the review process and decisional criteria for stream buffer modifications. We are providing a paraphrased version of the review process and decisional criteria for both the wetland and stream buffer modification proposals below:

> An improvement or land surface modification shall be approved in a wetland or stream buffer only if:
>
> a. 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 Site is located within the Forbes Creek Basin. Two wetlands are mapped by the Watershed Company report in the general vicinity of the Site. These are Forbes 1 and Forbes 3. Forbes 1 is described as being relatively high value, despite the amount of development pressure surrounding it. Forbes Creek flows through Forbes 1. Forbes 3, which is located north of Forbes Creek Drive and approximately 880 feet west of the Site, is described as low to moderate quality. An unnamed stream is mapped flowing through Forbes 3, crossing under Forbes Creek Drive, and connecting with Forbes Creek. No wetlands are mapped by the Watershed Company report on the Site. However, it appears that one stream was mapped on the Site. This stream appears to be roughly in line with Stream 2. No other information is provided concerning this stream.*

General recommendations provided in the Watershed Company report include improvements of stormwater treatment and detention, protection of existing wetlands and streams, wetland enhancements, and improving fish passage issues. Improving fish passage issues is beyond the scope of this project in that no streams with usable fish habitat exist on the Site. The proposed project will, however, utilize the best available technology for stormwater treatment and detention, which will address water quality and hydroperiod issues to a limited extent on Forbes Creek. No direct impacts to wetlands are being proposed, so there is no reason based in the applicable code for enhancing onsite wetlands. Stream and wetland buffers will be maintained.

Recent comments provided by the Watershed Company made reference to Washington Department of Ecology (WDOE) guidelines that suggest that buffers on steep slopes should be increased to compensate for a reduced ability for steep slope areas to filter out pollutants. While we agree with the concept as outlined by WDOE, we also feel that it does not take into consideration current building standards and stormwater management. An increased buffer width would make sense if pollutants were able to flow off of the developed Site towards a wetland or stream. However, required stormwater infrastructure (curb, gutter, sidewalk, etc.) will capture all precipitation falling on the developed area and direct it towards the proposed stormwater system for the project. CC&R's will be established that will limit the use of fertilizers, herbicides, or pesticides on the project's greenscape. It is our contention, therefore, that increasing the width of the buffer on steep slope areas will not provide any appreciable protection to existing critical areas and is not needed.

The Adolfson report reiterates much of what was stated in the Watershed Company report, with the admonition to provide a "greater degree of protection" to wetlands and streams located within a Primary Basin compared to wetlands and streams located within Secondary Basins. The Site is located within a Primary Basin (Forbes Creek).

The Adolfson report recommends standard buffer widths and setbacks for wetlands and streams located in Primary Basins. Class B streams are recommended to have a 60-foot standard buffer. Class C streams are recommended to have a 35-foot standard buffer. Both of these widths are provided for by the proposed site development, except where buffer reduction with enhancement is proposed.

Buffers for Type 2 and Type 3 wetlands located within a Primary Basin are suggested to be 75 feet and 50 feet, respectively. Both of these buffer widths are provided for by the proposed site development, except where buffer reduction with enhancement is proposed. No direct modification of

wetlands is proposed by the current site development plan.

Finally, the Adolfson report discusses Significant Habitat Areas. The report recommends that the City establish Wildlife Habitat Conservation Areas to protect known populations of Federally- and State-listed threatened or endangered species. The Site has not been designated as a Wildlife Habitat Conservation Area. However, it cannot be ignored that significant wildlife habitat potential is present onsite. The proposed site development plan protects a significant portion of the Site, including the areas with the highest value habitat (steeply sloped ravines and associated wetlands and streams). Approximately 70-percent of the Site will remain undeveloped. This habitat is separated from the main Forbes Creek 1 habitat area by Forbes Creek Drive, but may still provide additional value for birds and other wildlife. Additionally, habitat connections to the undeveloped properties to the east and west will be maintained. These properties include Crestwoods Park to the east of the Site and Juanita Bay Park to the west (Juanita Bay Park also exists north of Forbes Creek Drive, but is separated from the Site by existing residential development).

b. It will not adversely affect water quality;

All stormwater will be collected within the development and directed via stormwater pipes to a stormwater detention vault to be constructed adjacent to Forbes Creek Drive. The proposed project will not adversely affect the quality of water within Wetland A or associated streams.

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

The onsite streams are non-fish-bearing and seasonal. Therefore, there will be no potential for the proposed buffer reduction to affect fish habitat onsite. Additionally, maintaining the existing vegetative cover reduces the potential for erosion of soil on the steep slopes that could impact the quality of water in the onsite streams. These streams eventually combine with Forbes Creek, which is a fish-bearing water. Maintaining high-quality water leaving the Site will ensure that there will be do degradation to fish habitat in Forbes Creek downstream of the Site. Furthermore, the judicious use of large woody debris in the enhancement areas will improve the potential of the buffers to provide habitat for wildlife, including small mammals and birds. The proposed buffer reduction with enhancement will not adversely affect fish, wildlife, or their habitat.

d. It will not have an adverse effect on drainage and/or stormwater detention capabilities;

Hydrology for the onsite wetlands and streams is from stormwater

discharge off of 20th Avenue. No work will occur that will alter this source of hydrology. Stormwater detention for the developed portion of the Site will be provided by a new stormwater detention vault. This vault will be sized in accordance with the City of Kirkland's stormwater design requirements.

e. It will not lead to unstable earth conditions or create an erosion hazard or contribute to scouring actions;

*As stated in our discussion of project impacts in **Section 6.2**, the proposed development will not directly affect areas of steep slopes, which could lead to unstable earth conditions. Grading and filling to create a level building area will be contained within structural walls. All stormwater will be collected onsite and discharged to a stormwater detention vault; no undetained stormwater will be allowed to leave the building envelope and flow onto the steep slope areas. The proposed project will not increase the amount of water currently flowing within the onsite stream channels, which could result in increased erosion or scouring actions. The boundaries of all proposed work will be contained within silt fencing and construction limits fencing. No disturbance of soils or vegetation within identified steep slope areas will occur. Buffer enhancement work will occur within buffer areas identified as having steep slopes. This enhancement work will be limited to an area approximately 15 feet wide measured from the edge of the proposed development and will be limited to the placement of large woody debris and creating planting terraces immediately upslope of the debris.*

f. It will not be materially detrimental to any other property or the City as a whole;

The proposed development will not be materially detrimental to any other property or the City as a whole. All construction-related work will be in accordance with the City's development regulations and best management practices.

g. Fill material does not contain organic or inorganic material that would be detrimental to water quality or to fish, wildlife, or their habitat;

Fill material will be locally sourced from clean material and approved by the City prior to placement. It will not contain organic or inorganic pollutants that could affect fish, wildlife, or their habitats. Best management practices (i.e., silt fencing, straw bales, coir logs, etc.) will be used to prevent any fill material from leaving the development envelope.

h. All exposed areas are stabilized with vegetation normally associated with native stream buffers, as appropriate;

At the conclusion of construction work, all exposed earth shall be revegetated with native trees, shrubs, and groundcover species suitable for use within stream and wetland buffers associated with slopes where applicable. Other areas, where trees and shrubs are not specified for planting, will be seeded with a native grass species to stabilize exposed soil. Construction and silt fencing shall remain in place until the native vegetation is sufficiently mature to stabilize and protect previously disturbed earth. Construction and silt fencing shall be removed when vegetation maturity has been adequately demonstrated.
and

i. There is no practical or feasible alternative development proposal that results in less impact to the buffer.

The proposed site development plan, including the proposed buffer reduction with enhancement plan, represents the minimum impact to buffers that still allows for an economic development of the property in accordance with City of Kirkland development codes and guidelines.

6.3.2 Proposed Site Mitigation – Buffer Enhancement

The proposed development area borders two streams within relatively steep-walled ravines. Per the recommendation by the project's geotechnical engineer, we are proposing to selectively enhance areas with slopes greater than 40 percent (specifically, the ravine containing Stream 2). Much of the steep-sloped buffer area is vegetated with non-native blackberries, which are an undesirable species. However, they are providing a valuable soil stabilization function that could be severely impacted by their removal. We are proposing to limit enhancement activities to within 15 feet of the edge of the proposed development in most cases. The ravine for Stream 2 will have enhancement plantings extending further than the minimum width of 15 feet towards the stream where slopes of the buffer are less than 40 percent. All enhancement will occur adjacent to areas of proposed development.

We are proposing two enhancement strategies (Enhancement Strategy 1 and Enhancement Strategy 2) depending on the existing slope of the buffer. The first enhancement strategy will be limited to those buffer areas with a slope of less than 40 percent. The second enhancement strategy will be limited to those buffer areas with a slope greater than 40 percent.

6.3.2.1 Enhancement Strategy 1

Sheet W2.0 shows the location of areas where the slope of the buffers is less than 40 percent (areas indicated by the green fill color). Approximately 16,252 sf of buffer has been identified as suitable for enhancement using Enhancement Strategy 1.

Enhancement Strategy 1 involves the removal of all non-native invasive species within the enhancement area. Non-native blackberries will be completely removed (including the root balls) by hand to limit the degree of soil disturbance. Large woody debris (in

the form of down logs and rootwads) will be placed within the buffer enhancement limits. The large woody debris may be modified by the creation of planting pockets as shown on **Sheet W2.0**. Native trees and shrubs will be planted to restore those areas where blackberry was removed and to enhance the remaining Enhancement Strategy 1 buffer with native trees and shrubs (see **Sheet W3.0** - Planting Typical 1 on the plan sheets). Planting pockets created in the LWD will be filled with well-composed mulch and planted with either western hemlock or red elderberry. We propose that some of the LWD with the proposed planting pockets be black cottonwood in order to accelerate the development of nurse logs.

We believe that the proposed Enhancement Strategy 1, with its combination of removal of non-native species, replanting with native trees and shrubs, and the use of LWD (including the accelerated creation of nurse logs) will provide greater buffer habitat value compared with existing conditions.

6.3.2.2 Enhancement Strategy 2

The use of Enhancement Strategy 2 will be limited to those areas of buffer with slopes greater than 40 percent. These are indicated on **Sheet W2.0** by the salmon-colored fill. Approximately 8,914 sf of buffer has been identified for enhancement using Enhancement Strategy 2.

Enhancement Strategy 2 does not seek to remove all non-native blackberry due to the potential to create unstable earth conditions that are to be avoided under conditions described in **Section 6.3.1**. Instead, the strategy will utilize select placement of LWD to create planting bench areas. The location of these planting benches will be determined in the field by Talasaea Consultants. Non-native blackberry will be removed from the planting bench areas, but generally left alone in the surrounding buffer area.

Large wood debris will be selectively placed within the 15-foot enhancement area as shown on **Sheet W2.0**¸ and arrayed as show on Planting Typical 2 illustrated on **Sheet W3.0**. This illustration shows two different placement options for large woody debris. In one option, logs will be placed so that they are either anchored against existing trees, or keyed in location by placement of rootwads. The logs will be oriented parallel to topography to the extent possible. The second option will utilize two logs with rootwads attached placed at an angle to each other. The attached rootwads will anchor these pieces in place. This option is to be used in the steep slope areas where existing trees are not present that would allow the use of the first option.

An area upslope of the LWD placements will be measured out so that a slope no greater than 3:1 can be created from the top of the placed LWD. This area will be cleared of non-native vegetation, including the root balls. High-quality topsoil will be placed against the LWD to create the proposed slope. The terrace created in this manner will be planted with native species of trees and shrubs. Select logs and stumps may be further modified by the creation of planting pockets as described under **Section 6.3.2.1** for Enhancement Strategy 1.

It is vital for the success of Enhancement Strategy 2 that a representative of Talasaea be present onsite to aid in the placement of large woody debris.

6.3.3 Conceptual Planting Design

Plant species were chosen for a variety of qualities, including:

- adaptation to specific water regimes;
- value to wildlife;
- value as a physical or visual barrier;
- patterns of growth (structural diversity); and
- aesthetic values.

Native species were chosen to increase both the structural and species diversity of the mitigation areas, thereby increasing the value of the area to wildlife for food and cover.

Sheet W3.0 provides a list of candidate plant species to be used for buffer enhancement. Trees include bitter cherry (*Prunus emarginata*), Douglas fir, western red cedar, and western hemlock. Small trees and shrubs include vine maple, western hazelnut, cascara, Indian plum, and red elderberry. Massing shrubs include oceanspray (*Holodiscus discolor*), Nootka rose (*Rosa nutkana*), salmonberry, snowberry (*Symphoricarpos albus*), and evergreen huckleberry (*Vaccinium ovatum*). Groundcover plant species include salal and sword fern. Planting quantities and densities are based on the density recommendations of the King County Mitigation Guidelines. Plant materials shall consist of one- and two-gallon container trees and shrubs. See **Sheet W3.0** for proposed tree, shrub, and groundcover quantities.

6.3.4 Temporary Irrigation System

The Client shall water plants immediately upon planting, then provide manual watering or a temporary irrigation system to prevent plant mortality and ensure proper plant establishment. Plants shall receive a minimum of approximately 1-inch of water every week (0.5 inches every 3 days) during the dry season, generally June 15th to October 15th) for the first two years after planting. Watering amounts may need to be increased during prolonged periods of hot, dry weather.

6.4 Fertilizer

The Client shall fertilize all trees and shrubs with a slow-released general-purpose granular fertilizer or slow-release tablets at manufacturer's specified rate at the time of planting.

6.4.1 Mulch

A full 3 inches of medium bark mulch (after settling) shall be around all installed plants and on any disturbed open soil areas. Mulch shall be derived from fir, pine, or hemlock species, and shall not contain trash, rocks, or other debris that may be detrimental to plant growth.

