



SUBMITTED TO:

Mr. Erik Barr

Patano Studio Architecture
603 Stewart Street, Suite 500
Seattle, Washington 98101

BY:

Shannon & Wilson, Inc.
400 N. 34th St., Suite 100
Seattle, Washington 98103

(206) 632-8020

www.shannonwilson.com

FINAL WETLAND/STREAM DELINEATION REPORT and MITIGATION PLAN

JUANITA BEACH PARK PHASE II IMPROVEMENTS PROJECT

KIRKLAND, WASHINGTON



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**WETLAND/STREAM DELINEATION REPORT AND MITIGATION PLAN
JUANITA BEACH BATHHOUSE REPLACEMENT AND SHELTER
JUANITA BEACH PARK PHASE II IMPROVEMENTS
KIRKLAND, WASHINGTON**

1.0 INTRODUCTION

Shannon & Wilson, Inc. (Shannon & Wilson) conducted a wetland and stream delineation on portions of Juanita Beach Park located at 9703 NE Juanita Drive and reviewed an existing delineation along a segment of Juanita Bay Park, Kirkland, Washington (Figure 1). Juanita Beach Park (King County tax parcels 179150-0425 and 302605-9147) is located in the SW $\frac{1}{4}$ of Section 30 and the NE $\frac{1}{4}$ of Section 31, Township 26N, Range 5E and Juanita Bay Park is located in the eastern half of Section 31. The parks are owned and operated by the City of Kirkland (hereafter referred to as “the City”) and provide a variety of passive and active recreation opportunities to park users.

The City has been implementing the Juanita Beach Park Master Plan (J.A. Brennan, 2006) in phases (Exhibit 1). In 2006, the City issued a Determination of Non-Significance based on a programmatic State Environmental Policy Act (SEPA) checklist for the Master Plan. At the time, the presence of wetlands in the park, other than those associated with Juanita Creek, was not confirmed so the programmatic SEPA did not identify any project-related wetland impacts.



Exhibit 1. Excerpt from Juanita Beach Park Master Plan (J.A. Brennan Associates PLLC, 2006).

During development of the Phase I plans, an additional wetland was confirmed on the Lake Washington shoreline. The Phase I SEPA analysis documented the stream and wetland impacts and associated mitigation, and the City issued a Determination of Non-Significance in 2009. The remaining project permits were obtained for Phase I in 2009 and 2010, and construction was completed in 2011. The final permitted condition is shown in Exhibit 2.



Exhibit 2. Phase I Improvements at Juanita Beach Park (J.A. Brennan Associates PLLC, 2010).

As part of Phase II, the City is planning several improvements to Juanita Beach Park, including a new bathhouse with concessions and utility/storage spaces, relocated playground, and pavilion (picnic shelter). Since implementation of Phase I, the existing conditions and critical areas regulations have changed, resulting in discovery of a new wetland in the current Phase II project area and increased buffer encroachment into the Phase II project area. Accordingly, the proposed Phase II Juanita Beach Park improvements will impact wetlands and wetland and stream buffers. This area, and the on-site buffer mitigation area, will hereafter be referred to as “the project area” or “project site.”

A review of an existing wetland delineation was conducted at the north end of Juanita Bay Park to support development of a wetland mitigation plan. No additional flags were hung and no additional data pits were dug. The existing wetland rating form for the site wetland was also reviewed (The Watershed Company, 2016). Portions of Juanita Bay Park used to mitigate for Juanita Beach Park wetland impacts will be referred to as “the wetland mitigation area.”

This report characterizes and identifies the limits of streams, wetlands, and their associated buffers on the portion of Juanita Beach Park being considered for Phase II facility improvements; describes the governing local, state, and federal regulations; discusses wetland, wetland buffer, and stream buffer project area impacts; and describes the project's mitigation strategy.

2.0 DOCUMENT REVIEW

2.1 Juanita Beach Park

Background information pertaining to the site was collected and reviewed prior to the wetland and stream delineation fieldwork. These information sources included:

- Douglass Consulting (Douglass) Wetland and Ordinary High Water Mark Determination Report, Juanita Beach Park dated December 2008 (Douglass, 2008)
- Douglass Addendum to the Juanita Beach Park Wetland and Stream Mitigation Plan (Douglass, 2009)
- Nationwide Permit Verification Letter for Phase I, NWS-2008-01222 (U.S. Army Corps of Engineers [Corps], 2010)
- King County iMap Interactive Mapping Tool (King County, 2016)
- U.S. Department of Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (USFWS, 2016)
- King County Soil Survey accessed via the Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS, 2016)

A 2008 wetland and stream delineation performed at Juanita Beach Park by Douglass identified four riverine wetlands associated with Juanita Creek (Douglass Wetlands A, B, C, and D), one depressional wetland (Douglass Wetland E), one lake fringe wetland (Douglass Wetland F), and the ordinary high water mark (OHWM) of Juanita Creek (Douglass, 2008). In 2011, Phase I of the Juanita Beach Park Master Plan was implemented, which included restoration work in the portion of Juanita Creek that flows through the park and its associated riverine wetlands. The restoration work involved increasing sinuosity within Juanita Creek and creating a single marsh wetland in place of Douglass Wetlands A, B, C, and D, now referred to as Wetland A or Oxbow Marsh, to provide fish and wildlife habitat and improve water quality function (Douglass, 2009). Other components of Phase I included modification of wetlands and buffers in the central and eastern portions of the park. Because the Douglass delineation was completed nearly ten years prior, it was necessary to redelineate the wetlands on the Juanita Beach Park site.

No wetlands are identified at Juanita Beach Park by the USFWS NWI and the King County iMap online mappers.

The NRCS web soil survey identifies site soils as Indianola loamy sand, 0 to 5 percent slopes, which is not considered a hydric soil.

The King County iMap and Washington State Department of Natural Resources (WDNR) stream typing web applications show Juanita Creek flowing north to south across the site and both identify the stream as salmon-bearing.

2.2 Juanita Bay Park

The proposed wetland mitigation area is part of a large wetland complex in Juanita Bay Park. The area of interest was delineated by The Watershed Company (2016); the complete report is included as Appendix A.

3.0 METHODS

3.1 Juanita Beach Park Wetland and Stream Delineation

Shannon & Wilson conducted the wetland and stream delineation fieldwork in Juanita Beach Park on January 18 and 19, 2016. Wetlands were identified using methods described in the Corps' 1987 *Wetland Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (Corps Engineer Research and Development Center, 2010). The OHWM of Juanita Creek was delineated using the Washington State Department of Ecology's (Ecology's) 2016 *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State.*"

Wetland areas were determined using the triple-parameter approach, which considers vegetation types, soil conditions, and hydrologic conditions. For an area to be considered wetland, it must display each of the following: (a) dominant plant species that are considered hydrophytic by the accepted classification indicators, (b) soils that are considered hydric under federal definition, and (c) indications of wetland hydrology, in accordance with federal definition. Appendix B includes a complete description of the methodology.

Nine data plots (four wetland and five upland) were characterized within wetland and upland community types in Juanita Beach Park to help describe the general conditions at the site. Information gathered at these locations is provided in Appendix C. Wetland boundaries were flagged with pink "wetland boundary" ribbon flagging and pink pin flags, the OHWM of Juanita Creek was flagged with orange ribbon flagging, and wetland data plots were identified by orange

pin flags. Wetland boundary, stream OHWM, and data pit flag locations were located using a hand-held Trimble Geo 7 series Global Positioning System (GPS) receiver.

KZC 83.80.79 specifies that the Lake Washington OHWM “corresponds with a lake elevation of 18.5 feet, based on the NAVD 88 datum.” Electronic topography information provided by the City was used to map shoreline jurisdiction (generally 200 feet upland of the OHWM) and the upland edge of the required shoreline setbacks. The topography was surveyed in 2009 prior to the Phase I implementation, and then was modified based on the project’s as-built drawings.

3.2 Juanita Bay Park Wetland Delineation

The Watershed Company’s wetland delineation in Juanita Bay Park was completed in April 2016 (Watershed, 2016). Shannon & Wilson visited the site in January 2017 to look for the wetland boundary flags and observe site conditions. Wetland boundary flags that were observed in the project wetland mitigation area were located using a hand-held Trimble Geo 7 series GPS receiver.

4.0 SITE DESCRIPTION

4.1 Juanita Beach Park

Juanita Beach Park sits on the northeast shore of Lake Washington and is surrounded by the City, commercial developments, and residential development. The park is generally divided into two sections by NE Juanita Drive, with ball fields, tennis courts, and mowed lawn in the north area. The southern portion of the park contains a bathhouse, playground, amphitheater, and shoreline promenade, as well as natural features such as Juanita Creek, Lake Washington, and wetlands.

The project site is located in the southern portion of the park, south of a paved parking lot and west of a recently constructed stormwater treatment swale network. The western boundary of the project site contains Juanita Creek and the Oxbow Marsh created as part of Phase I of the Master Plan. The creek flows from north to south through the park and into Lake Washington. Developed structures within the project site include a concrete block bathhouse and a playground. The project site slopes gently toward Lake Washington with topographical variations that direct surface water to Juanita Creek and the stormwater swale system, as well as the shores of Lake Washington (Appendix D, Photo 1). A concrete promenade meanders along the Lake Washington shoreline, connecting at either end to an over-water pedestrian boardwalk that encircles the swimming area and beach. During the fieldwork, all areas of the park were observed to be regularly used by visitors.

4.2 Juanita Bay Park

Juanita Bay Park is a 110-acre, City-owned park on the shore of Juanita Bay on Lake Washington. Approximately 98 acres of the park consist of wetlands, Forbes Creek, and functional buffer areas. These areas contain paved trails, boardwalks, and interpretive signs. The park's habitat areas support nearly 200 species of birds according to Eastside Audubon, which leads monthly bird-watching tours. Eastside Audubon also manages the Eastside Ranger Program, which leads monthly interpretive tours.

Juanita Bay Park has been the recipient of numerous planning and restoration efforts, starting with the preparation of the *Juanita Bay Park Vegetation Management Plan* in 2004 (Sheldon & Associates, Inc., 2004), formation of the Green Kirkland Partnership (Partnership) in 2005, and continuing with the development and implementation of a *20-Year Forest Restoration Plan* in 2008 (Partnership, updated in 2015). Most of these efforts target the control and removal of invasive species, and establishment of healthy native communities. The City's *Shoreline Restoration Plan* (The Watershed Company, 2010) recommends that invasive species control and native species plantings take place in Juanita Bay Park.

5.0 RESULTS

5.1 Juanita Beach Park

Four wetlands, Wetlands A through D, and Juanita Creek, were identified on the project site (Figure 3). Descriptions of Wetlands A through D follow and include observations made during the delineation fieldwork site visits. Vegetation is described below by common name, with the scientific name and indicator status in parentheses after the first use. Soils are described with the associated Munsell® Color Charts color in parentheses. Four wetland data plots were characterized at representative locations onsite to document general surface and subsurface conditions (Appendix C).

5.1.1 Wetland A (Oxbow Marsh)

Wetland A (approximately 1.2 acres) was delineated along the left (east) bank of Juanita Creek (Figure 3) and is the eastern border of Oxbow Marsh, the wetland created in 2011 as part of the Juanita Creek restoration work included in Phase I of the Juanita Beach Park Master Plan. Wetland A is a palustrine forested, scrub-shrub, emergent wetland according to the Cowardin classification, and is a riverine wetland according to hydrogeomorphic classification. The portion of Wetland A that was delineated on the project site is located on a shallow bench below the OHWM of Juanita Creek (Appendix D, Photo 2).

Based on guidance provided in the *Washington State Wetland Rating System for Western Washington* (Hruby, 2014), the wetland fringe on the east side of the stream channel (left bank) was rated as part of the Oxbow Marsh wetland unit. According to the rating manual, a stream less than 50 feet wide with wetland on both banks is considered part of the wetland unit and the two banks should not be rated separately.

Vegetation in Wetland A is dominated by a shrub layer of red-osier dogwood (*Cornus sericea*, FACW) and willow (*Salix* sp., assumed FAC), and an herbaceous layer of reed canarygrass (*Phalaris arundinacea*, FACW), soft rush (*Juncus effusus*, FACW), and small-fruited bulrush (*Scirpus microcarpus*, OBL) (see Appendix C, Data Sheet DP-1).

Soil in Wetland A is generally characterized by a surface horizon of very dark brown (10YR 2/2) sandy clay loam extending to 4 inches below ground surface (bgs), underlain by a dark gray (10YR 4/1), sandy loam with strong brown (7.5YR 4/6) redoximorphic concentrations in the matrix and pore linings extending to 9 inches bgs. Below 9 inches is a layer of loamy sand of the same dark gray matrix and strong brown redoximorphic concentrations extending to at least 20 inches bgs (Appendix D, Photo 3). Soil observed in Wetland A meets the *depleted matrix* (F3) hydric soil indicator.

Wetland A hydrology is likely supported predominantly by water levels in Juanita Creek as well as shallow subsurface flow. Observed hydric indicators in Wetland A include saturation to 6 inches bgs, water observed in the data pit at 10 inches bgs, drift deposits, and oxidized rhizospheres along living roots.

Wetland A was categorized according to Ecology's *Washington State Wetland Rating System for Western Washington* (Hruby, 2014) per City of Kirkland Zoning Code (KZC) Chapter 83.500 (Kirkland, 2016). Based on that rating system, Wetland A is a Category II riverine wetland with moderate water quality function (7 points), moderate hydrologic function (6 points), and moderate habitat function (7 points) (Appendix E).

5.1.2 Wetland B

Wetland B (approximately 0.47 acre) was identified on the shores of Lake Washington in a similar location as the lacustrine wetland described in 2008 by Douglass (2008). The northeast corner of Wetland B closest to the project site was delineated (Appendix D, Photo 4). Wetland B is a palustrine scrub-shrub, emergent wetland according to the Cowardin classification, and is a lacustrine wetland according to hydrogeomorphic classification. Wetland B is dissected by a system of foot paths that was observed to be heavily used by dog walkers on the day of fieldwork.

Vegetation in Wetland B is dominated by a shrub layer of Pacific willow (*Salix lucida lasiandra*, FACW) and black cottonwood (*Populus balsamifera*, FAC), and an herbaceous layer of reed canarygrass, yellow flat iris (*Iris pseudacorus*, OBL), and soft rush (see Appendix C, Data Sheet DP-3).

Soil in Wetland B is generally characterized by a surface horizon of very dark grayish brown (10YR 3/2), sandy loam extending to 1 inch bgs, underlain by a dark grayish brown (10YR 4/2), loamy sand extending to 2 inches bgs, underlain by a dark gray (N 4/) sand with strong brown (7.5YR 4/6) redoximorphic concentrations in the matrix extending to at least 18 inches bgs. Soil observed in Wetland B meets the *sandy gleyed matrix* (S4) hydric soil indicator.

Wetland B hydrology is likely supported predominantly by water levels in Lake Washington. Observed hydric indicators in Wetland B were saturation to 5 inches bgs, and water observed in the data pit at 6 inches bgs.

Wetland B was categorized according to Ecology's *Washington State Wetland Rating System for Western Washington* (Hruby, 2014) per KZC Chapter 83.500 (Kirkland, 2016). Based on that rating system, Wetland B is a Category II lacustrine wetland with high water quality function (9 points), moderate hydrologic function (6 points), and moderate habitat function (6 points) (Appendix E).

5.1.3 Wetland C

Wetland C (approximately 3,870 square feet) was identified in the grassy area south of the park's existing bathhouse (Appendix D, Photo 5). This wetland is a portion of the much larger Douglass Wetland E that was originally delineated in 2008. As part of Phase I, this portion of Douglass Wetland E was "paper filled" under the City's wetland regulations in effect at that time, and the paper filled wetland and its buffer were mitigated accordingly. However, this portion of Douglass Wetland E was not physically altered and remained as mowed lawn that continued in active public use. East of the paper filled area, a portion of Douglass Wetland E was permanently altered to create the stormwater system and also mitigated consistent with local, state and federal permits. As part of this Phase II site investigation, the paper filled remnant of Douglass Wetland E was re-delineated and labeled Wetland C.

Wetland C extends to the east of the project site and converges with the stormwater swale treatment system that was built within a portion of the existing wetland. The bioswale was constructed to carry and treat stormwater runoff from the parking lot into a natural wetland on the south side of the promenade (part of the Douglass Wetland E). As shown in the wetland

rating form included in our report, the bioswale and Douglass Wetland E are included in the Wetland C rating unit. However, the bioswale between Wetland C and Douglass Wetland E is not jurisdictional wetland that requires a wetland buffer under the current code. The square footage of the original area of Douglass Wetland E in the present location of the bioswale was identified in the June 2009 plans and report as being part of the mitigated impact area square footage that was approved by the Corps, Ecology, and the City. Further, the June 2009 exhibits clearly delineate the new boundary of Douglass Wetland E, which does not extend landward of the waterward edge of the boardwalk crossing of the bioswale, and show the boundaries of the modified Douglass Wetland E buffer (see Exhibit 3). Wetland C is a palustrine emergent wetland according to the Cowardin classification and is a depressional wetland according to hydrogeomorphic classification.

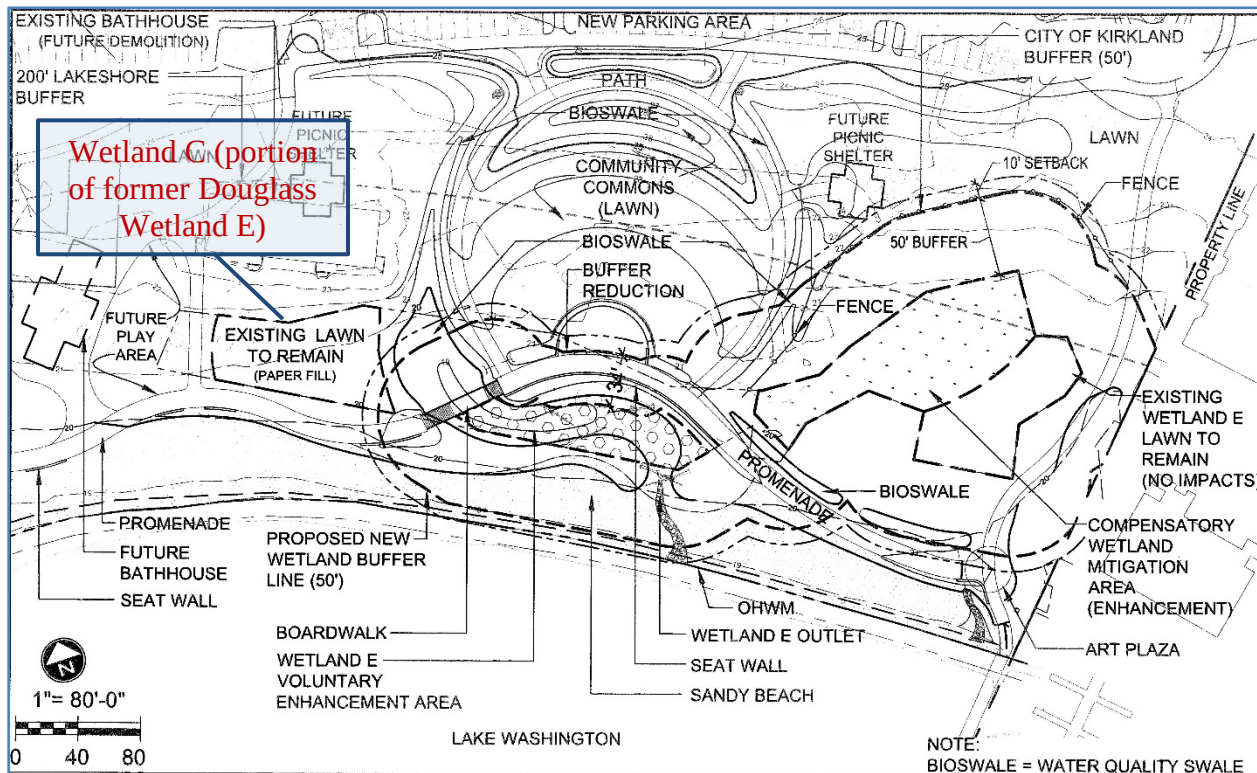


Exhibit 3. Modification of Douglass Wetland E permitted as part of Phase I. (Excerpt from figures submitted to local, state and federal agencies as part of Phase I permitting, J.A. Brennan Associates PLLC, 2009.)

Vegetation in Wetland C is dominated by an herbaceous layer of bluegrass (*Poa* sp., assumed FAC) and also contains toad rush (*Juncus bufonius*, FACW) (see Appendix C, Data Sheet DP-5). The vegetation in the wetland was mowed very short, and no bluegrass seed heads

were observed. We suspect that the bluegrass species present in the wetland is likely *Poa annua* or *Poa pratensis*, both of which are designated as a FAC hydric indicator status.

Soil in Wetland C is generally characterized by a surface horizon of black (10YR 2/1), loamy sand extending to 1 inch bgs, underlain by a dark grayish brown (10YR 4/2) sand with dark yellowish brown (10YR 3/4) redoximorphic concentrations in the matrix extending to 6 inches bgs, underlain by a black (10YR 2/1), loamy sand extending to 7 inches bgs, underlain by a dark gray (N 4/) sand with strong brown (7.5YR 4/6) redoximorphic concentrations in the matrix extending to 14 inches bgs, underlain by a dark gray (N 4/) sand extending to at least 20 inches bgs (Appendix D, Photo 6). Soil observed in Wetland C meets the *sandy redox* (S5) hydric soil indicator.

Wetland C hydrology is likely supported predominantly by seasonally high groundwater influenced water levels in Lake Washington and surface runoff. Observed hydric indicators in Wetland C were saturation from 0 to 6 inches bgs and again at 10 inches bgs, and water observed in the data pit at 11 inches bgs.

Wetland C was categorized according to Ecology's *Washington State Wetland Rating System for Western Washington* (Hruby, 2014) per KZC Chapter 83.500 (Kirkland, 2016). Based on that rating system, Wetland C is a Category III depressional wetland with moderate water quality function (6 points), moderate hydrologic function (5 points), and moderate habitat function (5 points) (Appendix E).

5.1.4 Wetland D

Wetland D (approximately 4,310 square feet) was identified in the lawn south of the Park's existing playground (Appendix D, Photo 7). This wetland was not previously identified during development of the Juanita Beach Park Master Plan or development of Phase I project designs. Wetland D is a palustrine forested, emergent wetland according to the Cowardin classification and is a depressional wetland according to hydrogeomorphic classification.

Vegetation in Wetland D is dominated by a forested layer of weeping willow (*Salix babylonica*, FACW) (one tree) and an herbaceous layer of bluegrass and toad rush (see Appendix C, Data Sheet DP-7). The vegetation in the wetland was mowed very short and no bluegrass seed heads were observed. We suspect that the bluegrass species present in the wetland is likely *Poa annua* or *Poa pratensis*, both of which are designated as a FAC hydric indicator status.

Soil in Wetland D is generally characterized by a surface horizon of very dark brown (10YR 2/2), loamy sand extending to 2 inch bgs, underlain by a very dark gray (10YR 3/1) sand extending to 4 inches bgs, underlain by a dark gray (10YR 4/1) sand with dark brown (7.5YR 3/4) redoximorphic concentrations in the matrix extending to at least 18 inches bgs (Appendix D, Photo 8). Soil observed in Wetland D meets the *sandy redox* (S5) hydric soil indicator.