6.4.2 Fence and Signage

An open 2-board critical areas fence shall be installed at the final critical areas boundary, following site preparation, planting, and mulching. On the fence, signs shall

be provided per the requirements of the City of Kirkland. Location and details of the fence and signage are shown on **Sheet W1.1**.

Chapter 7. CONSTRUCTION SEQUENCING

7.1 Mitigation Construction Sequence

The following provides the general sequence of activities anticipated to be necessary to complete this mitigation project. Some of these activities may be conducted concurrently as the project progresses.

1. Conduct a site meeting between the Contractor, Talasaea Consultants, and the Owner's Representative to review the project plans, work areas, staging/stockpile areas, and material disposal areas.
2. Survey clearing/grading limits per civil engineering plans.
3. Flag existing trees and other vegetation to remain.
4. Install silt fencing, tree protection fencing (if required), and any other erosion and sedimentation control BMPs necessary for work in the project areas per civil plans.
5. Grub out invasive species in buffer areas as shown on clearing and grubbing plan.
6. Install habitat features (down logs and stumps). A representative of Talasaea must be present onsite to assist in the placement of habitat features.
7. Mulch all disturbed buffer areas.
8. Complete site cleanup and install plant material as indicated on the planting plan.

7.2 Post-Construction Approval

Following mitigation construction completion, Talasaea Consultants shall notify the City in writing to request a final site inspection for final construction approval. Once the City has approved of the mitigation construction, the monitoring period shall commence.

7.3 Post-Construction Assessment

Once construction is approved by the City, a qualified wetland ecologist or biologist from Talasaea Consultants shall conduct a post-construction assessment. The purpose of this assessment will be to establish baseline conditions at Year 0 of the required monitoring period. A Baseline Assessment report including “as-built” drawings will be submitted to the City. The as-built plans will identify and describe any changes in planting or other features in relation to the original approved plan.

Chapter 8. MONITORING PLAN

8.1 Reporting

The reports will include: 1) Project Overview, 2) Mitigation Requirements, 3) Summary Data, 4) Maps and Plans, and 5) Conclusions. If the performance criteria are met, monitoring for the City will cease at the end of year five, unless objectives are met at an earlier date and the City accepts the mitigation project as successfully completed.

Table 1. Projected Schedule for Performance Monitoring and Maintenance Events

Year	Date	Maintenance Review	Performance Monitoring	Report Due to Agencies
Year 0, As-built and Baseline Assessment	Winter 2019	X	X	X
1	Spring 2020	X	X	
	Fall 2020	X	X	X
2	Spring 2021	X	X	
	Fall 2021	X	X	X
3	Spring 2022	X		
	Fall 2022	X	X	X
4	Spring 2023	X		
	Fall 2023	X	X	X
5	Spring 2024	X		
	Fall 2024	X	X	X*

*Obtain final approval to facilitate bond release from the City of Kirkland (presumes performance criteria are met).

8.2 Monitoring Methods

Vegetation monitoring methods may include counts; photo-points; random sampling; sampling plots, quadrats, or transects; stem density; visual inspection; and/or other methods deemed appropriate by the permitting agencies and the biologist/ecologist. Vegetation monitoring components shall include general appearance, health, mortality, colonization rates, percent cover, percent survival, volunteer plant species, and invasive weed cover.

Permanent vegetation sampling plots, quadrats, and/or transects will be established at selected locations to adequately sample and represent all of the plant communities within the mitigation project areas. The number, exact size, and location of transects, sampling plots, and quadrats will be determined at the time of the baseline assessment.

Percent areal cover of woody vegetation (forested and/or scrub-shrub plant communities) will be evaluated through the use of point-intercept sampling methodology. Using this methodology, a tape will be extended between two permanent markers at each end of an established transect. Trees and shrubs intercepted by the tape will be identified, and the intercept distance recorded. Percent cover by species will then be calculated by adding the intercept distances and expressing them as a total proportion of the tape length.

The established vegetation sampling locations will be monitored and compared to the baseline data during each performance monitoring event to aid in determining the success of plant establishment. Percent survival of shrubs and trees will be evaluated in a 10-foot-wide strip along each established transect. The species and location of all shrubs and trees within this area will be recorded at the time of the baseline assessment and will be evaluated during each monitoring event to determine percent survival.

8.3 Photo Documentation

Locations will be established within the mitigation areas from which panoramic photographs will be taken throughout the monitoring period. These photographs will

document general appearance and relative changes within the plant communities. Review of the photos over time will provide a semi-quantitative representation of the success of the planting plan. Vegetation sampling plot and photo-point locations will be shown on a map and submitted with the baseline assessment report and yearly performance monitoring reports.

8.4 Wildlife

Birds, mammals, reptiles, amphibians, and invertebrates observed in the mitigation areas (either by direct or indirect means) will be identified and recorded during scheduled monitoring events, and at any other times observations are made. Direct observations include actual sightings, while indirect observations include tracks, scat, nests, song, or other indicative signs. The kinds and locations of the habitat with the greatest use by each species will be noted, as will any breeding or nesting activities.

8.5 Water Quality and Site Stability

Water quality will be assessed qualitatively unless it is evident there is a serious problem. In such an event, water quality samples will be taken and analyzed in a laboratory for suspected parameters. Qualitative assessments of water quality include:

- oil sheen or other surface films,
- abnormal color or odor of water,
- stressed or dead vegetation or aquatic fauna,
- turbidity, and
- absence of aquatic fauna.

Observations will be made of the general stability of slopes and soils in the mitigation areas during each monitoring event. Any erosion of soils or slumping of slopes will be recorded and corrective measures will be taken.

8.6 Goals, Objectives, and Performance Standards

This section of the critical areas report addresses the mitigation goals (including requirements of the City of Kirkland and how they are planned to be met), as well as the related objectives and performance standards to which the project is expected to meet. These are described in detail below.

8.6.1 Mitigation Goals

The goal of the mitigation plan is to enhance the functions and services provided by the areas proposed for post-construction buffer. This will be accomplished through the removal of garbage and construction-related debris, removal of non-native invasive plant species, replanting with a variety of native trees and shrubs, and installation of habitat features such as large woody debris.

8.6.2 Mitigation Objectives and Performance Standards

The success of the proposed buffer enhancement plan will be evaluated through the following objectives and performance standards. Mitigation monitoring will be performed by a qualified biologist.

Objective A: Create structural and plant species diversity in the post-construction buffer area.

Performance Standard A1: *At least five (5) species of desirable native woody plants will be present in the added buffer area during the monitoring period. Percent survival of planted woody material must be 100 percent at the end of Year 1 (per contractor warranty), and at least 80 percent for each subsequent year of the monitoring period.*

Objective B: Create additional habitat within the post-construction buffer area.

Performance Standard B1: *Large woody debris, consisting of softwood logs, stumps, and root wads, shall be placed within the added buffer area. A minimum of twelve (12) pieced of large woody debris will be placed.*

Objective C: Limit the amount of non-native and invasive species in the post-construction buffer area.

Performance Standard C1: *After construction and for the entirety of the monitoring period, non-native, invasive species within the buffer enhancement areas shall be maintained at levels below 20 percent cover. Non-native, invasive species include, but are not limited to, Scot's broom, Himalayan and evergreen blackberry, hedge bindweed, exotic knotweeds, and bittersweet nightshade.*

Chapter 9. MAINTENANCE AND CONTINGENCY

Regular maintenance reviews will be performed according to the schedule presented in

Table 1. Projected Schedule for Performance Monitoring and Maintenance **Events** to address any conditions that could jeopardize the success of the mitigation project. Following maintenance reviews by the biologist or ecologist, required maintenance on the Site will be implemented within ten (10) business days of submission of a maintenance memo to the maintenance contractor and permittee.

Established performance standards for the project will be compared to the yearly monitoring results to judge the success of the mitigation. If, during the course of the monitoring period, there appears to be a significant problem with achieving the performance standards, the permittee shall work with the permitting agencies to develop a Contingency Plan in order to get the project back into compliance with the performance standards. Contingency plans can include, but are not limited to, the following actions: additional plant installation, erosion control, modifications to hydrology, and plant substitutions of type, size, quantity, and/or location. If required, a Contingency Plan shall be submitted by December 31st of any year when deficiencies are discovered.

The following list includes examples of maintenance (M) and contingency (C) actions that may be implemented during the course of the monitoring period. This list is not intended to be exhaustive, and other actions may be implemented as deemed necessary.

- During year one, replace all dead woody plant material (M).

- Water all plantings at a rate of 1” of water every week between June 15 – October 15 during the first two years after installation, and for the first two years after any replacement plantings (C & M).
- Replace dead plants with the same species or a substitute species that meet the goals and objectives of the mitigation plan, subject to Talasaea and agency approval (C).
- Re-plant area after the reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.) (C).
- After consulting with City staff, minor excavations, if deemed to be more beneficial to the existing conditions than currently exists, will be made to correct surface drainage patterns (C).
- Remove/control weedy or non-native invasive plants (e.g., Scot's broom, reed canarygrass, Himalayan blackberry, purple loosestrife, Japanese knotweed, etc.) by manual or chemical means approved by permitting agencies. Use of herbicides or pesticides within the mitigation area would only be implemented if other measures failed or were considered unlikely to be successful, and would require prior agency approval. All non-native vegetation must be removed and disposed of off-site. (C & M).
- Weed all trees and shrubs to the dripline and provide 3-inch deep mulch rings 24 inches in diameter for shrubs and 36 inches in diameter for trees (M).
- Remove trash and other debris from the mitigation areas twice a year (M).
- Selectively prune woody plants at the direction of Talasaea Consultants to meet the mitigation plan's goal and objectives (e.g., thinning and removal of dead or diseased portions of trees/shrubs) (M).
- Repair or replace damaged structures including weirs, signs, fences, or bird boxes (M).

Chapter 10. FINANCIAL GUARANTEE

Financial guarantee in the form of a performance or maintenance bond will be required per KZC §90.145, which states:

“The Planning Official shall require a performance or maintenance bond, a performance or maintenance security, a perpetual culvert maintenance agreement, and/or a perpetual landscape maintenance agreement, as determined to be appropriate by the Planning Official, to ensure compliance with any aspect of this chapter or any decision or determination made pursuant to this chapter.

1. Performance or Maintenance Bond or Security Requirement – The performance or maintenance security required by the Planning Official shall be provided in such forms and amounts as the Planning Official deems necessary to assure that all work or actions are satisfactorily completed or maintained in accordance with the approved plans, specifications, permit or approval requirements, and applicable regulations, and to assure that all work or actions not satisfactorily completed or maintained will be corrected to comply with approved plans, specifications, requirements, and regulations to restore environmental damage or degradation,

protect fish and wildlife habitat and protect the health, safety, and general welfare of the public.

2. Form of Performance Security – The performance security shall be a surety bond obtained from companies registered as surety in the state or certified as acceptable sureties on federal bonds. In lieu of a surety bond, the Planning Official may allow alternative performance security in the form of an assignment of funds or account, and escrow agreement, an irrevocable letter of credit, or other financial security device in an amount equal to that required for the surety bond. The surety bond or other performance security shall be conditioned on the work being completed or maintained in accordance with requirements, approvals, or permits; on the site being left or maintained in a safe condition; and on the site and adjacent or surrounding areas being restored in the event of damages or other environmental degradation from development or maintenance activities conducted pursuant to the permit or approval.
3. Amount of Performance Security – The amount of the performance or maintenance security shall be 125 percent of the estimated cost, as approved by the Planning Official, of conformance to plans, specifications, and permit or approval requirements under this chapter, including corrective work and compensation, enhancement, mitigation, maintenance, and restoration of sensitive areas. In addition, an administrative deposit shall be paid as required in KZC §175.25. All bond or performance security shall be submitted in their original form with original signatures of authorization.
4. Administration of Performance Security – If during the term of the performance or maintenance security, the Planning Official determines that conditions exist which do not conform with plans, specifications, approval or permit requirements, the Planning Official may issue a stop work order prohibiting any additional work or maintenance until the condition is corrected. The Planning Official may revoke the performance or maintenance security, or a portion thereof, in order to correct conditions that are not in conformance with plans, specifications, approval or permit requirements. The performance or maintenance security may be released upon written notification by the Planning Official, following final site inspection or completion, as appropriate, or when the Planning Official is satisfied that the work or activity complies with permits or approved requirements.
5. Exemptions for Public Agencies – State agencies and local government bodies, including school districts, shall not be required to secure the performance or maintenance of permit or approval conditions with a surety bond or other financial security device. These public agencies are required to comply with all requirements, terms, and conditions of the permit or approval, and the Planning Official may enforce compliance by withholding certificates of occupancy or occupancy approval, by administrative enforcement action, or by any other legal means."

Chapter 11. SUMMARY

The Orcas Moon Cottages property is an approximately 7.1-acre assemblage of two lots located in Kirkland, Washington. The property is currently undeveloped and forested.

Three wetlands and five streams were identified and delineated on the property. One wetland was identified off property to the west. Orcas Moon, LLC proposes to development of 14 units of cottage housing on the property. The units will be constructed in two groups across the property to take advantage of limited relatively level areas. Approximately 1.6 acres of the approximately 7-acre Site will be developed. The remaining portion (approximately 73 percent of the total Site size) will remain in its natural state.

In order for the project to meet specific design standards and economically-feasibility, it will be necessary to reduce stream and wetland buffers adjacent to the development areas. Buffer reductions of up to 1/3rd of the standard buffer width are allowed under City of Kirkland Zoning Code. Mitigation for the proposed buffer reduction will be provided through buffer enhancement. Buffer enhancement will be mostly limited to an area extending at least 15 feet away from the proposed development and will follow one of two enhancement strategies based on the presence or absence of steep slopes (slopes greater than 40 percent). Enhancement, supported by placement of large woody debris, is proposed for the areas of buffer with slopes greater than 40 percent.

Temporary impacts to buffers will occur during the construction of the soft-surface trail and various utilities. Areas of temporary buffer impact will be mitigated through the restoration of the original (pre-impact) topography and replanting with a variety of native trees and shrubs.

While buffer enhancement is not specifically required where the functions and values of the post-construction buffer area are equal to or greater than the functions and values of the buffer being reduced, the project will still provide habitat improvements. Enhancement will include the removal of non-native, invasive species, installation of habitat features (large woody debris), and enhancement planting with a variety of native trees, shrubs ground cover. The proposed site development plan will not directly impact wetlands or streams onsite.

Chapter 12. REFERENCES

City of Kirkland, 2016. Chapter 90 – Drainage Basins. Retrieved from http://www.codepublishing.com/wa/kirkland.html.

Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service.

Google Earth. 2016. *Google Earth.* https://www.google.com/earth/.

Hitchcock, C. Leo, Arthur Cronquist, Marion Owensby, and J. W. Thompson. 1969. *Vascular Plants of the Pacific Northwest.* Seattle: University of Washington Press.

Iowa State University. 1995. *Hydric Soils of Washington State.* U.S. Department of Agriculture, Natural Resources Conservation Service.

King County. 2010. *GIS Database.* Accessed mo da, year. <http://www.kingcounty.gov/operations/GIS/GISData.aspx>.

Lichvar, R.W. 2012. *The National Wetland Plant List.* ERDC/CRREL TR-12-11, Hanover, NH: U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory. http://acwc.sdp.sirsi.net/client/search/asset:asset?t:ac=$N/1012381.

Munsell Color. 1988. *Munsell Soil Color Charts.* Grand Rapids, Michigan: X-RiteCorp.

Natural Resources Conservation Service. 2012. *National Technical Committee for Hydric Soils - Hydric Soils List.* http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

Olson, P, and E Stockdale. 2008. *Determining the Ordinary High Water Mark on Streams in Washington State.* Olympia: Washington Department of Ecology.

Reed, P. B. 1988. *National List of Plant Species that Occur in Wetlands: Northwest (Region 9).* Report 88, USF & WS Biol.Update.

Reed, P. B. 1996. *Supplement to National List of Plant Species that Occur in Wetlands (Region 9). National Wetlands Inventory.* US Fish and Wildlife Service.

Soil Survey Staff. 2013. *Web Soil Survey.* December. Accessed September 2014. http://websoilsurvey.nrcs.usda.gov/.

StreamNet. 2016. "StreamNet Mapper." *StreamNet.* Accessed July 2016. http://map.streamnet.org/website/bluesnetmapper/viewer.htm.

U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*

(Version 2.0). U. S. Army Corps of Engineers, Vicksburg, MS: U.S. Army Engineer Research and Development Center.

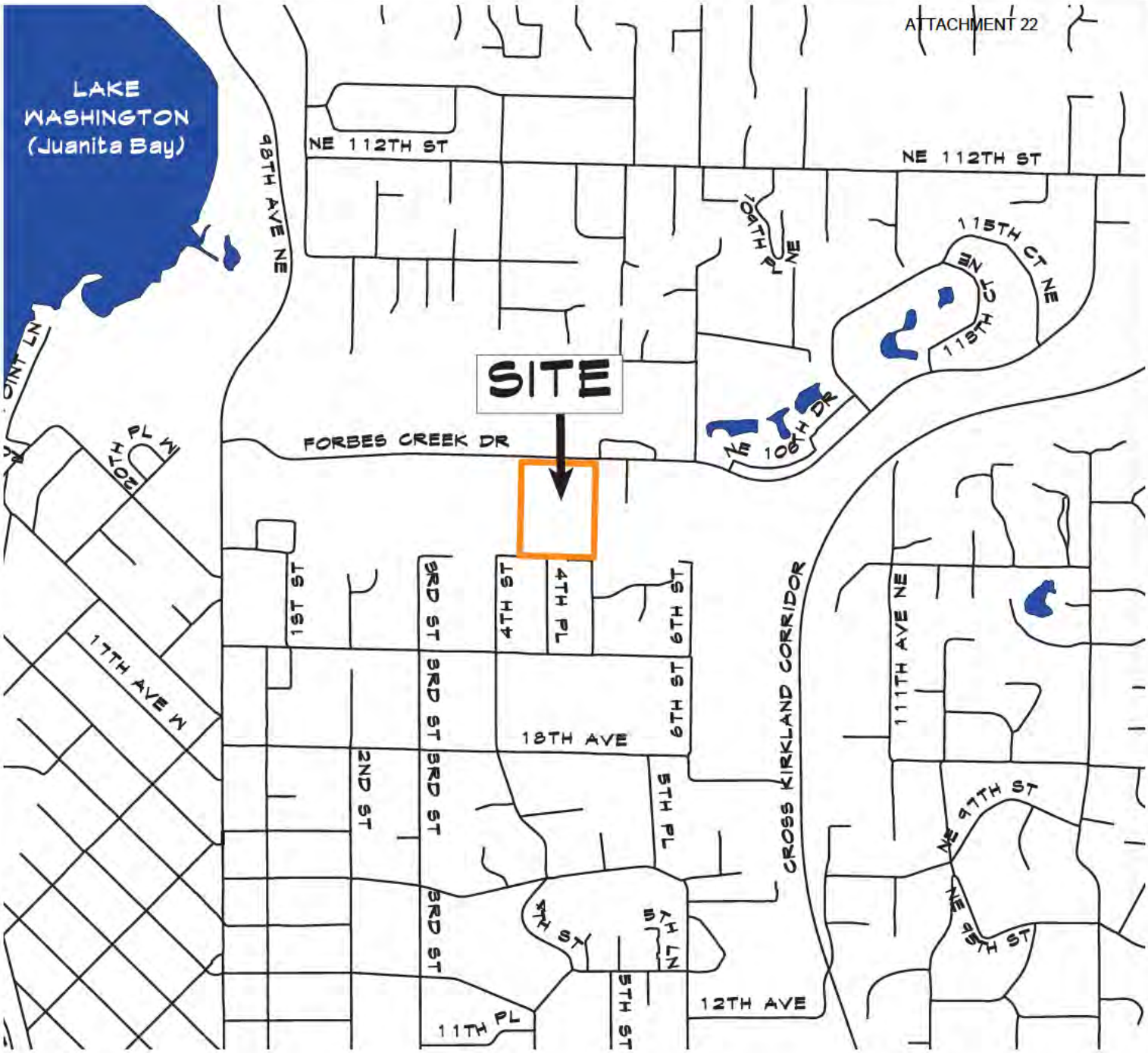
U.S. Department of Agriculture. 1991. *Hydric Soils of The United States.* Washington, DC: Soil Conservation Service.

U.S. Department of the Interior, Fish and Wildlife Service. year. *National Wetlands Inventory Map.* Washington D.C., month day.

United States Geological Service. 2014. *EarthExplorer.* http://earthexplorer.usgs.gov/.

Washington State Department of Fish and Wildlife. 2016. *Salmonscape.* Accessed July 2016. wdfw.wa.gov/mapping/salmonscape/index.html.

Figures



Property Location: 400 Block of Forbes Creek Drive. T26N, R5E, Section 32, Willamette Meridian.

N

Reference: GIS parcel, road, watercourse, and water body data from City of Kirkland, 2015.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 1

VICINITY MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 1000 ft

DATE 6 NOV 2017

REVISED

1

N

Reference: GIS parcel and road data from City of Kirkland, 2015.
Aerial image 2012 from Earth Explorer, downloaded 2016.

TALASAEA
CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 2

SITE MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE
1 in : 200 ft

DATE
6 NOV 2017

REVISED

2

N

Reference: GIS parcel and road data from City of Kirkland, 2015. National Wetlands Inventory GIS data from USFWS, 2012. Aerial image 2012 from Earth Explorer, downloaded 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 3

NWI MAP - KIRKLAND QUADRANGLE
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

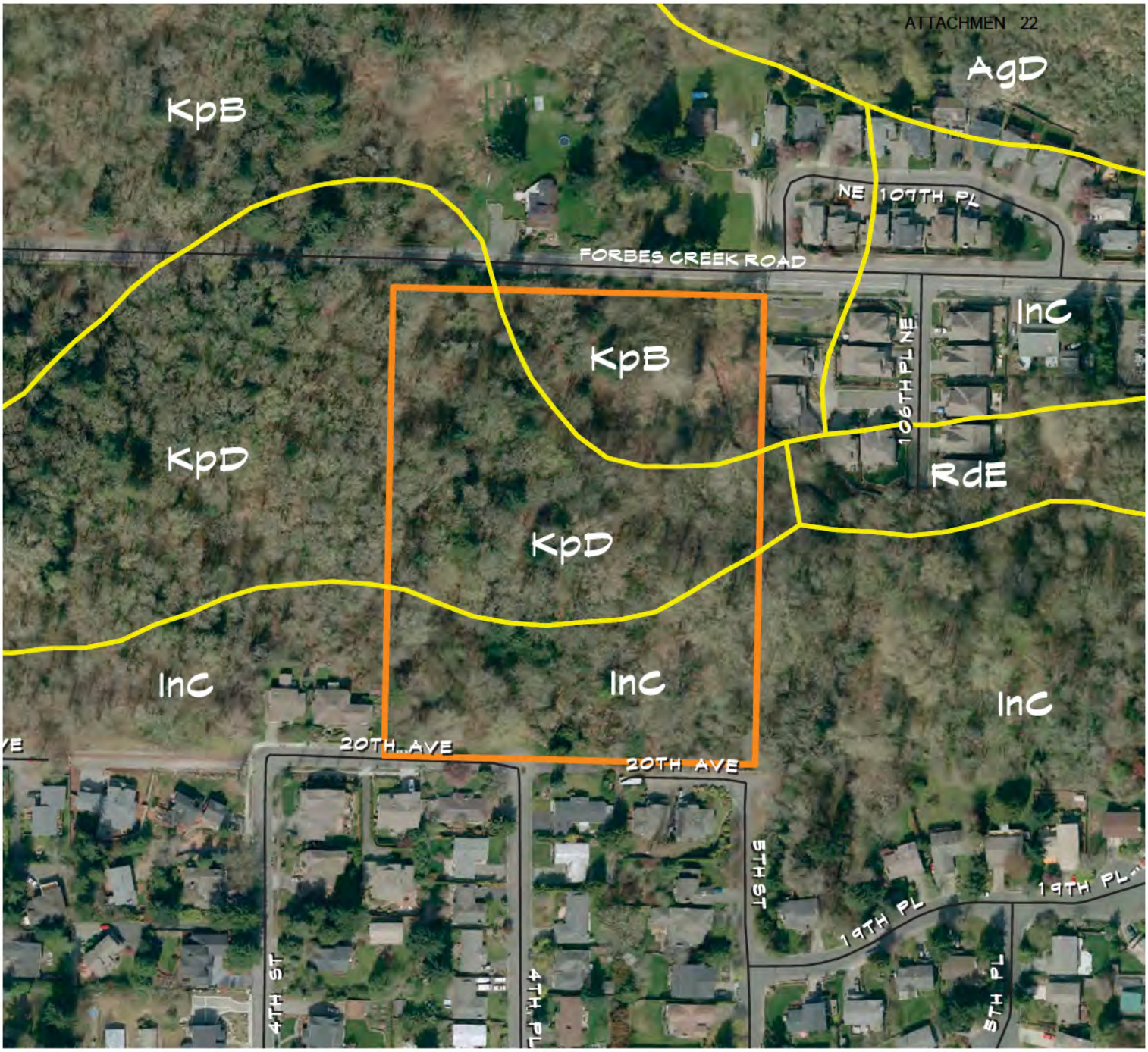
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 6 NOV 2017

REVISED

3



SOIL KEY

AgD - Alderwood gravelly sandy loam, 15 to 30 percent slope
lnC - Indianola lomay sand, 5 to 15 percent slope
KpB - Kitsap silt loam, 2 to 8 percent slope
KpD - Kitsap silt loam, 15 to 30 percent slope

N

Reference: GIS parcel, road, and soil GIS data from City of Kirkland, 2015. Aerial image 2012 from Earth Explorer, downloaded 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 4

NRCS SOILS DATA
(from City of Kirkland)
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