Wetland D hydrology is likely supported predominantly by seasonally high groundwater levels influenced by water levels in Lake Washington and surface runoff. Observed hydric indicators in Wetland D were saturation from 0 to 4 inches and saturation at 10 inches bgs, and water observed in the data pit at 11 inches bgs. Surface water was observed within the wetland, adjacent to the data pit (Appendix D, Photo 9).

Wetland D was categorized according to Ecology's *Washington State Wetland Rating System for Western Washington* (Hruby, 2014) per KZC Chapter 83.500 (Kirkland, 2016). Based on that rating system, Wetland D is a Category IV depressional wetland with low water quality function (4 points), moderate hydrologic function (5 points), and moderate habitat function (5 points) (Appendix E).

5.1.5 Juanita Creek

Juanita Creek flows through the site from the north to the south before joining with Lake Washington. It is a Class A stream as identified in the KZC and a Type F stream as classified by the WDNR (Kirkland, 2016 and WDNR, 2016). Type F streams are known to be used by fish or meet the criteria for potential use (WDNR, 2016). No permanent or total fish barriers are present within the site and none were identified within the project area on Washington State Department of Fish and Wildlife (WDFW) SalmonScape (WDFW, 2016). This stretch of Juanita Creek has documented Chinook, winter steelhead, and sockeye presence, as well as coho spawning habitat (WDFW, 2016).

The OHWM of Juanita Creek was delineated on the left (east) bank using the presence of rack lines, sediment deposits, undercut banks, and water staining. At the time of the site visit, the wetted width within the site averaged 20 feet with a water depth of approximately 2 feet in the thalweg (Appendix D, Photo 2). The channel substrate is dominated by sand and gravels. In-stream habitat consists of glides, scour pools, and off-channel marsh habitat associated with Oxbow Marsh. Juanita Creek is on Ecology's 303(d) list for temperature, bacteria, and dissolved oxygen.

5.1.6 Uplands

Uplands onsite consist of the landscaped lawn areas surrounding the existing developed structures (bathhouse, playground, parking lot, and volleyball courts). Vegetation observed in site uplands consisted of ornamental trees growing adjacent to the walking path and parking lot, and planted conifer saplings such as Douglas-fir (*Pseudotsuga menziesii*, FACU) and western redcedar (*Thuja plicata*, FAC) bordering Juanita Creek. The lawn area consisted of bluegrass, white clover (*Trifolium repens*, FAC), dandelion (*Taraxacum officinale*, FACU), and lawn daisy (*Bellis perennis*, NI).

Upland soils are predominantly composed of fill and are very compacted. The soils are generally characterized by a surface layer of black (10YR 2/1), loamy sand 2 to 4 inches thick underlain by dark grayish brown (10YR 4/2) to very dark grayish brown (10YR 3/2), gravelly, loamy sand extending to at least 14 inches bgs. The hard pan, compacted gravel layer began at 2 and 11 inches bgs at different points on the site. Closer to the wetland boundary, upland soils contained brown (10YR 4/3) to dark yellowish brown (10YR 4/4) redoximorphic features in the second horizon.

The compacted gravel limited data pit depth to approximately 12 to 14 inches, and no hydrology was observed in all but one of the upland areas. In the lawn area north of Wetland D and east of the playground, saturation was observed at 17 inches bgs and water was observed in the data pit at 18 inches bgs.

5.2 Juanita Bay Park

As mentioned above, The Watershed Company (2016, see Figure 4 and Appendix A) delineated the eastern edge of the proposed wetland mitigation area in Juanita Bay Park as part of an evaluation of a City sidewalk project. During our January 2017 site visit, we located boundary flags hung by The Watershed Company and recorded their location using a hand-held Trimble Geo 7 series GPS receiver to generate the information shown in Figure 3.

A description of the wetland area is included in The Watershed Company's report, along with data sheets and a wetland rating form with figures. The wetland is rated as Category II.

6.0 REGULATIONS

Several local, state, and federal regulations apply to development proposals in and/or near wetlands and streams. A summary of applicable regulatory implications is given below.

6.1 City of Kirkland (City)

Within shoreline jurisdiction, the City regulates the Juanita Beach Park wetlands, Juanita Bay Park wetlands, Juanita Creek, and Lake Washington under Chapter 83 (Shoreline Management) of the KZC (2016). Outside of shoreline jurisdiction, wetland and stream buffers would be subject to regulations in Chapter 90 (Drainage Basins) of the KZC.

For purposes of establishing the limits of shoreline jurisdiction with respect to lakes, Washington Administrative Code (WAC) 173-22-030(4) defines lake as:

“...a body of standing water in a depression of land or expanded part of a river, including reservoirs, of twenty acres or greater in total area. A lake is bounded by the ordinary high water mark or, where a stream enters a lake, the extension of the elevation of the lake's ordinary high water mark within the stream.”

In an environmental review of Phase I improvements of Juanita Beach Park, The Watershed Company (2009) states that “the project area [Oxbow Marsh] is more or less at (and portions at times below) the placid lake level...” An update of the Phase I mitigation plan also states that:

“the project [Oxbow Marsh creation] is located in the natural depositional zone of the stream system, with a low hydraulic gradient and backwater effects from Lake Washington. This situation is amplified by the reversal of natural seasonal fluctuation of lake levels..., which pairs low stream flows in Juanita Creek with high lake levels in Lake Washington during the summer.” (Douglass Consulting, 2010)

KZC 83.80.79 specifies that the Lake Washington OHWM “corresponds with a lake elevation of 18.5 feet, based on the NAVD 88 datum.” Based on the WAC definition of lake, the topographic information shown on the available Phase I plan sets, and the 2009 and 2010 documents mentioned above, shoreline jurisdiction extends landward of the Lake Washington OHWM as it extends up Juanita Creek to the culvert underneath NE Juanita Drive (see Figure 5). This conclusion was also confirmed by the City’s Planning Manager, Jeremy McMahan, via email on April 8, 2016. This effectively places all of the critical areas and their buffers along Juanita Creek and within the proposed project footprint within shoreline jurisdiction, and subject to the Shoreline Master Program version of the critical areas regulations.

6.1.1 Shoreline Regulations

The proposed Juanita Beach Park Phase II Improvements project is expressly intended to improve the public’s ability to enjoy and use the Lake Washington waterfront, which is a Shoreline of Statewide Significance. All uses and modifications in shoreline jurisdiction must be

“designed, located, sized, constructed and/or maintained to achieve no net loss of shoreline ecological functions” (KZC 83.360.1.c).

The majority of Juanita Beach Park is located in the Urban Mixed shoreline environment designation, which has a minimum shoreline setback of the greater of 25 feet or 15 percent of the average parcel depth (KZC 83.180). At Juanita Beach Park, the average parcel depth is conservatively estimated to be 512 feet, based on calculations made using CAD tools consistent with the methodology described in the definition of “average parcel depth” (KZC 83.80(7)). Accordingly, the standard minimum setback from the lake OHWM is 77 feet. Wetland C and most of Wetlands B and D are located in the Urban Mixed designation. Water-related and water-enjoyment commercial uses are allowed, as are water-related and water-enjoyment recreational uses. Non-water-oriented recreational development, such as play structures, are also allowed within this environment designation if they are “...part of mixed-use development containing water-dependent uses (excluding moorage buoys or floats), [or] where there is intervening development between the shoreline and the use...” (KZC 83.170).

The western portion of the park, including Juanita Creek, Oxbow Marsh, and portions of Wetlands Band D, is in the Urban Conservancy shoreline environment designation, which has a setback of 30 feet for water-enjoyment recreational uses and 25 feet for water-related recreational uses. Certain water-related and water-enjoyment commercial uses are allowed if accessory to a public park, as are “other public park improvements” that would be considered water-related and water-enjoyment recreational uses (KZC 83.170). Bioretention swales and similar systems “that allow for filtration of water through planted grasses or other native vegetation” are allowed in shoreline setbacks (KZC 83.190.2.d.6). Pedestrian access facilities and underground utilities are also allowed in shoreline setbacks (KZC 83.190.2.d.1 and 5).

Juanita Bay Park has a Natural shoreline environment designation. Restoration activities are an allowed use in this environment.

6.1.2 Wetland and Stream Regulations

The City regulates wetlands and wetland buffers in shoreline jurisdiction under KZC Chapter 83.500 and assigns wetland buffer widths based on wetland rating and the wetland habitat function, as defined by the wetland’s habitat score (KZC, 2016). According to KZC 83.500.4(a), Wetlands A and B have a moderate level of habitat function and are assigned a standard buffer width of 125 feet (Figure 3). Wetland D is assigned a 50-foot standard buffer width. In 2009, the City approved the “paper fill” of Wetland C and the elimination of its buffer. Both the paper fill and actual fill of Wetland C (former Douglass Wetland E) were mitigated in

the eastern portion of Juanita Beach Park consistent with City regulations in effect at that time. That mitigation included wetland creation at a 1:1 ratio (Oxbow Marsh) and wetland rehabilitation at a 0.5:1 ratio (in the preserved portion of Douglass Wetland E). However, the City did not include the paper fill in its request for authorization from the Corps or Ecology, so alteration of the wetland will be regulated by the Corps and Ecology (see Sections 6.2 and 6.3 below).

The City regulates streams and stream buffers in shoreline jurisdiction under KZC 83.510 and assigns stream buffer widths based on stream class and basin category (primary or secondary). Juanita Creek is a Class A stream in a primary basin with a minimum buffer width of 75 feet.

TABLE 1
CITY OF KIRKLAND WETLAND AND STREAM BUFFER WIDTHS

Wetland/Stream	KZC 83 Rating/Type	KZC 83 Standard Buffer Width (feet)
A	Category II	125
B	Category II	125
C	Category III	N/A
D	Category IV	50
Juanita Creek	Class A	75
Juanita Bay wetland	Category II	125

Note:

KZC = City of Kirkland Zoning Code

Stormwater discharges through buffers on the surface are allowed under KZC 83.500.4.c and KZC 83.510.4.c. Utilities are also allowed in critical areas and buffers if they “connect to existing lines in a sensitive area or buffer where no feasible alternative location exists based on an analysis of technology and system efficiency” (KZC 83.500.4.e). Administrative options available for other wetland buffer modifications include: (a) buffer averaging or (b) reducing the buffer by a maximum of one-fourth of the standard buffer with compensatory enhancement in the remaining buffer as part of the underlying permit. The stream buffer could be reduced to 50 feet with compensatory enhancement in the remaining buffer as part of the underlying permit. Reductions of stream or wetland buffers below the level that can be approved by the Planning Director through Process I (KZC Chapter 145) would require a Shoreline Variance with approval first by a Hearing Examiner through Process IIA (KZC Chapter 150) and then by Ecology. This would also require appropriate compensatory mitigation, and would need to demonstrate that additional Shoreline Variance criteria are met. Those criteria include providing proof that “the strict application of the bulk, dimensional or performance standards ... precludes, or significantly

interferes with, reasonable use of the property” and that “the variance requested is the minimum necessary to afford relief,” among others.

An additional structure setback of 10 feet is required upland of stream and wetland buffers, but there are allowances for some modifications of the setback if certain standards are met.

The Corps, in cooperation with Ecology, has developed ratios for conducting permittee-responsible wetland mitigation in western Washington (Ecology, 2006). The City has adopted these wetland mitigation ratios within shoreline jurisdiction in KZC 83.500.8. For unavoidable impacts to Category III and IV wetlands, the City requires compliance with the mitigation ratios shown in Table 2 based on area (area of mitigation: area of wetland impact). No modification of wetlands outside of shoreline jurisdiction is anticipated as part of implementing Phase II of the Juanita Beach Park Master Plan.

**TABLE 2
WETLAND IMPACT COMPENSATORY MITIGATION RATIOS
IN SHORELINE JURISDICTION**

Wetland Category	Reestablishment or Creation	Rehabilitation	Reestablishment or Creation (R/C) and Rehabilitation (RH)	Reestablishment or Creation (R/C) and Enhancement (E)	Enhancement Only
III	2:1	4:1	1:1 R/C and 2:1 RH	1:1 R/C and 4:1 E	8:1
IV	1.5:1	3:1	1:1 R/C and 1:1 RH	1:1 R/C and 2:1 E	6:1

6.2 State Regulations

Ecology has been authorized to implement Section 401 of the Clean Water Act (CWA) for Water Quality Certification in Washington for most projects that require Corps permits under CWA Section 404 (see Section 6.3). Typically, projects requiring a CWA Section 404 permit also require a CWA Section 401 Water Quality Certification.

The purpose of the certification process is to ensure that federally permitted activities comply with the federal CWA, state water quality laws, and any other applicable state laws. Some general requirements for Section 401, if it is required, include pollution spill prevention and response measures, disposal of excavated or dredged material in upland areas, use of fill material that does not compromise water quality, clear identification of construction boundaries, and provision for site access to the permitting agency for inspection.

Ecology will also review and approve the City's Shoreline Variance decision.

6.3 Federal Regulations

The Corps' CWA Section 404 review process is required for projects involving discharges of dredges or fill materials into the waters of the United States, including non-isolated wetlands and streams. Any proposed impact located within a jurisdictional wetland or stream would require either a Nationwide Permit (NWP) or an Individual permit from the Corps. NWP 42 was established for recreational facilities (including ball fields, sport courts, trails, and "small support facilities, such as maintenance and storage buildings and stables, that are directly related to the recreational activity"), and can authorize up to a one-half acre loss of waters of the United States (jurisdictional streams and wetlands). The Phase I improvements to Juanita Beach Park were approved under NWP 42, as well as NWP 27 for the restoration activities associated with Juanita Creek. The application to the Corps must include information about water quality impacts or any projected changes in base and peak flows that could result directly or indirectly from the project.

Projects that require or trigger a federal permit from the Corps would also require approval under the Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, and National Historic Preservation Act.

7.0 PROJECT IMPACTS

After conducting a thorough mitigation sequencing process, the final project design contains the following improvements located in wetlands, wetland buffers, stream buffers, and the shoreline setback (Table 3; Figure 6). Other than a portion of the new pavilion(s) and some pathway modification, all activities will take place within shoreline jurisdiction. As a result of the proposed extent of wetland and buffer modification, the project will pursue a Shoreline Variance. The following discussion describes the mitigation sequencing process for the project as a whole, followed by specific supplementary details pertaining to individual project elements, and then quantifies and characterizes the remaining impacts.

TABLE 3
PERMANENT AND TEMPORARY PROJECT ELEMENT IMPACTS IN
CRITICAL AREAS OR BUFFERS

Project Element	Wetland C ¹	Wetland D	Wetland Buffer	Juanita Creek Buffer	Shoreline Setback
Relocated bathhouse		●	●○	●○	
Relocated play ground		●	●○		
Lawn /open space rehabilitation	●	●	○	○	○
Pedestrian walkways			●○	●○	○
Sewer connection					○
Stormwater facilities			○	○	○

Notes:

¹ As noted in Section 5.1.3, above, Wetland C was already “paper filled” and mitigated according to City standards as part of Phase I. This Phase II proposal will eliminate the wetland.

● = Permanent Impact

○ = Temporary Impact

7.1 Mitigation Sequencing

KZC 83.490.2.a states that:

“An applicant for a land surface modification or development permit within a critical area or its associated buffer shall utilize the following mitigation sequencing guidelines, that appear in order of preference, during design of the proposed project:

1. Avoiding the impact or hazard by not taking a certain action, or redesigning the proposal to eliminate the impact. The applicant shall consider reasonable, affirmative steps and make best efforts to avoid critical area impacts. If impacts cannot be avoided through redesign, *or because of site conditions or project requirements* [emphasis added], the applicant shall then proceed with the following sequence of steps ...
2. Minimizing the impact or hazard by limiting the degree or magnitude of the action or impact with appropriate technology or by changing the timing of the action.
3. Restoring the impacted critical areas by repairing, rehabilitating or restoring the affected critical area or its buffer.
4. Minimizing or eliminating the hazard by restoring or stabilizing the hazard area through plantings, engineering or other methods.
5. Reducing or eliminating the impact or hazard over time by preservation or maintenance operations during the life of the development proposal, activity or alteration.
6. Compensating for the adverse impact by enhancing critical areas and their buffers or creating substitute critical areas and their buffers as required in KZC 83.500 and 83.510.

7. Monitoring the impact, hazard or success of required mitigation and taking remedial action based upon findings over time.

In the required critical areas study, the applicant shall include a discussion of how the proposed project will utilize mitigation sequencing to avoid, minimize, and mitigate impacts to critical areas and associated buffers. The applicant shall seek to avoid, minimize and mitigate overall impacts based on the functions and values of all relevant critical areas.”

The proposed project has gone through an extensive and nearly year-long mitigation sequencing analysis and design process, focused primarily on the location and configuration of the bathhouse with respect to Wetlands C and D. The project’s mitigation sequencing process is described below.

7.1.1 Avoid

This process formally evaluated the implications of the following scenarios on the Phase II park improvements: complete avoidance of wetlands and buffers, complete avoidance of wetlands, fill of only Wetland D, and fill of Wetlands C and D. As noted in KZC 83.490.2.a.1, the first step of the mitigation sequencing process (avoid) should consider design modification potential in the context of “site conditions and project requirements.” The “site conditions and project requirements” variables analyzed by stakeholders for this project included:

- Degree of critical areas alteration and associated mitigation
- Area of usable public open space
- Safety
- Constructability issues and cost
- Permit complexity and cost
- Schedule
- View obstruction
- Consistency with the Juanita Beach Park Master Plan

The stakeholders involved in the discussions included City Parks and City Planning staff, the City’s Park Board, City Council, and City Manager. The stakeholders, including staff, elected officials, and appointed citizens, all concluded that the benefits to the region and local community arising from maximum implementation of the project objectives outweighed the benefits of preserving the critical areas that would otherwise be impacted. As mentioned, all of the impacted wetlands, wetland buffers, and stream buffers are currently mowed lawn that are separated from the lake and Juanita Creek by concrete or asphalt pathways.

The selected alternative avoids impacts to the greatest extent possible (see Table 3 and Figure 6), within the confines of the site conditions and project requirements. While the selected

alternative results in greater wetland impact than identified during Phase I design, this is largely due to the presence of Wetland D, which was not identified during the Phase I design. The selected alternative provides the greatest human safety benefits, maximizes the amount of usable public open space in an already tightly confined and very actively used park, and is the most consistent with the original Juanita Beach Park Master Plan (see Exhibit 1), which was developed using extensive public input and formally adopted by the City Council. The key project requirements for each of the proposed project elements that precluded avoidance of all critical area impacts are listed below:

- **Bathhouse:** The final orientation and location was compelled by safety factors that favor placement of the lifeguard station close to the water, the substantial concerns raised by property owners whose views might be obstructed if the bathhouse was oriented parallel to the shoreline, the utility of having water-related concessions in close proximity to the lake, and the more intangible improvements to park usability and open space. The bathhouse location was also shifted farther west during the design process to avoid damaging the large weeping willow at the north edge of Wetland D.
- **Playground:** As a critical cost-saving measure, the existing playground equipment will be reused. The size and general inflexibility of the equipment dictates the proposed location, particularly when paired with safety considerations. Park users with children often find themselves dividing their attention between the playground and the water; the proposed playground location will reduce the inherent associated risks to children's safety.
- **Lawn rehabilitation:** Usable open space at this popular park for seating, sunbathing, play, picnicking, and other activities is at a premium. Currently, large areas of the available mowed lawn are too wet, which limits their use for much of the year. Drainage and soil improvements in Wetlands C and D and the buffers of Wetlands A and B and Douglass Wetland E will increase dry and usable lawn area.
- **Pedestrian walkways:** Reconfigured pedestrian walkways are necessary in buffers to connect proposed new facilities to each other and to the existing circulation system. The reconfigured pathways are confined to existing lawn or playground areas; impacts to vegetation that contributes to shoreline, stream or wetland ecological function have been avoided.
- **Stormwater facilities:** Runoff from the new bathhouse will be routed to the west side of the building, and discharged via 2-foot-long slab trench drains filled with cobble. The flow will then be routed into a vegetated bioswale (planted with native shrubs and emergents) along the east side of the existing paved pathway, before finally passing underneath the concrete promenade via a culvert into a gravel "pocket" that is buried a minimum of 8 inches below the ground surface (sand beach). Runoff from the new pavilion will be piped underground to connect to the underdrain system beneath the play area. The water collected from the pavilion and play area will then

be piped underneath the concrete promenade to discharge into a second underground gravel pocket. None of the new impervious surfaces are pollution-generating, so water quality treatment is not necessary. The location of the new structures and the down-gradient slope towards Lake Washington precludes location of these facilities outside of shoreline jurisdiction and outside of buffers. The stormwater facilities are all located in existing lawn or other improved areas, and impacts have been avoided by moving features underground where possible.

- **Sewer connection:** The relocation of the bathhouse requires a new sewer connection between the restrooms and the sewer main. The Northshore Utility District has mandated that the project connect to the County's existing sewer main parallel to the shoreline. The connection must be made at a manhole located in the concrete promenade. As a result, temporary impacts to Wetland D, buffers and the shoreline setback are unavoidable. As with the other proposed project elements, only lawn or other improved areas will be altered.

The proposed project has avoided alteration of critical areas that provide important food, cover, perch, breeding, resting, or riparian shade functions. For example, the project design has avoided removal of woody vegetation within critical areas, including the tree within Wetland D.

7.1.2 Minimize

The proposed facilities are the minimum size needed to provide an appropriate level of service to meet park users' needs and to satisfy local regulations related to stormwater management and compliance with the Americans with Disabilities Act. As previously mentioned, all permanent and temporary impacts are restricted to lawn or other improved areas. Impacts to wetland and stream buffer and shoreline setback have been minimized by restricting impacts to the existing lawn area or sand beach.

7.1.3 Restore

The temporarily disturbed wetland and stream buffer and shoreline setback areas will be restored to similar or improved pre-project conditions. For example, a mix of native shrubs, groundcovers, and emergents will be planted west of the bathhouse and in the proposed vegetated swale. These areas are currently comprised of lawn. The remaining temporarily impacted buffer areas will be re-seeded with lawn grasses.

7.1.4 Reduce or Eliminate

The project design has reduced and eliminated impacts to critical areas to the extent possible. The project will remove 1,325 square feet of existing pavement and bathhouse structure from Douglass Wetland E's buffer. Also, future park maintenance activities associated

with the park's active recreation areas, structures, and utility lines will occur in areas of buffer with minimal buffer function.

7.1.5 Compensate

Chapter 8 of this report describes in detail the proposed mitigation for wetland and stream/wetland buffer impacts. As required by KZC 83.500.10, the proposed off-site wetland mitigation will be in the same basin (South Juanita Slope) as the project impacts (see Figure 2). Stream and wetland buffer mitigation is proposed on-site.

7.1.6 Monitor

Mitigation for impacts to wetlands and buffers will be monitored for 10 and 5 years, respectively, with detailed reports provided to the Corps and the City. See Section 8.4 of this report for a description of the monitoring protocol and conditions, which would trigger preparation of and compliance with a Contingency Plan.