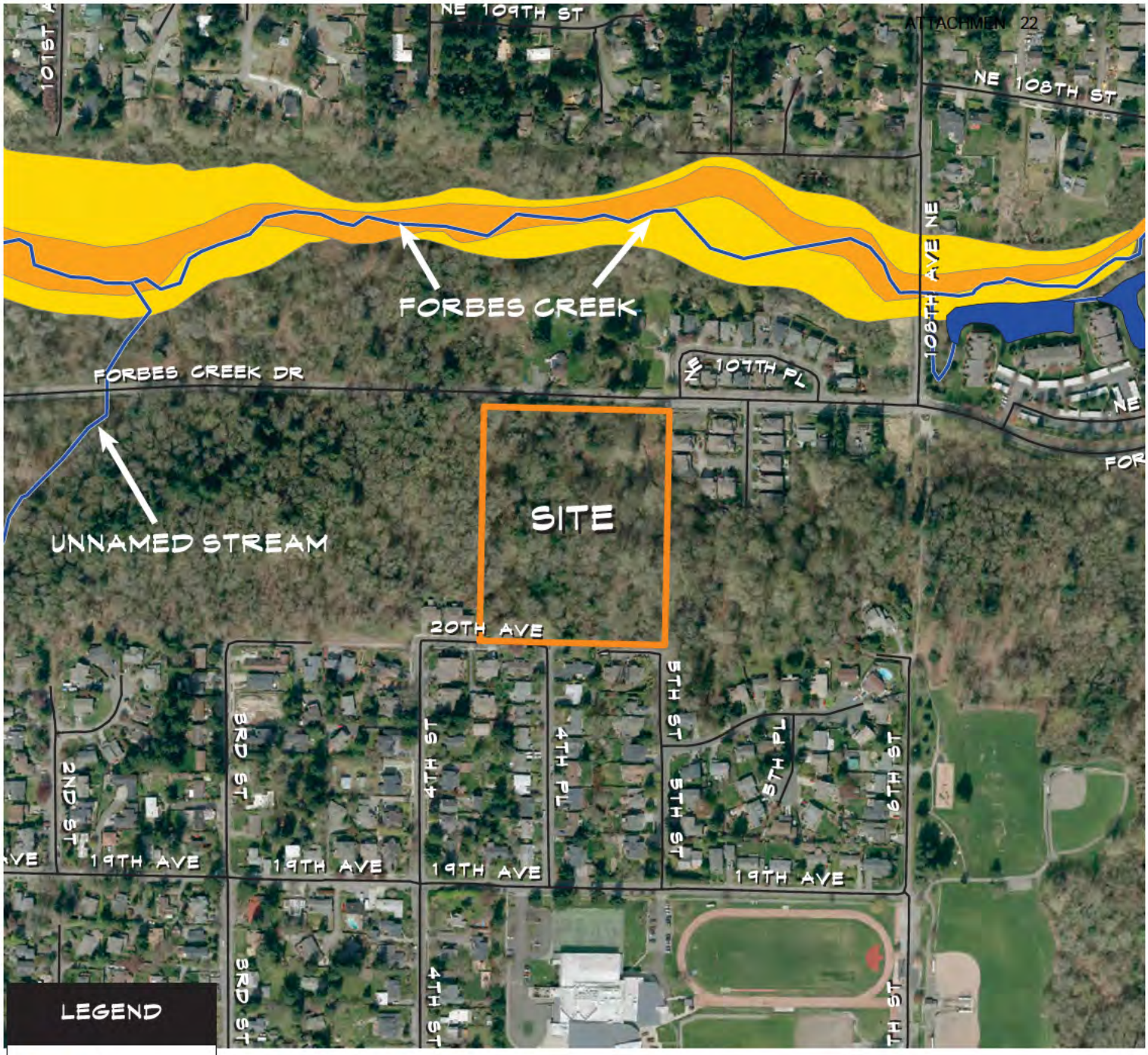
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 200 ft

DATE 6 NOV 2017

REVISED

4



Reference: GIS parcel and road data from City of Kirkland, 2015. Stream, water body, floodway, and floodplain data from King County GIS, 2015. Aerial image 2012 from Earth Explorer, downloaded 2016

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 5

KING COUNTY CRITICAL AREAS
GIS DATA
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

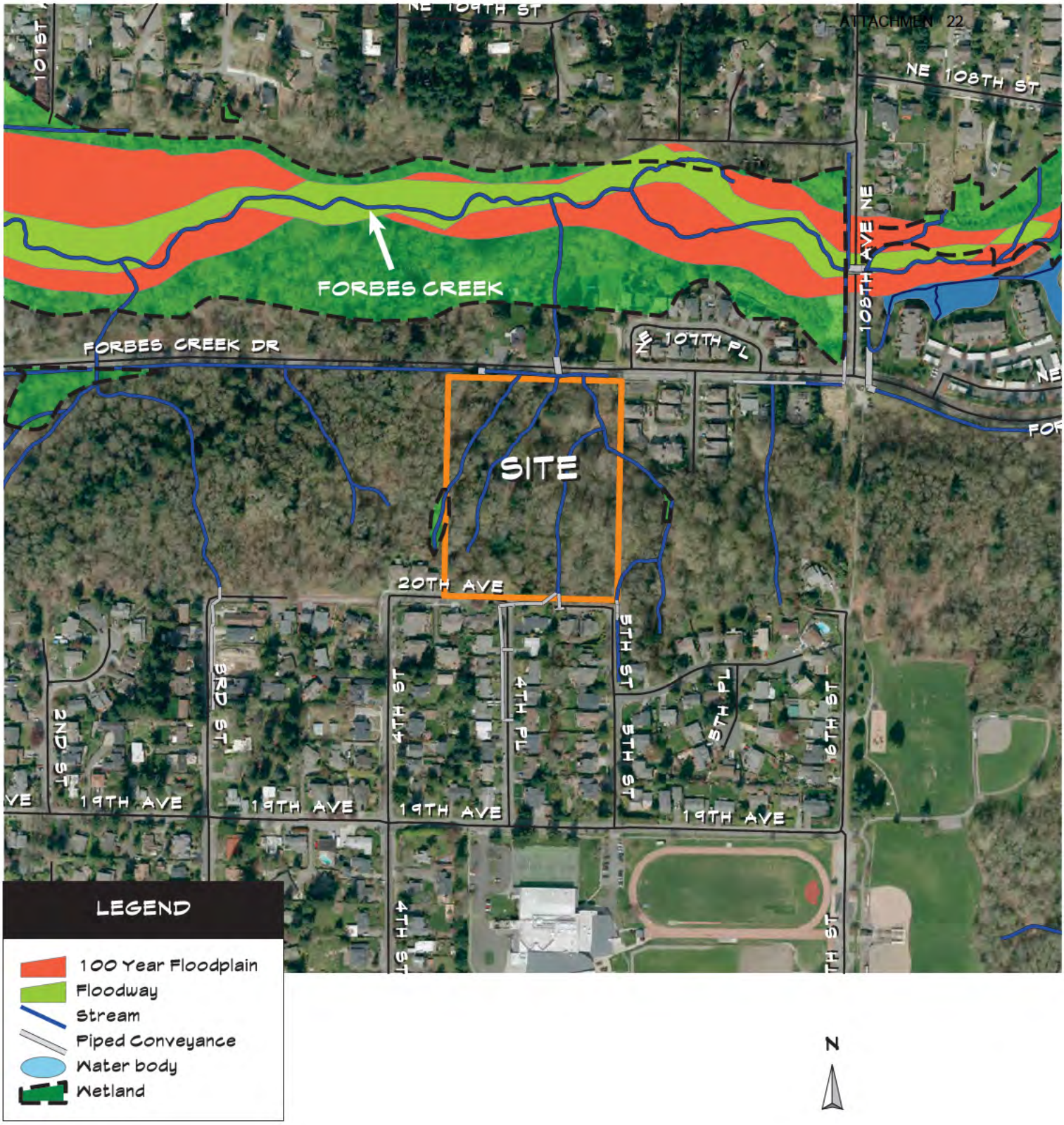
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 6 NOV 2017

REVISED

5



Reference: GIS parcel, road, stream, wetland, water body, floodplain, and floodway data from City of Kirkland, 2015. Aerial image 2012 from Earth Explorer, 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 6

CITY OF KIRKLAND CRITICAL AREAS GIS DATABASE
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 6 NOV 2017

REVISED

6

See also Sheet W 1.0.

N

Reference: GIS parcel and wetland data from City of Kirkland, 2015.
Surveyed stream and wetland data provided by Blueline Group, 2016.
Aerial image 2012 from Earth Explorer, downloaded 2016.

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425)861-7550 - Fax (425)861-7549

FIGURE 7

WETLAND AND STREAM MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 100 ft

DATE 6 NOV 2017

REVISED

7

Appendix A

City of Kirkland Wetland Rating Forms (Plate 26)

FILE 318B
wetland A

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 2

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from	Acres	Point Value	Points

choices

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

		# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area		1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre		2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	X	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area	X	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area	X	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3

NONE

Emergent	1-2	=	1	Forested	1-2	=	1
	3-4	=	2		3-4	=	2
	>4	=	3		>4	=	3

4. Structural diversity.

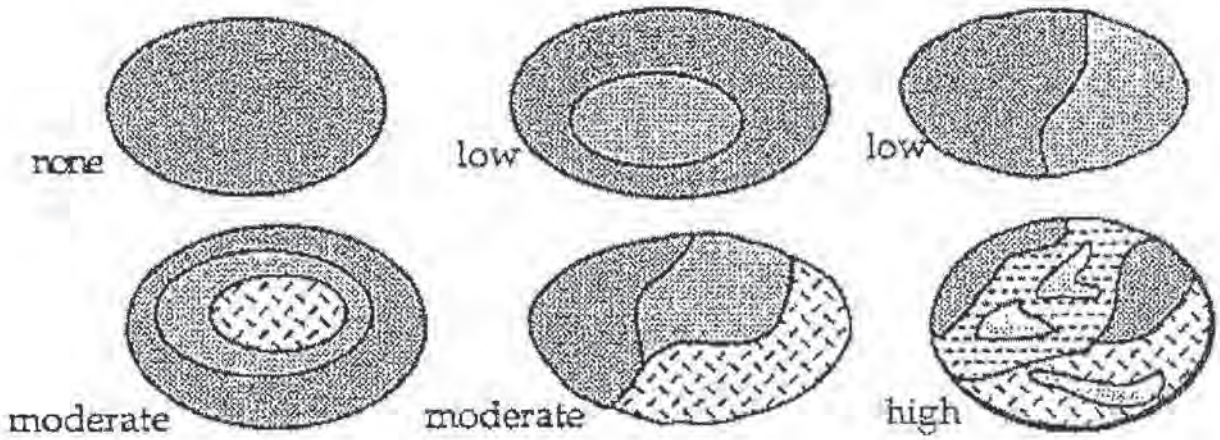
If the wetland has a forested class, add 1 point for each of the following attributes present:

Trees >50' tall	=	1
Trees 20' to 49' tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300'?	= 1
Are raptor nest(s) located within 300'?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	% X 0 =		=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	100 % X 4 =	400 x	2 =	800
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50'

By 2 if buffer width is 50-100'

By 3 if buffer width is >100'

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3 800

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area? = 5

Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area? = 3

Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor? = 1

Is the wetland and buffer completely isolated by development and/or cultivated agricultural land? = 0

10. Scoring

Add the scores to get a total: 26

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2

No = Type 3

 TAb-518B
wetland B

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 3

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from	Acres	Point Value	Points

choices

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

	# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area	1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre	2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area X	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3
	none		

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3
	none		

Emergent	1-2	=	1	Forested	1-2	=	1
	3-4	=	2		3-4	=	2
	>4	=	3		>4	=	3

none

4. Structural diversity.

If the wetland has a forested class, add 1 point for each of the following attributes present:

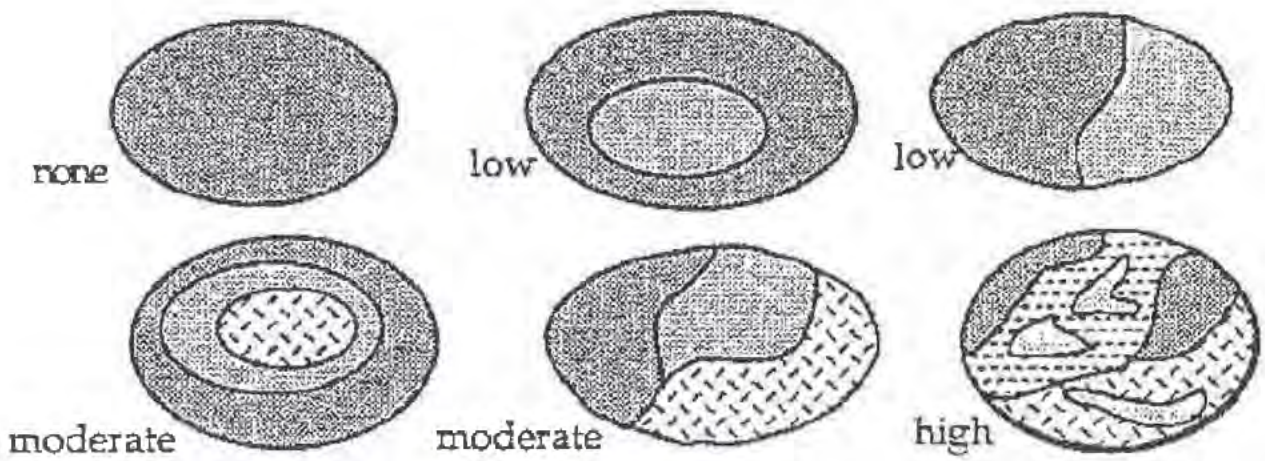
Trees >50′ tall	=	1
Trees 20′ to 49′ tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

none

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300'?	= 1
Are raptor nest(s) located within 300'?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer Step 1	Width Factor Step 2
Roads, buildings or parking lots	% X 0 =	=
Lawn, grazed pasture, vineyards or annual crops	% X 1 =	=
Ungrazed grassland or orchards	% X 2 =	=
Open water or native grasslands	% X 3 =	=
Forest or shrub	100 % X 4 = 400 x 3	= 1200
		Add buffer total

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50'

By 2 if buffer width is 50-100'

By 3 if buffer width is >100'

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4 1200

600-899 = 3

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area? = 5

Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area? = 3

Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor? = 1

Is the wetland and buffer completely isolated by development and/or cultivated agricultural land? = 0

10. Scoring

Add the scores to get a total: 17

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2

No = Type 3

TAL-518B
wetland C

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 2

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from	Acres	Point Value	Points

choices

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

		# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area		1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre		2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	X	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area		4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area	X	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3

None

Emergent	1-2	=	1	Forested	1-2	=	1
	3-4	=	2		3-4	=	2
	>4	=	3		>4	=	3

4. Structural diversity.

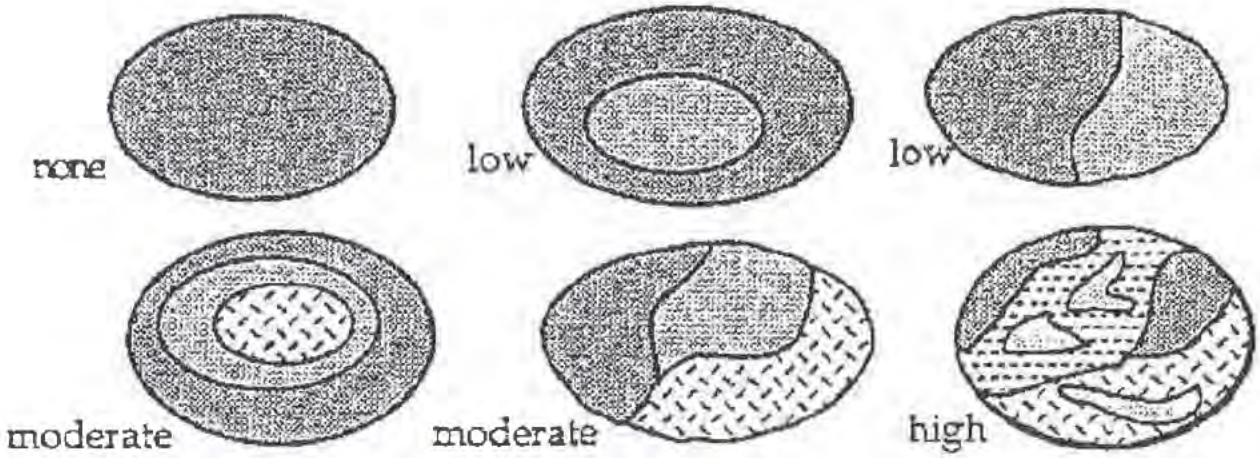
If the wetland has a forested class, add 1 point for each of the following attributes present

Trees >50' tall	=	1
Trees 20' to 49' tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300'?	= 1
Are raptor nest(s) located within 300'?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer Step 1	Width Factor Step 2
Roads, buildings or parking lots	% X 0 =	=
Lawn, grazed pasture, vineyards or annual crops	% X 1 =	=
Ungrazed grassland or orchards	% X 2 =	=
Open water or native grasslands	% X 3 =	=
Forest or shrub	100 % X 4 = 400 X	2 = 800
		Add buffer total

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50'

By 2 if buffer width is 50-100'

By 3 if buffer width is >100'

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3 800

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area?	= 5
Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area?	= 3
Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor?	= 1
Is the wetland and buffer completely isolated by development and/or cultivated agricultural land?	= 0

10. Scoring

Add the scores to get a total: 25

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2 75' PRIMARY BASIN BUFFER

No = Type 3

TAL-5183
ATTACHMENT 22
Wetland D

Chapter 1. Plate 26 WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; No

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; No

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or No

e. The wetland contains state or federally listed threatened or endangered plant species. No

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from choices	Acres	Point Value	Points

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

	# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area	1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre	2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3
	NONE		

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3
	NONE		

Emergent	1-2	=	1	Forested	1-2	=	1
	3-4	=	2		3-4	=	2
	>4	=	3		>4	=	3

4. Structural diversity.

If the wetland has a forested class, add 1 point for each of the following attributes present:

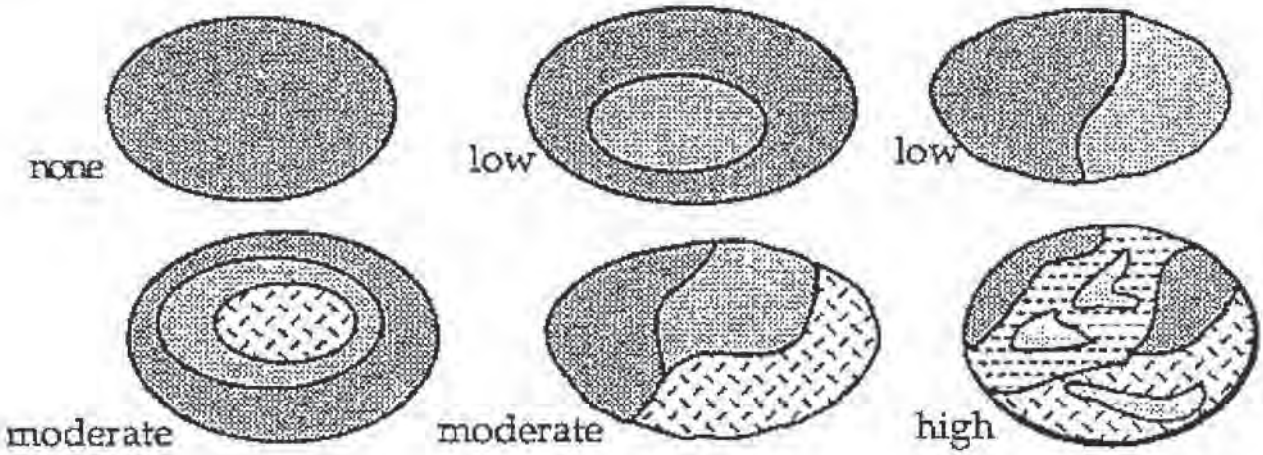
Trees >50' tall	=	1
Trees 20' to 49' tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

NONE

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300'?	= 1
Are raptor nest(s) located within 300'?	= 1 NONE
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	50 % X 0 =	0	=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	50 % X 4 =	200 x 3	=	600
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50′

By 2 if buffer width is 50-100′

By 3 if buffer width is >100′

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area? = 5

Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area? = 3

Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor? = 1

Is the wetland and buffer completely isolated by development and/or cultivated agricultural land? = 0

10. Scoring

Add the scores to get a total: 13

Question: Is the total greater than or equal to 22 points?

Answer:

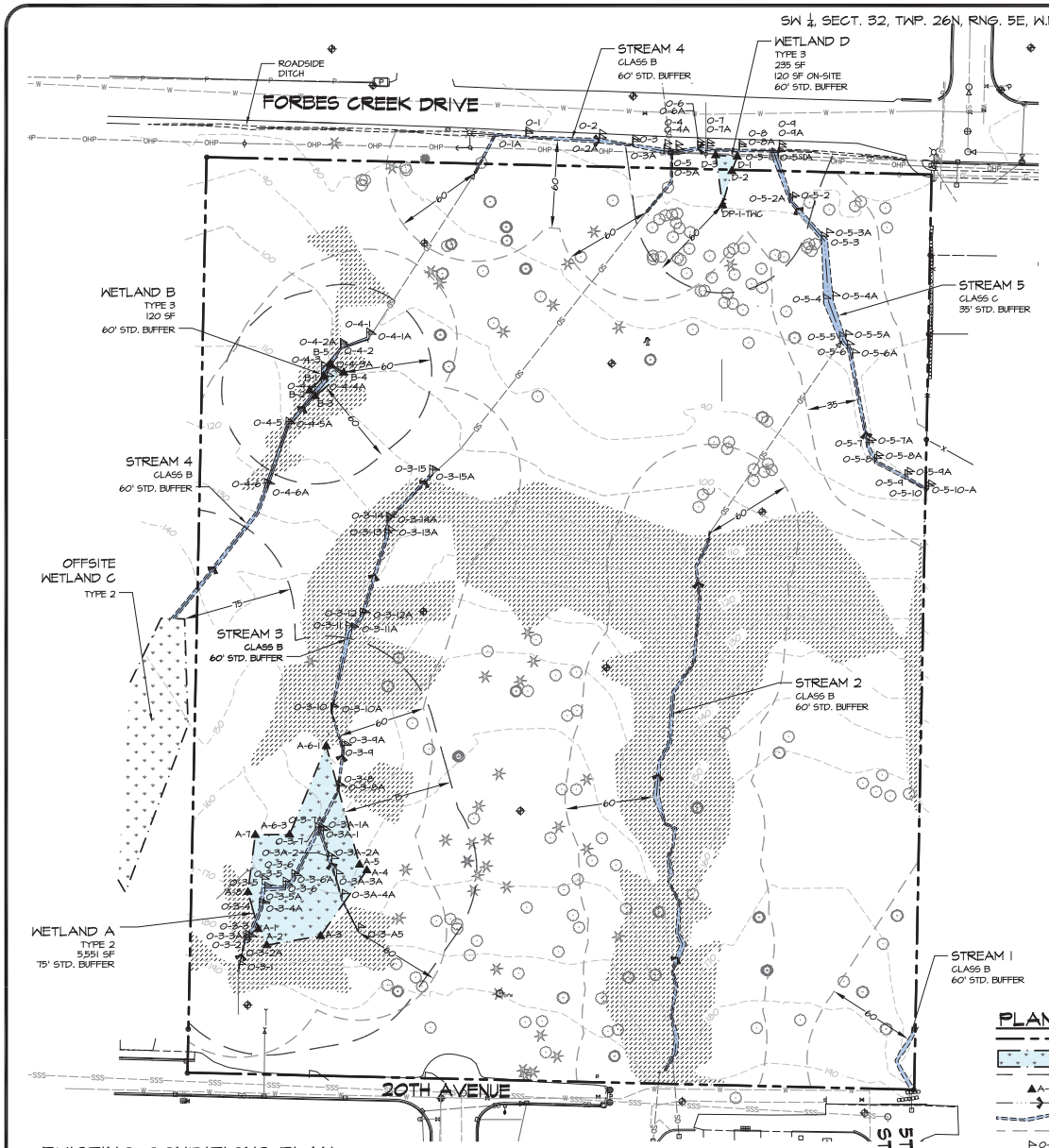
Yes = Type 2

No = Type 3

APPENDIX B

CRITICAL AREAS MITIGATION PLAN SHEETS

Sheet W1.0. Existing Conditions Plan
Sheet W1.1. Proposed Site Plan, Impacts & Mitigation Overview
Sheet W2.0. Clearing, Grubbing, and Habitat Feature Plan
Sheet W3.0. Conceptual Planting Plan, Plant List, and Notes



EXISTING CONDITIONS PLAN

GRAPHIC SCALE (IN FEET)
0 20 40 80
SCALE: 1"=40'
NORTH

VICINITY MAP

NTS

SOURCE: GOOGLE MAPS; WWW.MAPS.GOOGLE.COM (ACCESSED 5/28/2017)

NORTH

CONTACTS

APPLICANT

NAME:	ORCAS MOON, LLC
ADDRESS:	P.O. BOX 2710 REDMOND, WA 98073
PHONE:	(206) 550-5560
CONTACT:	ROBERT LONDO

SURVEYOR

NAME:	AXIS SURVEY & MAPPING
ADDRESS:	15241 NE 90TH ST REDMOND, WA 98052
PHONE:	(425) 823-5100
CONTACT:	STEVE PHILLIPS, PLS

ENGINEER

NAME:	THE BLUELINE GROUP
ADDRESS:	25 CENTRAL WAY KIRKLAND, WA 98033
PHONE:	(425) 216-4051
CONTACT:	MOIRA HAUGHIAN

ENVIRONMENTAL CONSULTANT

NAME:	TALASAEA CONSULTANTS, INC.
ADDRESS:	15020 BEAR CREEK RD. NE WOODINVILLE, WA 98077
PHONE:	(425) 861-7550
CONTACT:	ANN OLSEN, SENIOR PROJECT MANAGER DAVID TEESDALE, PWS, SENIOR WETLAND ECOLOGIST

SHEET INDEX

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND
- WETLAND BUFFER - STANDARD
- A-# WETLAND FLAG LOCATION
- STREAM CENTERLINE
- STREAM ORDINARY HIGH WATER MARK (OHWM)
- STREAM BUFFER - STANDARD
- O-# OHWM FLAG
- DITCH CENTERLINE
- CRITICAL SLOPE AREA (SEE GEOTECHNICAL REPORT)
- 100 EXISTING 10-FT CONTOURS
- CONIFER DECID. EXISTING TREES

Know what's **below.** **Call** before you dig.

NOTES

1. SURVEY PROVIDED BY AXIS SURVEY AND MAPPING, 15241 NE 90TH ST REDMOND, WA 98052, (425) 823-5100
2. SITE PLAN PROVIDED BY THE BLUE LINE GROUP, 25 CENTRAL WAY KIRKLAND, WA 98033, (425) 216-4051.
3. SOURCE DRAWING WAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
4. THIS PLAN IS AN ATTACHMENT TO THE CRITICAL AREAS REPORT PREPARED BY TALASAEA CONSULTANTS IN JULY 2018.

APPROVED FOR CONSTRUCTION

BY:

CITY OF KIRKLAND PLANNING AND BUILDING DEPT.

DATE:

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast - Woodinville, Washington 98077
Bus (425) 861-7550 - Fax (425) 861-9648

CRITICAL AREAS DETAILED CONCEPTUAL MITIGATION PLAN
EXISTING CONDITIONS PLAN
ORCAS MOON COTTAGES
KIRKLAND, WASHINGTON

Revisions		Date	By
UPDATED SURVEY		10/17/17	OA
CITY COMMENTS		11/9/17	OA
CITY COMMENTS		7/20/18	ABS

Date	5/31/2017
Scale	AS SHOWN
Designed	AO/DT
Drawn	MH/ABS
Checked	AO
Approved	BS
Project #	518B
Sheet #	W1.0

SW ¼, SECT. 32, TWP. 26N, RNG. 5E, W.M.