7.2 Wetland Impacts

The project will result in permanent wetland impacts. As noted in Table 3 above, Wetland C will be filled with soil and other amendments to increase the usability of this existing lawn area. Wetland D will be eliminated to construct the replacement bathhouse and relocated play area, and to add soil and other amendments to increase the usability of the existing lawn area. Table 4 quantifies these permanent impacts.

**TABLE 4
PERMANENT WETLAND IMPACTS**

Wetland	Category	Square Footage (acres)	Percent of Wetland (%)
C	Category III	3,870 (0.089)	100
D	Category IV	4,310 (0.099)	100
TOTAL		8,180 (0.188)	100

Wetlands C and D are both entirely within areas of active park use and provide extremely limited hydrologic, water quality, and habitat function. As part of Phase I, 5,895 square feet of "paper filled" Category III wetland was mitigated according to City standards in 2011.

The project will not have temporary wetland impacts.

7.3 Buffers/Setback Impacts

The proposed project will result in temporary and permanent stream and wetland buffer impacts and temporary impacts to the Lake Washington shoreline setback (Table 5 and Figure 7).

**TABLE 5
BUFFER/SETBACK IMPACTS**

Feature¹	Permanent Impact Area (square feet)	Temporary Impact Area (square feet)
Wetland buffer ²	6,326	21,751
Juanita Creek buffer	2,229	8,806
NET BUFFER IMPACT	6,326	21,751
Lake Washington shoreline setback	0	7,612

Notes:

¹ Wetland and stream buffers overlap and, therefore, impact areas overlap.

² Buffer impacts for Wetland C were not included in these calculations because the buffer was effectively eliminated and mitigated during Phase I improvements (see Sections 5.1.3 and 6.1.2).

Like Wetlands C and D, the permanent and temporary buffer impact areas identified in Table 5 are entirely in active park use, and consist of maintained lawn, playground structures and fill, the concrete shoreline promenade, picnic benches, the existing bathhouse and its paved apron, and paved walkways. These buffer areas are also separated from higher-quality buffer by heavily used paved trails, rendering them largely non-functional.

The shoreline setback will also be temporarily disturbed during lawn rehabilitation, underground stormwater drainage construction, and installation of the new sewer connection to King County's trunk line that parallels the Lake Washington shoreline. After construction, all temporary buffer impacts to vegetated areas will be restored to existing or improved pre-project conditions by reseedling; some of the temporarily impacted buffer area will be planted with native shrubs and groundcovers as part of the bathhouse's stormwater management system.

8.0 PROPOSED MITIGATION

The proposed wetland and buffer mitigation actions were developed in close coordination with the Green Kirkland Partnership. The Partnership is a division of the City's Parks and Community Services Department. Since 2005, Juanita Beach Park and Juanita Bay Park have been part of the Partnership's program to restore habitat conditions, primarily through invasive species removal and planting of native species. The Partnership has mapped 11 "restoration management units" based on habitat types in Juanita Beach Park and 18 restoration management units in Juanita Bay Park. Most of the work is accomplished by volunteers under the direction of the Partnership.

8.1 Approach

8.1.1 Juanita Beach Park Buffer Mitigation

At present, approximately 3.3 acres of Juanita Beach Park along Juanita Creek are included in the Partnership's restoration plan, and are currently restored and being monitored. We propose to expand Unit 10 and 11 to the east, into the bare ground area currently used for observation of beach volleyball (Appendix F; Appendix D, Photo 11) and between the new bathhouse and the existing paved trail to the west, extending south to the concrete promenade along the proposed stormwater swale. These areas will be vegetated with native trees, shrubs, and groundcovers. Enlargement of Units 10 and 11 will provide the equivalent of 10,414 square feet of buffer enhancement, which will benefit Juanita Creek, Wetland A/Oxbow Marsh, and Wetland B (Figures 7 and 9).

As noted above, the impacted buffer areas are all mowed lawn separated from the functional portion of the stream and/or wetland buffer by paved surfaces and the activities of park users. The proposed buffer mitigation will provide buffer functional lift by increasing vegetation structure, increasing cover of native species, enhancing wildlife habitat, and improving screening between the wetland and stream and the busy park facilities.

8.1.2 Juanita Bay Park Wetland Mitigation

A 2008 federal rule titled *Compensatory Mitigation for Losses of Aquatic Resources; Final Rule* (Federal Rule) 33 Code of Federal Regulations Section 332.3(b) establishes preferences for wetland compensation in the following order:

- a. Wetland mitigation banks,
- b. In-lieu fee (ILF) programs,
- c. Permittee-responsible mitigation under a watershed approach,
- d. Permittee-responsible mitigation through on-site and in-kind mitigation, and lastly
- e. Permittee-responsible mitigation through off-site and/or out-of-kind mitigation.

The Federal Rule also states:

“If, after considering opportunities for on-site, in-kind compensatory mitigation as provided in paragraph (b)(5) of this section, the [Corps] district engineer determines that these compensatory mitigation opportunities are not practicable, are unlikely to compensate for the permitted impacts, or will be incompatible with the proposed project, and an alternative, practicable off-site and/or out-of-kind mitigation opportunity is identified that has a greater likelihood of offsetting the permitted impacts or is environmentally preferable to on-site or in-kind

mitigation, the district engineer should require that this alternative compensatory mitigation be provided.”

The following discussion describes the viability of the different mitigation strategies:

1. Mitigation Bank: There is no approved wetland mitigation bank serving the project impact area. The City’s code does not recognize mitigation banks as a wetland mitigation strategy in shoreline jurisdiction.
2. ILF Program: As of 2012, King County has an approved ILF program that serves the project impact area. However, the ILF program does not include any restoration sites in the City or in any of the upstream sub-basins (Juanita Creek or Forbes Creek) that drain to Juanita Bay. At present, the list of roster sites for the Cedar River/Lake Washington service area includes projects in only the Lower Cedar River and May Creek subbasins, more than 15 miles south of the impact area. The ILF program has up to three years from the time of payment to implement improvements and would therefore result in a temporal loss of wetland function until the mitigation is constructed. The City’s code does not recognize ILF mitigation as a mitigation strategy in shoreline jurisdiction.
3. On-Site/In-Kind: According to KZC 83.500.10:

“On-site mitigation for a wetland or its buffer is preferable to off-site mitigation. Given on-site constraints, the City may approve a plan to implement all or a portion of the required mitigation off-site, if the off-site mitigation is within the same drainage basin as the property that will be impacted by the project. The applicant shall demonstrate that the off-site mitigation will result in higher wetland functions, values, and/or acreage than on-site mitigation. Required compensatory mitigation ratios shall be the same for on-site or off-site mitigation, or a combination of both.”

As noted in other sections of this report, Juanita Beach Park is already encumbered by significant wetlands, a stream, and their buffers. Creation of additional wetland and associated buffer on-site would be in direct opposition to the overall project’s goal of enhancing use of the limited remaining land area for recreation. Aside from the two wetlands proposed for removal as part of this project, all of the other wetlands at the park have already been enhanced as part of Phase I.

4. Off-Site/In-Basin: At present, 97.9 acres of Juanita Bay Park are included in the Partnership’s restoration plan, with 10.8 of those acres currently restored and being monitored. The wetland impact area and the proposed wetland mitigation site all drain into the Juanita Bay area of Lake Washington, and are in the South Juanita Slope basin. The project’s proposed wetland mitigation area is currently comprised of a deciduous forest and understory of invasive species, including

reed canarygrass, bamboo, English ivy, and Himalayan blackberry (Appendix D, Photos 12 and 13). The proposed wetland mitigation would enhance approximately 0.11 acre of the Partnership's Juanita Bay Park restoration management Unit 07 (Appendix F) by removing invasive species and planting native conifer, shrub, and emergent wetland species (Figure 9, Table 6).

TABLE 6
WETLAND MITIGATION REQUIREMENTS

Wetland	Category	Standard Wetland Enhancement Ratio (for concurrent mitigation only)	Phase I "Paper Fill" (Square Feet)	Advance Mitigation Implemented for Phase I "Paper Fill" (Square Feet)	Proposed Phase II Impact (Square Feet)	Remaining Unmitigated Wetland Area (Square Feet)
C (part of former Wetland E)	III	8:1	5,895	5,895 creation 2,948 rehabilitation (@ 1:1 creation and 0.5:1 rehabilitation)	3,870	
D	IV	6:1			4,310	
TOTAL			5,895	5,895 creation 2,948 rehabilitation (equivalent to 1,474 creation ¹)	8,180	811 (8180-7,369)

Note:

¹ Rehabilitation is assigned half the value of creation. Essentially, the 2,948 square feet of rehabilitation is equivalent to 1,474 square feet of creation. The total effective wetland creation is thus 5,895+1,474 = 7,369 square feet.

Wetland mitigation completed as part of Phase I for "paper fill" of Wetland C consisted of 5,895 square feet of creation and 2,948 square feet of rehabilitation. As this mitigation was associated with a paper fill (not a physical impact that altered Wetland C), it is effectively advance mitigation. The implemented wetland creation and rehabilitation has been successful according to agency-required monitoring completed to date, and will continue to be monitored and maintained until all performance standards have been met. Based on the analysis above, which has been reviewed and agreed to by Doug Gresham at Ecology, there is only 811 square feet of proposed wetland fill that has not been compensated at an advance creation mitigation ratio of 1:1. At the enhancement ratio required for concurrent mitigation of the remaining 811 square feet of Category IV wetland fill, at least 4,866 square feet of wetland enhancement is necessary.

The proposed use of the Partnership's restoration plan for Juanita Bay Park would provide greater benefit to the impacted Juanita Bay system than any of the mitigation strategies preferred by the Federal Rule. The overall functional lift provided by the wetland enhancement

will be supported by an increase in woody species that will help contribute woody debris and other organic material to the wetland, an increase in wildlife habitat opportunities by diversifying available forage and cover for birds and small mammals, and an increase in vegetative structure and diversity that will improve the wetland's hydrologic and water quality functions. Additionally, the enhancements at Juanita Bay Park could be implemented immediately, and would further completion of an ongoing, successful comprehensive restoration plan for this large habitat area.

The existing functioning buffer width associated with the enhanced wetland area cannot be increased to the 125 feet required for Category II wetlands because of the close proximity of existing development (roads and other infrastructure) and private properties. The City recently completed a sidewalk improvement project along 98th Avenue NE, and has enhanced the existing buffer and a small area of wetland immediately adjacent to the proposed wetland enhancement area. The project team has decided not to shift the wetland enhancement area to the west to provide a "buffer" (a mix of wetland and upland) of 125 feet between the wetland enhancements and the roadway, as suggested by the City, because it would place the enhancement area farther waterward of the OHWM, lowering the potential habitat benefits to be gained by the enhancement and lowering the likelihood of successful mitigation. Shifting the mitigation area farther waterward would also have the unintended and adverse consequence that a small island of restoration would occur in a landscape that itself could benefit from restoration, or damage to native communities or further harm to already degraded areas might occur in the process of accessing the mitigation area. An isolated island of enhancement would also be more vulnerable to colonization by invasive species from the surrounding, unenhanced community. This proposal will maximize enhancement without degrading adjacent areas, which meets the ultimate intent of critical areas protection code.

8.2 Mitigation Installation Sequence

The sequences below summarize the steps that should be taken to implement the wetland and buffer mitigation plans.

8.2.1 Wetland Enhancement Installation Sequence

1. Prior to the start of mitigation work, the biologist will use flagging or stakes to identify in the field the locations of the proposed mitigation areas.
2. Install erosion control Best Management Practices (BMPs) as needed and protect existing native woody vegetation in and adjacent to the planting areas. Earth disturbance should be minimized to the extent possible to avoid damaging existing tree roots in the area.

3. With the assistance of the biologist, invasive species shall be identified for removal. To avoid impacting the bird nesting season and high water levels in the lake, invasive species removal shall occur between October 15 and March 1. If water levels in Lake Washington vary significantly from the mean average, invasive clearing may occur outside of the designated window if City approval is granted.
4. Remove existing non-native invasive species such as Himalayan blackberry, English ivy, English holly, and bamboo from the enhancement area using a combination of grubbing and hand pulling/cutting, depending on size of individuals. English ivy vines growing on trees shall be cut at shoulder height and all roots and stems below the cut and along the ground shall be removed from the site and properly disposed of. Himalayan blackberry roots shall be grubbed out. Golden and purple loosestrife shall be hand pulled. Grasp the base of the plant and pull slowly with steady pressure to release the roots from the soil. Older plants with larger roots can be eased out with a garden fork. Remove as much of the root system as possible, because broken roots may sprout new plants. If the plants are in flower or seed, cut off and bag all flower stalks and seed heads before pulling to prevent seed dispersal. All loosestrife plant parts, including flowers, seed heads, stems, leaves and roots, must be securely bagged and discarded in the trash or taken to a transfer station. All other invasive species should be disposed of where they cannot reestablish in critical areas or buffers. Care shall be taken during invasive species removal to preserve native trees and shrubs.
5. After other invasive species are completely removed from the site, remaining reed canarygrass within the mitigation area shall be mowed to ground level. If planting does not occur prior to March 1, new reed canarygrass growth shall be mowed again with a hand-held grass trimmer prior to planting. High water levels in Lake Washington following March 1 will preclude the use of wheeled or tracked equipment in the wetland mitigation area.
6. Procure plants and store properly. Plant material will be native to the Pacific Northwest and from plant stock genomes from Western Washington. Biologist shall review plant material and plant layout prior to planting. Each plant shall be loosely flagged for easy identification during future monitoring visits.
7. Mulch the mitigation areas with 6 inches of wood chips to discourage weed establishment. Hand-dig circular plant pits; take care to avoid cutting through existing native tree roots. Install plants by hand in the planting areas in natural, random clusters. Backfill with native soil that has been mixed with 3 inches of compost. Planting should occur between October 15 and April 1 to take advantage of cool temperatures, precipitation, and low lake levels.
8. Water plants thoroughly after planting to avoid capillary stress. Planted areas shall be watered with approximately 1 inch of water immediately after planting.
9. Remove construction debris and any other unnatural refuse. Remove BMPs after site is stabilized.

10. Landscaper shall submit copies of the planting invoices showing planted species and quantities.
11. Landscaper shall replace all plant mortalities and perform maintenance for one year after installation.

8.2.2 Buffer Enhancement Installation Sequence

1. Prior to the start of mitigation work, the biologist will use flagging or stakes to identify in the field the locations of the proposed mitigation areas.
2. Install erosion control Best Management Practices (BMPs) as needed and protect existing native woody vegetation in and adjacent to the planting areas. Earth disturbance should be minimized to the extent possible to avoid damaging existing tree roots in the area.
3. With the assistance of the biologist, invasive species shall be identified for removal.
4. Remove existing non-native invasive species such as Himalayan blackberry, English ivy, English holly, and bamboo from the enhancement area using a combination of grubbing and hand pulling/cutting, depending on size of individuals. English ivy vines growing on trees shall be cut at shoulder height and all roots and stems below the cut and along the ground shall be removed from the site and properly disposed of. Himalayan blackberry roots shall be grubbed out. Invasive species should be disposed of where they cannot reestablish in critical areas or buffers. Care shall be taken during invasive species removal to preserve native trees and shrubs.
5. Procure plants and store properly. Plant material will be native to the Pacific Northwest and from plant stock genomes from Western Washington. Biologist shall review plant material and plant layout prior to planting. Each plant shall be loosely flagged for easy identification during future monitoring visits.
6. In the flat, sandy portion of the buffer mitigation area adjacent to the existing volleyball court, compost shall be added and mixed into the upper 12 inches of soil.
7. Mulch the mitigation area with 6 inches of wood chips to discourage weed establishment. Hand-dig circular plant pits; take care to avoid cutting through existing native tree roots. Install plants by hand in the planting areas in natural, random clusters. Backfill with native soil that has been mixed with 3 inches of compost. Planting should occur between September 15 and January 15 to take advantage of cool temperatures and precipitation.
8. Water plants thoroughly after planting to avoid capillary stress. Planted areas shall be watered with approximately 1 inch of water immediately after planting.
9. Install wire fencing around each plant installation, around planted clusters, or around the whole mitigation area to protect from beaver herbivory. Install split-rail

fencing in specific locations around the buffer mitigation area, as shown on Figure 9.

10. Remove construction debris and any other unnatural refuse. Remove BMPs after site is stabilized.
11. Landscaper shall submit copies of the planting invoices showing planted species and quantities.
12. Landscaper shall replace all plant mortalities and perform maintenance for one year after installation.

8.3 Performance Standards

Native plant survival and invasive cover standards are established to measure enhancement plan success. The proposed performance standards are summarized in Table 7.

**TABLE 7
VEGETATION PERFORMANCE STANDARDS**

Monitoring Year	Survival (%)	Native Cover	Invasive/Non-native Cover (%)
Wetland Enhancement in Juanita Bay Park			
Year 1	100*	--	≤5
Year 2	--	≥10	≤10***
Year 3	--	≥20	
Year 4	--	≥30	
Year 5	--	≥50	
Year 7	--	≥60	
Year 10	--	≥80	
Buffer Enhancement in Juanita Beach Park			
Year 1	100*	--	≤5
Year 2	--	≥10	≤10
Year 3	--	≥30	
Year 4	--	≥50	
Year 5	--	≥70	

Notes:

* 100 percent (%) survival criteria shall be met by replacing all mortalities the first year after planting.

** Includes native plants that are naturally recruiting. The existing mature tree canopy will not be included in the cover measurements in the wetland enhancement area.

*** Applies to all exotic invasive species except for reed canarygrass in the wetland enhancement area. During the monitoring period, reed canarygrass must be managed and controlled to prevent interference with the growth of native installed vegetation.

If weed cover exceeds 10% during vegetation monitoring, this performance standard can be met by removing weeds within 60 days of vegetation monitoring.

8.4 Monitoring Plan

Monitoring shall be conducted at the following time intervals:

- At the time of construction (mitigation plan installation to identify mitigation areas, identify invasive species, and review materials and methods);
- Approximately 30 days after planting to prepare an as-built plan and Baseline Monitoring Report;
- Early in the growing season of the first year to identify invasive species maintenance needs;
- Near end of the growing season of the first year to perform vegetation monitoring;
- Twice the second, third, fourth, and fifth years (at the beginning and end of the growing season); and
- Near end of the growing season of the seventh and tenth (final) years.

Below we have outlined proposed monitoring methods, success criteria, and reporting schedule. Monitoring will be conducted by a qualified biologist and will consist of documenting plant mortality and health in Year 1, and estimating percent native cover every year thereafter. Percent cover will be measured using the line-intercept method, or similar, as adapted during the fieldwork. Methodology will be determined and documented during the baseline monitoring effort. Monitoring will also include identifying maintenance needs as they relate to plant survival and weed control.

1. Installation. A biologist will inspect and approve the plant materials prior to installation, including any substitutions. The biologist should also observe plant layout and installation for compliance with the plan details.
2. Baseline Documentation. Within 30 days of completion of the vegetation enhancement installation, the site will be visited to document the as-built condition. The final plant count by species will be verified, and any approved departures from the plan will be mapped and recorded. Recommendations for correcting any unauthorized plan deviations will be included in a Baseline Monitoring Report. Permanent photo points and monitoring transects will be established during the as-built site visit to provide a record of the entire monitoring area. These points will be noted on the map and baseline photos included in the report.
3. Vegetation Monitoring.
 - Years 1 through 5: The wetland and buffer enhancement areas will be visited at the beginning and end of the growing season.

- The site visit early in the growing season will be used to identify invasive species maintenance needs. Findings will be communicated to the City informally via email. A report will not be prepared.
- At the end of the growing season, vegetation monitoring will be completed prior to September 30. At the Year 1 monitoring, each installed plant will be assessed and counted, and its condition recorded. Invasive species cover will be visually estimated. In subsequent monitoring years, total percent cover of native and invasive vegetation will be measured. Native volunteer species may be counted in the cover assessment. Signs of beaver activity within the mitigation area will be noted and recommendations for control will be provided. Photos will be taken from each photo point.
- Years 7 and 10: The wetland mitigation area will be visited once annually at the end of the growing season, by September 30. Total percent cover of native vegetation will be measured, as will presence of invasive species. Photos will be taken from each photo point.

The monitoring reports for the end-of-growing season monitoring visits will be submitted to the City and the Corps by December 31 of each reporting year, and will include the following description/data:

1. Site plan and location map.
2. History of project, including date of plant installation, current year of monitoring, and restatement of performance standards.
3. Plant survival and/or cover of the installed vegetation, in the context of assessing achievement of performance standards.
4. Incidental observations of wildlife or their sign.
5. Assessment of nuisance/exotic biota and recommendations for management.
6. Color photographs taken from permanent photo points established during the baseline visit.
7. Summary of maintenance and contingency measures proposed for the next visit, and those completed since the most recent visit.

Any deficiency discovered during any monitoring or inspection visit must be corrected within 60 days. If any monitoring report reveals that the mitigation plan has failed in whole or in part, and if that failure is beyond the scope of routine maintenance, a Contingency Plan shall be prepared and submitted. Once approved, contingency measures may be installed and will replace the approved wetland and buffer mitigation plan.

8.5 Maintenance

The Contractor will be responsible for maintenance of the mitigation areas for the first year following installation. The City will be responsible for maintenance of the mitigation areas for the remaining four (buffer) to nine (wetland) years of the monitoring period. Maintenance will include weeding around base of installed plants, replacing plants to meet survival requirements, removing all classes of noxious weeds (see Washington State Noxious Weeds List, WAC 16-750-005, with the exception of reed canarygrass, see note in Table 7), and implementing any other measures needed to ensure plant survival.

In the buffer mitigation area, water shall be provided to installed plants during the dry season (June 1 through October 15) for the first year after plant installation for plant survival and establishment. Water should be applied at a rate of one inch of water, once per week.

In the wetland mitigation area, we anticipate that high water levels in Lake Washington during the growing season will obviate the need for manual watering. However, the site should be monitored throughout the growing season by Partnership or City Parks Department staff for signs of dryness and manual watering should begin if necessary.

9.0 CLOSURE

The findings and conclusions documented in this report have been prepared for specific application to this project, and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions and recommendations presented in this report are professional opinions based on interpretation of information currently available to us, and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

Shannon & Wilson has prepared Appendix G, “Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report,” to assist you and others in understanding the use and limitations of our reports.

SHANNON & WILSON, INC.



Sarah Corbin, PWS
Senior Biologist

Amy Summe
Senior Biologist/Permit Specialist

SCC:AJS:KLW/scc:ajs

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BUFFER MITIGATION (SEE FIGURES 7 and 9)

PROJECT SITE
(SEE FIGURES 3, 5, 6, and 7)

WETLAND MITIGATION
(SEE FIGURES 4 and 8)

A map of the Juanita Beach Park area. The map shows the coastline, a road labeled 'Northeast Juanita Drive', and the park area. A bus stop is marked with a black dot and a line pointing to it. The text 'JUANITA BEACH PARK' is prominently displayed in large, bold, black letters.