PROPOSED SITE PLAN, IMPACTS AND MITIGATION OVERVIEW

GRAPHIC SCALE (IN FEET) 0 20 40 80
SCALE: 1"=40'
NORTH

IMPACTS LEGEND

BUFFER REDUCTION*	24,839 SF

* ANY BUFFER REDUCTION SHALL NOT EXCEED ONE-THRID (⅓) BUFFER WIDTH PER KZC 90.45(1) (WETLANDS) AND KZC 90.90(1) (STREAMS)

MITIGATION LEGEND

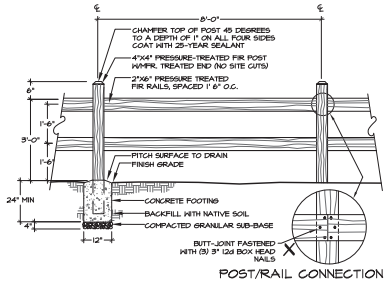
BUFFER ENHANCEMENT	16,252 SF
BUFFER ENHANCEMENT - STEEP SLOPES	8,914 SF
TOTAL MITIGATION:	25,166 SF

< 1:1 MITIGATION RATIO (IMPACT TO MITIGATION)

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND
- WETLAND BUFFER - STANDARD
- STREAM CENTERLINE
- STREAM ORDINARY HIGH WATER MARK (OHWM)
- STREAM BUFFER - STANDARD
- POST CONSTRUCTION BUFFER, LOCATION OF 2-BOARD FENCE*, SEE DETAIL 1/W1.1
- CRITICAL AREAS SIGN - SEE DETAIL 2/W1.1
- BUILDING SET BACK LINE (BSBL)
- DITCH CENTERLINE
- UTILITY EASEMENT
- CRITICAL SLOPE AREA

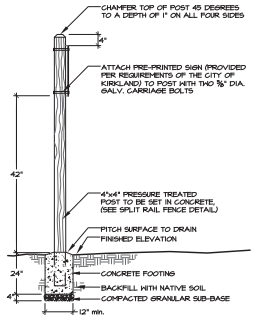
* NOTE: WHERE APPLICABLE, CRITICAL AREA FENCE SHALL BE DESIGNATED AS THE SAFETY FENCING ON ADJACENT PROPOSED WALLS. SEE CIVIL PLANS.



NOTES:
1. RAIL FENCE TO ALIGN WITH LAND GRADIENT.
2. TREAT WITH CLEAR PRESERVATIVE UPON COMPLETION OF INSTALLATION.
3. ALL FASTENERS TO BE GALVANIZED STEEL.

1 OPEN 2-BOARD FENCE DETAIL

N.T.S.



2 CRITICAL AREA SIGN DETAIL

N.T.S.

NOTES

1. SURVEY PROVIDED BY AXIS SURVEY AND MAPPING, 15241 NE 90TH ST REDMOND, WA 98052, (425) 823-5100
2. SITE PLAN PROVIDED BY THE BLUE LINE GROUP, 25 CENTRAL WAY KIRKLAND, WA 98033, (425) 216-4051.
3. SOURCE DRAWING WAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
4. THIS PLAN IS AN ATTACHMENT TO THE CRITICAL AREAS REPORT PREPARED BY TALASAEA CONSULTANTS IN JULY 2018.

Know what's below. Call before you dig.

APPROVED FOR CONSTRUCTION

BY:

CITY OF KIRKLAND PLANNING AND BUILDING DEPT.

DATE:

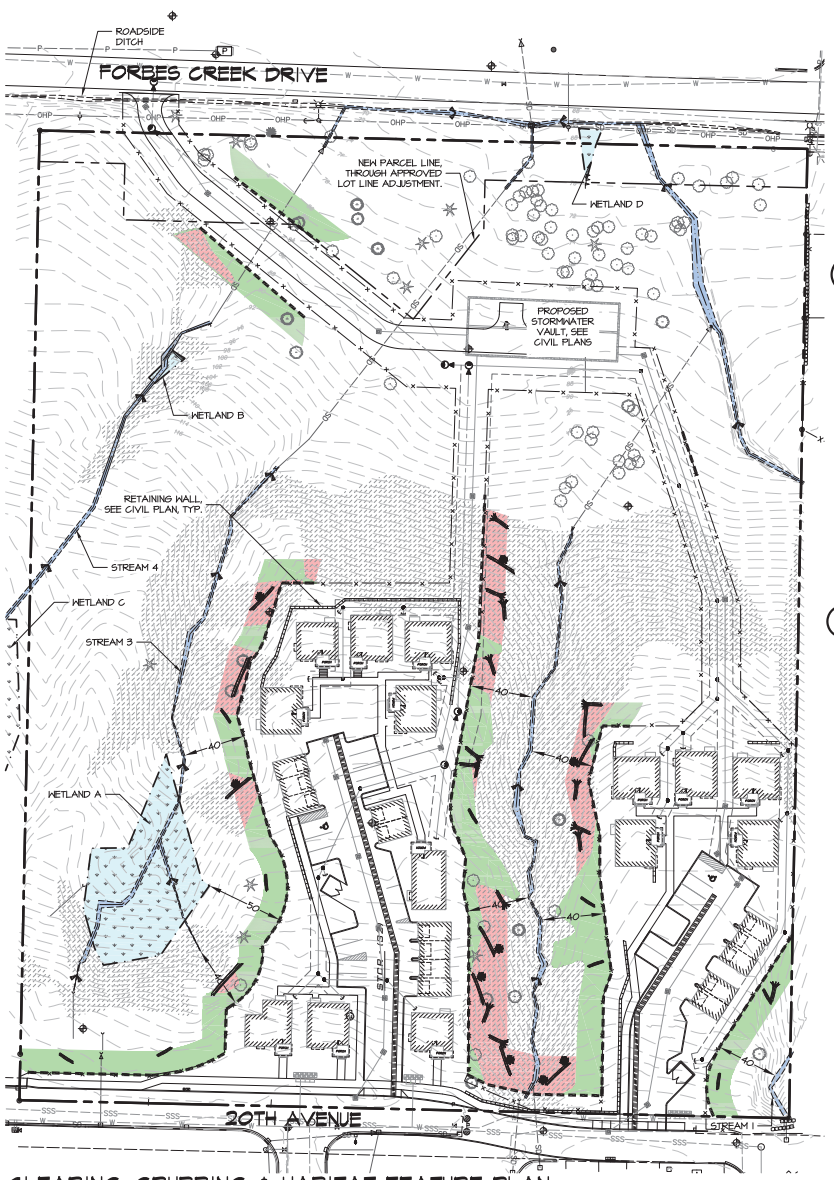
TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15000 Bear Creek Road Northeast - Woodinville, Washington 98077
Bus (425) 861-7800 - Fax (425) 861-7848

CRITICAL AREAS DETAILED CONCEPTUAL MITIGATION PLAN
PROPOSED SITE PLAN, IMPACTS AND MITIGATION OVERVIEW
ORCAS MOON COTTAGES
KIRKLAND, WASHINGTON

Revisions	Date	By
UPDATED SURVEY	10/17/17	OA
CITY COMMENTS	11/9/17	OA
CITY COMMENTS	11/20/18	ABS

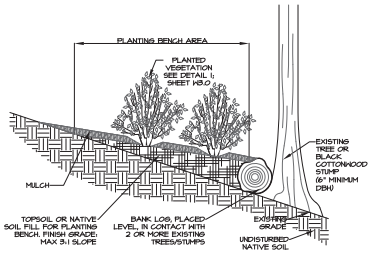
Date	5/31/2017
Scale	AS SHOWN
Designed	AO/DT
Drawn	MN/ABS
Checked	AO
Approved	BS
Project #	518B
Sheet #	W1.1

SW ¼, SECT. 32, TWP. 26N, RNG. 5E, W.M.



CLEARING, GRUBBING & HABITAT FEATURE PLAN

GRAPHIC SCALE (IN FEET) 0 20 40 80
SCALE: 1"=40'
NORTH

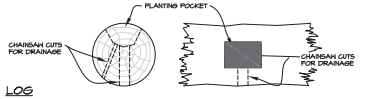


1 STEEP SLOPE ENHANCEMENT DETAIL

N.T.S.

NOTES:
1. BANK LOG SHALL BE 20" MIN. DIAMETER & 20' MIN. LENGTH.
2. PLACE BANK LOG LEVEL TO GRADE.
3. SALVAGE & REPLANT EXISTING NATIVE VEGETATION AS FEASIBLE IN WORK AREA.

STUMP



LOG

NOTE: SEE PLANT SCHEDULE FOR POCKET PLANT SPECIES SELECTION

2 STUMP WITH PLANTING POCKETS DETAIL

1"=1'

HABITAT FEATURE LEGEND

- CLEARING LIMITS / SILT FENCE - SEE CIVIL PLANS
- WOODY DEBRIS - SEE DETAIL 1/W2.0
- STUMP - SEE DETAIL 2/W2.0

CLEARING AND GRUBBING LEGEND

CLEAR & GRUB INVASIVE SPECIES BY HAND AS NEEDED.	16,252 SF
DUE TO STEEP SLOPE HAZARD AREAS, CONTACT TALASAEA CONSULTANTS TO LOCATE AND SELECT CLEARING AND GRUBBING AREAS. CLEAR & GRUB INVASIVE SPECIES BY HAND WITHIN SELECTED AREAS.	8,914 SF

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND
- STREAM CENTERLINE
- STREAM ORDINARY HIGH WATER MARK (OHWM)
- POST CONSTRUCTION BUFFER, LOCATION OF 2-BOARD FENCE*, SEE DETAIL 1/W2.0
- DITCH CENTERLINE
- UTILITY EASEMENT
- CRITICAL SLOPE AREA
- EXISTING 2-FT CONTOURS
- EXISTING TREES TO REMAIN
- CONIFER DBH.

* NOTE: WHERE APPLICABLE, CRITICAL AREA FENCE SHALL BE DESIGNATED AS THE SAFETY FENCING ON ADJACENT PROPOSED WALLS. SEE CIVIL PLANS.

NOTES FOR CLEARING, GRUBBING, AND HABITAT FEATURE INSTALLATION

PART 1: GENERAL

1.1 SEQUENCING

A. GENERAL CONSTRUCTION.
1. CONTRACTOR SHALL GIVE TALASAEA CONSULTANTS, AND/OR PROJECT ECOLOGIST, A MINIMUM OF TEN (10) DAYS NOTICE PRIOR TO BEGINNING CONSTRUCTION TO COORDINATE ENHANCEMENT WORK AREA.
2. NO CONSTRUCTION WORK SHALL COMMENCE UNTIL THERE IS A MEETING BETWEEN THE CLIENT, TALASAEA CONSULTANTS, GENERAL, CLEARING, AND/OR EARTHWORK CONTRACTORS, AND THE LANDSCAPE CONTRACTOR. THE APPROVED PLANS AND SPECIFICATIONS SHALL BE REVIEWED TO ENSURE THAT ALL PARTIES INVOLVED UNDERSTAND THE CONSTRUCTION DOCUMENTS, SPECIFICATIONS AND SITE CONSTRAINTS.
3. LOCATIONS OF EXISTING UTILITIES SHALL BE OBTAINED FROM AVAILABLE RECORDS AND SHOULD BE CONSIDERED APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO: (1) INDEPENDENTLY VERIFY THE ACCURACY OF UTILITY LOCATIONS AND (2) DISCOVER AND AVOID ANY UTILITIES WITHIN THE MITIGATION PLAN AREA(S) THAT ARE NOT SHOWN, BUT WHICH MAY BE AFFECTED BY IMPLEMENTATION OF THE PLAN. SUCH AREA(S) ARE TO BE CLEARLY MARKED IN THE FIELD.
4. A COPY OF THE APPROVED PLANS MUST BE ON SITE WHENEVER CONSTRUCTION IS IN PROGRESS, AND SHALL REMAIN ON SITE UNTIL PROJECT COMPLETION.
5. CONSTRUCTION MUST BE PERFORMED IN ACCORDANCE WITH ALL AGENCY STANDARDS, RULES, CODES, PERMIT CONDITIONS, AND/OR OTHER APPLICABLE ORDINANCES AND POLICIES.
6. THE PROJECT OWNER/APPLICANT IS RESPONSIBLE FOR OBTAINING ANY OTHER RELATED OR REQUIRED PERMITS PRIOR TO THE START OF CONSTRUCTION.
7. A QUALIFIED ECOLOGIST SHALL BE ON SITE, AS NECESSARY, TO MONITOR MITIGATION CONSTRUCTION AND APPROVE MINOR REVISIONS TO THE PLAN.
8. DURING CONSTRUCTION, THE CONTRACTOR MUST USE MATERIALS AND CONSTRUCTION METHODS THAT PREVENT TOXIC SUBSTANCES AND OTHER POLLUTANTS FROM ENTERING MITIGATION AREAS OR OTHER NATURAL WATERS OF THE STATE.
9. PREVENTATIVE MEASURES SHALL BE USED TO PROTECT EXISTING STORM DRAINAGE SYSTEMS, EXISTING UTILITIES, AND ROADS.
10. THE CONTRACTOR SHALL PROVIDE SEDIMENT AND EROSION CONTROLS AROUND THE PROJECT AREA PRIOR TO SOIL DISTURBANCE FROM CONSTRUCTION ACTIVITY.

B. MITIGATION CONSTRUCTION. THE FOLLOWING PROVIDES THE GENERAL SEQUENCE OF ACTIVITIES ANTICIPATED TO BE NECESSARY TO COMPLETE THIS MITIGATION PROJECT. SOME OF THESE ACTIVITIES MAY BE CONDUCTED CONCURRENTLY AS THE PROJECT PROGRESSES.
1. CONDUCT A SITE MEETING BETWEEN THE CONTRACTOR, TALASAEA CONSULTANTS, AND THE OWNER'S REPRESENTATIVE TO REVIEW THE PROJECT PLANS, WORK AREAS, STAGING/STOCKPILE AREAS, AND MATERIAL DISPOSAL AREAS.
2. SURVEY CLEARING/GRADING LIMITS PER CIVIL ENGINEERING PLANS.
3. FLAG EXISTING TREES AND OTHER VEGETATION TO REMAIN.
4. INSTALL SILT FENCING, TREE PROTECTION FENCING (IF REQUIRED), AND ANY OTHER EROSION AND SEDIMENTATION CONTROL BMPS NECESSARY FOR WORK IN THE PROJECT AREAS PER CIVIL PLANS.
5. GRUB OUT INVASIVE SPECIES IN BUFFER AREAS AS DETERMINED BY TALASAEA IN THE FIELD.
6. INSTALL HABITAT FEATURES (DOWN LOGS, AND STUMPS). A REPRESENTATIVE OF TALASAEA MUST BE PRESENT ONSITE TO ASSIST IN THE PLACEMENT OF HABITAT FEATURES.
7. MULCH ALL GRUBBED & PLANTED BUFFER AREAS.
8. COMPLETE SITE CLEANUP AND INSTALL PLANT MATERIAL AS INDICATED ON THE PLANTING PLAN.
9. INSTALL SPLIT-RAIL FENCE AND CRITICAL AREA SIGNS.