**JUANITA
BAY
PARK**



0

0.2

Miles

Juanita Beach Park Property
Kirkland, Washington

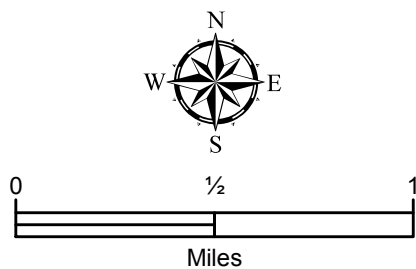
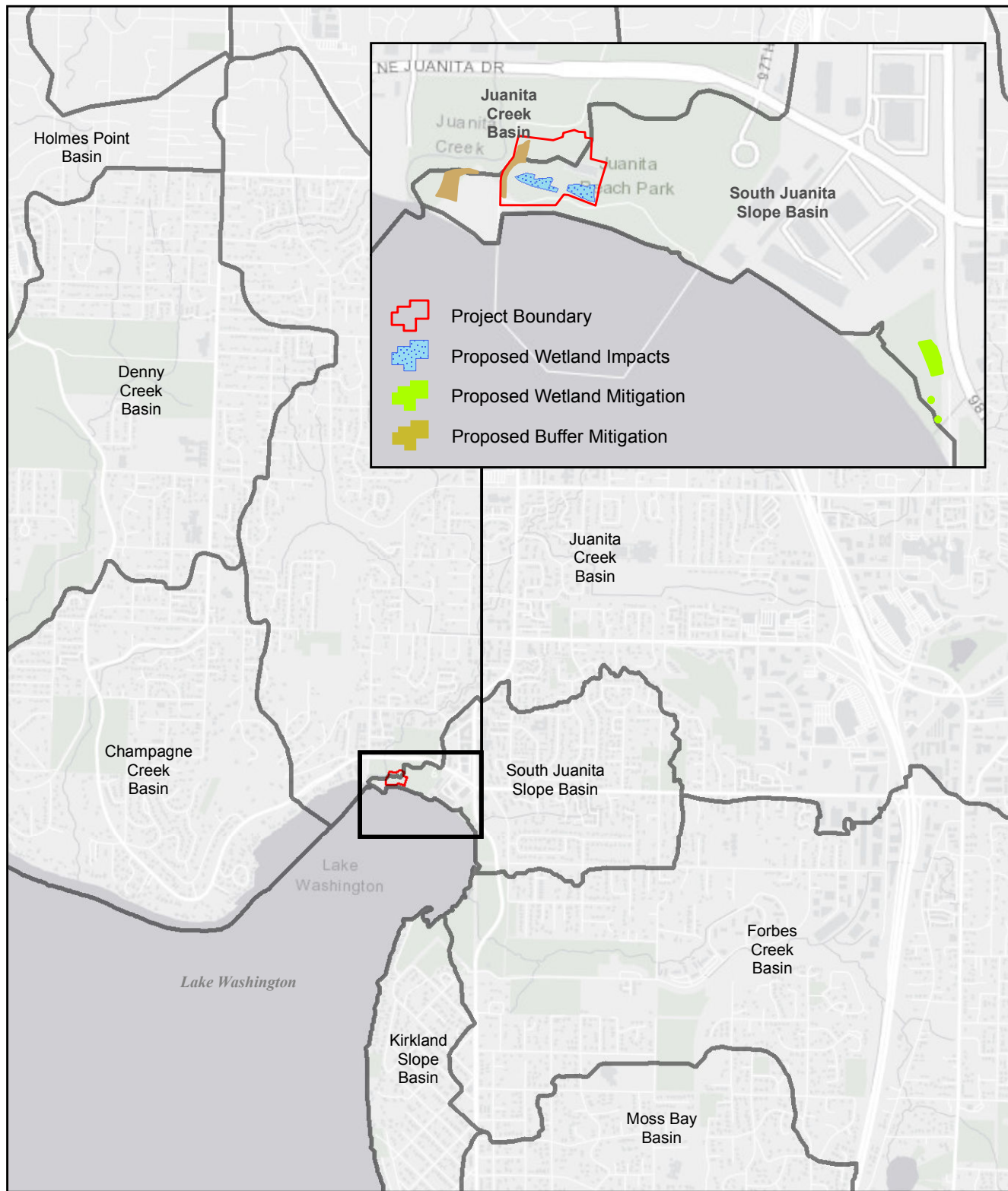
VICINITY MAP

December 2017

21-1-22161-006

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FIG. 1



Juanita Beach Park Property
Kirkland, Washington

DRAINAGE BASINS

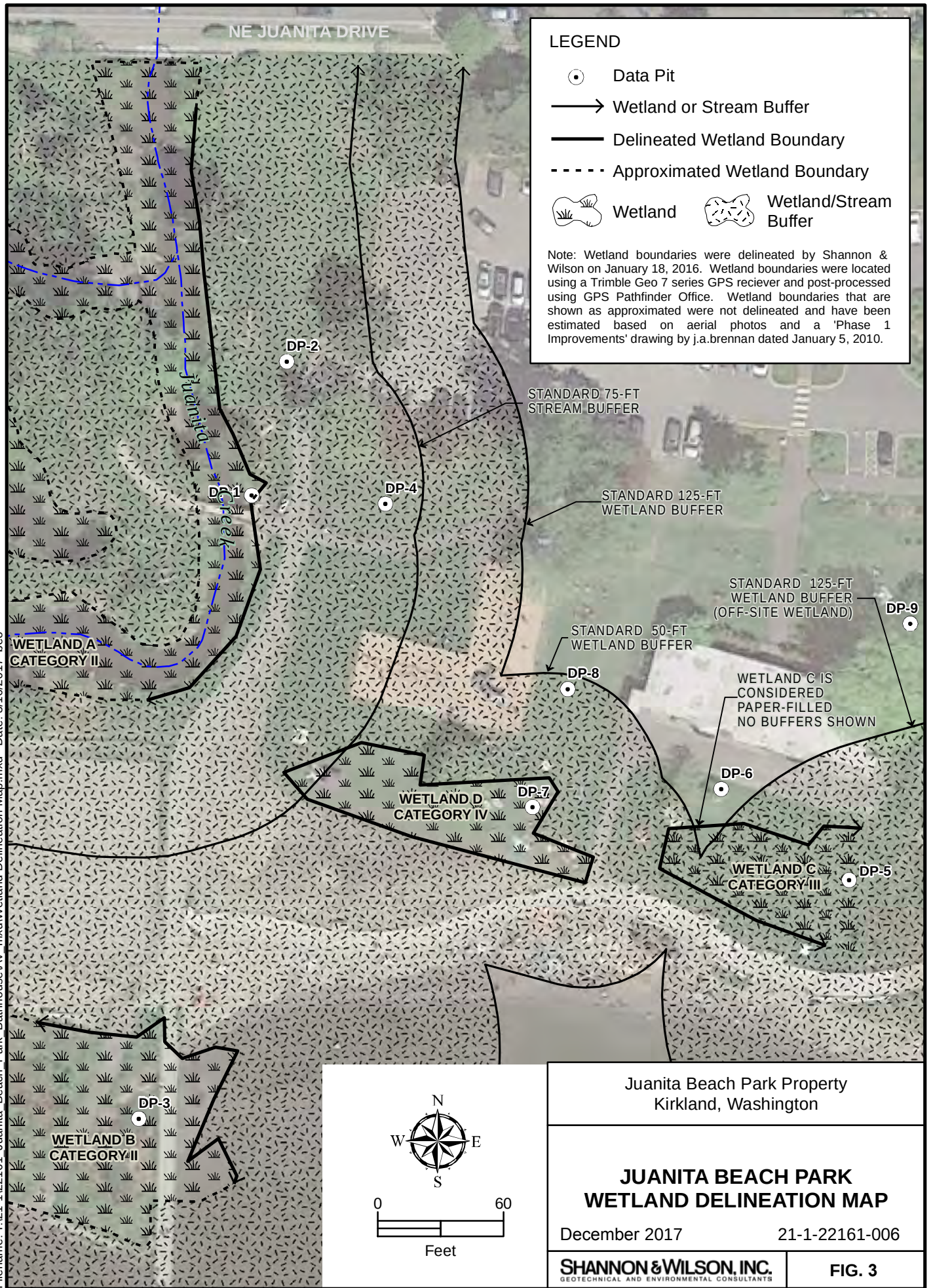
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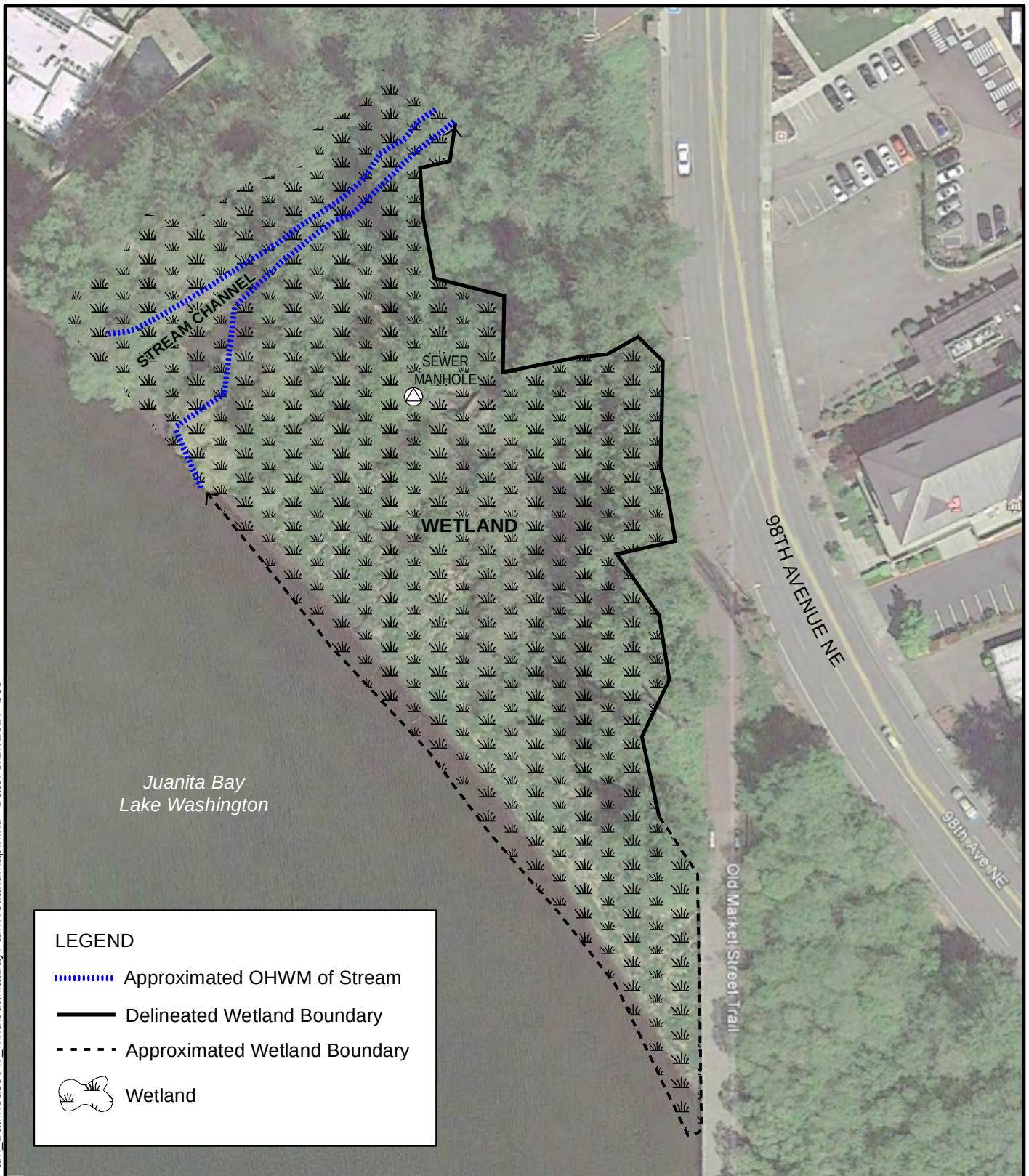
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FIG. 2

Filename: T:\21-1\22161 Juanita Beach Park Bathhouse\AV mxd\Wetland Delineation Map.mxd Date: 3/16/2017 beo

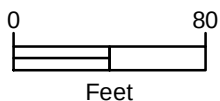




LEGEND

- Approximated OCHWM of Stream
- Delineated Wetland Boundary
- Approximated Wetland Boundary
-  Wetland

Note: Delineated wetland boundary shown here was delineated by The Watershed Company in April 2016 (see Appendix A). Shannon & Wilson visited the site in January 2017 to look for the wetland boundary flags and observe site conditions. Wetland boundary flags that were observed in the project wetland mitigation area were located using a hand-held Trimble Geo 7 series GPS receiver. The remaining approximated wetland boundary and ordinary high water mark (OCHWM) were estimated by Shannon & Wilson based on field observations and aerial photography.



Juanita Beach Park Property
Kirkland, Washington

JUANITA BAY PARK WETLAND DELINEATION MAP

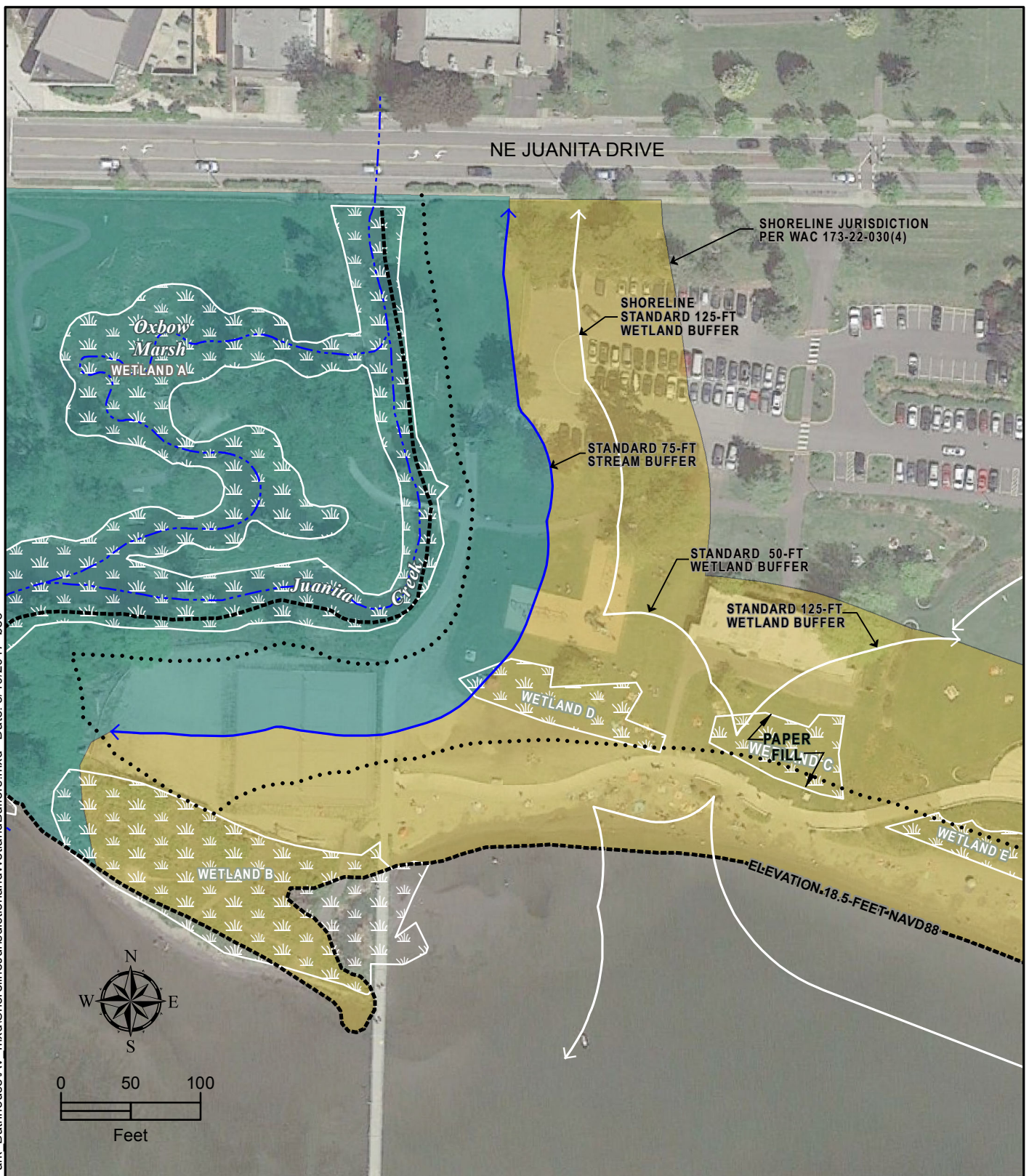
December 2017

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FIG. 4

Filename: T:\21-1\22161 Juanita Beach Park Bathhouse\AV mxd\ShorelineJurisdictionandWetlandBuffers.mxd Date: 5/10/2017 beo



Shoreline Jurisdiction

Urban Conservancy

Urban Mixed

Shoreline Setback



Wetlands



Wetland Buffer



Stream Buffer

Note: Not all wetland boundaries were delineated by S&W.
Some wetland boundaries shown here were approximated or assumed.

Juanita Beach Park Property
Kirkland, Washington

SHORELINE, WETLAND, STREAM BOUNDARIES AND BUFFERS

December 2017

21-1-22161-006

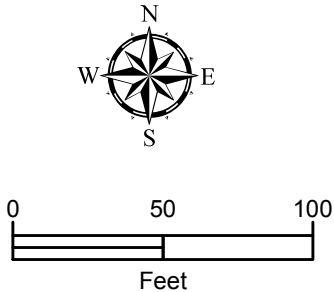
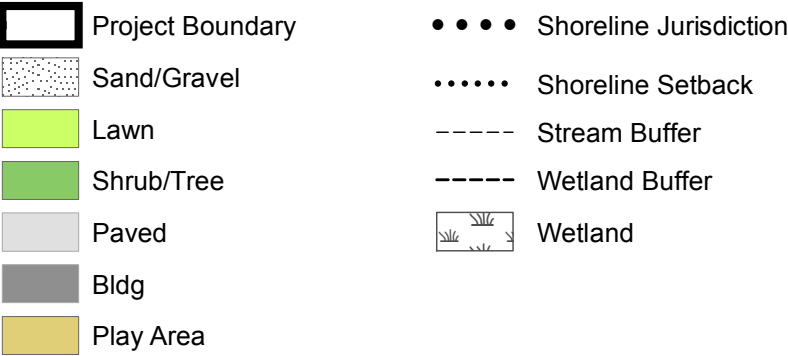
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FIG. 5

EXISTING CONDITIONS

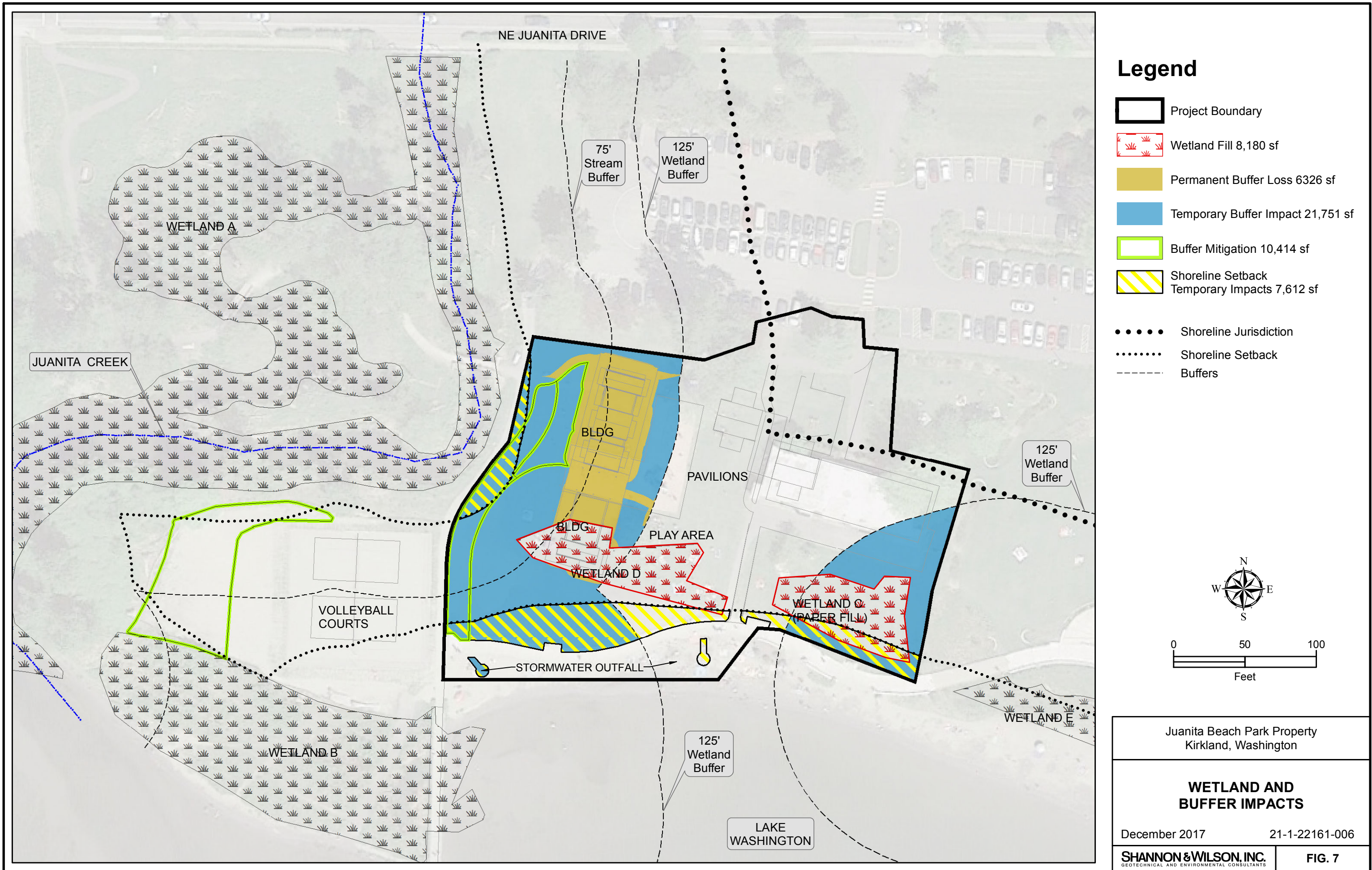


PROPOSED CONDITIONS



Juanita Beach Park Property Kirkland, Washington	
SITE PLAN BEFORE AND AFTER	
December 2017	21-1-22161-006
SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS	FIG. 6

Filename: T:\21-122161_Juanita_Beach_Park_Bathhouse\AV_mxd\FIG-1_IMPACTS_MAP.mxd Date: 12/5/2017 btl



WETLAND ENHANCEMENT PLANT SCHEDULE

Symbol	Common Name	Scientific Name	Size/Condition	Spacing ¹	Quantity ²
Emergents					
*	Slough sedge	Carex obnupta	Plugs	2-ft O.C. in select areas ³	200
*	Small-fruited bulrush	Scirpus microcarpus			104
Shrubs					
	Red-osier dogwood	Cornus sericea	1-Gallon Container	6-ft O.C.	34
	Black twinberry	Lonicera involucrata			34
	Salmonberry	Rubus spectabilis			34
	Pea-fruit rose	Rosa pisocarpa			34
	Sitka willow	Salix sitchensis	6-Foot Stakes/Poles		34
Trees					
	Pacific willow	Salix lucida	6-Foot Stakes/Poles	4-ft O.C.	12
	Western redcedar	Thuja plicata	1-Gallon Container	12-ft O.C. ⁴	11
	Sitka spruce	Picea sitchensis			11

- 1 Place in random, natural clusters (see Typical). Spacing is cumulative on center (O.C.) spacing.
- 2 Quantities based on a total planting area of 4,866 square feet.
- 3 Unlike shrubs and trees, emergent plugs will not be placed over the entire site, but will be placed in patches
- 4 Conifers will be field placed in higher elevation areas to avoid summer inundation.

INSTALLATION NOTES

PRIOR TO THE START OF MITIGATION WORK, THE BIOLOGIST WILL USE FLAGGING OR STAKES TO IDENTIFY IN THE FIELD THE LOCATIONS OF THE PROPOSED MITIGATION AREAS.

INSTALL EROSION CONTROL BEST MANAGEMENT PRACTICES (BMPS) AS NEEDED AND PROTECT EXISTING NATIVE WOODY VEGETATION IN AND ADJACENT TO THE PLANTING AREAS. EARTH DISTURBANCE SHOULD BE MINIMIZED TO THE EXTENT POSSIBLE TO AVOID DAMAGING EXISTING TREE ROOTS IN THE AREA.

WITH THE ASSISTANCE OF THE BIOLOGIST, INVASIVE SPECIES SHALL BE IDENTIFIED FOR REMOVAL. TO AVOID IMPACTING THE BIRD NESTING SEASON AND HIGH WATER LEVELS IN THE LAKE, INVASIVE SPECIES REMOVAL SHALL OCCUR BETWEEN OCTOBER 15 AND MARCH 1.

REMOVE EXISTING NON-NATIVE INVASIVE SPECIES SUCH AS HIMALAYAN BLACKBERRY, ENGLISH IVY, ENGLISH HOLLY, AND BAMBOO FROM THE ENHANCEMENT AREA USING A COMBINATION OF GRUBBING AND HAND PULLING/CUTTING, DEPENDING ON SIZE OF INDIVIDUALS. ENGLISH IVY VINES GROWING ON TREES SHALL BE CUT AT SHOULDER HEIGHT AND ALL ROOTS AND STEMS BELOW THE CUT AND ALONG THE GROUND SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF. HIMALAYAN BLACKBERRY ROOTS SHALL BE GRUBBED OUT. GOLDEN AND PURPLE LOOSESTRIFE SHALL BE HAND PULLED. GRASP THE BASE OF THE PLANT AND PULL SLOWLY

WITH STEADY PRESSURE TO RELEASE THE ROOTS FROM THE SOIL. OLDER PLANTS WITH LARGER ROOTS CAN BE EASED OUT WITH A GARDEN FORK. REMOVE AS MUCH OF THE ROOT SYSTEM AS POSSIBLE, BECAUSE BROKEN ROOTS MAY SPROUT NEW PLANTS. IF THE PLANTS ARE IN FLOWER OR SEED, CUT OFF AND BAG ALL FLOWER STALKS AND SEED HEADS BEFORE PULLING TO PREVENT SEED DISPERSAL. ALL LOOSESTRIFE PLANT PARTS, INCLUDING FLOWERS, SEED HEADS, STEMS, LEAVES AND ROOTS, MUST BE SECURELY BAGGED AND DISCARDED IN THE TRASH OR TAKEN TO A TRANSFER STATION.

INVASIVE SPECIES SHOULD BE DISPOSED OF WHERE THEY CANNOT REESTABLISH IN CRITICAL AREAS OR BUFFERS. CARE SHALL BE TAKEN DURING INVASIVE SPECIES REMOVAL TO PRESERVE NATIVE TREES AND SHRUBS.

AFTER OTHER INVASIVE SPECIES ARE COMPLETELY REMOVED FROM THE SITE, REMAINING REED CANARYGRASS WITHIN THE MITIGATION AREA SHALL BE MOWED TO GROUND LEVEL. IF PLANTING DOES NOT OCCUR PRIOR TO MARCH 1, NEW REED CANARYGRASS GROWTH SHALL BE MOWED AGAIN WITH A HAND-HELD GRASS TRIMMER PRIOR TO PLANTING. HIGH WATER LEVELS IN LAKE WASHINGTON FOLLOWING MARCH 1 WILL PRECLUDE THE USE OF WHEELED OR TRACKED EQUIPMENT IN THE WETLAND MITIGATION AREA.

PROCURE PLANTS AND STORE PROPERLY. PLANT MATERIAL WILL BE NATIVE TO THE PACIFIC NORTHWEST AND FROM PLANT

STOCK GENOMES FROM WESTERN WASHINGTON. BIOLOGIST SHALL REVIEW PLANT MATERIAL AND PLANT LAYOUT PRIOR TO PLANTING. EACH PLANT SHALL BE LOOSELY FLAGGED FOR EASY IDENTIFICATION DURING FUTURE MONITORING VISITS.

MULCH THE MITIGATION AREAS WITH 6 INCHES OF WOOD CHIPS TO DISCOURAGE WEED ESTABLISHMENT. HAND-DIG CIRCULAR PLANT PITS; TAKE CARE TO AVOID CUTTING THROUGH EXISTING NATIVE TREE ROOTS. INSTALL PLANTS BY HAND IN THE PLANTING AREAS IN NATURAL, RANDOM CLUSTERS. BACKFILL WITH NATIVE SOIL THAT HAS BEEN MIXED WITH 3 INCHES OF COMPOST. PLANTING SHOULD OCCUR BETWEEN OCTOBER 15 AND APRIL 1 TO TAKE ADVANTAGE OF COOL TEMPERATURES, PRECIPITATION, AND LOW LAKE LEVELS.

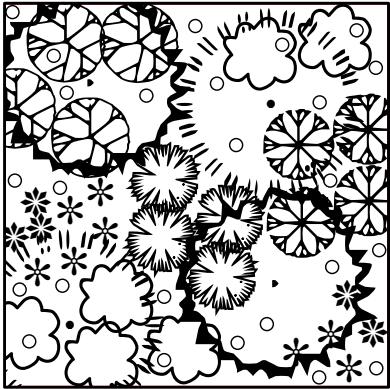
WATER PLANTS THOROUGHLY AFTER PLANTING TO AVOID CAPILLARY STRESS. PLANTED AREAS SHALL BE WATERED WITH APPROXIMATELY 1 INCH OF WATER IMMEDIATELY AFTER PLANTING.

REMOVE CONSTRUCTION DEBRIS AND ANY OTHER UNNATURAL REFUSE. REMOVE BMPS AFTER SITE IS STABILIZED.

LANDSCAPER SHALL SUBMIT COPIES OF THE PLANTING INVOICES SHOWING PLANTED SPECIES AND QUANTITIES.

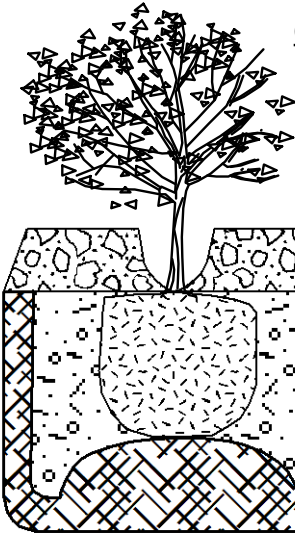
LANDSCAPER SHALL REPLACE ALL PLANT MORTALITIES AND PERFORM MAINTENANCE FOR ONE YEAR AFTER INSTALLATION.

WETLAND LAYOUT TYPICAL



0 5 10
Feet

CONTAINER DETAIL (NTS)

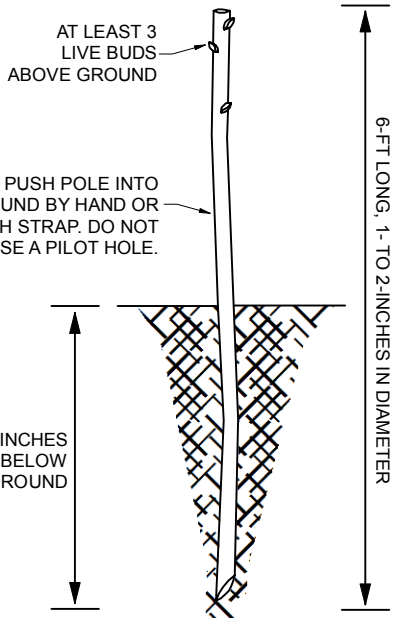


APPLY 6-INCHES OF MULCH. COMPOSTED HOG FUEL OR SIMILAR. KEEP MULCH AWAY FROM PLANT STEMS TO PREVENT ROT.

DIG CIRCULAR PITS WITH VERTICAL SIDES. INSTALL PLANT LEVEL WITH NATIVE GROUND SURFACE.

BACKFILL WITH NATIVE SOIL MIXED WITH 3 INCHES OF COMPOST.

STAKE/POLE DETAIL (NTS)



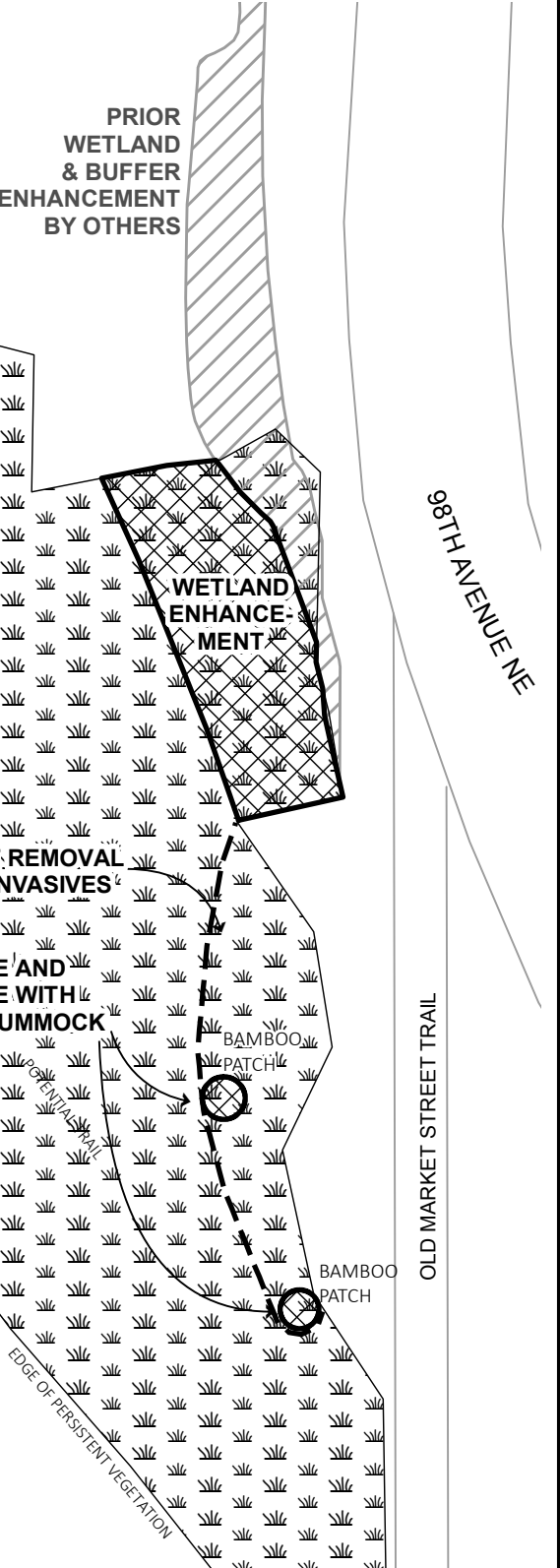
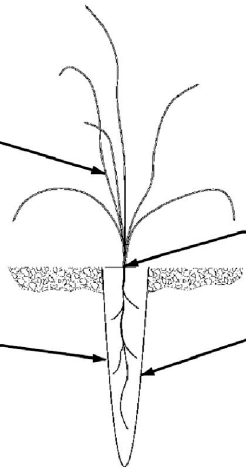
-  Wetland Enhancement (4,866 sf)
-  Existing Wetland
-  Prior Wetland & Buffer Enhancement by Others

PLUG DETAIL (NTS)

Avoid breaking or burying top growth.

Dig hole w/ dibble, small shovel, or trowel to full root depth. Place plant so roots are fully extended into planting hole. Do not force roots into too small or shallow a planting hole.

0 30 60
Feet



Juanita Beach Park Property
Kirkland, Washington

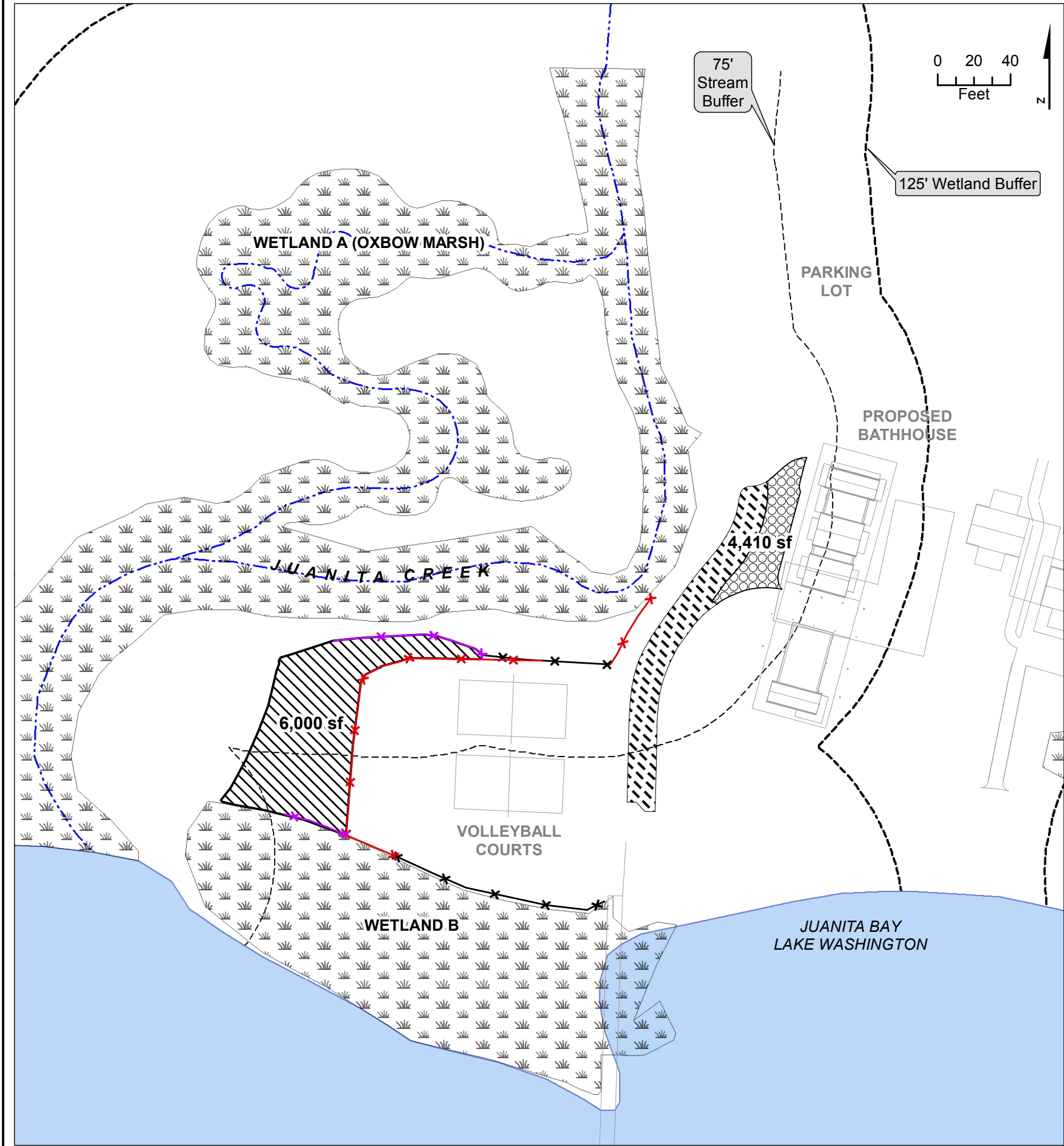
WETLAND MITIGATION
PLAN SHEET

December 2017

21-1-22161-006

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 8



INSTALLATION NOTES

PRIOR TO THE START OF MITIGATION WORK, THE BIOLOGIST WILL USE FLAGGING OR STAKES TO IDENTIFY IN THE FIELD THE LOCATIONS OF THE PROPOSED MITIGATION AREAS.

INSTALL EROSION CONTROL BEST MANAGEMENT PRACTICES (BMPS) AS NEEDED AND PROTECT EXISTING NATIVE WOODY VEGETATION IN AND ADJACENT TO THE PLANTING AREAS. EARTH DISTURBANCE SHOULD BE MINIMIZED TO THE EXTENT POSSIBLE TO AVOID DAMAGING EXISTING TREE ROOTS IN THE AREA.

WITH THE ASSISTANCE OF THE BIOLOGIST, INVASIVE SPECIES SHALL BE IDENTIFIED FOR REMOVAL.

REMOVE EXISTING NON-NATIVE INVASIVE SPECIES SUCH AS HIMALAYAN BLACKBERRY, ENGLISH IVY, AND ENGLISH HOLLY FROM THE ENHANCEMENT AREA USING A COMBINATION OF GRUBBING AND HAND PULLING/CUTTING, DEPENDING ON SIZE OF INDIVIDUALS.

PROCURE PLANTS AND STORE PROPERLY. PLANT MATERIAL WILL BE NATIVE TO THE PACIFIC NORTHWEST AND FROM PLANT STOCK GENOMES FROM WESTERN WASHINGTON. BIOLOGIST SHALL REVIEW PLANT MATERIAL AND PLANT LAYOUT PRIOR

TO PLANTING. EACH PLANT SHALL BE LOOSELY FLAGGED FOR EASY IDENTIFICATION DURING FUTURE MONITORING VISITS.

IN THE FLAT, SANDY PORTION OF THE BUFFER MITIGATION AREA ADJACENT TO THE EXISTING VOLLEYBALL COURT, 4 INCHES OF COMPOST SHALL BE ADDED AND MIXED INTO THE UPPER 12 INCHES OF SOIL. 4 INCHES OF COMPOST SHALL BE TILLED INTO UPPER 8 INCHES OF SOIL IN THE BUFFER ENHANCEMENT AREA BETWEEN THE PROPOSED BATHHOUSE AND EXISTING TRAIL.

MULCH THE MITIGATION AREA WITH 6 INCHES OF WOOD CHIPS TO DISCOURAGE WEED ESTABLISHMENT. HAND-DIG CIRCULAR PLANT PITS; TAKE CARE TO AVOID CUTTING THROUGH EXISTING NATIVE TREE ROOTS. INSTALL PLANTS BY HAND IN THE PLANTING AREAS IN NATURAL, RANDOM CLUSTERS, EXCEPT THAT ROSE SHALL BE CONCENTRATED ALONG FENCE LINE TO DISCOURAGE ACCESS. BACKFILL WITH NATIVE SOIL THAT HAS BEEN MIXED WITH 3 INCHES OF COMPOST. PLANTING SHOULD OCCUR BETWEEN SEPTEMBER 15 AND JANUARY 15 TO TAKE ADVANTAGE OF COOL TEMPERATURES AND PRECIPITATION.

WATER PLANTS THOROUGHLY AFTER PLANTING TO AVOID CAPILLARY STRESS. PLANTED AREAS SHALL BE WATERED WITH APPROXIMATELY 1 INCH OF WATER IMMEDIATELY AFTER PLANTING.

INSTALL WIRE FENCING AROUND EACH PLANT INSTALLATION, AROUND PLANTED CLUSTERS, OR AROUND THE WHOLE MITIGATION AREA WEST OF THE VOLLEYBALL COURTS TO PROTECT FROM BEAVER HERBIVORY. INSTALL SPLIT-RAIL FENCING AS SHOWN ON PLAN.

REMOVE CONSTRUCTION DEBRIS AND ANY OTHER UNNATURAL REFUSE. REMOVE BMPS AFTER SITE IS STABILIZED.

LANDSCAPER SHALL SUBMIT COPIES OF THE PLANTING INVOICES SHOWING PLANTED SPECIES AND QUANTITIES.

LANDSCAPER SHALL REPLACE ALL PLANT MORTALITIES AND PERFORM MAINTENANCE FOR ONE YEAR AFTER INSTALLATION.

JBPB - ARCH SITE new pavillions.dwg Polyline

MitigationFence

Name

✖

 Remove Existing Fence

✖

 New Split-Rail Fence

✖

 Existing Fence

BUFFER MITIGATION

Buffer Planting Area (See Shannon and Wilson Plant Schedule on Figure 9, Sheet 2)

Wetter Area Native Mix (See MIG | SvR Plant Schedule on Figure 9, Sheet 2)

Woodland Area Native Mix (See MIG | SvR Plant Schedule on Figure 9, Sheet 2)

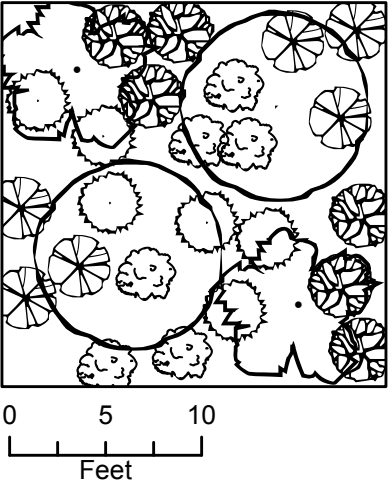


SHANNON & WILSON BUFFER ENHANCEMENT PLANT SCHEDULE

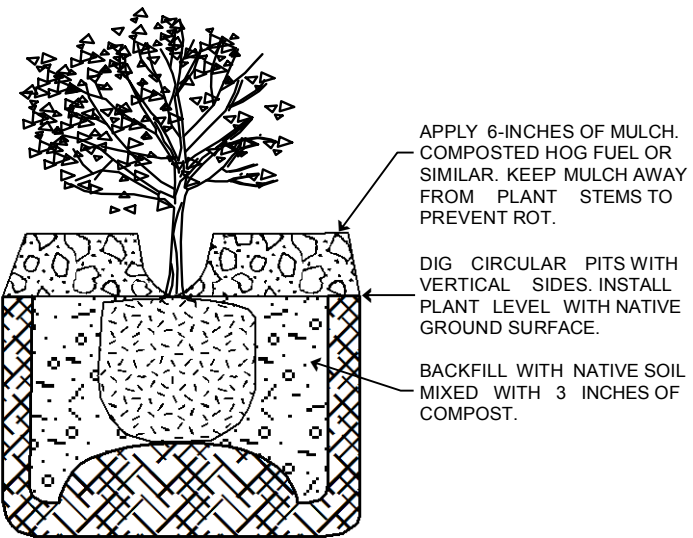
Symbol	Common Name	Scientific Name	Size/Condition	Spacing ¹	Quantity ²
Shrubs					
	Red-flowering Currant	Ribes sanguineum	1-Gallon Container	4-ft O.C.	94
	Osoberry	Oemleria cerasiformis			94
	Red Elderberry	Sambucus racemosa			94
	Vine Maple	Acer circinatum			94
Trees					
	Cascara	Rhamnus purshiana	1-Gallon Container	10-ft O.C.	30
	Douglas Fir	Psuedotsuga menziesii			30

1 Place in random, natural clusters (see Typical). Spacing is cumulative on center (O.C.) spacing.
2 Quantities based on a total planting area of 6,000 square feet.