1.2 PROJECT CONDITIONS

A. PROTECTION AND MAINTENANCE OF OFF-SITE AREAS. CONTRACTOR SHALL ENSURE THAT CONSTRUCTION RELATED ACTIVITIES DO NOT DAMAGE OFF-SITE FEATURES OR ADJACENT VEGETATION. TALASAEA CONSULTANTS SHALL BE NOTIFIED IMMEDIATELY IF ACCIDENTAL DAMAGE OCCURS. CONTRACTOR SHALL COMPLY WITH THE GOVERNING JURISDICTION'S CODES REGARDING STREET MAINTENANCE/CLEANING DURING CONSTRUCTION.

B. PLAN CHANGES AND MODIFICATIONS. ANY ADDITIONAL CHANGES OR MODIFICATIONS TO THE MITIGATION PLANS OR SPECIFICATIONS MUST RECEIVE PRIOR APPROVAL FROM THE OWNER'S REPRESENTATIVE, TALASAEA CONSULTANTS, AND APPLICABLE AGENCIES.

1.3 WARRANTY

A. WARRANTY TERMS AND CONDITIONS. A CONTRACTOR-PROVIDED WARRANTY SHALL EXTEND FOR A PERIOD OF ONE YEAR FROM THE DATE OF PHYSICAL COMPLETION. PHYSICAL COMPLETION FOR THE WORK OF THIS SECTION IS THE DATE WHEN ALL CLEARING/GRUBBING, HABITAT FEATURE PLACEMENT, PLANTING, IRRIGATION, AND RELATED PHASES OF SUCH WORK HAVE BEEN COMPLETED AND ARE ACCEPTED BY THE OWNER'S REPRESENTATIVE, TALASAEA CONSULTANTS, AND APPLICABLE AGENCIES.

PART 2: PRODUCTS AND MATERIALS

2.1 HABITAT FEATURES

A. DOWN LOGS/BOUGHS. DOWN LOGS SHALL BE SITE SOURCED WOOD MATERIAL OF CEDAR OR FIR SPECIES, HAVE A 20 FOOT MINIMUM LENGTH, WITH OR WITHOUT ROOTS, AND A MINIMUM DIAMETER OF 20 INCHES. BARK SHALL BE KEPT INTACT. ENDS THAT HAVE BEEN CUT SHALL BE DISTRESSED AND NOT BLUNT.

B. STUMPS. STUMPS SHALL BE SITE SOURCED MATERIAL OF COTTONWOOD, CEDAR OR FIR SPECIES. STUMPS SHALL BE PART-DECAYED, RELOCATED STUMPS OR CUT LIVE ROOTWADS WITH A MINIMUM OF THREE FEET OF TRUNK GREATER THAN 6 INCHES IN DIAMETER. ENDS THAT HAVE BEEN CUT SHALL BE DISTRESSED AND NOT BLUNT. TREAT PLANTING POCKETS WITH COMPOSTED MULCH. PLANT POCKET PER PLAN.

C. BOULDERS.
1. USE BOULDERS UNCOVERED FROM ON-SITE GRADING OPERATIONS TO SECURE LARGE WOOD DEBRIS, IF AVAILABLE.
2. ONE OR TWO-PERSON MINIMUM SIZE WITH TWELVE INCHES MINIMUM DIAMETER.

2.3 TOPSOIL

A. TOPSOIL. TOPSOIL THAT HAS BEEN STOCKPILED ON-SITE FOR REUSE IN PROJECT AREA(S) OR IMPORTED FROM OFF-SITE SOURCES SHALL BE FERTILE, FRIABLE, SANDY LOAM SURFACE SOIL, FREE OF SUBSOIL, CLAY LUMPS, BRUSH, WEEDS, ROOTS, STUMPS, STONES LARGER THAN 1 INCH IN ANY DIMENSION, LITTER, OR ANY OTHER EXTRANEOUS OR TOXIC MATTER HARMFUL TO PLANT GROWTH.

B. ORGANIC CONTENT. IMPORTED TOPSOIL SHALL CONSIST OF ORGANIC MATERIALS AMENDED AS NECESSARY TO PRODUCE A BULK ORGANIC CONTENT OF AT LEAST 10 PERCENT AND NOT GREATER THAN 20 PERCENT, AS DETERMINED BY AASHTO-T-194.

2.4 MULCH

A. BARK OR WOODCHIP MULCH SHALL BE DERIVED FROM DOUGLAS FIR, PINE, OR HEMLOCK SPECIES. THE MULCH SHALL NOT CONTAIN RESIN, TANNIN, OR OTHER COMPOUNDS IN QUANTITIES THAT WOULD BE DETRIMENTAL TO ANIMAL, PLANT LIFE OR WATER QUALITY. SANDUST SHALL NOT BE USED AS MULCH.

B. MULCH SHALL BE MEDIUM-COARSE GROUND WITH AN APPROXIMATELY 3-INCH MINUS PARTICLE SIZE. FINE PARTICLES SHALL BE MINIMIZED SO THAT NOT MORE THAN 30%, BY LOOSE VOLUME, WILL PASS THROUGH A US NO. 4 SIEVE.

PART 3: EXECUTION

A. SURVEY/STAKE/FLAG LIMITS OF CLEARING.
1. COORDINATE WITH CIVIL PLANS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REQUEST THAT TALASAEA CONSULTANTS REVIEW PRIOR TO STAKING ENHANCEMENT AREAS.

B. FLAG AND PROTECT EXISTING VEGETATION TO REMAIN.
1. CONTRACTOR SHALL BE RESPONSIBLE FOR AVOIDING DISTURBANCE TO EXISTING VEGETATION LOCATED OUTSIDE THE CLEARING LIMITS. NO REMOVAL OF ANY VEGETATION SHALL OCCUR WITHOUT PRIOR APPROVAL BY TALASAEA CONSULTANTS.

C. CONTRACTOR SHALL EXERCISE CARE TO PREVENT INJURY TO THE TRUNK, ROOTS, AND BRANCHES OF TREES AND SHRUBS TO REMAIN. ANY WOODY PLANT TO REMAIN THAT IS DAMAGED DURING CONSTRUCTION SHALL BE TREATED IMMEDIATELY AFTER DAMAGE OCCURS, AND TALASAEA CONSULTANTS SHALL BE NOTIFIED OF INCIDENT.

D. PLACE EROSION CONTROL MEASURES.
1. CONTRACTOR SHALL COORDINATE WITH CIVIL PLANS TO INSTALL SILT FENCING PRIOR TO ANY MITIGATION CONSTRUCTION ACTIVITY. OTHER EROSION CONTROL MEASURES SHALL BE INSTALLED AS NECESSARY OR AS REQUIRED. TALASAEA CONSULTANTS SHALL VERIFY AND APPROVE EROSION CONTROL MEASURES FOR MITIGATION WORK.
2. CONTRACTOR SHALL MAINTAIN EROSION CONTROL MEASURES FOR THE DURATION OF THE PROJECT. THESE MEASURES SHALL REMAIN IN PLACE UNTIL AUTHORIZATION IS GIVEN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE ALL EROSION CONTROL MEASURES WITHIN AND/OR ADJACENT TO SENSITIVE AREAS WHEN AUTHORIZED.
3. AS CONSTRUCTION PROGRESSES AND SEASONAL CONDITIONS DICTATE, EROSION CONTROL FACILITIES SHALL BE MAINTAINED AND/OR ALTERED AS REQUIRED BY TALASAEA CONSULTANTS TO ENSURE CONTINUED EROSION/SEDIMENTATION CONTROL.
4. WHERE POSSIBLE, NATURAL GROUNDCOVER VEGETATION SHALL BE MAINTAINED FOR EROSION CONTROL.

D. INVASIVE/NON-NATIVE VEGETATION REMOVAL FROM MITIGATION AREAS.
1. CONTRACTOR SHALL GRUB OUT ALL NON-NATIVE AND INVASIVE VEGETATION WITHIN SELECT BUFFER MITIGATION AREAS AS DEFINED BY PROJECT ECOLOGIST IN THE FIELD WITH CONTRACTOR. INVASIVE/NON-NATIVE VEGETATION SHALL BE REMOVED BY HAND WITH MINIMAL DISTURBANCE TO THE EXISTING NATIVE VEGETATION TO REMAIN.
2. ALL GRUBBED VEGETATION SHALL BE EXPORTED FROM THE SITE AND DISPOSED OF IN AN APPROVED MANNER FOLLOWING ALL APPLICABLE LOCAL/STATE/FEDERAL REGULATIONS.

F. TOPSOIL
A. IN ALL BUFFER MITIGATION AREAS TO BE PLANTED, EXISTING SOIL SHALL BE AMENDED WITH HIGH QUALITY TOPSOIL (IMPORTED) TO PROVIDE A 3:1 MAX GRADE IN ENHANCEMENT AREAS PER PLAN.

B. HABITAT FEATURES. PLACE HABITAT FEATURES UPON COMPLETION OF TOPSOIL AND/OR SOIL AMENDMENT PLACEMENT, AS DEPICTED ON THE MITIGATION PLANS AND DETAILS. TALASAEA CONSULTANTS SHALL APPROVE LOCATIONS PRIOR TO PLACEMENT.
1. DOWN LOGS: TO CUT/BREAK DOWN LOGS, FIRST SCORE THE LOG AT THE DESIRED LENGTH BY MECHANICAL MEANS, THEN SNAP THE LOG AT THE SCORED LOCATION TO CREATE A NATURAL LOOK TO THE BREAK. TWIST BROKEN ENDS TO DISGUISE SAW CUTS. HABITAT FEATURES THAT HAVE BEEN CUT SHALL HAVE NO BLUNT ENDS.
2. STUMPS: STUMPS SHALL BE SET UPRIGHT.
3. BOULDERS: IF AVAILABLE, BOULDERS SHALL BE PLACED IN PILES AT LEAST 2 ROCKS DEEP (5 ROCK MIN. PER PILE), IN A MANNER THAT PROVIDES BOTH PHYSICAL STABILITY AND LARGE INTERNAL VOIDS.

I. MULCH CLEARED/GRUBBED BUFFER AREAS. TALASAEA CONSULTANTS SHALL BE PROVIDED A MULCH SAMPLE PRIOR TO IT BEING DELIVERED TO THE SITE. NO BUFFER AREAS SHALL BE SEEDED. CONTRACTOR SHALL SPREAD MULCH OVER ALL GRADED BUFFER AREAS TO ACHIEVE A UNIFORM DEPTH OF 3 INCHES. NOTE: 3-INCH DEPTH IS THE MINIMUM AFTER SETTLING. IF MULCH IS INSTALLED BY BLOWER TRUCK IT SHALL BE INSTALLED AT A 4-INCH DEPTH TO PROVIDE A MINIMUM 3-INCH DEPTH AFTER SETTLING. NOT GRADED BUFFER AREAS SHALL BE MULCHED BY PLANTING RINS PER PLANTING DETAIL 1; SHEET W3.0.

J. INSPECTIONS. PRIOR TO PLANT INSTALLATION, TALASAEA CONSULTANTS SHALL APPROVE ALL CLEARING/GRUBBING WORK AND HABITAT FEATURE PLACEMENT. IF ITEMS ARE TO BE CORRECTED, A PUNCH LIST SHALL BE PREPARED BY TALASAEA CONSULTANTS AND SUBMITTED TO THE CONTRACTOR FOR COMPLETION. AFTER PUNCH LIST ITEMS HAVE BEEN COMPLETED, TALASAEA CONSULTANTS SHALL REVIEW THE PROJECT FOR FINAL ACCEPTANCE OF PUNCH LIST ITEMS, AND PLANTING MAY THEN PROCEED.

K. SOIL STABILIZATION. IF THERE IS A DELAY IN CONSTRUCTION FOR ANY REASON, CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF EROSION CONTROL MEASURES, DRAINAGE, AND TEMPORARY IRRIGATION DURING CONSTRUCTION DELAY PERIOD, UNLESS OTHERWISE STATED IN WRITING.

NOTES

1. SURVEY PROVIDED BY AXIS SURVEY AND MAPPING, 15241 NE 90TH ST REDMOND, WA 98052, (425) 823-5160.
2. SITE PLAN PROVIDED BY THE BLUE LINE GROUP, 25 CENTRAL WAY KIRKLAND, WA 98033, (425) 216-4051.
3. SOURCE DRAWING WAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
4. THIS PLAN IS AN ATTACHMENT TO THE CRITICAL AREAS REPORT PREPARED BY TALASAEA CONSULTANTS IN JULY 2018.

Know what's below. Call before you dig.

APPROVED FOR CONSTRUCTION

BY:

CITY OF KIRKLAND PLANNING AND BUILDING DEPT.

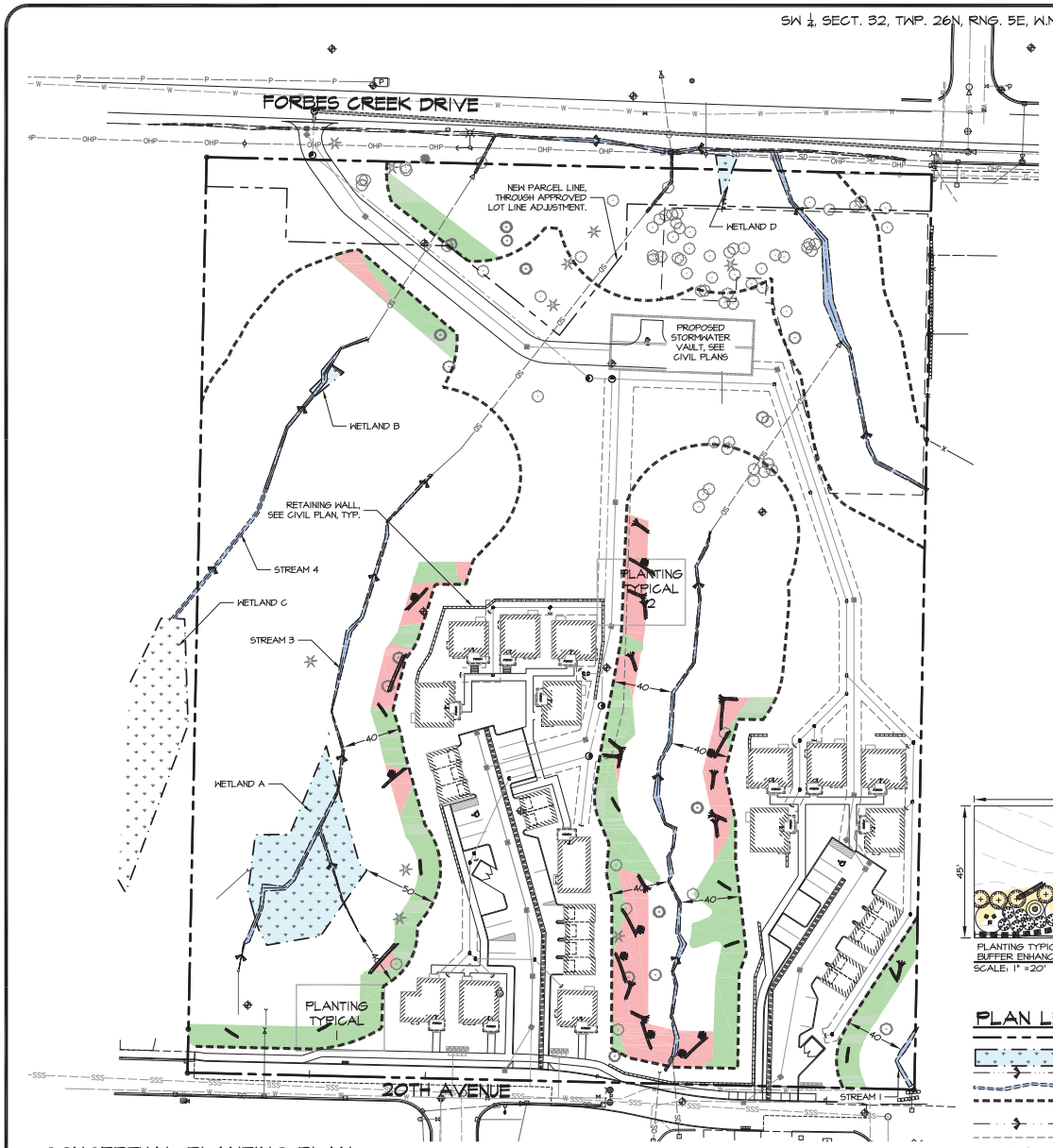
DATE:

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15200 Bear Creek Road Northeast - Woodinville, Washington 98077
Phone (425) 881-7800 - Fax (425) 881-7848

CRITICAL AREAS DETAILED CONCEPTUAL MITIGATION PLAN
CLEARING, GRUBBING & HABITAT FEATURE PLAN
ORCAS MOON COTTAGES
KIRKLAND, WASHINGTON

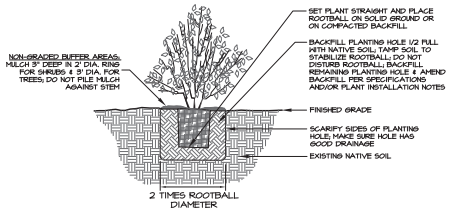
Revisions		Date	By
UPDATED SURVEY		10/17/17	OA
CITY COMMENTS		11/9/17	OA
CITY COMMENTS		7/20/18	ABS

Date	5/31/2017
Scale	AS SHOWN
Designed	AO/DT
Drawn	MH/ABS
Checked	AO
Approved	BS
Project #	518B
Sheet #	W2.0



CONCEPTUAL PLANTING PLAN

GRAPHIC SCALE (IN FEET) 0 20 40 80
SCALE: 1"=40'
NORTH



1 CONTAINER STOCK PLANTING DETAIL

N.T.S.

CANDIDATE PLANT LIST

TREES

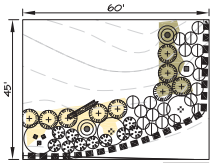
SCIENTIFIC NAME	COMMON NAME	WL STATUS	SIZE (MIN)	NOTES
PRUNUS EMARGINATA	BITTERCHERRY	FACU	3' HT.	SINGLE TRUNK, WELL BRANCHED
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	FACU	3' HT.	B&B, FULL & BUSHY
THUJA PLICATA	WESTERN REDCEDAR	FAC	3' HT.	B&B, FULL & BUSHY
TSUGA HETEROPHYLLA	WESTERN HEMLOCK	FACU	3' HT.	PLANT IN STUMP POCKET SEE DETAIL 2; W2.0
ACER CIRCINATUM	VINE MAPLE	FAC	4' HT.	SINGLE TRUNK, WELL BRANCHED
CORYLUS CORNUTA	WESTERN HAZELNUT	FACU	4' HT.	SINGLE TRUNK, WELL BRANCHED
FRANGULA PURSHIANA	CASCARA	FAC	5' HT	SINGLE TRUNK, WELL BRANCHED
OEMLERIA CERASIFORMIS	INDIAN PLUM	FACU	24" HT.	MULTI-CANE (3 MIN.)
SAMBUCUS RACEMOSA	RED ELDERBERRY	FACU	24" HT.	MULTI-CANE (3 MIN.)

MASSING SHRUBS

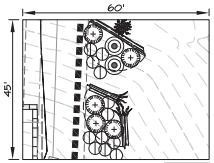
SCIENTIFIC NAME	COMMON NAME	WL STATUS	SIZE (MIN)	NOTES
HOLODISCUS DISCOLOR	OCEANSPRAY	FACU	24" HT.	MULTI-CANE (3 MIN.)
ROSA NUTKANA	NOOTKA ROSE	FACU	18" HT.	MULTI-CANE (3 MIN.)
RUBUS PARVIFLORUS	THIMBLEBERRY	FACU	18" HT.	MULTI-CANE (3 MIN.)
RUBUS SPECTABILIS	SALMONBERRY	FAC	18" HT.	MULTI-CANE (3 MIN.)
SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	FACU	18" HT.	MULTI-CANE (3 MIN.)
VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	FACU	1 GAL.	FULL & BUSHY
VACCINIUM PARVIFOLIUM	RED HUCKLEBERRY	FACU	1 GAL.	PLANT IN STUMP POCKET SEE DETAIL 2; W2.0

GROUNDCOVER

SCIENTIFIC NAME	COMMON NAME	WL STATUS	SIZE (MIN)	NOTES
GAULTHERIA SHALLON	SALAL	FACU	1 GAL.	FULL & BUSHY
POLYSTICHUM MUNITUM	SWORD FERN	FACU	1 GAL.	FULL & BUSHY



PLANTING TYPICAL 1 - BUFFER ENHANCEMENT
SCALE: 1" =20'



PLANTING TYPICAL 2 - STEEP SLOPE ENHANCEMENT
SCALE: 1" =20'

GENERAL PLANT INSTALLATION NOTES

1. PLANT TREE AND/OR SHRUB 1/2" HIGHER THAN DEPTH GROWN AT NURSERY.
2. FOR CONTAINER TREES AND/OR SHRUBS, SCORE FOUR SIDES OF ROOTBALL PRIOR TO PLANTING. BUTTERFLY ROOTBALL IF ROOT CIRCLING IS EVIDENT.
3. AFTER PLANTING, STAKE TREES ONLY IF NECESSARY (E.G. IF THEY ARE LEANING OR DROOPING OR ARE LOCATED IN EXPOSED AREAS).
4. TREE STAKES TO BE VERTICAL, PARALLEL, EVEN-TOPPED, UNSCARRED AND DRIVEN INTO UNDISTURBED SUBGRADE. REMOVE AFTER ONE YEAR.
5. WATER IMMEDIATELY AND THOROUGHLY, HEAVIER AT FIRST, 2 OR 3 TIMES PER WEEK TO PROVIDE 1" OF WATER TO PLANTS EACH WEEK THROUGH THE DRY SEASON, THEN LESS UNTIL ESTABLISHED. PROVIDE ON-GRADE OVERHEAD SPRAY IRRIGATION, IF NEEDED. TEMPORARY SYSTEM, TO BE REMOVED TWO YEARS AFTER PLANTING, OR AS DIRECTED BY TALASAEA.
6. FERTILIZE ALL TREES AND SHRUBS WITH AN APPROVED SLOW RELEASE FERTILIZER APPLIED AT MANUFACTURER'S SUGGESTED RATES.

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND
- STREAM CENTERLINE
- STREAM ORDINARY HIGH WATER MARK (OHWM)
- POST CONSTRUCTION BUFFER, LOCATION OF 2-BOARD FENCE*, SEE DETAIL 1/W2.0
- DITCH CENTERLINE
- UTILITY EASEMENT
- EXISTING TREES TO REMAIN (CONIFER DECID.)

* NOTE: WHERE APPLICABLE, CRITICAL AREA FENCE SHALL BE DESIGNATED AS THE SAFETY FENCING ON ADJACENT PROPOSED WALLS. SEE CIVIL PLANS.

NOT FOR CONSTRUCTION

THESE PLANS HAVE BEEN SUBMITTED TO THE APPROPRIATE AGENCIES FOR REVIEW AND APPROVAL. UNTIL APPROVED, THESE PLANS ARE:

SUBJECT TO REVISION

811 Know what's below. Call before you dig.

NOTES

1. SURVEY PROVIDED BY AXIS SURVEY AND MAPPING, 15241 NE 90TH ST REDMOND, WA 98052, (425) 823-5100
2. SITE PLAN PROVIDED BY THE BLUE LINE GROUP, 25 CENTRAL WAY KIRKLAND, WA 98033, (425) 216-4051.
3. SOURCE DRAWING WAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
4. THIS PLAN IS AN ATTACHMENT TO THE CRITICAL AREAS REPORT PREPARED BY TALASAEA CONSULTANTS IN JULY 2018.

APPROVED FOR CONSTRUCTION

BY:

CITY OF KIRKLAND PLANNING AND BUILDING DEPT.

DATE:

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15000 Bear Creek Road Northeast - Woodinville, Washington 98077
Phone (425) 861-7800 - Fax (425) 861-7848

CRITICAL AREAS DETAILED CONCEPTUAL MITIGATION PLAN
CONCEPTUAL PLANTING PLAN, PLANT LIST, & NOTES
ORCAS MOON COTTAGES
KIRKLAND, WASHINGTON

Revisions	Date	By
UPDATED SURVEY	10/17/17	OA
CITY COMMENTS	11/9/17	OA
CITY COMMENTS	7/20/18	ABS

Date	5/31/2017
Scale	AS SHOWN
Designed	AO/DT
Drawn	MN/ABS
Checked	AO
Approved	BS

Project # 518B

Sheet # W3.0

APPENDIX C

TECHNICAL MEMORANDUM BY ASSOCIATED EARTH SCIENCES, INC.

associated earth sciences incorporated

Technical Memorandum

Date:	June 25, 2018	**Project Manager:**	Jeffrey P. Laub, L.G., L.E.G.
To:	Orcas Moon, LLC P.O. Box 2710 Redmond, Washington 98073	**Principal in Charge:**	Bruce L. Blyton, P.E.
Attn:	Mr. Robert Londo	**Project Name:**	Londo Forbes Creek
Address:	rl@londotiberio.com	**Project No:**	160384E001

Subject: Wetland Buffer Enhancement (Vegetation Removal) on Slopes

You have requested that Associated Earth Sciences, Inc. (AESI) provide an opinion letter regarding the removal of existing vegetation from steep slopes at the proposed "Orcas Moon Cottages" residential project located near the intersection of 20th Avenue and 4th Place in Kirkland, Washington. We have previously issued our "Subsurface Exploration, Geologic Hazard, and Geotechnical Engineering Report," dated February 20, 2018, for the subject project. For our use in preparing this memorandum, we have been provided with a "Buffer Enhancement Plan," prepared by Blueline and dated June 22, 2018, showing the proposed wetland buffer enhancement areas relative to steeply sloping (>40%) terrain at the subject site.

We understand that, as a part of wetland buffer enhancement elements required by the City of Kirkland, invasive plants (e.g., Himalayan blackberries) are to be removed and replaced with native vegetation. The steeply sloping (>40%) terrain at the site is predominantly vegetated with ferns, other understory plants, brush (including blackberry brambles), and trees. This vegetation serves to protect the face of the slopes from soil erosion. We recommend that, for the portions of the buffer enhancement areas over steeply sloping terrain, this vegetation remain in place to provide root support for the near-surface soils along the slopes. For portions of the buffer enhancement areas over gently to moderately sloping terrain (i.e., less than 40%), we recommend that the planting plan associated with the buffer enhancement be implemented as soon as practical and that, prior to the establishment of the new plantings, the temporary erosion control recommendations presented in our February 20, 2018 report and appropriate best management practices (BMPs) be followed.

We trust this information meets your current needs. Please do not hesitate to contact us if you require additional information or have any questions.

JPL/ms
160384E001-6
Projects\20160384\KE\WP