WETLAND BUFFER PLANT
TYPICAL



CONTAINER DETAIL (NTS)



MIG | SvR

PLANT SCHEDULE NWN=NORTHWEST NATIVE OR CULTIVAR, DT=DROUGHT TOLERANT, EG = EVERGREEN, <3'HT = LESS THAN 3' HEIGHT

SYM	NWN	DT	EG	<3' HT	BOTANICAL NAME	COMMON NAME	SIZE / SPACING
-----	-----	----	----	--------	----------------	-------------	----------------

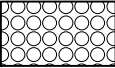
NATIVE PLANT MIX PLANTING ZONE



WETTER AREA NATIVE MIX

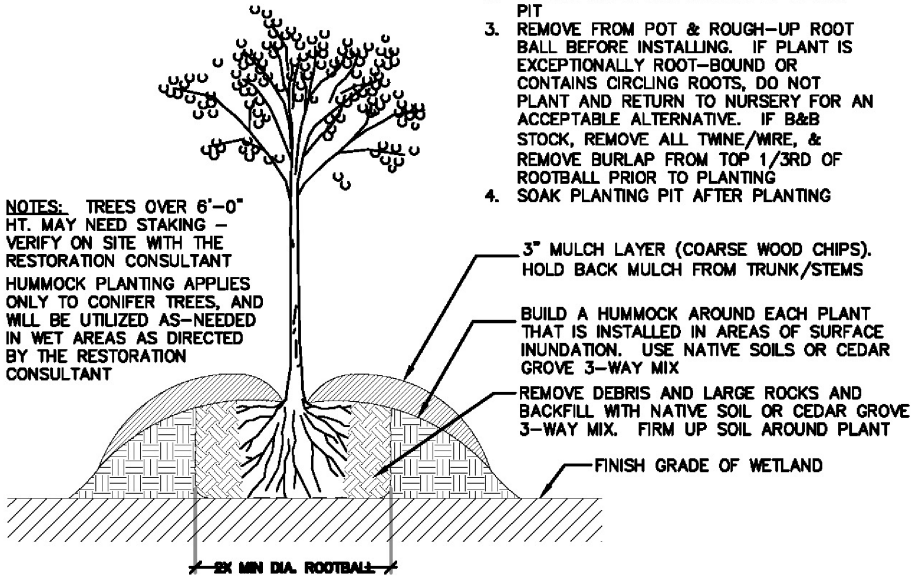
NWN			EG	<3' HT	IRIS TENAX	OREGON IRIS	1 GAL. / 18" O.C.
NWN					CORNUS SERICEA	REDTIG DOGWOOD	3 GAL. / 4' O.C.
NWN	DT		EG		MYRICA GALE	SWEET GALE	1 GAL. / 30" O.C.
NWN					RUBUS SPECTABILIS	SALMONBERRY	3 GAL. / 4' O.C.
NWN			EG		CAREX OBNUPTA	SLOUGH SEDGE	10 CU. IN. PLUG. / 9" O.C.
NWN			EG	<3' HT	JUNCUS ENSIFOLIUS	DAGGER-LEAF RUSH	10 CU. IN. PLUG. / 9" O.C.
NWN			EG	<3' HT	JUNCUS PATENS	COMMON RUSH	10 CU. IN. PLUG. / 9" O.C.

WOODLAND AREA NATIVE MIX



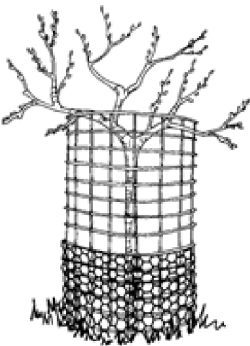
NWN				<3' HT	ALLIUM CERNUUM	NODDING ONION	4" POT / 12" O.C.
NWN	DT		EG		VARIES	GAULTHERIA SHALLON	3 GAL. / 36" O.C.
NWN	DT		EG	<3' HT	MAHONIA NERVOSA	OREGON GRAPE	1 GAL. / 18" O.C.
NWN					PHYSOCARPUS CAPITATUS	PACIFIC NINE BARK	5 GAL. / 6' O.C.
NWN	DT		EG	<3' HT	POLYSTICHUM MUNITUM	WESTERN SWORD FERN	1 GAL. / 30" O.C.
NWN					RIBES SANGUINEUM	FLOWERING RED CURRANT	3 GAL. / 4' O.C.
NWN	DT				SYMPHORICARPOS ALBUS	SNOWBERRY	1 GAL. / 4' O.C.
NWN				<3' HT	TELLIMA GRANDIFLORA	FRINGE CUP	1 GAL. / 18" O.C.
NWN					VACCINIUM OVALIFOLIUM	OVAL LEAVED BLUEBERRY	1 GAL. / 4' O.C.
NWN			EG		VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	1 GAL. / 4' O.C.
NWN	DT				VIBURNUM ELLIPTICUM	OREGON VIBURNUM	5 GAL. / 6' O.C.

CONNIFER HUMMOCK DETAIL (NTS)



- NOTES:
1. PLANTING PIT SHALL NOT BE LESS THAN (2) TIMES THE WIDTH OF THE ROOT BALL DIA.
 2. LOOSEN SIDES AND BOTTOM OF PLANT PIT
 3. REMOVE FROM POT & ROUGH-UP ROOT BALL BEFORE INSTALLING. IF PLANT IS EXCEPTIONALLY ROOT-BOUND OR CONTAINS CIRCLING ROOTS, DO NOT PLANT AND RETURN TO NURSERY FOR AN ACCEPTABLE ALTERNATIVE. IF B&B STOCK, REMOVE ALL TWINE/WIRE, & REMOVE BURLAP FROM TOP 1/3RD OF ROOTBALL PRIOR TO PLANTING
 4. SOAK PLANTING PIT AFTER PLANTING

BEAVER FENCE DETAILS (NTS)



BEAVER FENCE SHALL BE AT LEAST 4 FEET HIGH, PLACED FAR ENOUGH OUT FROM THE PLANT TO PREVENT BEAVER FROM CAUSING DAMAGE, AND BE FIRMLY STAKED TO THE GROUND. PRIOR TO INSTALLATION, REMOVE ALL GRASS AND WEEDS WITHIN THE BARRIER. ADD MULCH TO REDUCE MAINTENANCE NEEDS. AN OPTIONAL 2-FOOT HIGH BAND OF CHICKEN WIRE CAN BE ADDED TO THE BOTTOM TO EXCLUDE SMALL HERBIVORES, IF NEEDED.

Juanita Beach Park Property
Kirkland, Washington

WETLAND BUFFER MITIGATION
PLAN SHEET

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SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 9
SHEET 2 OF 2

APPENDIX A

**JUANITA PARK SIDEWALK CAPITAL IMPROVEMENT PROJECT
WETLAND AND LAKESHORE DELINEATION REPORT
(THE WATERSHED COMPANY, 2016)**

May 13, 2016

David Barnes
City of Kirkland Planning Department
123 5th Avenue
Kirkland, WA 98033

**Re: Juanita Park Sidewalk CIP Project, Wetland and Lakeshore
Delineation Report**

The Watershed Company Reference Number: 140622.64

Dear David:

On April 4 and May 4, 2016, I visited the 98th Street NW right-of-way near Juanita Park to conduct a wetland delineation and subsequent lakeshore delineation study. The study is required as part of the proposed sidewalk improvements for the above-referenced project. This letter summarizes the findings of this study and details applicable federal, state, and local regulations. The following attachments are included:

- Wetland Delineation Sketch
- Wetland Determination Data Forms
- Wetland Rating Form

Methods

Public-domain information on the subject property was reviewed for this delineation study. These sources include USDA Natural Resources Conservation Service Soil maps, U.S. Fish and Wildlife Service National Wetland Inventory maps, Washington Department of Fish and Wildlife interactive mapping programs (PHS on the Web), and King County's GIS mapping website (iMAP).

The study area was evaluated for wetlands using methodology from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (Regional Supplement) (US Army Corps of Engineers [Corps] May 2010). The wetland boundary was determined on the basis of an examination of vegetation, soils, and hydrology. Areas meeting the criteria set forth in the Regional Supplement were determined to be wetland. Soil, vegetation, and hydrologic parameters were sampled at several locations along the wetland boundary to make the determination. Data points on-site are marked with yellow- and black-striped flags. Data were recorded at two of these locations.

Delineated wetlands were classified using the City of Kirkland's *Wetland Field Data Form* (Rating System). On-site portions of Wetland A is marked with six pink- and black-striped flags. Wetland areas outside of the right-of-way were not delineated but were approximated on the attached Wetland Delineation Sketch.

The ordinary high water mark of Lake Washington was determined based on the definition provided by the Washington Department of Fish and Wildlife and WAC 220-110-020(69). The OHWM is located by examining the bed and bank physical characteristics and vegetation to ascertain the water elevation for mean annual floods. Areas meeting the definition were determined to be the OHWM and flagged. The distance from the OHWM to the project area was measured using a 100-foot field tape.

Findings

The site is located adjacent to Juanita Bay on the west side of 98th Avenue NE. The study area extends from the parking lot on Parcel #179150031 south approximately 300 feet to the connection with the existing, widened sidewalk. The study area includes the fill slope along the western edge of the existing sidewalk, then transitions into a large wetland complex associated with Lake Washington. Non-wetland vegetation generally includes black cottonwood with an understory dominated by Himalayan blackberry.

Wetland A

Wetland A is contiguous to Lake Washington, is well over 10-acres in size, and contains more than three Cowardin wetland classes. According NWI maps and field observations, those Cowardin classes include palustrine forested seasonally flooded, palustrine scrub-shrub seasonally flooded, palustrine scrub-shrub semi-permanently flooded, and palustrine emergent temporarily flooded. Areas in the vicinity of the study area are dominated by black cottonwood with a dense reed canarygrass monoculture and occasional patches of Douglas spirea comprising the understory. The soil was saturated at the surface, and the water table was present four inches below the surface at the time of the inspection. Hydrology is provided by the high groundwater, which is partially influenced by water levels in Lake Washington.

The boundary of Wetland A parallels the existing sidewalk at the southern end of the study area for approximately 100 feet, after which point, the boundary shifts towards the west and northwest, leaving the study area.

Lake Washington

The Lake Washington shoreline encroaches to within approximately 35 feet of the project area at its closest point (near the southern extent of the proposed improvements). Much of Wetland A, as described above, is located below the OHWM of the lake. Lake Washington is classified as a shoreline of the state.

Local Regulations

Wetlands associated with shorelines of the state are regulated under the Kirkland Shoreline Master Program (SMP). Under the SMP, wetlands are classified as one of four types based on the 2004 Ecology Western Washington Wetland Rating System or *“as amended.”* The 2004 Rating System has been replaced by an updated 2014 Rating System, which is now applied to all shoreline-associated wetlands in Kirkland. According to the 2014 Rating System, Wetland A received eight points for water quality functions, six points for hydrology functions, and seven points for wildlife habitat functions, for a total of 21 points. This score qualifies Wetland A as a Category II wetland. Wetland buffers under the SMP are determined based on a combination of the wetland category and the habitat score. Since the SMP references habitat scores based on the 2004 Rating System, the habitat scores must be converted using the conversion table provided by Ecology. A habitat score of five to seven points (2014 Rating System) is equivalent to a habitat score of 20-28 points (2004 Rating System). Based on this conversion, Wetland A is required to have a standard buffer width of 125 feet (KZC 83.500.4).

The proposed sidewalk improvements, which include widening the current five-foot sidewalk to ten feet, would necessitate wetland buffer impacts throughout most of the project area. Most of the area that would be impacted is dominated by invasive species, including Himalayan blackberry, reed canarygrass, and English holly. A few large black cottonwood trees are located in the vicinity of the project area, and it would be necessary to avoid those trees to the greatest extent feasible. Substantial opportunity exists for buffer mitigation in the wetland buffer areas west of the project area. Removal of the dense invasive species monocultures and replacement with native plants would provide a functional improvement for the wetland buffer areas. Appropriate native species for the wetland buffer areas include osoberry, snowberry, red elderberry, oceanspray, and baldhip rose. Shrubs would need to be planted densely (four feet on-center) to compete with re-emerging invasive species. Western red cedar could also be installed to add a coniferous component to the buffer.

Since the proposed sidewalk improvements are located within shoreline jurisdiction, the project must comply with the regulations of the Kirkland SMP.

State and Federal Regulations

Wetlands are also regulated by the Corps under section 404 of the Clean Water Act. Any filling of Waters of the U.S., including wetlands (except isolated wetlands), would require notification and permits from the Corps. Note that a new Clean Water Rule for wetlands and other Waters of the U.S. went into effect in August 2015; however, the rule was recently “stayed” nationwide by the 6th Circuit Court due to pending litigation. Therefore, the prior rule is in effect until further notice. Wetland A is not isolated

because of surface water connections Lake Washington. Federally permitted actions that could affect endangered species (i.e. salmon or bull trout) may also require a biological assessment study and consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service. Application for Corps permits may also require an individual 401 Water Quality Certification and Coastal Zone Management Consistency determination from Ecology and a Cultural Resource Study in accordance with Section 106 of the National Historic Preservation Act.

In general, neither the Corps nor Ecology regulates wetland buffers, unless direct impacts are proposed. When direct impacts are proposed, mitigated wetlands may be required to employ buffers based on Corps and Ecology joint regulatory guidance.

Disclaimer

The information contained in this letter or report is based on the application of technical guidelines currently accepted as the best available science and in conjunction with the manuals and criteria outlined in the methods section. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available to us at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, State and Federal regulatory authorities. No other warranty, expressed or implied, is made.

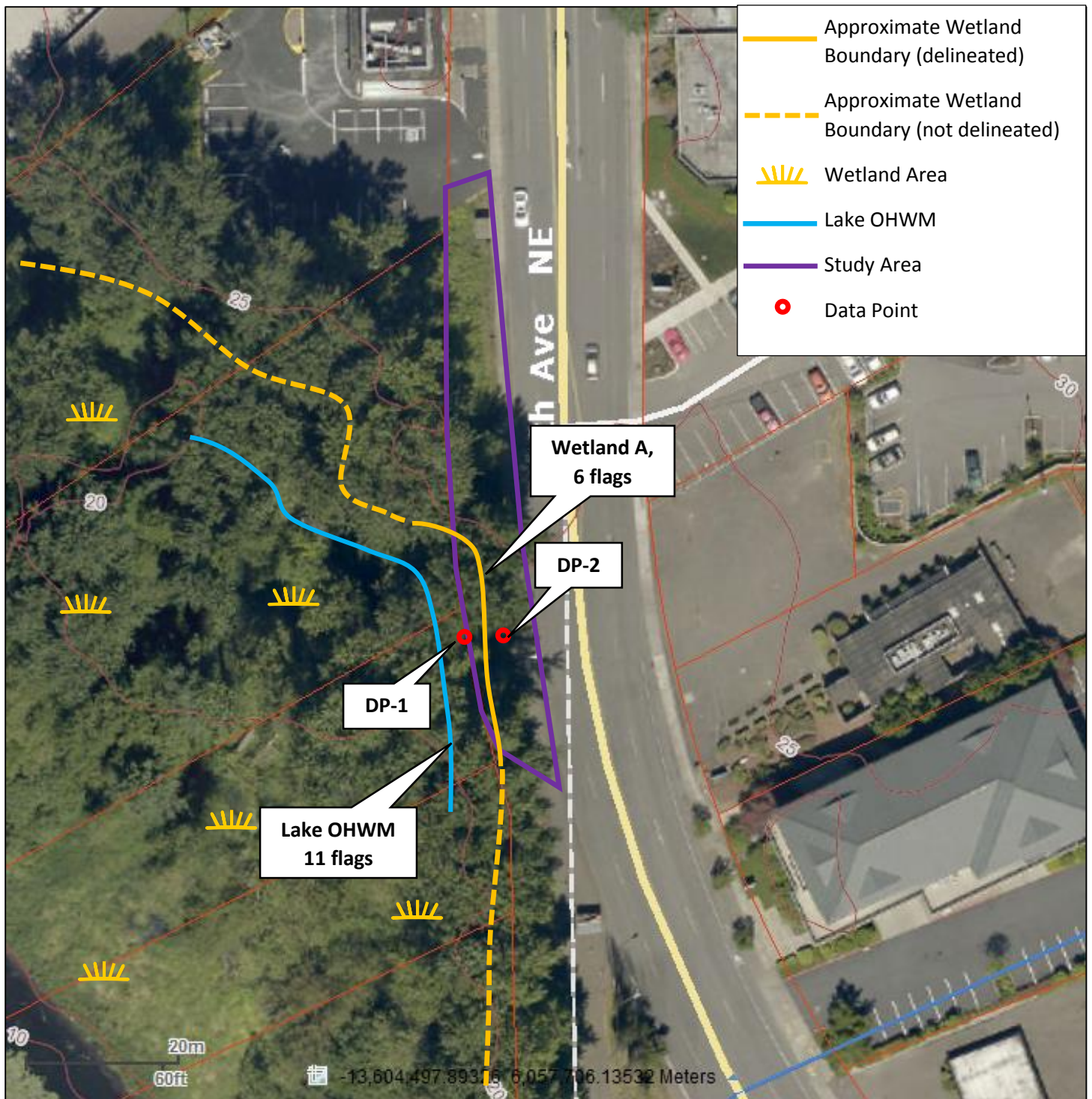
Please call if you have any questions or if we can provide you with any additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read 'R. Kahlo', is positioned above the printed name.

Ryan Kahlo, PWS
Ecologist

Enclosures



Note: Areas depicted have not been surveyed. All locations are approximate and not to scale.

Wetland and Lakeshore Delineation Study
 Juanita Park 100th Avenue NE Sidewalk Improvements
 Prepared for David Barnes, City of Kirkland
 April 8, 2016, revised May 5, 2016
 TWC Project #140622.64

Wetland boundary is marked with pink- and black-striped flags.
 Data points are marked with yellow-and black-striped flags

Project Site: Juanita Sidewalk Improvements 98th Ave NE		Sampling Date: 4/4/2016
Applicant/Owner: City of Kirkland		Sampling Point: DP- 1
Investigator: Kahlo, R		City/County: Kirkland / King Co.
Sect., Township, Range: S 31 T 26N R 5E		State: WA
Landform (hillslope, terrace, etc): Lake fringe	Slope (%): 1	Local relief (concave, convex, none): concave
Subregion (LRR): A	Lat:	Long:
Soil Map Unit Name: Indianola loamy sand, 0-5% slopes		NWI classification: PSSC
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No		
Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ significantly disturbed?		
Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ naturally problematic		
(If needed, explain any answers in Remarks.)		

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	
Hydric Soils Present?	Yes ☒ No ☐	Is the Sampling Point within a Wetland? Yes ☒ No ☐
Wetland Hydrology Present?	Yes ☒ No ☐	

 Remarks: [Click here to enter text.](#)
VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. Populus balsamifera	100	Yes	FAC	Number of Dominant Species that are OBL, FACW, or FAC:	2 (A)
2.				Total Number of Dominant Species Across All Strata:	3 (B)
3.				Percent of Dominant Species that are OBL, FACW, or FAC:	67 (A/B)
4.					
				= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)					
1. Phalaris arundinacea	100	Yes	FACW	Prevalence Index Worksheet	
2.				Total % Cover of	
3.				Multiply by	
4.				OBL species	x 1 =
5.				FACW species	x 2 =
				FAC species	x 3 =
				FACU species	x 4 =
				UPL species	x 5 =
				Column totals	(A) (B)
				Prevalence Index = B / A =	
Herb Stratum (Plot size: 1m diam.)					
1.				Hydrophytic Vegetation Indicators	
2.				☒ Dominance test is > 50%	
3.				☐ Prevalence test is ≤ 3.0 *	
4.				Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)	
5.				☐ Wetland Non-Vascular Plants *	
6.				☐ Problematic Hydrophytic Vegetation * (explain)	
7.					
8.					
9.					
10.					
11.					
				* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
Woody Vine Stratum (Plot size:)					
1. Rubus armeniacus	10	Yes	FACU	Hydrophytic Vegetation Present? Yes ☒ No ☐	
2.					
				= Total Cover	
% Bare Ground in Herb Stratum:					
Remarks:					

SOIL

Sampling Point – DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	10YR 2/2	98	10YR 3/4	2	C	M	Silt clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)

☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³

☐ 2cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Other (explain in remarks)

³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric soil present? Yes ☒ No ☐
---	---

Remarks: **Percent RMF does not satisfy F6, but aquic moisture regime is present. Very high water table well into the growing season.**

HYDROLOGY

Wetland Hydrology Indicators: <i>Primary Indicators (minimum of one required: check all that apply):</i> ☐ Surface water (A1) ☒ High Water Table (A2) ☒ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Surface Soil Cracks (B6) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9) ☐ Salt Crust (B11) ☐ Aquatic Invertebrates (B13) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Stunted or Stressed Plants (D1) (LRR A) ☐ Other (explain in remarks)				<i>Secondary Indicators (2 or more required):</i> ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A & 4B) ☐ Drainage Patterns (B10) ☐ Dry-Season Water Table (C2) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Raised Ant Mounds (D6) (LRR A) ☐ Frost-Heave Hummocks			
---	--	--	--	---	--	--	--

Field Observations Surface Water Present? Yes ☐ No ☒ Water Table Present? Yes ☒ No ☐ Saturation Present? Yes ☒ No ☐ (includes capillary fringe) Depth (in): _____ Depth (in): 4 Depth (in): 0	Wetland Hydrology Present? Yes ☒ No ☐
---	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Project Site: Juanita Sidewalk Improvements 98th Ave NE		Sampling Date: 4/4/2016
Applicant/Owner: City of Kirkland		Sampling Point: DP- Click here to enter text.
Investigator: Kahlo, R		City/County: Kirkland / King Co.
Sect., Township, Range: S 31 T 26N R 5E		State: WA
Landform (hillslope, terrace, etc): Lake fringe	Slope (%): 20	Local relief (concave, convex, none): concave
Subregion (LRR): A	Lat:	Long:
Soil Map Unit Name: Indianola loamy sand, 0-5% slopes		Datum:
Soil Map Unit Name: Indianola loamy sand, 0-5% slopes		NWI classification: PSSC
Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No		(If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No		
Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ significantly disturbed?		
Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ naturally problematic		
(If needed, explain any answers in Remarks.)		

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampling Point within a Wetland?	Yes ☐ No ☒
Hydric Soils Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Click here to enter text.			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. Populus balsamifera	100	Yes	FAC	Number of Dominant Species that are OBL, FACW, or FAC:	2 (A)
2.				Total Number of Dominant Species Across All Strata:	2 (B)
3.				Percent of Dominant Species that are OBL, FACW, or FAC:	100 (A/B)
4.					
_____ = Total Cover					
Sapling/Shrub Stratum (Plot size: 3m diam.)				Prevalence Index Worksheet	
1.				Total % Cover of	
2.				Multiply by	
3.				OBL species	x 1 =
4.				FACW species	x 2 =
5.				FAC species	x 3 =
_____ = Total Cover				FACU species	x 4 =
				UPL species	x 5 =
				Column totals	(A) (B)
Herb Stratum (Plot size: 1m diam.)				Prevalence Index = B / A =	
1. Phalaris arundinacea	100	Yes	FACW		
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
_____ = Total Cover					
Woody Vine Stratum (Plot size:)				Hydrophytic Vegetation Indicators	
1.				☒ Dominance test is > 50%	
2.				☐ Prevalence test is ≤ 3.0 *	
_____ = Total Cover				Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)	
				☐ Wetland Non-Vascular Plants *	
				☐ Problematic Hydrophytic Vegetation * (explain)	
				* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
				Hydrophytic Vegetation Present? Yes ☒ No ☐	
% Bare Ground in Herb Stratum:					
Remarks:					

SOIL

Sampling Point – DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8	10YR 2/2	100					Sandy loam	
8-14	2.5Y 3/2	100					Loamy sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)

☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³

☐ 2cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Other (explain in remarks)
☐

³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric soil present? Yes ☐ No ☒
---	---

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: <i>Primary Indicators (minimum of one required: check all that apply):</i> ☐ Surface water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Surface Soil Cracks (B6) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9) ☐ Salt Crust (B11) ☐ Aquatic Invertebrates (B13) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Stunted or Stressed Plants (D1) (LRR A) ☐ Other (explain in remarks)				<i>Secondary Indicators (2 or more required):</i> ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A & 4B) ☐ Drainage Patterns (B10) ☐ Dry-Season Water Table (C2) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☒ FAC-Neutral Test (D5) ☐ Raised Ant Mounds (D6) (LRR A) ☐ Frost-Heave Hummocks			
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Field Observations Surface Water Present? Yes ☐ No ☒ Water Table Present? Yes ☐ No ☒ Saturation Present? Yes ☐ No ☒ (includes capillary fringe) Depth (in): _____ Depth (in): _____ Depth (in): _____	Wetland Hydrology Present? Yes ☐ No ☒
---	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland name or number: Wetland A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 2/10/2016

Rated by: Kahlo, R Trained by Ecology? ☒ Y ☐ N Date of training: 8/2014

HGM Class used for rating: Depressional

Wetland has multiple HGM classes? ☒ Y ☐ N

NOTE: Form is not complete without the figures requested (*figures can be combined*).

Source of base aerial photo/map: [Click here to enter text.](#)

OVERALL WETLAND CATEGORY (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

- ☐ **Category I** – Total score = 23 - 27
- ☒ **Category II** – Total score = 20 - 22
- ☒ **Category III** – Total score = 16 - 19
- ☐ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
<i>Circle the appropriate ratings</i>				
Site Potential	H <u>M</u> L	H <u>M</u> L	<u>H</u> M L	
Landscape Potential	<u>H</u> M L	<u>H</u> M L	H M <u>L</u>	
Value	<u>H</u> M L	H M <u>L</u>	<u>H</u> M L	TOTAL
Score Based on Ratings	8	6	7	21

**Score for each
function based
on three
ratings**
(*order of ratings
is not
important*)

9 = H,H,H

8 = H,H,M

7 = H,H,L

7 = H,M,M

6 = H,M,L

6 = M,M,M

5 = H,L,L

5 = M,M,L

4 = M,L,L

3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	☒

Wetland name or number: Wetland A

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	2
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	NA
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	2
Map of the contributing basin	D 4.3, D 5.3	3
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	6

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

☒ NO – go to 2

☐ YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine)

YES – Freshwater Tidal Fringe

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☒ NO – go to 3

☐ YES – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

☒ NO – go to 4

☐ YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),

☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

☐ The water leaves the wetland **without being impounded**.

☒ NO – go to 5

☐ YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

☐ The overbank flooding occurs at least once every 2 years.

Wetland name or number: Wetland A

☒ NO – go to 6

☐ YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☒ NO – go to 7

☐ YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☒ NO – go to 8

☐ YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

DEPRESSIONAL AND FLATS WETLANDS		
Water Quality Functions - Indicators that the site functions to improve water quality		
D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland: ☐ Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 ☐ Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☒ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing. points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions). ☐ Yes = 4 ☒ No = 0	0	
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): ☐ Wetland has persistent, ungrazed, plants > 95% of area points = 5 ☒ Wetland has persistent, ungrazed, plants > 1/2 of area points = 3 ☐ Wetland has persistent, ungrazed plants > 1/10 of area points = 1 ☐ Wetland has persistent, ungrazed plants < 1/10 of area points = 0	3	
D 1.4. Characteristics of seasonal ponding or inundation: <i>This is the area that is ponded for at least 2 months. See description in manual.</i> ☐ Area seasonally ponded is > ½ total area of wetland points = 4 ☒ Area seasonally ponded is > ¼ total area of wetland points = 2 ☐ Area seasonally ponded is < ¼ total area of wetland points = 0	2	
Total for D 1	Add the points in the boxes above	6

Rating of Site Potential If score is: ☐ 12-16 = H ☒ 6-11 = M ☐ 0-5 = L

Record the rating on the first page

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	☒ Yes = 1 ☐ No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	☒ Yes = 1 ☐ No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	☐ Yes = 1 ☒ No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source: Concentrations of water fowl, boat traffic	☒ Yes = 1 ☐ No = 0	1
Total for D 2	Add the points in the boxes above	3

Rating of Landscape Potential If score is: ☒ 3 or 4 = H ☐ 1 or 2 = M ☐ 0 = L

Record the rating on the first page

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	☒ Yes = 1 ☐ No = 0	1
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	☒ Yes = 1 ☐ No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (answer YES if there is a TMDL for the basin in which the unit is found)?	☒ Yes = 2 ☐ No = 0	2
Total for D 3	Add the points in the boxes above	4

Rating of Value If score is: ☒ 2-4 = H ☐ 1 = M ☐ 0 = L

Record the rating on the first page

DEPRESSIONAL AND FLATS WETLANDS**Hydrologic Functions** - Indicators that the site functions to reduce flooding and stream degradation**D 4.0. Does the site have the potential to reduce flooding and erosion?****D 4.1. Characteristics of surface water outflows from the wetland:**

- | | | |
|--|------------|---|
| ☐ Wetland is a depression or flat depression with no surface water leaving it (no outlet). | points = 4 | 0 |
| ☐ Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. | points = 2 | |
| ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. | points = 1 | |
| ☒ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing. | points = 0 | |

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*

- | | | |
|---|------------|---|
| ☐ Marks of ponding are 3 ft or more above the surface or bottom of outlet. | points = 7 | 5 |
| ☒ Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet. | points = 5 | |
| ☐ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet. | points = 3 | |
| ☐ The wetland is a "headwater" wetland. | points = 3 | |
| ☐ Wetland is flat but has small depressions on the surface that trap water. | points = 1 | |
| ☐ Marks of ponding less than 0.5 ft (6 in). | points = 0 | |

D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*

- | | | |
|--|------------|---|
| ☐ The area of the basin is less than 10 times the area of the unit. | points = 5 | 3 |
| ☒ The area of the basin is 10 to 100 times the area of the unit. | points = 3 | |
| ☐ The area of the basin is more than 100 times the area of the unit. | points = 0 | |
| ☐ Entire wetland is in the Flats class. | points = 5 | |

Lake Washington does not flood; so basin includes only the Forbes Creek basin.

Total for D 4

Add the points in the boxes above

8

Rating of Site Potential If score is: ☐ 12-16 = H ☒ 6-11 = M ☐ 0-5 = L

Record the rating on the first page

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges?	☒ Yes = 1 ☐ No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	☒ Yes = 1 ☐ No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	☒ Yes = 1 ☐ No = 0	1
Total for D 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: ☒ 3 = H ☐ 1 or 2 = M ☐ 0 = L

Record the rating on the first page

D 6.0. Are the hydrologic functions provided by the site valuable to society?**D 6.1. The unit is in a landscape that has flooding problems. Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.**

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):

- | | | |
|---|------------|---|
| • ☐ Flooding occurs in a sub-basin that is immediately down-gradient of unit. | points = 2 | 0 |
| • ☐ Surface flooding problems are in a sub-basin farther down-gradient. | points = 1 | |
| ☐ Flooding from groundwater is an issue in the sub-basin. | points = 1 | |
| ☒ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. | | |

Explain why: Lake Washington controlled by the locks. points = 0**D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?**☐ Yes = 1 ☒ No = 0

0

Total for D 6

Add the points in the boxes above

0

Rating of Value If score is: ☐ 2-4 = H ☐ 1 = M ☒ 0 = L

Record the rating on the first page

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | | |
|--|----------------------------------|---|
| ☒ Aquatic bed | 4 structures or more: points = 4 | 4 |
| ☒ Emergent | 3 structures: points = 2 | |
| ☒ Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: points = 1 | |
| ☒ Forested (areas where trees have > 30% cover) | 1 structure: points = 0 | |
| <i>If the unit has a Forested class, check if:</i> | | |
| ☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon | | |

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | | |
|---|-------------------------------------|-----------------|
| ☒ Permanently flooded or inundated | 4 or more types present: points = 3 | 3 |
| ☒ Seasonally flooded or inundated | 3 types present: points = 2 | |
| ☒ Occasionally flooded or inundated | 2 types present: points = 1 | |
| ☐ Saturated only | 1 type present: points = 0 | |
| ☒ Permanently flowing stream or river in, or adjacent to, the wetland | | |
| ☐ Seasonally flowing stream in, or adjacent to, the wetland | | |
| ☐ Lake Fringe wetland | | 2 points |
| ☐ Freshwater tidal wetland | | 2 points |

H 1.3. Richness of plant species

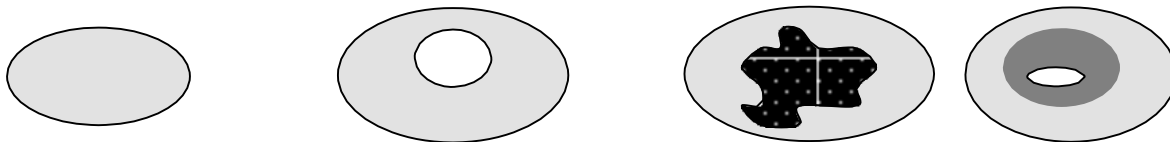
Count the number of plant species in the wetland that cover at least 10 ft².

*Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. **Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

- | | | |
|--|------------|---|
| If you counted: | points = 2 | 2 |
| ☒ > 19 species | | |
| ☐ 5 - 19 species | points = 1 | |
| ☐ < 5 species | points = 0 | |

H 1.4. Interspersion of habitats

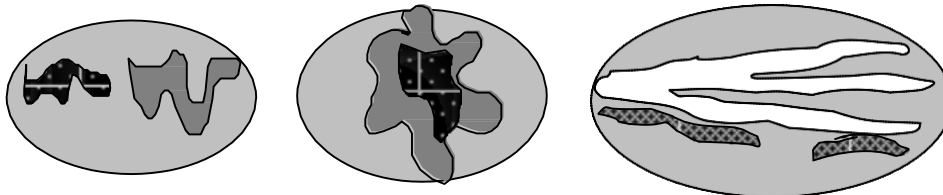
Decide from the diagrams below whether interspersions among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



☐ **None** = 0 points

☐ **Low** = 1 point

☐ **Moderate** = 2 points



All three diagrams in this row are

☒ **HIGH** = 3 points

3

Wetland name or number: Wetland A

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i> ☒ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☒ Standing snags (dbh > 4 in) within the wetland. ☒ Undercut banks are present for at least 6.6 ft (2 m) AND/OR overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m). ☒ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>). ☒ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>). ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>).		5
Total for H 1	Add the points in the boxes above	17

Rating of Site Potential If score is: ☒ **15-18 = H** ☐ **7-14 = M** ☐ **0-6 = L**

Record the rating on the first page

H 2.0. Does the landscape have the potential to support the habitat functions of the site?

H 2.1. Accessible habitat (include only habitat that directly abuts wetland unit). <i>Calculate: 2.2% undisturbed habitat + [(10.6% moderate and low intensity land uses)/2] = 2.2% + (10.6%/2) = 7.5%</i> If total accessible habitat is: ☐ > 1/3 (33.3%) of 1 km Polygon points = 3 ☐ 20-33% of 1 km Polygon points = 2 ☐ 10-19% of 1 km Polygon points = 1 ☒ < 10% of 1 km Polygon points = 0		0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. <i>Calculate: 8.5% undisturbed habitat + [(11.6% moderate and low intensity land uses)/2] = 8.5% + (11.6%/2) = 14.3%</i> ☐ Undisturbed habitat > 50% of Polygon points = 3 ☒ Undisturbed habitat 10-50% and in 1-3 patches points = 2 ☐ Undisturbed habitat 10-50% and > 3 patches points = 1		2
H 2.3. Land use intensity in 1 km Polygon: If ☒ > 50% of 1 km Polygon is high intensity land use points = (- 2) ☐ ≤ 50% of 1 km Polygon is high intensity points = 0		-2
Total for H 2	Add the points in the boxes above	0

Rating of Landscape Potential If score is: ☐ **4-6 = H** ☐ **1-3 = M** ☒ **< 1 = L**

Record the rating on the first page

H 3.0. Is the habitat provided by the site valuable to society?

H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? Choose only the highest score that applies to the wetland being rated. Site meets ANY of the following criteria: points = 2 ☒ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan ☐ Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 ☐ Site does not meet any of the criteria above points = 0		2
--	--	---

Rating of Value If score is: ☒ **2 = H** ☐ **1 = M** ☐ **0 = L**

Record the rating on the first page

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☒ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☒ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐ Yes –Go to SC 1.1 ☒ No= Not an estuarine wetland	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ Yes = Category I ☐ No - Go to SC 1.2	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i>, see page 25) ☐ At least ⅓ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐ Yes = Category I ☐ No= Category II	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☐ Yes – Go to SC 2.2 ☒ No – Go to SC 2.3 SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = Category I ☐ No = Not a WHCV SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes – Contact WNHP/WDNR and go to SC 2.4 ☒ No = Not a WHCV SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = Category I ☐ No = Not a WHCV	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐ Yes – Go to SC 3.3 ☒ No – Go to SC 3.2 SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐ Yes – Go to SC 3.3 ☒ No = Is not a bog SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐ Yes = Is a Category I bog ☐ No – Go to SC 3.4 NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ☐ Yes = Is a Category I bog ☐ No = Is not a	Cat. I

2014 Wetland Rating Form:

Riverine and Freshwater Tidal figures

Figure 1. Cowardin plant classes - H1.1, H1.4

Figure 2. Hydroperiods, ponded depressions, stream-width-to-unit-width ratio, and 150ft buffer
H1.2, R1.1, R2.4, R4.1

Figure 3. Plant cover of trees, shrubs, and herbaceous plants (not Cowardin classes) - R1.2, R4.2

Figure 4. Contributing basin - R2.2, R2.3, R5.2

Figure 5. Accessible and undisturbed habitat 1km from wetland edge - H2.1, H2.2, H2.3

Figure 6. Screen-capture of 303(d) listed waters in basin - R3.1

Figure 7. Screen-capture of TMDL list for WRIA - R3.2, R3.3

Resources and Links:

Google Earth

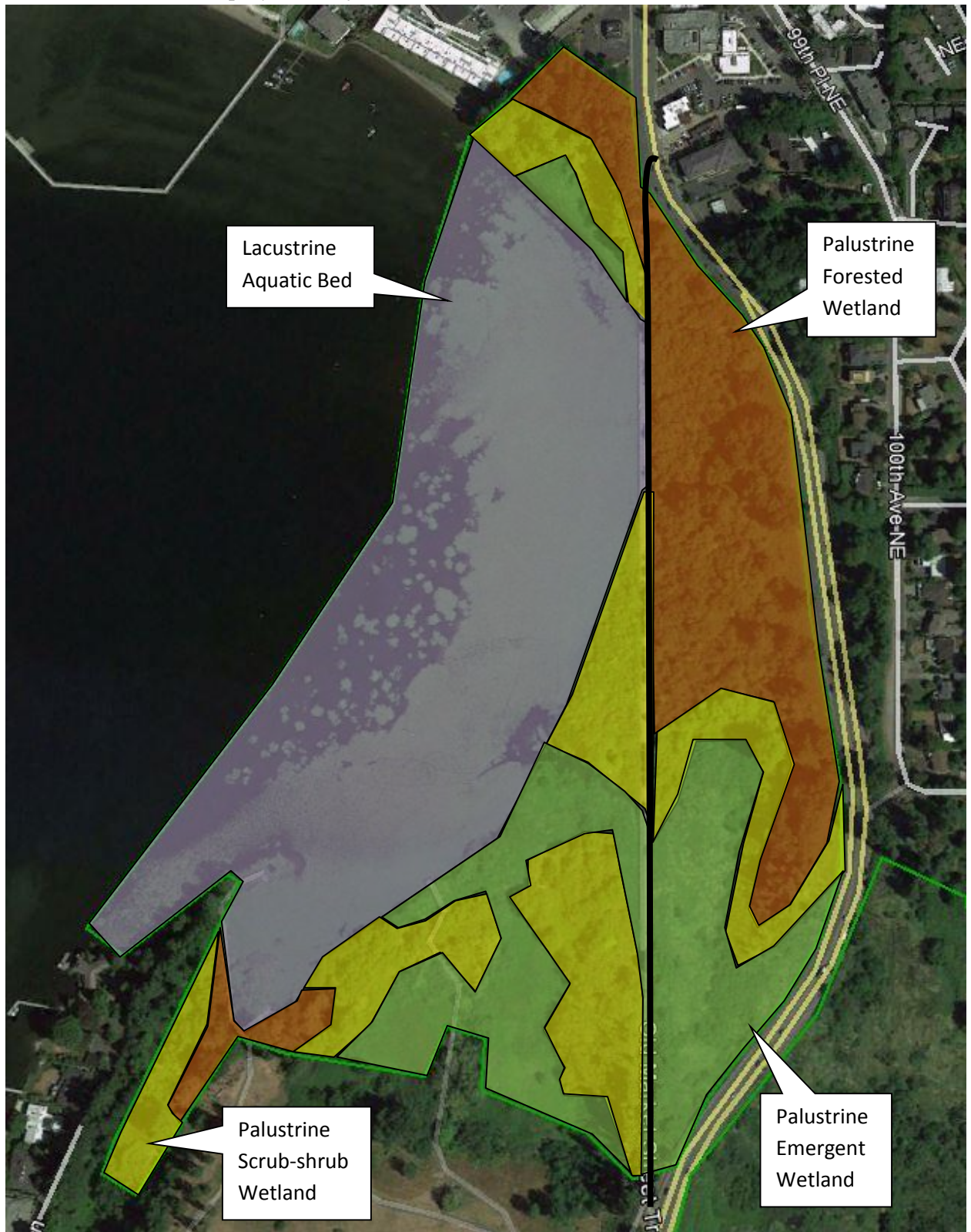
King County iMap

ECY 303(d) list

TMDL list

Figure 1. Cowardin plant classes - H1.1, H1.4

West side of wetland (project study area)



Palustrine Emergent Wetland

Palustrine Scrub-shrub Wetland

Palustrine Forested Wetland

Old Market Stream Trail

102nd Ave NE

NE 109th St

Google

Figure 3. Contributing basin – D4.3, D5.3



This aerial map illustrates a wetland unit and its surrounding land use patterns. The wetland unit is delineated by a red boundary and contains several distinct areas: a large olive-green area on the left, a smaller olive-green area on the right, a green area in the center, and a purple area at the bottom. A red line marks an 'Approx. 1km buffer' around the wetland unit. Callout boxes identify 'High intensity land use' (olive-green), 'Low/moderate intensity land use' (green), and 'Relatively undisturbed' (purple). The map includes numerous street names, such as NE 126th Pl, NE 125th Pl, NE 124th St, NE 123rd St, NE 122nd St, NE 121st Pl, NE 120th St, NE 119th Pl, NE 118th St, NE 117th Pl, NE 116th St, NE 115th Pl, NE 114th St, NE 113th Pl, NE 112th St, NE 111th Pl, NE 110th St, NE 109th Pl, NE 108th St, NE 107th Pl, NE 106th St, NE 105th Pl, NE 104th St, NE 103rd St, NE 102nd St, NE 101st St, NE 100th St, NE 99th St, NE 98th St, NE 97th St, NE 96th St, NE 95th St, NE 94th St, NE 93rd St, NE 92nd St, NE 91st St, NE 90th St, NE 89th St, NE 88th St, NE 87th St, NE 86th St, NE 85th St, NE 84th St, NE 83rd St, NE 82nd St, NE 81st St, NE 80th St, NE 79th St, NE 78th St, NE 77th St, NE 76th St, NE 75th St, NE 74th St, NE 73rd St, NE 72nd St, NE 71st St, NE 70th St, NE 69th St, NE 68th St, NE 67th St, NE 66th St, NE 65th St, NE 64th St, NE 63rd St, NE 62nd St, NE 61st St, NE 60th St, NE 59th St, NE 58th St, NE 57th St, NE 56th St, NE 55th St, NE 54th St, NE 53rd St, NE 52nd St, NE 51st St, NE 50th St, 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Figure 6. Screen-capture of 303(d) listed waters in basin - D3.1, D3.2

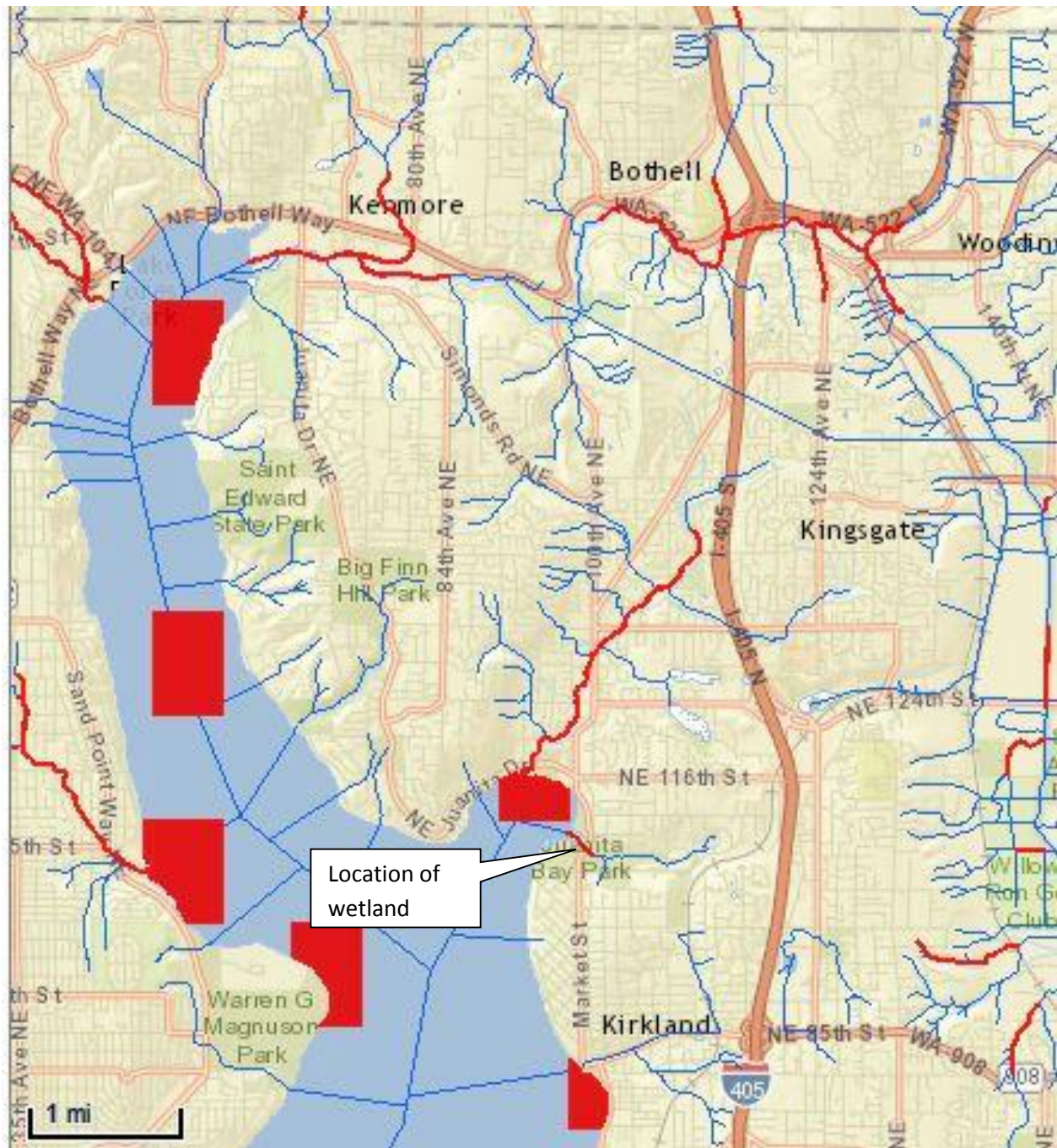


Figure 7. Screen-capture of TMDL list for WRIA - D3.3

WRIA 8: Cedar-Sammamish

The following table lists overview information for water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.

Counties

- [King](#)
- [Snohomish](#)



Waterbody Name	Pollutants	Status**	TMDL Lead
Ballinger Lake	Total Phosphorus	Approved by EPA	Tricia Shoblom 425-649-7288
Bear-Evans Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
	Dissolved Oxygen Temperature	Approved by EPA	
Cottage Lake	Total Phosphorus	Approved by EPA Has an implementation plan	Tricia Shoblom 425-649-7288
Issaquah Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Little Bear Creek Tributaries: Trout Stream Great Dane Creek Cutthroat Creek	Fecal Coliform	Approved by EPA	Ralph Svrcek 425-649-7036
North Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrcek 425-649-7036
Pipers Creek	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Sammamish River	Dissolved Oxygen Temperature	Field work starts summer 2015	Ralph Svrcek 425-649-7036
Swamp Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrcek 425-649-7036

** **Status** will be listed as one of the following: Approved by EPA, Under Development or Implementation

APPENDIX B
WETLAND DELINEATION METHODOLOGY

APPENDIX B **WETLAND DELINEATION METHODOLOGY**

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APPENDIX B

WETLAND DELINEATION METHODOLOGY

The triple-parameter approach, as required in the United States Army Corps of Engineers' (the Corps') 1987 *Corps of Engineers Wetland Delineation Manual* and the Corps' 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* was used to identify and delineate the wetlands on the site described in this report. The triple-parameter approach requires that vegetation, soils, and hydrology are each evaluated to determine the presence or absence of wetlands. An area is considered to be a wetland if each of the following is met: (a) dominant hydrophytic vegetation is present in the area, (b) the soils in the area are hydric, and (c) the necessary hydrologic conditions within the area are met.

A determination of wetland presence was made by conducting a Routine Delineation. Corresponding upland and wetland plots were recorded to characterize surface and subsurface conditions and more accurately determine the boundaries of on-site wetlands.

B.1 WETLAND VEGETATION

Hydrophytic plants are plant species specially adapted for saturated and/or anaerobic conditions. These species can be found in areas where there is a significant duration and frequency of inundation, which produces permanently or periodically saturated soils. Hydrophytic species, due to morphological, physiological, and reproductive adaptations, have the ability to grow, effectively compete, reproduce, and thrive in anaerobic soil. Indicators of hydrophytic vegetation are based on the wetland indicator status of plant species on the national wetland plant list for the State of Washington (Lichvar and others, 2016). Plants are categorized as Obligate (OBL), Facultative Wetland (FACW), Facultative (FAC), Facultative Upland (FACU), or Upland (UPL). Species in the facultative categories (FACW, FAC, and FACU) are recognized as occurring in both wetlands and non-wetlands to varying degrees. Most wetlands are dominated mainly by species rated as OBL, FACW, or FAC (Table B-1).

TABLE B-1
PLANT INDICATOR STATUS GROUPS

Plant Indicator Status Categories
Obligate Wetland (OBL) – Plants that almost always occur in wetlands.
Facultative Wetland (FACW) – Plants that usually occur in wetlands, but may occur in non-wetlands.
Facultative (FAC) – Plants that occur in wetlands or non-wetlands.
Facultative Upland (FACU) – Plants that usually occur in non-wetlands, but may occur in wetlands.
Obligate Upland (UPL) – Plants that almost never occur in wetlands.

(Lichvar and others, 2016)

The approximate percentage of absolute cover for each of the different plant species occurring within the tree, sapling/shrub, woody vine, and herbaceous strata was determined. Trees within a 30-foot radius; sapling/shrubs and woody vines within a 15-foot radius; and herbaceous species within a 5-foot radius of each data point were identified and noted. However, where site conditions merited it, the dimensions of the tree, sapling/shrub, woody vine, and herbaceous strata were modified.

The dominance test is the primary hydrophytic vegetation indicator and it is used in all wetland delineations. Dominant plant species are considered to be those that, when cumulatively totaled in descending order of absolute percent cover, exceed 50 percent of the total absolute cover for each vegetative stratum. Any additional species individually representing 20 percent or greater of the total absolute cover for each vegetative strata are also considered dominant. Hydrophytic vegetation is considered to be present when greater than 50 percent of the dominant plant species within the area had an indicator status of OBL, FACW, or FAC.

If a plant community does not meet the dominance test in areas where hydric soils and wetland hydrology are present, vegetation is reevaluated using the prevalence index, plant morphological adaptations for living in wetlands, and/or abundance of bryophytes (e.g., mosses) adapted to living in wetlands. The prevalence index is a weighted average that takes into account the abundance of all plant species within the sampling area to determine if hydrophytic vegetation is more or less prevalent. Using the prevalence index, all plants within the sampling area are grouped by wetland indicator status and absolute percent cover is summed for each group. Total cover for each indicator status group is weighted by the following multipliers: OBL=1, FACW=2, FAC=3, FACU=4, UPL=5. The prevalence index is calculated by dividing the sum of the weighted totals by the sum of total cover in the sampling area. A prevalence index of 3.0 or less indicates that hydrophytic vegetation is present.

B.2 HYDRIC SOILS

Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA SCS, 1994). Repeated periods of saturation and inundation for more than a few days, in combination with soil microbial activity, causes depletion in oxygen (anaerobic conditions) and results in delayed decomposition of organic matter and reduction of iron, manganese, and sulfur elements. As a result of these processes, most hydric soils develop distinctive characteristics observable in the field during both wet and dry periods (Vasilas, Hurt, and Noble, 2010). These characteristics may be exhibited as an accumulation of organic matter; bluish-gray, green-gray, or low chroma and high value soil colors; mottling or other concentrations of iron and manganese; and/or hydrogen sulfide odor similar to a rotten egg smell.

The USDA Natural Resources Conservation Service (NRCS) has developed official hydric soil indicators as summarized in *Field Indicators of Hydric Soils in the United States* (Vasilas and others, 2010). These indicators were developed to assist in delineation of hydric soils and are based predominantly on hydric soils near the margins of wetlands. Some hydric soils, including soils within the wettest parts of wetlands, may lack any of the approved hydric soil indicators. If a hydric soil indicator is present, the soil is determined to be hydric. If no hydric soil indicator is present, additional site information is used to assess whether the soil meets the definition of hydric soil.

Identification of hydric soils was aided through observation of surface hydrologic characteristics and indicators of wetland hydrology (e.g., drainage patterns). Soil characteristics were observation at several data points, placed both inside and outside the wetland. Holes were dug with a shovel to the depth needed to document an indicator or to confirm the absence of hydric soil indicators. Soil organic content was estimated visually and texturally. Soil colors were examined in the field immediately after sampling. Dry soils were moistened. Soil colors were determined through analysis of the hue, value, and chroma best represented in the Munsell® Soil Color Chart.

B.3 WETLAND HYDROLOGY

Wetland hydrology is determined by observable evidence that inundation or soil saturation have occurred during a significant portion of the growing season repeatedly over a period of years so that wet condition have been sufficient to produce wetland vegetation and hydric soils. Wetland hydrology indicators give evidence of a continuing wetland hydrologic regime. Wetland hydrology criteria were considered to be satisfied if it appeared that wetland hydrology was

present for at least 5 to 12.5 percent (12 to 31 days) of the growing season. The growing season in western Washington is typically considered to be from March 1 to October 31 (244 days). However, the growing season is considered to have begun when: (a) evidence of plant growth has begun on two non-evergreen vascular plants, and (b) the soil reaches a temperature of 41 degrees Fahrenheit at 12 inches. The Seattle District Corps of Engineers requires 14 consecutive days of inundation or saturation for a wetland hydrology to be considered present.

Wetland hydrology was evaluated by direct visual observation of surface inundation or soil saturation in data plots. The area near each data point was examined for indicators of wetland hydrology. Wetland hydrology indicators are categorized as primary or secondary based on their estimated reliability. Wetland hydrology was considered present if there was evidence of one primary indicator or at least two secondary indicators.

Some primary indicators include surface water, a shallow water table or saturated soils observed within 12 inches of the surface, dried watermarks, drift lines, sediment deposits, water-stained leaves, and algal mat/crust. Some secondary indicators include a water table within 12 to 24 inches of the surface during the dry season; drainage patterns; a landscape position in a depression, drainage, or fringe of a water body; and a shallow restrictive layer capable of perching water within 12 inches of the surface.

B.4 DISCLAIMER

This methodology was prepared for reference use only and is not intended to replace the 1987 *Corps of Engineers Wetland Delineation Manual* or the Corps' 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0).

B.5 REFERENCES

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APPENDIX C

**WETLAND DETERMINATION DATA FORMS – WESTERN MOUNTAINS,
VALLEYS, AND COAST REGION**

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Juanita Park City/County: Kirkland/King Sampling Date: 1/18/16
 Applicant/Owner: City of Kirkland State: WA Sampling Point: DP-1
 Investigator(s): S. Corbin (PWS) Section, Township, Range: T26N, R05E, S30
 Landform (hillslope, terrace, etc.): stream bank Local relief (concave, convex, none): concave Slope (%): 100
 Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Indianola loamy sand, 0-5% slopes NWI classification: NIA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No _____	Is the Sampled Area within a Wetland? Yes ☒ No _____
Hydric Soil Present?	Yes ☒ No _____	
Wetland Hydrology Present?	Yes ☒ No _____	
Remarks: <u>Below the OHWM of Juanita Creek</u>		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. <u>Red Osier</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	
2. <u>Salix sp</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Phalaris arundinacea</u>	<u>50</u>	<u>Y</u>	<u>FACW</u>	
2. <u>Scirpus microcarpus</u>	<u>40</u>	<u>Y</u>	<u>OBL</u>	
3. <u>Ranunculus repens</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
4. <u>Rumex occidentalis</u>	<u>3</u>	<u>N</u>	<u>FACW</u>	
5. <u>Juncus effusus</u>	<u>15</u>	<u>N</u>	<u>FACW</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes ☒ No _____
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
% Bare Ground in Herb Stratum <u>0</u> = Total Cover				
Remarks: <u>Conifers & HBB rooted upgradient from data plot, outside of wetland unit.</u>				

SOIL

Sampling Point: DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR2/2	100	—	—	—	—	sandy clay loam	Many roots in top 6"
4-9	10YR4/1	95	7.5YR4/6	5	C	M, PL	sandy loam	
9-20+	10YR4/1	90	7.5YR4/6	10	C	M, PL	loamy sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- | | |
|--|---|
| ☐ Histosol (A1) | ☐ Sandy Redox (S5) |
| ☐ Histic Epipedon (A2) | ☐ Stripped Matrix (S6) |
| ☐ Black Histic (A3) | ☐ Loamy Mucky Mineral (F1) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ Depleted Below Dark Surface (A11) | ☒ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- | | |
|--|---|
| ☒ Surface Water (A1) | ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) |
| ☒ High Water Table (A2) | ☐ Salt Crust (B11) |
| ☒ Saturation (A3) | ☐ Aquatic Invertebrates (B13) |
| ☐ Water Marks (B1) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Sediment Deposits (B2) | ☐ Oxidized Rhizospheres along Living Roots (C3) |
| ☒ Drift Deposits (B3) | ☐ Presence of Reduced Iron (C4) |
| ☐ Algal Mat or Crust (B4) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Iron Deposits (B5) | ☐ Stunted or Stressed Plants (D1) (LRR A) |
| ☐ Surface Soil Cracks (B6) | ☐ Other (Explain in Remarks) |
| ☐ Inundation Visible on Aerial Imagery (B7) | |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): _____Water Table Present? Yes ☒ No ☐ Depth (inches): 10" by SSaturation Present? Yes ☒ No ☐ Depth (inches): 6" by SWetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Below rack/debris line, below OHWM of Juanita Creek

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Juanita Park City/County: Kirkland/King Sampling Date: 1/18
 Applicant/Owner: City of Kirkland State: WA Sampling Point: 10P-2
 Investigator(s): S. Corbin (PWS) Section, Township, Range: T26N, R05E, S30
 Landform (hillslope, terrace, etc.): lawn Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: 1nA NWI classification: N/A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☒	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present?	Yes _____ No ☒	
Wetland Hydrology Present?	Yes _____ No _____	
Remarks:		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
4. _____	_____	_____	_____	Prevalence Index worksheet:
Sapling/Shrub Stratum (Plot size: <u>15'</u>) <u>Ø</u> = Total Cover				
1. <u>Thuja plicata (planted)</u>	<u>3</u>	<u>Y</u>	<u>FAC</u>	Total % Cover of: _____ Multiply by: _____
2. _____	_____	_____	_____	OBL species _____ x 1 = _____
3. _____	_____	_____	_____	FACW species _____ x 2 = _____
4. _____	_____	_____	_____	FAC species _____ x 3 = _____
5. _____	_____	_____	_____	FACU species _____ x 4 = _____
Herb Stratum (Plot size: <u>51</u>) <u>3</u> = Total Cover				UPL species _____ x 5 = _____
1. <u>Trifolium repens</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	Column Totals: _____ (A) _____ (B)
2. <u>Poa annua</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	Prevalence Index = B/A = _____
3. <u>Poa sp *</u>	<u>80</u>	<u>Y</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: ☒ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% _____ 3 - Prevalence Index is ≤3.0 ¹ _____ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) _____ 5 - Wetland Non-Vascular Plants ¹ _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4. <u>Taraxacum officinale</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
5. <u>Geranium carolinianum</u>	<u>5</u>	<u>N</u>	<u>NI</u>	
6. <u>Bellis perennis (lawn daisy)</u>	<u>10</u>	<u>N</u>	<u>NI</u>	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
Woody Vine Stratum (Plot size: <u>15</u>) <u>115</u> = Total Cover				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☒ No _____
2. _____	_____	_____	_____	
% Bare Ground in Herb Stratum <u>Ø</u> <u>Ø</u> = Total Cover				Remarks: <u>* Seed heads not available - short, mowed. Maybe pratensis.</u> <u>Assume FAC.</u>

SOIL

Sampling Point: DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/1	100	—	—	—	—	loamy sand	
2-5"	10YR 3/1	100	—	—	—	—	grav. loamy sand compacted	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- | | | |
|--|---|---|
| ☐ Histosol (A1) | ☐ Sandy Redox (S5) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Stripped Matrix (S6) | ☐ Red Parent Material (TF2) |
| ☐ Black Histic (A3) | ☐ Loamy Mucky Mineral (F1) (except MLRA 1) | ☐ Very Shallow Dark Surface (TF12) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) | ☐ Other (Explain in Remarks) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Matrix (F3) | |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) | |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) | |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) | |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ☒

Remarks:

Hard / compacted @ 2". Very hard to dig.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- | | | |
|--|---|--|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) | ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) |
| ☐ High Water Table (A2) | ☐ Salt Crust (B11) | ☐ Drainage Patterns (B10) |
| ☐ Saturation (A3) | ☐ Aquatic Invertebrates (B13) | ☐ Dry-Season Water Table (C2) |
| ☐ Water Marks (B1) | ☐ Hydrogen Sulfide Odor (C1) | ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Sediment Deposits (B2) | ☐ Oxidized Rhizospheres along Living Roots (C3) | ☐ Geomorphic Position (D2) |
| ☐ Drift Deposits (B3) | ☐ Presence of Reduced Iron (C4) | ☐ Shallow Aquitard (D3) |
| ☐ Algal Mat or Crust (B4) | ☐ Recent Iron Reduction in Tilled Soils (C6) | ☐ FAC-Neutral Test (D5) |
| ☐ Iron Deposits (B5) | ☐ Stunted or Stressed Plants (D1) (LRR A) | ☐ Raised Ant Mounds (D6) (LRR A) |
| ☐ Surface Soil Cracks (B6) | ☐ Other (Explain in Remarks) | ☐ Frost-Heave Hummocks (D7) |
| ☐ Inundation Visible on Aerial Imagery (B7) | | |
| ☐ Sparsely Vegetated Concave Surface (B8) | | |

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____Water Table Present? Yes _____ No ☒ Depth (inches): _____Saturation Present? Yes _____ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Juanita Park City/County: Kirkland / King Sampling Date: 1/18/16
 Applicant/Owner: City of Kirkland State: WA Sampling Point: DP-3
 Investigator(s): S. Corbin (PWS) Section, Township, Range: T26N, R05E, S30
 Landform (hillslope, terrace, etc.): lake shore Local relief (concave, convex, none): concave Slope (%): 1
 Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: InA NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No _____	Is the Sampled Area within a Wetland? Yes ☒ No _____
Hydric Soil Present?	Yes ☒ No _____	
Wetland Hydrology Present?	Yes ☒ No _____	
Remarks: <u>Along shores of lake WA</u>		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>) 1. <u>Salix lasiandra</u> <u>10</u> <u>Y</u> <u>FACW</u> 2. <u>Bide cfrund</u> <u>3</u> <u>Y</u> <u>FAC</u> 3. _____ 4. _____ 5. _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>5'</u>) 1. <u>RCG</u> <u>75</u> <u>Y</u> <u>FACW</u> 2. <u>Ylw Iris</u> <u>30</u> <u>Y</u> <u>OBL</u> 3. <u>Hard stem Bullrush</u> <u>20</u> <u>N</u> <u>OBL</u> 4. <u>J. effusus</u> <u>25</u> <u>N</u> <u>FACW</u> 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____				
Woody Vine Stratum (Plot size: <u>15'</u>) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____				
% Bare Ground in Herb Stratum <u>0</u> = Total Cover				
Remarks:				

Hydrophytic Vegetation Present? Yes ☒ No _____

SOIL

Sampling Point: DP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1	10YR2.5/2	100	—	—	—	—	loam	lots roots!
1-2	10YR4/2	100	—	—	—	—	loamy sand	
2-18+	Gley 1, 4/N	85	7.5YR4/6	15	C	M	sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☒ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

- ☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☒ No ☒ Depth (inches): 0" bgs
 Water Table Present? Yes ☒ No ☐ Depth (inches): 5" bgs
 Saturation Present? Yes ☒ No ☐ Depth (inches): 5" bgs
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Juanita Beach Park City/County: Kirkland / King Sampling Date: 1/18/16
 Applicant/Owner: City of Kirkland State: WA Sampling Point: DP-4
 Investigator(s): S. Corbin (PWS) Section, Township, Range: T26N, R5E, S30
 Landform (hillslope, terrace, etc.): lawn Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: lnA NWI classification: NIA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☒	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present?	Yes _____ No ☒	
Wetland Hydrology Present?	Yes _____ No ☒	
Remarks: <u>North of play area.</u>		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>) <u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
Herb Stratum (Plot size: <u>5'</u>) <u>0</u> = Total Cover				Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Poa annua</u>	<u>75</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Trifolium repens</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
3. <u>Taraxacum officinale</u>	<u>3</u>	<u>N</u>	<u>FACW</u>	
4. <u>Myosotis arvensis</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	
5. <u>Geranium carolinianum</u>	<u>3</u>	<u>N</u>	<u>N/A</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
Woody Vine Stratum (Plot size: <u>15'</u>) <u>101</u> = Total Cover				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☒ No _____
2. _____	_____	_____	_____	
% Bare Ground in Herb Stratum <u>0</u> = Total Cover				
Remarks: _____				

SOIL

Sampling Point: DP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR2/1	100	—	—	—	—	loamy sand	Roots in upper 2"
4-6+	10YR2.3/2	100	—	—	—	—	grav. loamy sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- | | | |
|--|---|---|
| ☐ Histosol (A1) | ☐ Sandy Redox (S5) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Stripped Matrix (S6) | ☐ Red Parent Material (TF2) |
| ☐ Black Histic (A3) | ☐ Loamy Mucky Mineral (F1) (except MLRA 1) | ☐ Very Shallow Dark Surface (TF12) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) | ☐ Other (Explain in Remarks) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Matrix (F3) | |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) | |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) | |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) | |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ☒

Remarks:

Hard pan @ 4" bgs, very diff to dig

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- | | | |
|--|---|--|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) | ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) |
| ☐ High Water Table (A2) | ☐ Salt Crust (B11) | ☐ Drainage Patterns (B10) |
| ☐ Saturation (A3) | ☐ Aquatic Invertebrates (B13) | ☐ Dry-Season Water Table (C2) |
| ☐ Water Marks (B1) | ☐ Hydrogen Sulfide Odor (C1) | ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Sediment Deposits (B2) | ☐ Oxidized Rhizospheres along Living Roots (C3) | ☐ Geomorphic Position (D2) |
| ☐ Drift Deposits (B3) | ☐ Presence of Reduced Iron (C4) | ☐ Shallow Aquitard (D3) |
| ☐ Algal Mat or Crust (B4) | ☐ Recent Iron Reduction in Tilled Soils (C6) | ☐ FAC-Neutral Test (D5) |
| ☐ Iron Deposits (B5) | ☐ Stunted or Stressed Plants (D1) (LRR A) | ☐ Raised Ant Mounds (D6) (LRR A) |
| ☐ Surface Soil Cracks (B6) | ☐ Other (Explain in Remarks) | ☐ Frost-Heave Hummocks (D7) |
| ☐ Inundation Visible on Aerial Imagery (B7) | | |
| ☐ Sparsely Vegetated Concave Surface (B8) | | |

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____Water Table Present? Yes _____ No ☒ Depth (inches): _____Saturation Present? Yes _____ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: