FINAL TECHNICAL INFORMATION REPORT (TIR)

For

BAKHCHINYAN SHORT PLAT

9032 116th Avenue NE, Kirkland, Washington 98033

Parcel Number: 1238501180

9/14/15

DRS Project No. 13125
Kirkland File No. PRE14-00668

Applicant

Maxim Lissak
11121 NE 53rd Street
Kirkland, WA 98033

Report Prepared by

D.R. STRONG Consulting Engineers, Inc.
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Report Issue Date:
September 14, 2015

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BAKHCHINYAN SHORT PLAT
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SECTION I
PROJECT OVERVIEW

GENERAL SITE INFORMATION:

This report has been prepared per the 2009 King County Surface Water Design Manual (KCSWDM) and the City of Kirkland Addendum. The Site is located at 9032 116th Avenue NE, Kirkland, Washington 98033. The Project proposes the subdivision of the existing parcel known as Tax Parcel 1238501180 (Site) into three lots. The existing house on the site will be retained and the two new lots would be suitable for construction of two new detached single family homes. Frontage improvements including curb and gutter, planter strip and sidewalk will be constructed along 116th Ave NE and Slater Ave NE. A new public storm drainage conveyance system will also be built through the Site to convey upstream runoff to the existing conveyance system located in Slater Ave NE along with the proposed shared access driveway. Demolition of the existing shed and part of the patio and deck along with on-site storm water BMPs for each lot will be completed under separate permits.

PREDEVELOPED SITE CONDITIONS:

The Site is currently developed with one existing single family home and paved drive, with most improvements located in the western portion of the Site. Access to the existing house is via 116th Avenue NE. The property also fronts Slater Ave NE to the east. Existing improvements to the 116th Avenue NE frontage include approximately 12 of pavement from centerline with a planter strip, at-grade asphalt walkway, and asphalt driveway entrance. Neighboring frontage improvements on 116th are similar. Existing improvements to the Slater Ave NE frontage include approximately 7 of pavement from centerline, and a ditch. To the north curb and gutter has been installed and to the south is a gravel driveway.

The total Site area is approximately 26,305 S.F. (0.60 acres). The total project area (frontage improvements and storm drainage system) is approximately 30,205 S.F. (0.69 acres (Project). The Site slopes from west to east at approximately 4%.

The vegetation is a mixture of deciduous and evergreen trees, grass and shrubs. The Site contains an unregulated wetland in the eastern half with a total area of 2,375 S.F.. The Site abuts single-family parcels to the north and south. Runoff generated by 116th Avenue NE flows onto the Site via two paths. To the north of the Site a 12-inch pipe discharges onto the adjacent parcel and flows southeasterly via ditch onto the Site and eventually into the onsite wetland. To the south a 12-inch pipe discharges to a broad swale which flows east across the adjacent property before re-entering the Site and draining to wetland.

The Site s natural discharge point is primarily along its eastern property line where the wetland drains into the roadside ditch on Slater Ave NE. The entire Site is located within one Threshold Discharge Area.

DEVELOPED SITE CONDITIONS:

The applicant received preliminary approval to subdivide the lot as a short plat with three lots for detached single family residences. The proposed lot sizes are Lot 1: 9,070 S.F., Lot 2: 8,709 S.F., Lot 3: 8,545 S.F. The existing residence will remain with removal of portions of the existing patio and deck. The existing shed will also be removed. A shared drive will be constructed using porous asphalt pavement serving lots 2 and 3. Grading activities will mainly include the shared access driveway and along both frontages.

Runoff generated by the future roof drains will be routed to dry wells with overflow connections to the proposed storm system through the Site. A dispersal trench providing full dispersion is proposed for the existing roof area on Lot 1. Conceptual locations of the dispersal trench and the infiltration dry wells are shown on the site plan. Per City s Policy L-1, for lots up to 11,000 S.F. runoff from impervious surfaces equal to at least 10% of the lot shall be directed to on-site BMPs. Runoff from remaining impervious areas will be directed to the conveyance system proposed through the Site. Shared drive and private driveway will be pervious pavement and will drain to the storm drainage conveyance system on Slater Avenue NE.

Runoff generated by the paving, curb and sidewalk constructed along 116th Ave NE will enter the Site via the catch basin and 12-inch pipe at the western property line and be conveyed through the Site to the existing conveyance system in Slater Ave NE. Runoff generated by paving, curb and sidewalk along Slater Ave NE will be collected by the proposed conveyance system.

The project will add less than 10,000 s.f. of new or replaced impervious area including less than 5,000 s.f. of PGIS. The following is a combined breakdown of those areas:

Impervious Areas

	SF	Acres
Site Area:	30,152	0.69
Frontage		
Road/ Driveway	1,492	0.03
Sidewalk	604	0.01
Total	2,096	0.05
Lot 1		
Ex. Roof	1,756	0.04
Ex. Walks	87	0.00
Ex. Driveway	1,548	0.04
Ex. Patio	264	0.01
Total	3,655	0.08
Lot 2		
Shared Driveway	2,120	0.05
Lot Driveway*	400	0.01
Building*	1,834	0.04
Total	4,354	0.10
Lot 3		0.00
Shared Driveway	0	0.00
Lot Driveway*	400	0.01
Building*	2,421	0.06
Total	2,821	0.06

* future improvement may be modified during house building permit.

Ex. wetlands to remain	441	0.01
Total new & replaced impervious	9,271	
Total new& replaced PGIS	4,412	

Per the City of Kirkland Drainage Review Flow Chart, since the Project adds greater than 5,000 s.f. of new impervious area, it will be subject to Full Drainage Review per Policy D-3.

NATURAL DRAINAGE SYSTEM FUNCTIONS:

A review of the SCS soils map for the area (see Figure 4 Soils) indicates Alderwood gravelly sandy loam soils 6 to 15 percent slopes (AgC). Per the Manual this soil type is classified as Till material. The SCS descriptions follow Figure 4.

The Site is located between 116th Ave NE and Slater Ave NE Street in Kirkland. On-site slopes are primarily easterly at about 4%. Some negligible portions of the Site flow directly southerly. There are two existing structures located on the Site.

By examining field topographic information, there appears to be one Natural Discharge Area point (NDA) for the Site. There did not appear to be any noticeable drainage hazards as part of the Level 1 downstream analysis. The Level 1 Downstream Report is included in Section III.

In evaluating the upstream area, a site visit was aided by aerial topography from King County iMap, the City of Kirkland GIS portal, and Google Earth, as well as stream and basin information mapped on the Kirkland Sensitive Areas Map. The site may receive minor runoff from upstream lawn areas from six lots to the north.

The Site will receive runoff from as far north as the catch basin on the northeastern corner of 116th Avenue NE and NE 94th Place. This runoff heads south as pipe flow to a catch basin in 116th Avenue NE to a point even with the northern property line of the Site. From here runoff heads east as pipe flow along northern property and continues east for approximately 87 until it outlets to a stream just north of the northern property line. This stream flows east along the adjacent neighbor s southern property line for approximately 120 until it enters the northeastern part of the Site and continues to flow southeast. Runoff from the six lots north heads south and southeast to the Site.

There is a catch basin on 116th Avenue NE that is even with the southwestern property line. This catch basin directs runoff from 116th Ave NE east as pipe flow onto the Site. Once on the site it flows through a grass-lined ditch towards the wetland.

Figure 1
TIR Worksheet

King County Department of Development and Environmental Services

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Part 1 PROJECT OWNER AND PROJECT ENGINEER	Part 2 PROJECT LOCATION AND DESCRIPTION
Project Owner: **Maxim Lissak** Address/Phone: **11121 NE 53rd St** **Kirkland, WA 98083** Project Engineer: **Luay R. Joudeh, P.E.** **D.R. STRONG Consulting Engineers Inc.** Address/Phone: **620 7th Avenue** **Kirkland WA 98033** **(425) 827-3063**	Project Name: **Bakhchinyan Short Plat** Location: Township: **25** Range: **05 E** Section: **4**

Part 3 TYPE OF PERMIT APPLICATION	Part 4 OTHER REVIEWS AND PERMITS
☐ Subdivision ☒ **Short Subdivision** ☒ **Clearing and Grading** ☐ Commercial ☐ Other: ___	☐ DFW HPA ☐ Shoreline Management ☐ COE 404 ☐ Rockery ☐ DOE Dam Safety ☐ Structural Vault ☐ FEMA Floodplain ☐ Other: Vertical Wall ☐ COE Wetlands

Part 5 SITE COMMUNITY AND DRAINAGE BASIN
Community: **Norkirk**
Drainage Basin **Cedar River/Lake Washington**

Part 6 SITE CHARACTERISTICS	
☐ River: _____ ☐ Stream: ☐ Critical Stream Reach ☒ **Depressions/Swales** ☐ Lake: _____ ☐ Steep Slopes	☐ Floodplain ☒ **Wetlands** ☐ Seeps/Springs ☐ High Groundwater Table ☐ Groundwater Recharge ☐ Other: None apply

Part 7 SOILS			
Soil Type: **Alderwood Gravelly Sandy Loam (AgC)**	Slopes: **6-15%**	Erosion Potential: **Moderate**	Erosive Velocities: **Medium**
☒ **Additional Sheets Attached:**		**SCS Map and Soil Description, Figure 4 Soils**	

Part 8 DEVELOPMENT LIMITATIONS	
REFERENCE ☒ **Level 1 Downstream Analysis** ☐ Geotechnical Engineering Study ☒ **Environmentally Sensitive Areas** ☐ Level 2 Off-Site Stormwater Analysis ☐ Level II Traffic Impact Analysis ☐ Structural Report ☐ Additional Sheets Attached	LIMITATION/SITE CONSTRAINT **Unregulated wetlands**_____ _____ _____ _____ _____

Part 9 ESC REQUIREMENTS	
MINIMUM ESC REQUIREMENTS DURING CONSTRUCTION ☒ **Sedimentation Facilities** ☒ **Stabilized Construction Entrance** ☒ **Perimeter Runoff Control** ☒ **Clearing and Grading Restrictions** ☒ **Cover Practices** ☒ **Construction Sequence** ☐ Other	MINIMUM ESC REQUIREMENTS AFTER CONSTRUCTION ☒ **Stabilize Exposed Surface** ☒ **Remove and Restore Temporary ESC Facilities** ☒ **Clean and Remove All Silt and Debris** ☐ Ensure Operation of Permanent Facilities ☒ **Flag Limits of SAO and open space preservation areas** ☐ Other

Part 10 SURFACE WATER SYSTEM			
☐ Grass Lined Channel ☒ **Pipe System** ☐ Open Channel ☐ Dry Pond ☐ Wet Pond	☐ Tank ☐ Vault ☐ Energy Dissipater ☐ Wetland ☐ Stream	☒ **Infiltration** ☐ Depression ☒ **Flow Dispersal** ☐ Waiver ☐ Regional Detention	Method of Analysis: **KCRTS** Compensation/ Mitigation of Eliminated Site Storage **N/A**

Brief Description of System Operation: **Roof runoff to be collected and conveyed to the existing stormwater system. Dispersal trenches and infiltration dry wells will be used to treat an area equal to 10-percent of each lot.**

Facility Related Site Limitations:

Reference	Facility	Limitation

Part 11 STRUCTURAL ANALYSIS
☐ Cast in Place Vault ☐ Retaining Wall ☐ Rockery > 4' High ☐ Structural on Steep Slope ☐ Other:

Part 12 EASEMENTS/TRACTS
☒ **Drainage Easement** ☒ **Access Easement** ☐ Native Growth Protection Easement ☐ Tracts ☐ Other:

Part 13 SIGNATURE OF PROFESSIONAL ENGINEER

I, or a civil engineer under my supervision, have visited the site. Actual site conditions as observed were incorporated into this worksheet and the attachments. To the best of my knowledge the information provided here is accurate.

9/14/15

Signed/Date

Figure 2
Vicinity Map

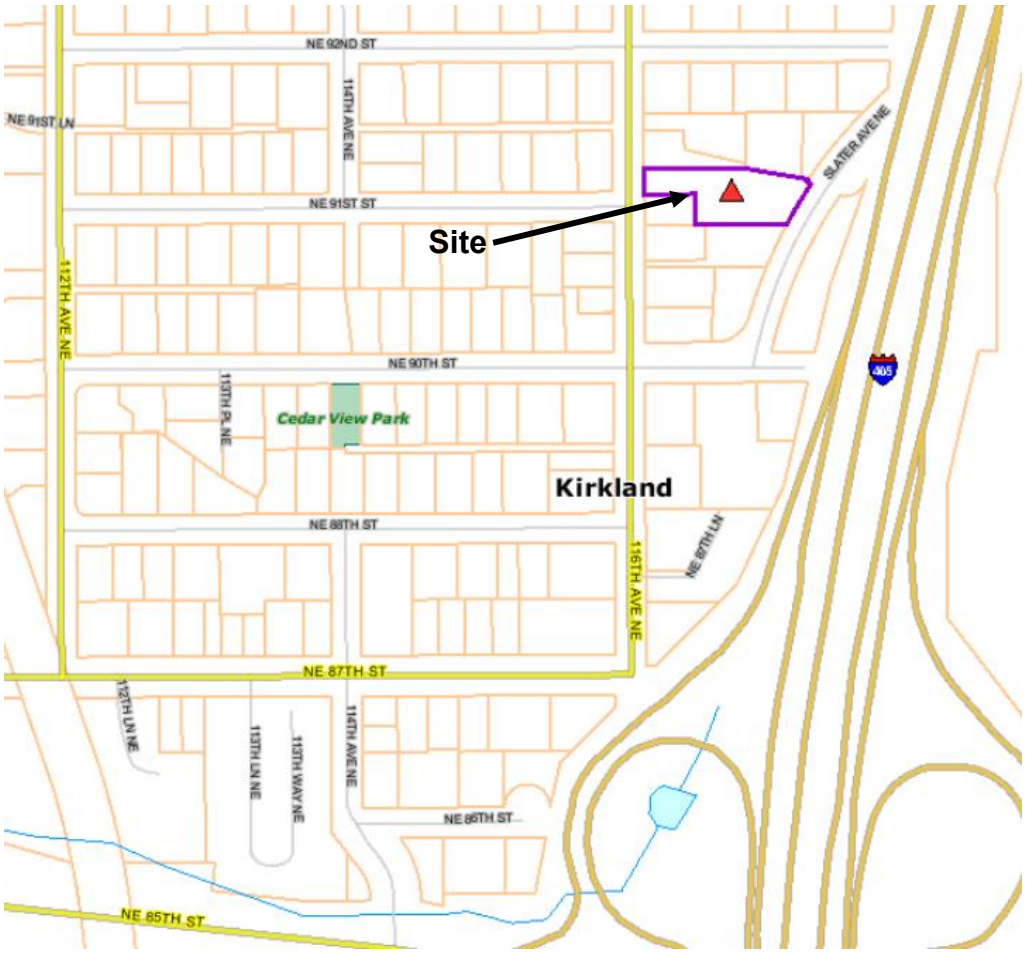

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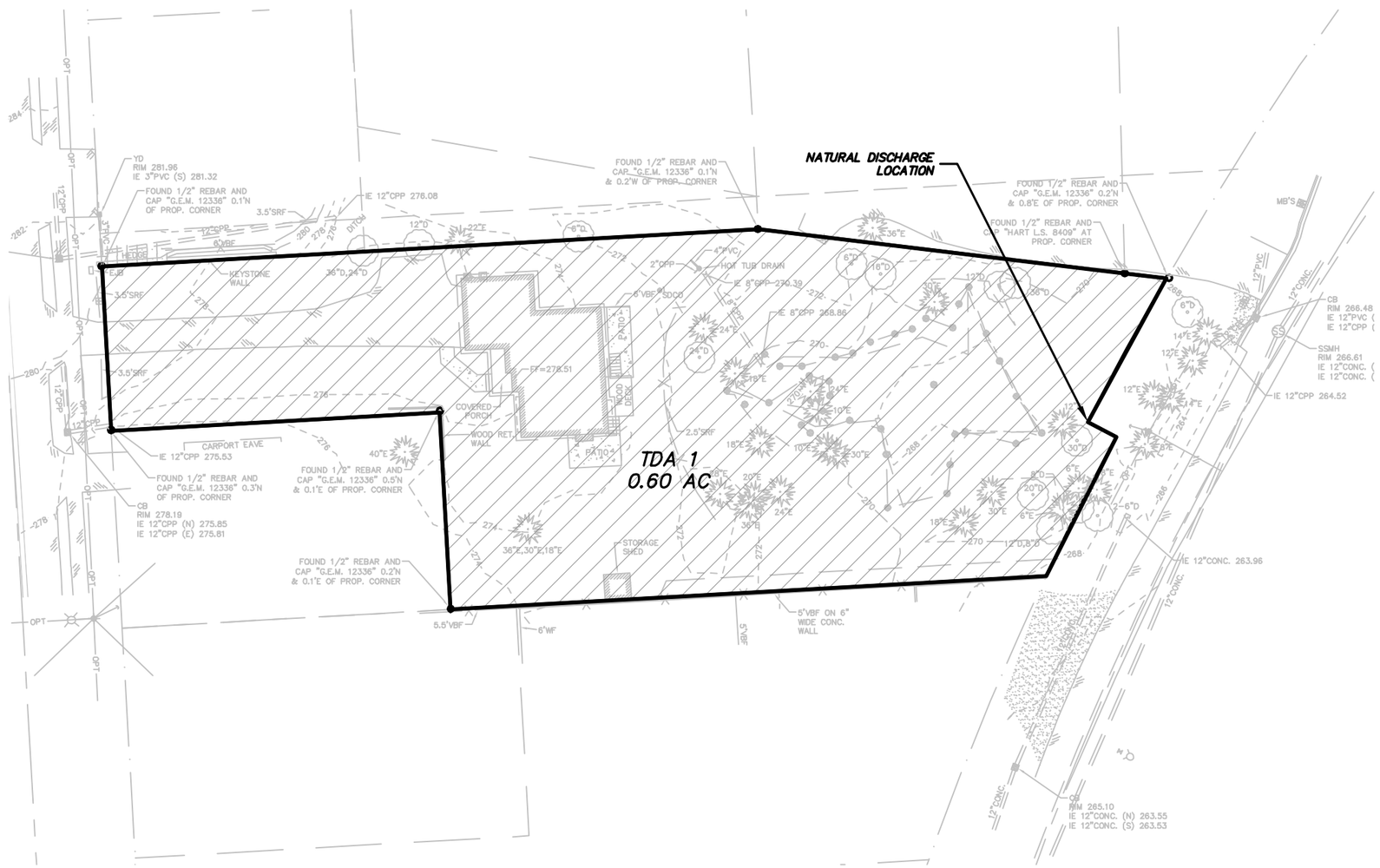
Figure 3
Drainage Basins and Site Characteristics



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BAKHCHINYAN SHORT PLAT

FIGURE 3: DRAINAGE BASINS, AND SITE CHARACTERISTICS

9032 116TH AVE NE
KIRKLAND, WASHINGTON

DRAFTED BY: CEN
DESIGNED BY: JSM
PROJECT ENGINEER: LRJ
DATE: 8-27-15
PROJECT NO.: 13125

FIGURE: 3

Figure 4
Soils

AgC—Alderwood gravelly sandy loam, 6 to 15 percent slopes

Map Unit Setting

- Elevation: 50 to 800 feet
- Mean annual precipitation: 25 to 60 inches
- Mean annual air temperature: 48 to 52 degrees F
- Frost-free period: 180 to 220 days

Map Unit Composition

- Alderwood and similar soils: 95 percent
- Minor components: 5 percent

Description of Alderwood

Setting

- Landform: Moraines, till plains
- Parent material: Basal till with some volcanic ash

Properties and qualities

- Slope: 6 to 15 percent
- Depth to restrictive feature: 24 to 40 inches to dense material
- Drainage class: Moderately well drained
- Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
- Depth to water table: About 18 to 37 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water capacity: Very low (about 2.5 inches)

Interpretive groups

- Land capability (nonirrigated): 4s
- Hydrologic Soil Group: B

Typical profile

- 0 to 12 inches: Gravelly ashy sandy loam
- 12 to 27 inches: Very gravelly sandy loam
- 27 to 60 inches: Very gravelly sandy loam

Minor Components

Norma

- Percent of map unit: 1 percent
- Landform: Depressions

Bellingham

- Percent of map unit: 1 percent
- Landform: Depressions

Seattle

- Percent of map unit: 1 percent
- Landform: Depressions

Tukwila

- Percent of map unit: 1 percent
- Landform: Depressions

Shalcar

- Percent of map unit: 1 percent

- Landform: Depressions

SECTION II
CONDITIONS AND REQUIREMENTS SUMMARY

CORE REQUREMENTS

The Project must comply with the following Core and Special Requirements:

- C.R. #1 Discharge at the Natural Location: **Runoff will discharge at the natural location located at the eastern edge of the Site, and will be conveyed by the proposed 12-inch storm line to the existing conveyance system.**
- C.R. #2 Offsite analysis: **An offsite analysis is included in Section III.**
- C.R. #3 Flow Control: **The project is located within the Level 2 Flow Control Area. Through dispersal, infiltration, and pervious pavement the Project will cause an increase of less than 0.1cfs for the 100-year storm.**
- C.R. #4 Conveyance System: **The conveyance system will be designed to convey the 100-year peak developed flow.**
- C.R. #5 Erosion and Sediment Control: **The Project provides the nine minimum ESC measures (see Section VII).**
- C.R. #6 Maintenance and Operations: **An Operation and Maintenance Manual is included in Section X**.
- C.R. #7 Financial Guarantees: **Prior to commencing construction, the Applicant must post a drainage facilities restoration and site stabilization financial guarantee**
- C.R. #8 Water Quality: **The Project is located within the Basic Water Quality Treatment Area. Total Pollution Generating Impervious Surface (P.G.I.S.) is less than 5,000 s.f. so no water quality treatment is proposed.**
- S.R.#1 Other Adopted Area-Specific Requirements:

  Seasonal Clearing Restrictions: **This project is required by the City of Kirkland Addendum to the 2009 King County Surface Water Design Manual to comply with KCC 16.82.095(A). Clearing and grading shall not be allowed during the period from October 1st through March 31st, unless otherwise approved.**

  Significant Tree Retention: **This project will be required to meet significant tree retention requirements of the City of Kirkland.**
- S.R.#2 Floodplain/Floodway Delineation: **Not applicable for this project.**
- S.R.#3 Flood Protection Facilities: **Not applicable for this project.**
- S.R.#4 Source Control: **Not applicable for this project.**
- S.R.#5 Oil Control: **Not applicable for this project.**

SECTION III
OFFSITE ANALYSIS

A Level One Downstream Analysis prepared by D.R. STRONG Consulting Engineers Inc. is included in this section.

LEVEL ONE DOWNSTREAM ANALYSIS

for

Bakhchinyan Short Plat

9032 116th Avenue N.E. Kirkland, WA

LUAY R. JOUDEH
STATE OF WASHINGTON
32162
REGISTERED
PROFESSIONAL ENGINEER

8/5/14

DRS Project No. 13125
City of Kirkland File No. PRE14-00668

Owner/Applicant

Maxim Lissak
11121 NE 53rd Street
Kirkland, WA 98033

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Report Issue Date

August 1, 2014

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LEVEL ONE DOWNSTREAM ANALYSIS

BAKHCHINYAN SHORT PLAT

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Disclaimer

THIS REPORT WAS PREPARED AT THE REQUEST OF MAXIM LISSAK FOR THE 0.62 ACRE PARCEL KNOWN AS A PORTION OF THE NORTHWEST QUARTER OF SECTION 4, TOWNSHIP 25, RANGE 5 EAST, W.M., IN KING COUNTY, TAX PARCEL NUMBER 1238501180. D.R. STRONG CONSULTING ENGINEERS INC. (DRS) HAS PREPARED THIS REPORT FOR SPECIFIC APPLICATION ON THUS REPORT, OR ANY OF ITS CONTENTS FOR ANY REVISIONS OF THIS PROJECT, OR ANY PROJECT, OR BY OTHERS NOT DESCRIBED ABOVE, IS FORBIDDEN WITHOUT THE EXPRESSED PERMISSION BY DRS.

TASK 1 DEFINE AND MAP THE STUDY AREA

This Offsite Analysis was prepared in accordance with Core Requirement #2, Section 1.2.2 of the 2009 King County Surface Water Design Manual (Manual). The Site is located at 9032 116th Ave. N.E. Kirkland, WA 98033.

See Figure 1, Figure 2, and Figure 3 for maps of the study area.

FIGURE 1
VICINITY MAP

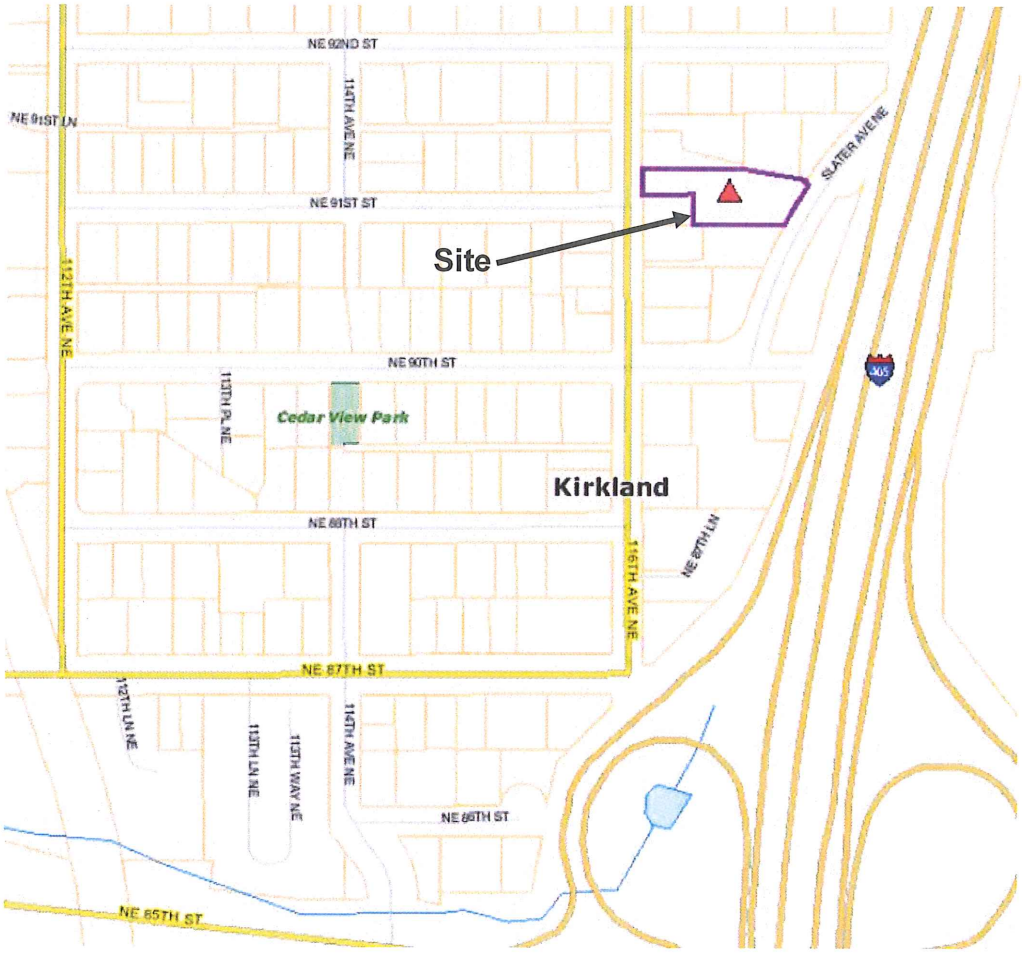

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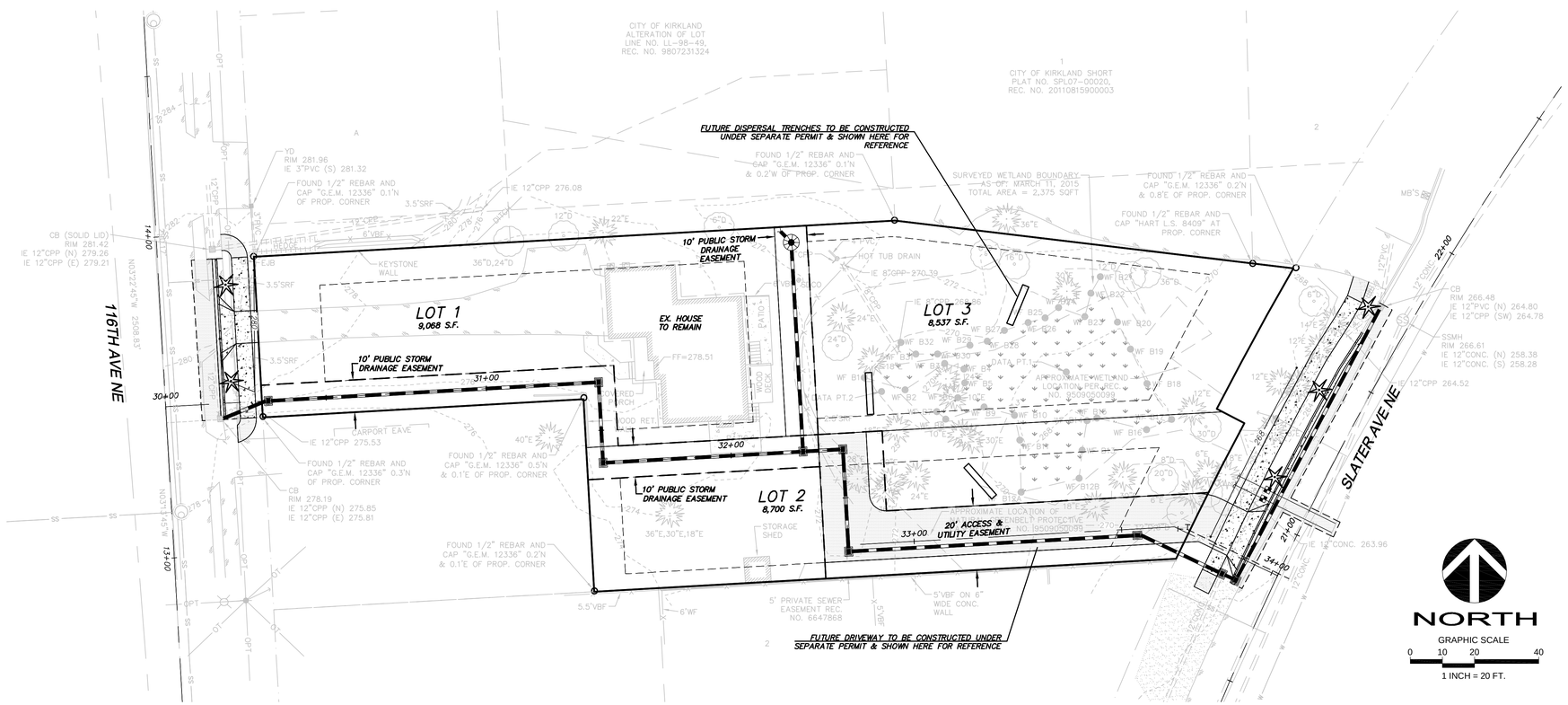
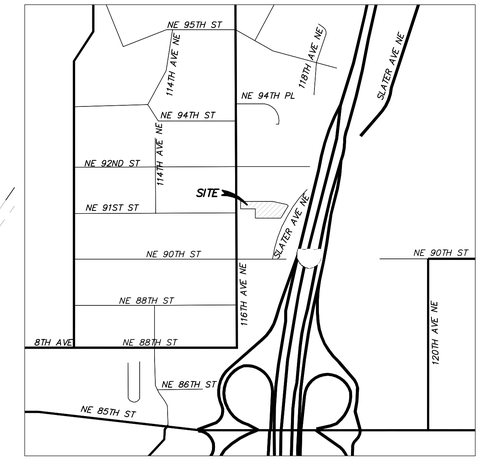
FIGURE 2
SITE MAP

NW 1/4 SECTION 4, TOWNSHIP 25 N, RANGE 5 E, W.M.

BAKHCHINYAN SHORT PLAT





VICINITY MAP
1"=500'

NORTH

PROJECT CONTACTS

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.....KIRKLAND, WA 98033
.....(425) 672-5079

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.....(425) 827-3063
.....CONTACT: LUAY R. JOUDEH, P.E.
.....EMAIL: LUAY.JOUDEH@DRSTRONG.COM
.....CONTACT: STEPHEN J. SCHREI P.L.S.
.....EMAIL: STEPHEN.SCHREI@DRSTRONG.COM

PROJECT DESCRIPTION:

ADDRESS OF THE PROPERTY:.....9032 116TH AVE NE, KIRKLAND, WA 98033
PARCEL NUMBER:.....1238501180
EXISTING ZONING:.....RS 8.5
NEIGHBORING ZONING:.....RS 8.5
NUMBER OF LOTS:.....3
SITE AREA:.....26,305 S.F. (0.604 ACRES)
PROPOSED USE:.....SINGLE FAMILY RESIDENCE
SEWER AND WATER DISTRICT:.....CITY OF KIRKLAND
TELEPHONE SERVICE:.....QWEST
POWER SOURCE:.....PUGET SOUND ENERGY

SURVEYOR'S NOTES:

1. ALL TITLE INFORMATION SHOWN ON THIS MAP HAS BEEN EXTRACTED FROM NEXTITLE A TITLE AND ESCROW COMPANY SHORT PLAT CERTIFICATE ORDER NO. NXWA-0129436 DATED JANUARY 9, 2014. IN PREPARING THIS MAP, D.R. STRONG CONSULTING ENGINEERS INC. HAS CONDUCTED NO INDEPENDENT TITLE SEARCH NOR IS D.R. STRONG CONSULTING ENGINEERS INC. AWARE OF ANY TITLE ISSUES AFFECTING THE SURVEYED PROPERTY OTHER THAN THOSE SHOWN ON THE MAP AND DISCLOSED BY REFERENCED NEXTITLE A TITLE AND ESCROW COMPANY CERTIFICATE. D.R. STRONG CONSULTING ENGINEERS INC. HAS RELIED WHOLLY ON NEXTITLE A TITLE AND ESCROW COMPANY REPRESENTATIONS OF THE TITLE'S CONDITION TO PREPARE THIS SURVEY AND THEREFORE D.R. STRONG CONSULTING ENGINEERS INC. QUALIFIES THE MAP'S ACCURACY AND COMPLETENESS TO THAT EXTENT.

2. THIS SURVEY REPRESENTS VISIBLE PHYSICAL IMPROVEMENT CONDITIONS EXISTING ON JANUARY 9, 2014. ALL SURVEY CONTROL INDICATED AS "FOUND" WAS RECOVERED FOR THIS PROJECT IN JANUARY, 2014.

3. PROPERTY AREA = 26,305± SQUARE FEET (0.6039± ACRES).

4. ALL DISTANCES ARE IN FEET.

5. THIS IS A FIELD TRAVERSE SURVEY. A LEICA FIVE SECOND COMBINED ELECTRONIC TOTAL STATION WAS USED TO MEASURE THE ANGULAR AND DISTANCE RELATIONSHIPS BETWEEN THE CONTROLLING MONUMENTATION AS SHOWN. CLOSURE RATIOS OF THE TRAVERSE MET OR EXCEEDED THOSE SPECIFIED IN WAC 332-130-090. ALL MEASURING INSTRUMENTS AND EQUIPMENT ARE MAINTAINED IN ADJUSTMENT ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

6. UTILITIES OTHER THAN THOSE SHOWN MAY EXIST ON THIS SITE. ONLY THOSE UTILITIES WITH EVIDENCE OF THEIR INSTALLATION VISIBLE AT GROUND SURFACE ARE SHOWN HEREON. UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY. UNDERGROUND CONNECTIONS ARE SHOWN AS STRAIGHT LINES BETWEEN SURFACE UTILITY LOCATIONS BUT MAY CONTAIN BENDS OR CURVES NOT SHOWN. SOME UNDERGROUND LOCATIONS SHOWN HEREON MAY HAVE BEEN TAKEN FROM PUBLIC RECORDS. D.R. STRONG CONSULTING ENGINEERS INC. ASSUMES NO LIABILITY FOR THE ACCURACY OF PUBLIC RECORDS.

VERTICAL DATUM:

NAVD 88 PER CITY OF KIRKLAND VERTICAL CONTROL.

BENCHMARK:

1. CITY OF KIRKLAND BENCHMARK NO. 32, FOUND CONCRETE MONUMENT WITH 3/8" BRASS PIN DOWN 1.3' IN MONUMENT CASE AT THE INTERSECTION OF NE. 100TH STREET AND 116TH AVENUE NE, ELEVATION = 354.89 FEET.

REFERENCES:

1. THE PLAT OF BURKE & FARRAR'S KIRKLAND ADDITION TO THE CITY OF SEATTLE, DIVISION NO. 14, RECORDED IN VOLUME 20 OF PLATS, PAGE 14.

2. RECORD OF SURVEY RECORDED VI VOLUME 8 OF SURVEYS, PAGE 128, UNDER RECORDING NUMBER 7701109004.

3. CITY OF KIRKLAND SHORT PLAT NO. SPL08-00020, RECORDED UNDER RECORDING NUMBER 20110815900003.

4. CITY OF KIRKLAND ALTERATION OF LOT LINE NO. LL-94-88, RECORDED UNDER RECORDING NUMBER 9409280448.

TITLE RESTRICTIONS:

1. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS OF AN EASEMENT FOR A SEWER LINE, AS DISCLOSED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER RECORDING NUMBER 6647868.

2. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS OF A SIDE SEWER EASEMENT AS DISCLOSED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER RECORDING 9504071057 THE LEGAL DESCRIPTION CONTAINED WITHIN SAID INSTRUMENT IS IN SUFFICIENT TO DETERMINE THE EXACT EASEMENT'S LOCATION WITHIN THIS SITE AND IS SHOWN HEREON.

3. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS OF AN EASEMENT FOR A GREENBELT AREA AS DISCLOSED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 9509050099. NOTE: SAID INSTRUMENT INCLUDES A GRAPHIC DEPICTION OF THE EASEMENT AREA WITH BEARINGS AND DISTANCES IDENTIFYING SAID EASEMENT, HOWEVER, THE PROVIDED COPY OF SAID INSTRUMENT IS UNREADABLE THE EASEMENT AREA SHOWN HEREON IS APPROXIMATE ONLY.

4. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS OF A RELEASE OF DAMAGE AGREEMENT AS DISCLOSED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 9410071739.

5. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS OF A RELEASE OF DAMAGE AGREEMENT AS DISCLOSED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 9504071056.

6. THIS SITE IS SUBJECT TO ALL COVENANTS, CONDITIONS, RESTRICTIONS, RESERVATIONS, EASEMENTS OR OTHER SERVITUDES, IF ANY, DISCLOSED BY THE ALTERATION OF LOT LINE ADJUSTMENT NO. LL-94-88 RECORDED UNDER RECORDING NO. 9409280448.

BASIS OF BEARINGS:

N03°13'45"W BETWEEN THE MONUMENT FOUND IN PLACE ALONG THE CENTERLINE OF 116TH AVENUE NE. PER REFERENCE 1.

Call 2 Working Days Before You Dig
811
Utilities Underground Location Center
(ID,MT,ND,OR,WA)

LEGAL DESCRIPTION

LOT 3, BLOCK 49, BURKE AND FARRAR'S KIRKLAND ADDITION TO THE CITY OF SEATTLE, DIVISION NO. 14, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 20 OF PLATS, PAGE(S) 14, RECORDS OF KING COUNTY, WASHINGTON.

EXCEPT THE SOUTH 60 FEET OF THE WEST 100 FEET THEREOF; AND

EXCEPT THAT PORTION DESCRIBED AS FOLLOWS:
BEGINNING AT THE NORTHWEST CORNER OF SAID LOT 3; THENCE EAST ALONG THE NORTH LINE THEREOF 200 FEET; THENCE SOUTH PARALLEL TO THE WEST LINE OF SAID LOT 3 TO A POINT 110 FEET SOUTH OF THE NORTH LINE OF LOT 2 IN SAID BLOCK 49; THENCE WESTERLY TO A POINT ON THE WEST LINE OF SAID LOT 3 WHICH IS 10 FEET SOUTHERLY OF THE POINT OF BEGINNING; THENCE NORTH ALONG SAID WEST LINE 10 FEET TO THE POINT OF BEGINNING; AND

EXCEPT PORTION FOR STATE HIGHWAY NO. 2-A AS CONVEYED BY WARRANTY DEED UNDER
RECORDING NUMBER 4366401; AND

EXCEPT THAT PORTION DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTHWESTERLY CORNER OF SAID LOT 3; THENCE NORTH 86°46'15" EAST ALONG THE NORTHERLY LINE OF SAID LOT 3, 200.00 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING ALONG SAID NORTHERLY LINE 146.63 FEET TO INTERSECT A POINT ON A CURVE TO THE LEFT FROM WHICH THE CENTER LIES SOUTH 56°29'04" EAST 957.00 FEET DISTANT; THENCE SOUTHWESTERLY ALONG SAID CURVE TO THE LEFT THROUGH A CENTRAL ANGLE OF 02°21'19" AN ARC DISTANCE OF 39.34 FEET; THENCE NORTH 83°08'55" WEST 125.69 FEET; THENCE NORTH 03°13'45" WEST 10.00 FEET TO THE POINT OF BEGINNING;

(ALSO KNOWN AS LOT A, CITY OF KIRKLAND ALTERATION OF LOT LINE NO. LL-94-88, RECORDED UNDER RECORDING NUMBER 9409280448, IN KING COUNTY, WASHINGTON).

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.

TYPICAL BUILDING SETBACKS:

UNLESS OTHERWISE NOTED, BUILDING SETBACKS ARE AS FOLLOWS:

FRONT YARD SETBACK:	20 FEET
SIDE YARD SETBACK:	5 FEET
REAR SETBACK:	10 FEET

NOTES:

1. EXISTING SINGLE FAMILY RESIDENCE TO REMAIN, GROSS FLOOR AREA APPROX 2,880 S.F.
2. NO PROPOSED DISTURBANCE OF UNREGULATED WETLAND WITHOUT SEPARATE PERMIT.
3. SHARED ACCESS DRIVEWAY AND DISPERSION TRENCHES SHOWN FOR REFERENCE AND WILL BE CONSTRUCTED UNDER SEPARATE PERMIT.

LEGEND:

FOUND MONUMENT AS NOTED
FOUND CORNER MONUMENT AS NOTED
POWER POLE
LIGHT POLE
GUY ANCHOR
POWER METER
FIRE HYDRANT
WATER VALVE
CATCH BASIN
YARD DRAIN
SANITARY MANHOLE
GAS METER
DECIDUOUS TREE, 12"D
EVERGREEN TREE, 12"E
SDCO STORM DRAIN CLEANOUT
EJB ELECTRICAL JUNCTION BOX
VBF VERTICAL BOARD FENCE
WF WOOD FENCE
SRF SPLIT RAIL FENCE
MB MAIL BOX
FF FINISH FLOOR ELEVATION
RPE ROOF PEAK ELEVATION
OPT OVERHEAD POWER & TELEPHONE
OT OVERHEAD TELEPHONE
EDGE OF PAVEMENT
FENCE

AREA BREAKDOWN

EXISTING IMPERVIOUS AREA:

LOT 1 (9,068 S.F.)

ROOF:	1,750 S.F.
CONCRETE PATH:	87 S.F.
DRIVEWAY:	1,548 S.F.
CONCRETE PATIO:	264 S.F.
TOTAL EXISTING IMPERVIOUS AREA:	3,649 S.F.

PROPOSED NEW AND REPLACED IMPERVIOUS:

LOT 2 (8,700 S.F.)

MAX COVERAGE:	50%
MAX IMPERVIOUS PER CODE:	4,350 S.F.
PROPOSED IMPERVIOUS	
SHARED DRIVEWAY (FUTURE):	2,120 S.F.
LOT DRIVEWAY (FUTURE):	400 S.F
HOUSE FOOTPRINT (FUTURE):	1,460 S.F. (LIMITED BY WETLAND AND SETBACKS)

LOT 3 (8,537 S.F.)

MAX COVERAGE: 50%	
MAX IMPERVIOUS PER CODE:	4,269 S.F.
PROPOSED IMPERVIOUS	
LOT DRIVEWAY (FUTURE):	400 S.F
HOUSE FOOTPRINT (FUTURE):	2,019 S.F. (LIMITED BY WETLAND AND SETBACKS)
TOTAL NEW AND REPLACED IMPERVIOUS AREA:	6,399 S.F.
TOTAL NEW PGIS:	2,920 S.F.

FRONTAGE:

NEW/ REPLACED IMPERVIOUS:	2,063 S.F.

LOT AREAS:

ZONE:	RS 8.5
MINIMUM LOT AREA:	8,500 S.F.
SITE AREA:	26,305 S.F. (0.604 ACRES)
MAXIMUM UNITS	3.09 D.U.
PROPOSED UNITS	3 D.U.
LOT 1 AREA:	9,068 S.F.
LOT 2 AREA:	8,800 S.F.
LOT 3 AREA:	8,538 S.F.

CONDITIONS OF APPROVAL

1. THIS APPLICATION IS SUBJECT TO THE APPLICABLE REQUIREMENTS CONTAINED IN THE KIRKLAND MUNICIPAL CODE, ZONING CODE, AND BUILDING AND FIRE CODE. ATTACHMENT 3, DEVELOPMENT STANDARDS, IS PROVIDED IN THIS REPORT TO FAMILIARIZE THE APPLICANT WITH SOME OF THESE DEVELOPMENT REGULATIONS. THIS ATTACHMENT REFERENCES CURRENT REGULATIONS AND DOES NOT INCLUDE ALL OF THE ADDITIONAL REGULATIONS. IT IS THE RESPONSIBILITY OF THE APPLICANT TO ENSURE COMPLIANCE WITH THE VARIOUS PROVISIONS CONTAINED IN THESE ORDINANCES. WHEN A CONDITION OF APPROVAL CONFLICTS WITH A DEVELOPMENT REGULATION IN ATTACHMENT 3, THE CONDITION OF APPROVAL SHALL BE FOLLOWED.
2. PRIOR TO RECORDING THE SHORT PLAT, THE APPLICANT SHALL:
   A. OBTAIN A DEMOLITION PERMIT FROM THE CITY OF KIRKLAND AND REMOVE THE DECK ATTACHED TO THE EXISTING RESIDENCE AND THE EXISTING SHED, ALONG WITH THE PORTION OF THE PATIO THAT CROSSES THE PROPOSED PROPERTY LINE BETWEEN LOTS 1 AND 2 (SEE CONCLUSION V.B).
   B. RECORD ON THE FACE OF THE PLAT ACCESS EASEMENTS WHICH PROVIDE CLEAR AND ADEQUATE ACCESS AND ONSITE TURNAROUND CAPABILITIES FOR THE PROPOSED LOTS 2 AND 3 (SEE CONCLUSION V.C).

SHEET INDEX:

C1 OF 8 COVER SHEET
C2 OF 8 TESC PLAN
C3 OF 8 TESC NOTES & DETAILS
C4 OF 8 ROAD AND STORM DRAINAGE PLAN
C5 OF 8 SEWER AND WATER PLAN
C6 OF 8 NOTES AND DETAILS
C7 OF 8 DETAILS
C8 OF 8 DETAILS

D.R. STRONG CONSULTING ENGINEERS
ENGINEERS PLANNERS SURVEYORS
620 - 7th AVENUE KIRKLAND, WA 98033
O 425.827.3063 F 425.827.2423

BAKHCHINYAN SHORT PLAT
COVER SHEET
9032 116TH AVENUE NE
KIRKLAND WA, 98033
PARCEL: 1238501180

MAXIM LISSAK
11121 NE 53RD STREET
KIRKLAND WA, 98033
425-672-5079

DRAFT
LUAY R. JOUDEH
STATE OF WASHINGTON
32182
REGISTERED
PROFESSIONAL ENGINEER

DRAFT
STEPHEN J. SCHREI
STATE OF WASHINGTON
37550
REGISTERED
PROFESSIONAL LAND SURVEYOR

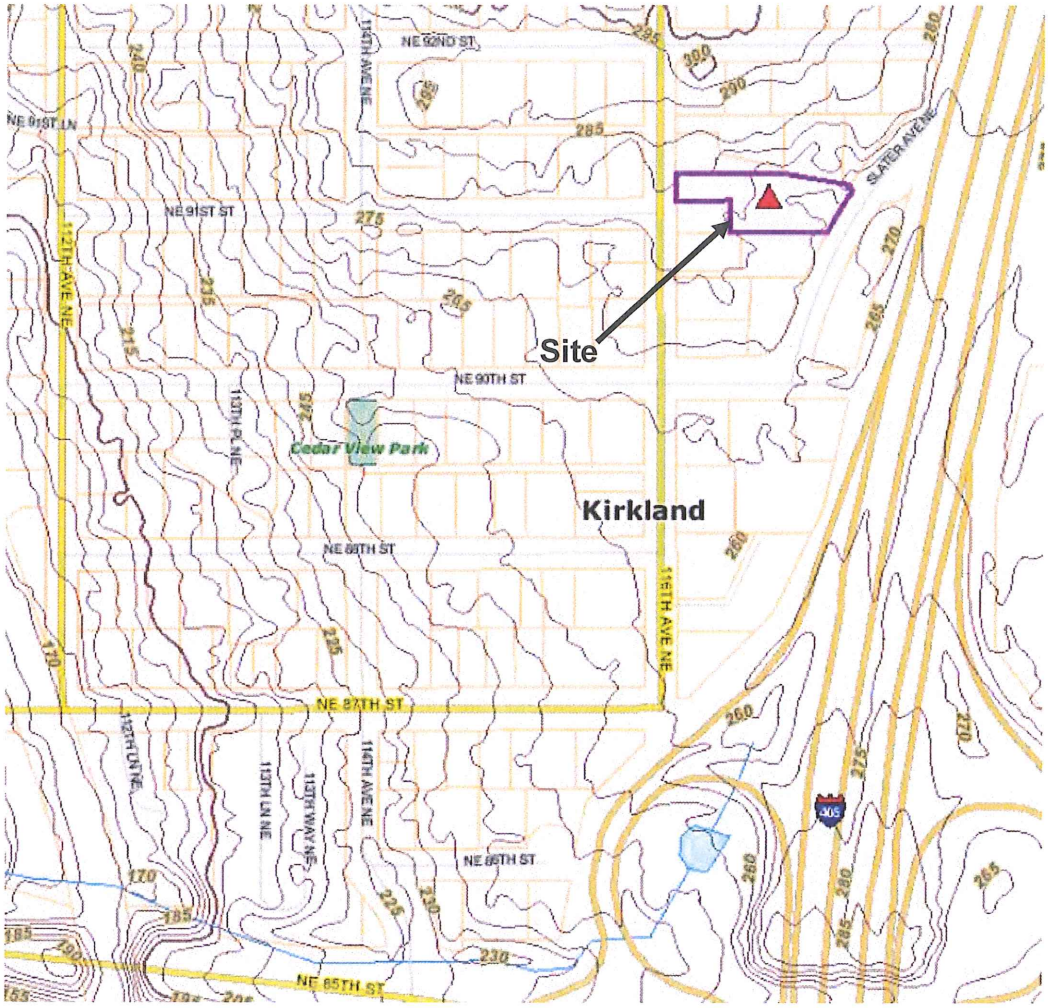
DATE	REVISION	APR

DRAFTED BY: DLR
DESIGNED BY: LRJ
PROJECT ENGINEER: LRJ
DATE: 8.26.15
PROJECT NO.: 13125

DRAWING: C1
SHEET: 1 OF 8

R:\2013\1\13125\3\Drawings\Plots\Engineering\01-3CVR13125.dwg 8/26/2015 5:04:40 PM PDT COPYRIGHT © 2015, D.R. STRONG CONSULTING ENGINEERS INC.

FIGURE 3
KING COUNTY IMAP TOPOGRAPHY



Legend

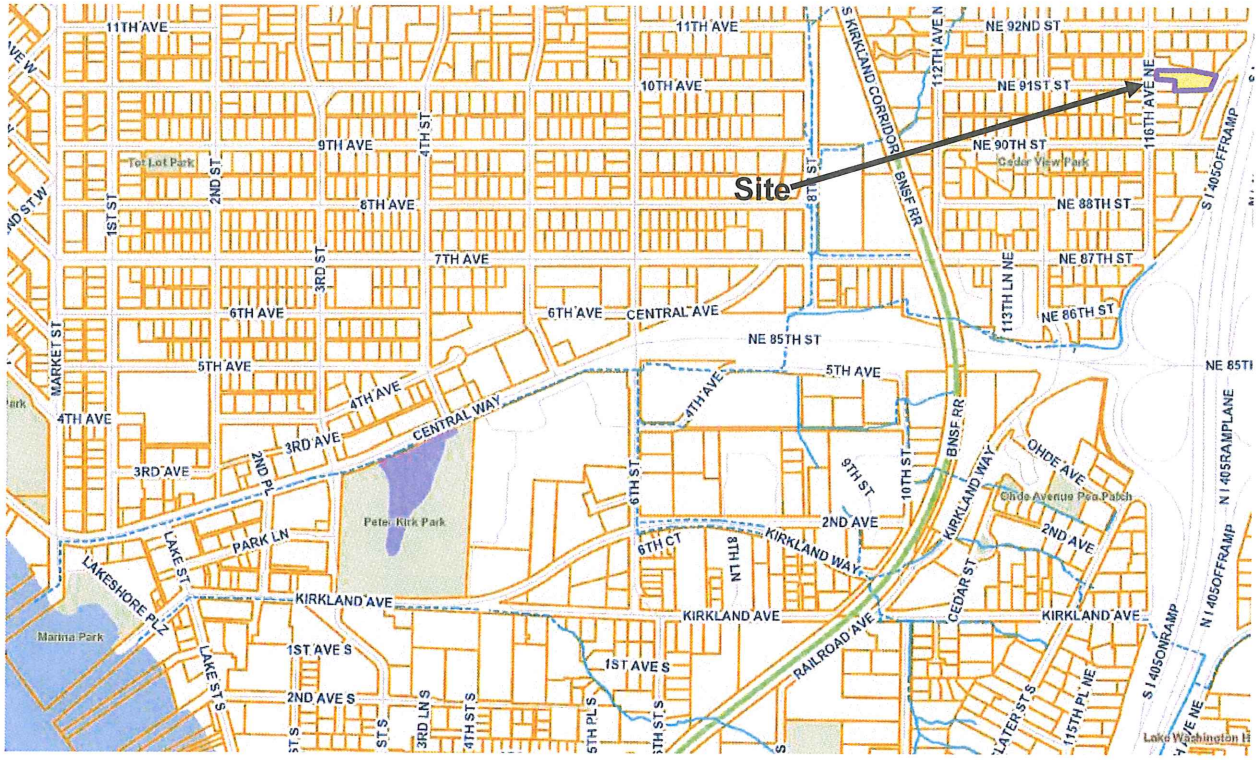
- Highlighted Feature
- County Boundary
- Mountain Peaks
- Contours (5ft dark)
  - 100; 500; 1000
  - Other
- Highways
- Streets
  - Highway
  - Arterials
  - Local
- Parcels
- Lakes and Large Rivers
- Streams

TASK 2 RESOURCE REVIEW

- City of Kirkland Sensitive Areas Map. The site is in the Moss Bay drainage basin, denoted as a "Secondary Basin" by the City of Kirkland. According to City of Kirkland communication (Bakhchinyan Property Short Plat File No. SPLXX-XXXXX), Class B streams in a Secondary Basin have a 50 foot wide buffer. The entire subject short plat site is outside of the required buffer and 10 foot buffer setback.
- Floodplain/Floodway (FEMA) Map: *No floodplains exist on site, See Figure 9.*
- Other Offsite Analysis Reports: *None available at this time.*
- Sensitive Areas Folio Maps: *See Figures 4-8 for documentation of the distance downstream from the proposed project to the nearest critical areas. Included, are sections of the King County Sensitive Areas Folio which indicate the following:*
    - **Figure 4 Streams and 100-Year Floodplains and Floodway:** *The stream that site runoff discharges into, located south of NE 86th Street and north of NE 85th Street is unclassified according to King County. However, as noted above the City of Kirkland classifies the un-named stream as "Class B." King County maps shows the un-named stream contributing to the 100-year floodplain area at Peter Kirk Park, approximately 1.1 miles downstream of the Site. However, Kirkland's "Kirkland Sensitive Areas Map" shows the stream runoff bypassing Peter Kirk Park.*
    - **Figure 5 Wetlands:** *There are no mapped Wetland Areas in the downstream path, extending to Lake Washington.*
    - **Figure 6 Erosion Hazard:** *There are no mapped Erosion Hazard Areas in the downstream path, extending to Lake Washington.*
    - **Figure 7 Landslide Hazard:** *There is a mapped Landslide Hazard Area in the downstream path located north and south of NE 85th Street between 114th avenue NE and 6th Street. This is slope fill from NE 85th Street. The downstream path bypasses this landslide hazard area through a piped network.*
    - **Figure 8 Seismic Hazard:** *There are no mapped Seismic Hazard Areas in the downstream path, extending to Lake Washington.*
- DNRP Drainage Complaints and Studies: A*s shown in Figure 10, there are drainage complaints in the downstream path. However, these complaints are not relevant to the project because they are not reoccurring complaints.*
- Road Drainage Problems: *None noted.*
- USDA King County Soils Survey: *See Figure 11.*
- Wetlands Inventory: *City of Kirkland GIS Portal – The City of Kirkland GIS Portal revealed no additional wetlands within the downstream path (See Figure 5).*
- Migrating River Studies: *None are applicable to the site.*

- Washington State Department of Ecology's latest published Clean Water Act Section 303d list of polluted waters: *None listed along the downstream path.*
- King County Designated Water Quality Problems: *None at this time.*
- Adopted Stormwater Compliance Plans: *None applicable to this site.*
- Basin Reconnaissance Summary Reports: *None available at this time*

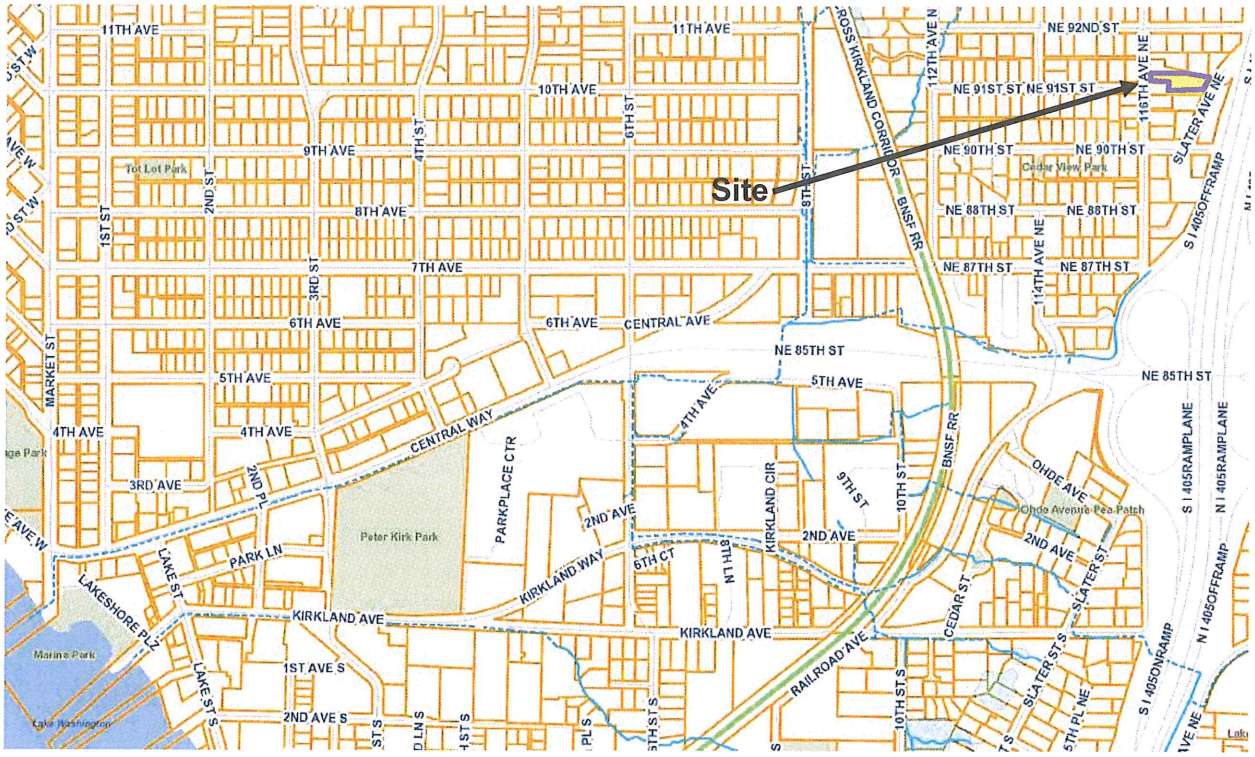
FIGURE 4
STREAMS AND 100-YEAR FLOODPLAINS AND FLOODWAY



Legend

- Streams
  - Open
  - Pipe
- Floodplain
- City Limits
- Cross Kirkland Corridor
- Regional Rail Corridor
- Streets
- Parcels
- Lakes
- Parks
- Schools
- wtrbdy_area

FIGURE 5
CITY OF KIRKLAND WETLANDS MAP



Legend

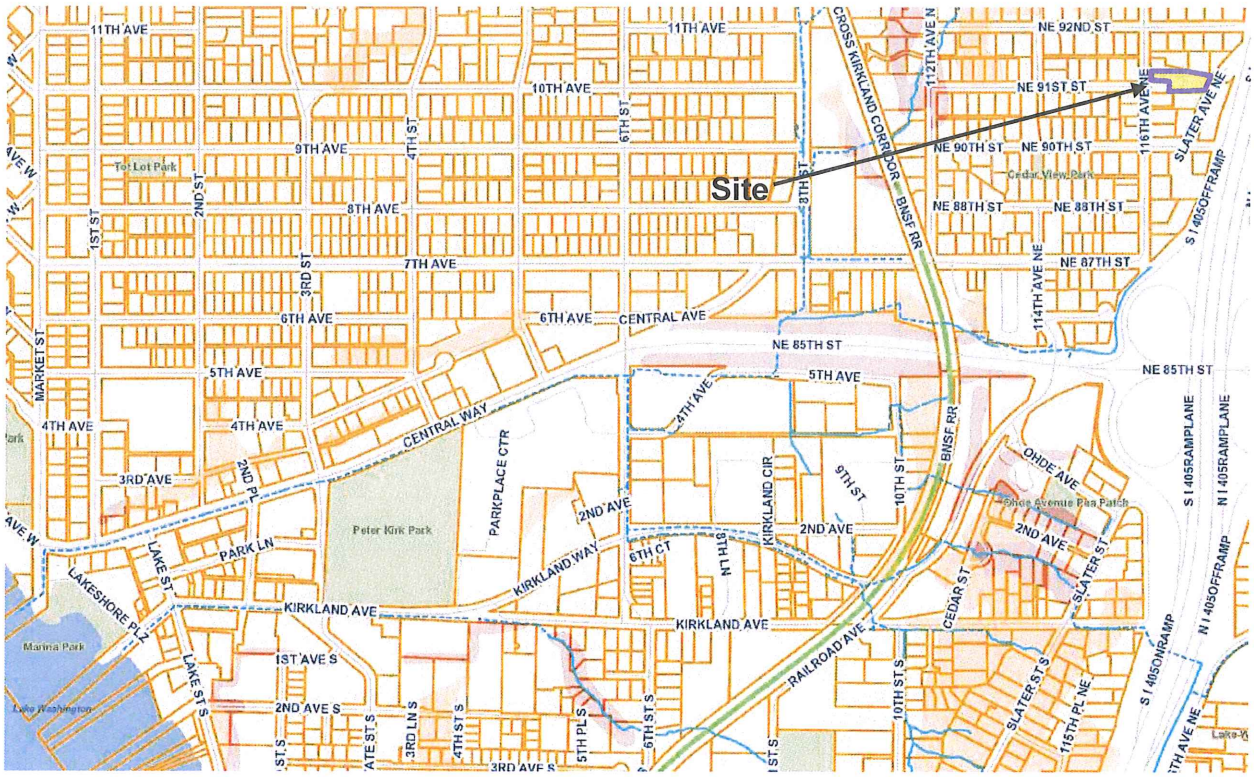
- Streams
  - Open
  - Pipe
- Wetlands
- City Limits
- Cross Kirkland Corridor
- Regional Rail Corridor
- Streets
- Parcels
- Lakes
- Parks
- Schools
- wtrbdy_area

FIGURE 6
KING COUNTY IMAP EROSION HAZARD AREAS

Legend

- Highlighted Feature
- County Boundary
- Mountain Peaks
- Highways
- Streets
- Highway (cont)
- Arterials
- Local
- Parcels
- Lakes and Large Rivers
- Streams
- SAO Erosion

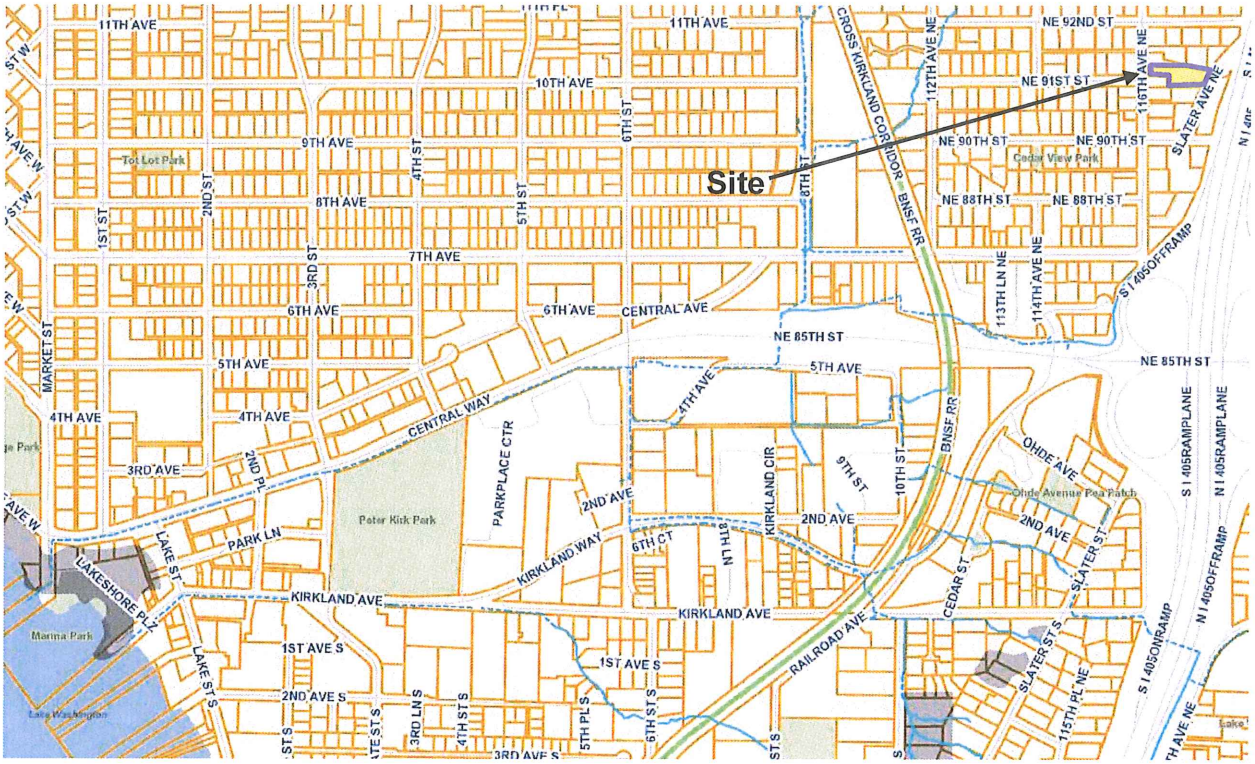
FIGURE 7
CITY OF KIRKLAND GIS PORTAL LANDSLIDE HAZARD AREAS



Legend

- Streams
  - Open
  - Pipe
- Landslide
  - High
  - Medium
- City Limits
- Cross Kirkland Corridor
- Regional Rail Corridor
- Streets
- Parcels
- Lakes
- Parks
- Schools
- wtrbdy_area

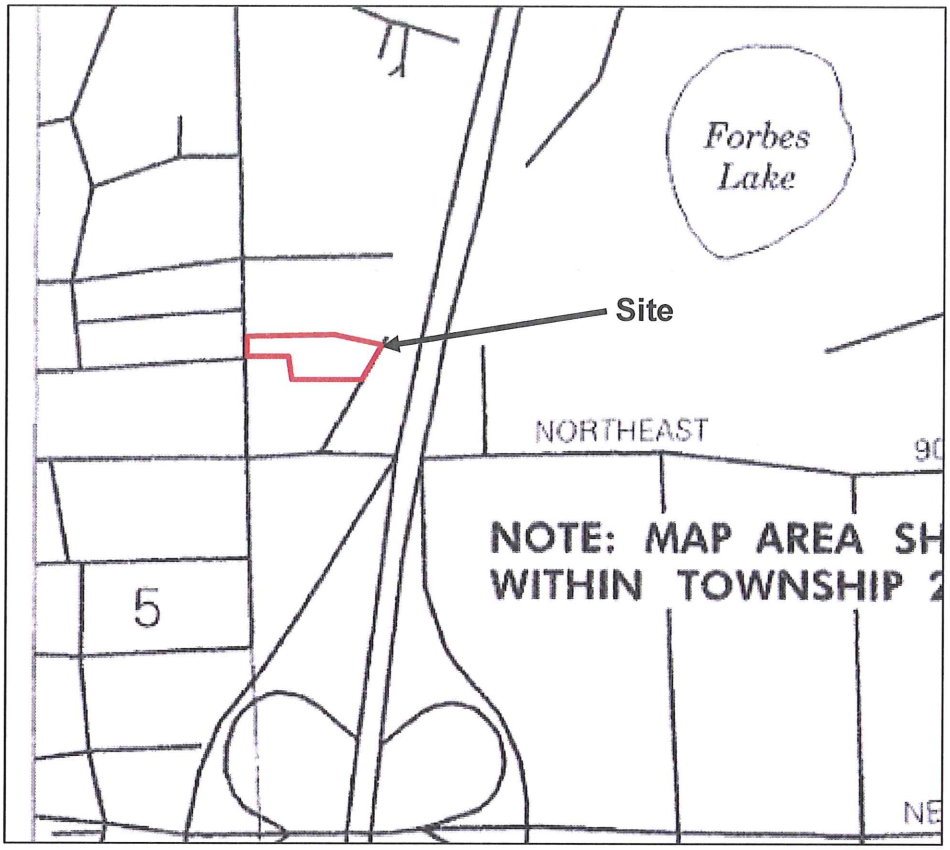
FIGURE 8
CITY OF KIRKLAND GIS PORTAL SEISMIC HAZARD AREAS



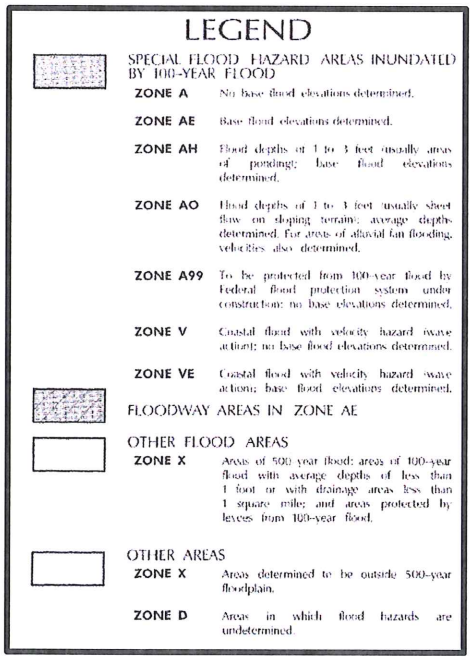
Legend

- Streams
  - Open
  - Pipe
- Seismic
- City Limits
- Cross Kirkland Corridor
- Regional Rail Corridor
- Streets
- Parcels
- Lakes
- Parks
- Schools
- wtrbdy_area

FIGURE 9
FEMA FLOOD INSURANCE RATE MAP



Site in "Zone X", outside of 500-yr FP. Portion of Map Number 53033C0370



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

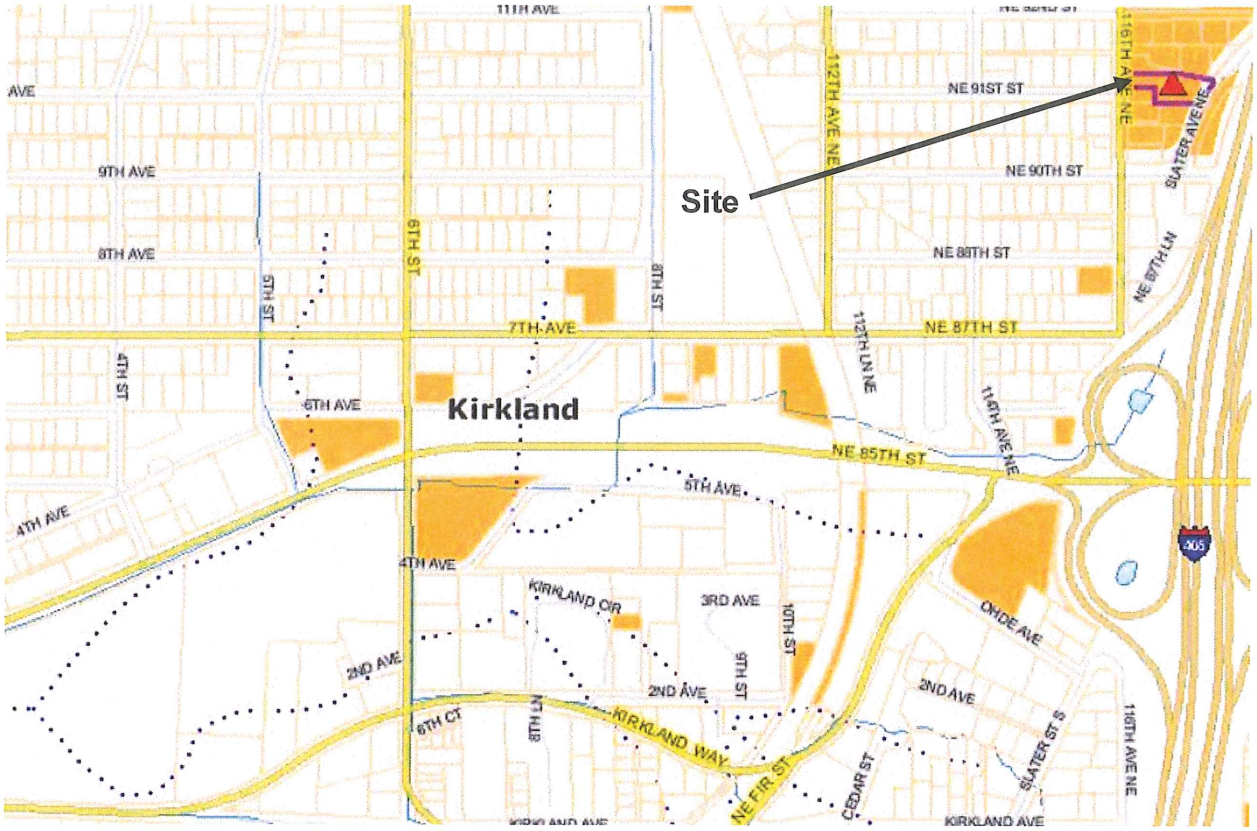
ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

FIGURE 10
KING COUNTY IMAP DRAINAGE COMPLAINTS



Legend

- Selected Parcels
- County Boundary
- Mountain Peaks
- Highways
- Incorporated Area
- Streets
- (cont)
- Highway
- Arterials
- Local
- Parcels
- Lakes and Large Rivers
- Streams
- Drainage Complaints

FIGURE 11
USDA KING COUNTY SOILS SURVEY MAP

AgC—Alderwood gravelly sandy loam, 6 to 15 percent slopes

Map Unit Setting

- Elevation: 50 to 800 feet
- Mean annual precipitation: 25 to 60 inches
- Mean annual air temperature: 48 to 52 degrees F
- Frost-free period: 180 to 220 days

Map Unit Composition

- Alderwood and similar soils: 95 percent
- Minor components: 5 percent

Description of Alderwood

Setting

- Landform: Moraines, till plains
- Parent material: Basal till with some volcanic ash

Properties and qualities

- Slope: 6 to 15 percent
- Depth to restrictive feature: 24 to 40 inches to dense material
- Drainage class: Moderately well drained
- Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
- Depth to water table: About 18 to 37 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water capacity: Very low (about 2.5 inches)

Interpretive groups

- Land capability (nonirrigated): 4s
- Hydrologic Soil Group: B

Typical profile

- 0 to 12 inches: Gravelly ashy sandy loam
- 12 to 27 inches: Very gravelly sandy loam
- 27 to 60 inches: Very gravelly sandy loam

Minor Components

Norma

- Percent of map unit: 1 percent
- Landform: Depressions

Bellingham

- Percent of map unit: 1 percent
- Landform: Depressions

Seattle

- Percent of map unit: 1 percent
- Landform: Depressions

Tukwila

- Percent of map unit: 1 percent
- Landform: Depressions

Shalcar

- Percent of map unit: 1 percent
- Landform: Depressions

TASK 3 FIELD INSPECTION

UPSTREAM TRIBUTARY AREA

In evaluating the upstream area, a site visit was aided by aerial topography from King County iMap, the City of Kirkland GIS portal, and Google Earth, as well as stream and basin information mapped on the Kirkland Sensitive Areas Map. The site *may* receive minor runoff from upstream lawn areas from six lots to the north.

The Site will receive runoff from as far north as the catch basin on the northeastern corner of 116th Avenue NE and NE 94th Place. This runoff heads south as pipe flow to a catch basin in 116th Avenue NE even with the northern property line of the Site. From here runoff heads east as pipe flow along southern property line of the property adjacent to the north. Flow continues east for approximately 87' until it outlets to a stream just north of the southern property line of the property to the north. This stream flows east along the adjacent neighbor's southern property line for approximately 120' until it enters the northeastern part of the Site and continues to flow southeast. Runoff from the six lots north heads south and southeast to the Site.

There is a catch basin on 116th Avenue NE that is even with the southwestern property line. This catch basin sends runoff east as pipe flow onto the Site. Once on the site it flows through a grass-lined ditch towards the wetland.

GENERAL ONSITE AND OFFSITE DRAINAGE DESCRIPTION

The 0.60 acre parcel is located on the east side of 116th Avenue NE. The existing home and garage are located approximately 2' below the 116th Avenue road grade. Downspouts discharge to the ground. On the northern part of the Site, runoff heads east as sheet flow until it converges with the stream on the eastern part of the Site. On the southern part of the Site, runoff heads east as channel flow through a grass-lined ditch (3'-5' bottom, 13'-15' top, 2'-2.5' deep) located on the southwestern property line. Runoff heads east as channel flow for approximately 100' until it continues southeast as sheet flow across the center of the property and then east to the Type 2 Wetland located on the east part of the Site. Once in the wetland and stream, runoff outlets to a ditch on the east side of the Site.

Runoff heads south to NE 90th Street and then continues east to a catch basin on the west side of I-405 south. It heads southwest for approximately 0.25 miles, outfalls to an un-named stream and continues west for approximately 276', then continues west in a piped network along NE 85th Street for approximately 1.25 miles before it outfalls to Lake Washington, a distance of approximately 1.6 miles from the Site.

TASK 4 DRAINAGE SYSTEM DESCRIPTION AND PROBLEM DESCRIPTIONS

DRAINAGE SYSTEM DESCRIPTION

The downstream analysis is illustrated and detailed in the Downstream Analysis Summary table and Offsite Analysis Figure which follow. The downstream area is located within the Moss Bay drainage basin. A field reconnaissance was done on January 8, 2014. The weather was cloudy and there was light to steady rain the time of the walk. Water was visible in parts of the downstream path.

DOWNSTREAM PATH TDA 1

Point "A1" is the NDA of TDA 1. It is located just south of the approximated midpoint of the eastern property line for 9032 116th Avenue NE (±0').

From Point "A1" to Point "B1" runoff heads east as sheet flow across native vegetation. No flow was observed (±0'-16').

Point "B1" runoff enters a native vegetation ditch (1' bottom, 6' top, 1.5' deep) located on the west side of Slater Avenue (±16').

From Point "B1" to Point "C1" runoff heads south as channel flow. Trickle flow was observed (±16'-53').

Point "C1" is the inlet of a 12-inch diameter concrete pipe located on the west side of Slater Avenue NE (±53').

From Point "C1" to Point "D1" runoff heads south as pipe flow via 12-inch diameter concrete pipe. Trickle flow was observed (±53'-134').

Point "D1" runoff enters a Type 1 catch basin on the west side of Slater Avenue NE. No flow was observed (±134').

From Point "D1" to Point "E1" runoff heads south as pipe flow via a 12-inch concrete pipe. Light flow was observed (±134'-205').

Point "E1" runoff enters a Type 1 catch basin on the west side of Slater Avenue NE (±205').

From Point "E1" to Point "F1" runoff heads south as pipe flow via a 12-inch diameter concrete pipe. Light flow was observed (±205'-312').

Point "F1" runoff enters a Type 1 catch basin on the west side of Slater Avenue NE (±312').

From Point "F1" to Point "G1" runoff heads east as pipe flow via an 18-inch diameter reinforced concrete pipe. Light flow was observed (±312'-354').

Point "G1" runoff enters a native vegetation ditch (1' bottom, 5' top, 1.5' deep) located on the east side of Slater Ave NE (±354').

From Point "G1" to Point "H1" runoff heads south as channel flow. No flow was observed, however standing water visible (±354'-366').

Point "H1" is the inlet of a 12-inch diameter concrete pipe located on the east side of Slater Avenue NE (±366').

From Point "H1" to Point "I1" runoff heads south as pipe flow via a 12-inch diameter concrete pipe. Trickle flow was observed (±366'-384').

Point "I1" runoff enters a Type 1 catch basin located on the northeastern corner of the intersection of Slater Avenue NE and NE 90th Street (±384').

From Point "I1" to Point "J1" runoff heads east as pipe flow via a 12-inch diameter concrete pipe. No flow was observed (±384'-510').

Point "J1" runoff enters a Type 1 catch basin just east of the wall at the eastern end of NE 90th Street and west of the south I-405 off ramp (±510').

From Point "J1" to "K1" runoff heads south as pipe flow via an 18-inch reinforced concrete pipe. Steady was observed (±510'-629').

Point "K1" runoff enters a Type 2 catch basin on the western side of the south I-405 off ramp (±629').

From Point "K1" to Point "L1" runoff heads south as pipe flow via an 18-inch diameter reinforced concrete pipe. Steady flow was observed (±629'-772').

Point "L1" runoff enters a Type 2 catch basin located on the western side of the south I-405 off ramp (±772').

From Point "L1" to "M1" runoff heads southwest as pipe flow via an 18-inch diameter reinforced concrete pipe. Steady flow was observed (±772'-1,018').

Point "M1" runoff enters a Type 2 catch basin located on the western side of the southI-405 off ramp (±1,018').

From Point "M1" to Point "N1" runoff heads southwest as pipe flow via an 18-inch diameter reinforced concrete pipe. Steady flow was observed (±1,018'- 1,162').

Point "N1" runoff enters a Type 2 catch basin located on the western side of the south I-405 off ramp (±1,162').

From Point "N1" to Point "O1" runoff heads southeast as pipe flow via a 24-inch diameter corrugate aluminum pipe. Steady flow was observed (±1,162'-1,269').

Point "O1" runoff enters a Type 1 catch basin located east of the south I-405 off ramp and west of the south I-405 ramp lane (±1,269').

From Point "O1" to point "P1" runoff heads southwest as pipe flow via a 24-inch diameter corrugated aluminum pipe. The catch basin at P1 was inaccessible (±1,269'-1,437').

Point "P1" runoff enters a Type 1 catch basin just north of the center of the south I-405 on ramp (±1,437').

From Point "P1" to Point "Q1" runoff heads southwest as pipe flow via a 30-inch diameter corrugated aluminum pipe. Steady flow was observed (±1,437'-1,700').

Point "Q1" runoff enters a Type 1 catch basin located on the eastern side of the south I-405 off and on ramps just north of NE 85th Street (±1,700').

From Point "Q1" to Point "R1" runoff heads west as pipe flow via a 30-inch diameter corrugated aluminum pipe. Steady flow was observed (±1,700'-1,819').

Point "R1" runoff outfalls to a stream located on the west side of the south I-405 off ramp (±1,819').

This stream continues west along NE 85th Street and then into a pipe network that eventually outfalls to Lake Washington approximately 1.25 miles west.

FIGURE 12
OFFSITE ANALYSIS

FIGURE 13
DOWNSTREAM TABLE

Basin: Moss Bay Subbasin Name: N/A Subbasin Number: N/A

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance From site Discharge, FT (Google Earth)	Existing Problems	Potential Problems	Observations of field inspector resource reviewer, or resident
See map	Type: sheet flow, swale, Stream, channel, pipe, Pond; Size: diameter Surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 mi=1,320 ft	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts.
A1	APPROXIMATE MIDDLE OF EAST PROPERTY LINE	DISCHARGE FROM SITE		±0'	NONE OBSERVED	NONE ANTICIPATED	
A1-B1	EASTERLY CHANNEL FLOW	NATIVE VEGETATION			NONE OBSERVED	NONE ANTICIPATED	NO FLOW OBSERVED
B1	DITCH	NATIVE VEGETATION (1' BOTTOM, 6' TOP, 1.5' DEEP)		±16'	PONDING	NONE ANTICIPATED	
B1-C1	SOUTHERLY CHANNEL FLOW	NATIVE VEGETATION			PONDING	NONE ANTICIPATED	NO FLOW OBSERVED
C1	PIPE INLET	12" Ø CONCRETE		±53'	THICK NATIVE VEGETATION AND LEAVES AT PIPE INLET	NONE ANTICIPATED	
C1-D1	SOUTHERLY PIPE FLOW	12" Ø CONCRETE			NONE OBSERVED	NONE ANTICIPATED	TRICKLE FLOW OBSERVED
D1	CATCH BASIN	-INLET (N) -OUTLET (S)		±134'		NONE ANTICIPATED	

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance From site Discharge, FT (Google Earth)	Existing Problems	Potential Problems	Observations of field inspector resource reviewer, or resident
See map	Type: sheet flow, swale, Stream, channel, pipe, Pond; Size: diameter Surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 mi=1,320 ft	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts.
D1-E1	SOUTHERLY PIPE FLOW	12" Ø CONCRETE			NONE OBSERVED	NONE ANTICIPATED	LIGHT FLOW OBSERVED
E1	CATCH BASIN	-INLET (N) -OUTLET (S)		±205'	NONE OBSERVED	NONE ANTICIPATED	
E1-F1	SOUTHERLY PIPE FLOW	12" Ø CONCRETE			NONE OBSERVED	NONE ANTICIPATED	LIGHT FLOW OBSERVED
F1	CATCH BASIN	-INLET (N) -OUTLET (E)		±312'	NONE OBSERVED	NONE ANTICIPATED	
F1-G1	EASTERLY PIPE FLOW	18" Ø REINFORCED CONCRETE			NONE OBSERVED	NONE ANTICIPATED	LIGHT FLOW OBSERVED
G1	DITCH	NATIVE VEGETATION (1' BOTTOM, 5' TOP, 1.5' DEEP)		±354'	NATIVE VEGETATION, SEDIMENT, AND LEAVES AT PIPE OUTLET	NONE ANTICIPATED	
G1-H1	SOUTHERLY CHANNEL FLOW	NATIVE VEGETATION			NONE OBSERVED	NONE ANTICIPATED	STANDING WATER OBSERVED

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance From site Discharge, FT (Google Earth)	Existing Problems	Potential Problems	Observations of field inspector resource reviewer, or resident
See map	Type: sheet flow, swale, Stream, channel, pipe, Pond; Size: diameter Surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 mi=1,320 ft	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts.
H1	PIPE INLET	12" Ø CONCRETE		±366'	GRASS, SEDIMENT, AND LEAVES BLOCKING NEARLY HALF THE INLET	NONE ANTICIPATED	
H1-I1	SOUTHERLY PIPE FLOW	12" Ø CONCRETE			NONE OBSERVED	NONE ANTICIPATED	TRICKLE FLOW OBSERVED
I1	CATCH BASIN	-INLET (N) -OUTLET (E)		±384'	NONE OBSERVED	NONE ANTICIPATED	
I1-J1	EATERLY PIPE FLOW	12" Ø CONCRETE			NONE OBSERVED	NONE ANTICIPATED	NO FLOW OBSERVED
J1	CATCH BASIN	-INLET (W) -OUTLET (S)		±510'	NONE OBSERVED	NONE ANTICIPATED	
J1-K1	SOUTHERLY PIPE FLOW	18" Ø REINFORCED CONCRETE			NONE OBSERVED	NONE ANTICIPATED	STEADY FLOW OBSERVED
K1	CATCH BASIN	INLET (N) -OUTLET (S)		±629'	NONE OBSERVED	NONE ANTICIPATED	
K1-L1	SOUTHERLY PIPE FLOW	18" Ø REINFORCED CONCRETE			NONE OBSERVED	NONE ANTICIPATED	STEADY FLOW OBSERVED

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance From site Discharge, FT (Google Earth)	Existing Problems	Potential Problems	Observations of field inspector resource reviewer, or resident
See map	Type: sheet flow, swale, Stream, channel, pipe, Pond; Size: diameter Surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 mi=1,320 ft	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts.
L1	CATCH BASIN	-INLET (N) -OUTLET (SW)		±772'	NONE OBSERVED	NONE ANTICIPATED	
L1-M1	SOUTHWESTERLY PIPE FLOW	18" Ø REINFORCED CONCRETE			NONE OBSERVED	NONE ANTICIPATED	STEADY FLOW OBSERVED
M1	CATCH BASIN	-INLET (NE) -OUTLET (SW)		±1,018'	NONE OBSERVED	NONE ANTICIPATED	
M1-N1	SOUTHWESTERLY PIPE FLOW	18" Ø REINFORCED CONCRETE			NONE OBSERVED	NONE ANTICIPATED	STEADY FLOW OBSERVED
N1	CATCH BASIN	-INLET (NE) -OUTLET (SE)		±1,162'	NONE OBSERVED	NONE ANTICIPATED	
N1-O1	SOUTHEASTERLY PIPE FLOW	24" Ø CORRUGATED ALUMINUM			NONE OBSERVED	NONE ANTICIPATED	STEADY FLOW OBSERVED
O1	CATCH BASIN	-INLET (NW) -OUTLET (SW)		±1,269'	NONE OBSERVED	NONE ANTICIPATED	
O1-P1	SOUTHWESTERLY PIPE FLOW	24" Ø CORRUGATED ALUMINUM			NONE OBSERVED	NONE ANTICIPATED	CATCH BASIN AT P1 WAS INACCESSIBLE
P1	CATCH BASIN	-INLET (NE) -OUTLET (SW)		±1,437'	NONE OBSERVED	NONE ANTICIPATED	

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance From site Discharge, FT (Google Earth)	Existing Problems	Potential Problems	Observations of field inspector resource reviewer, or resident
See map	Type: sheet flow, swale, Stream, channel, pipe, Pond; Size: diameter Surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 mi=1,320 ft	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts.
P1-Q1	SOUTHWESTERLY PIPE FLOW	30" ø CORRUGATED ALUMINUM			NONE OBSERVED	NONE ANTICIPATED	STEADY FLOW OBSERVED
Q1	CATCH BASIN	-INLET (NE) -OUTLET (W)		±1,700'	NONE OBSERVED	NONE ANTICIPATED	
Q1-R1	WESTERLY PIPE FLOW	30" ø CORRUGATED ALUMINUM			NONE OBSERVED	NONE ANTICIPATED	STEADY FLOW OBSERVED
R1	OUTFALL TO STREAM / END OF DOWNSTREAM PATH	30" ø CORRUGATED ALUMINUM		±1,819'	NONE OBSERVED	NONE ANTICIPATED	STREAM CONTINUES WEST INTO A PIPE NETWORK AND INTO LAKE WASHINGTON

TASK 5 MITIGATION OF EXISTING OR POTENTIAL PROBLEMS

A review of the King County Water and Land Resources Division – Drainage Services Section Documented Drainage Complaints within one mile of the downstream flow paths revealed no complaints within the last ten years. On the King County iMap there are downstream areas that are flagged orange as having drainage complaints. However those complaints are not within the past ten years which deems them irrelevant to this project, according to communication with King County.

The project should not create any problems as specified in Section 1.2.2.1 of the Manual and therefore is not required to provide Drainage Problem Impact Mitigation subject to the requirements of Section 1.2.2.2.

Project runoff will be collected and released per the Manual's requirements to accommodate Level 2 Flow Control and Basic Water Quality requirements. During construction, standard sediment and erosion control methods will be utilized. This will include the use of a stabilized construction entrance, perimeter silt fencing, and other necessary measures to minimize soil erosion during construction.

APPENDIX

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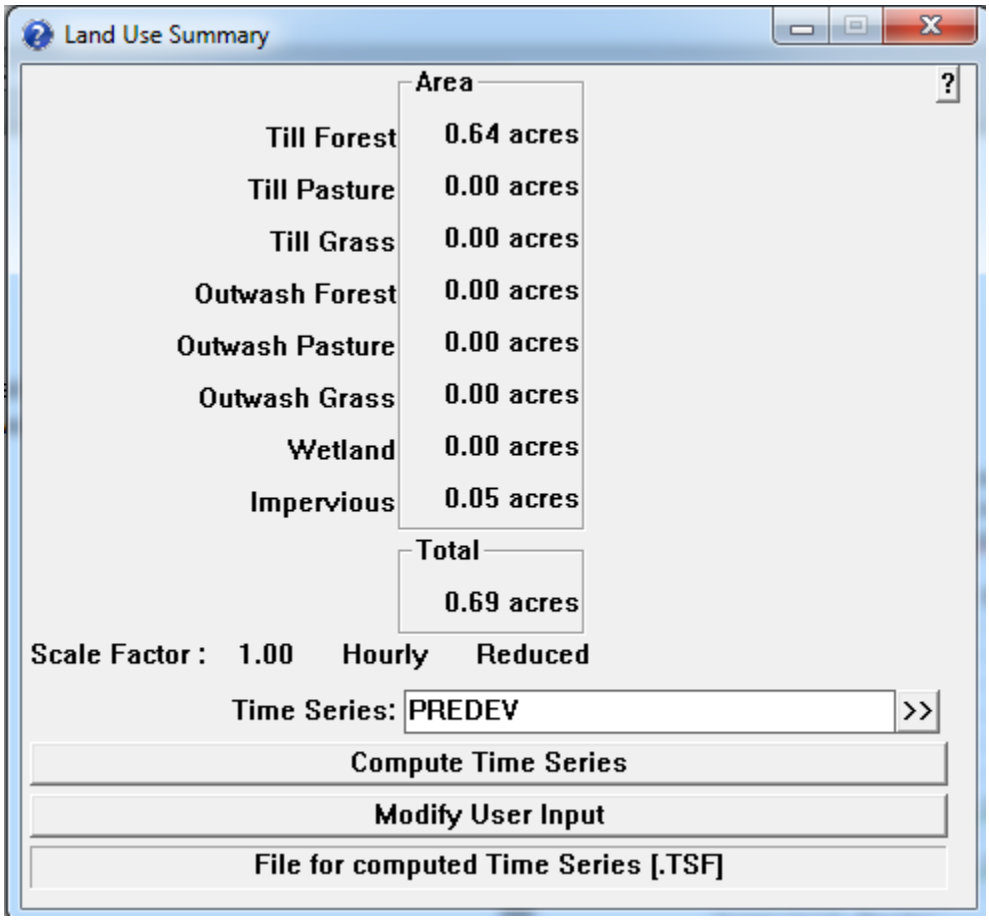
SECTION IV
FLOW CONTROL AND WATER QUALITY FACILITY ANALYSIS AND DESIGN

EXISTING SITE HYDROLOGY (PART A)

KCRTS was used to model the peak runoff from the Site. Per Table 3.2.2.b of the Manual the soil type is modeled as Till for the SCS classification of Alderwood as shown in Figure 4, Soils. Existing surfaces within Lot 1 were excluded from this analysis because they will not be modified. The evaluated Site is modeled as Forest.

Pre-developed Hourly Time Step Modeling Input:

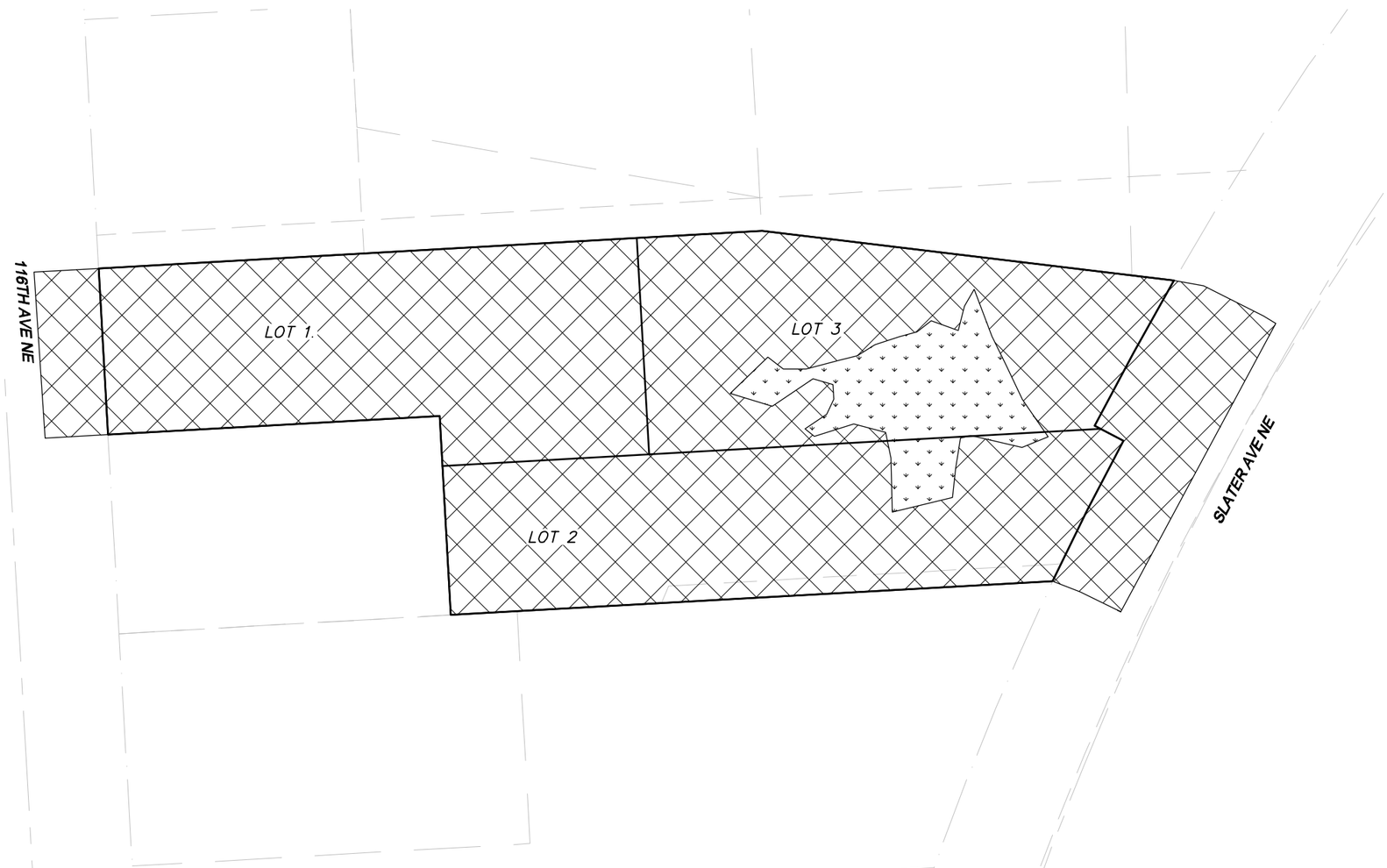


Pre-developed Hourly Time Step Output:

```
              Flow Frequency Analysis
  Time Series File:predev.tsf
  Project Location:Sea-Tac
```

---Annual Peak Flow Rates---			-----Flow Frequency Analysis-------			
Flow Rate (CFS)	Rank	Time of Peak	- - Peaks - - (CFS)	Rank	Return Period	Prob
0.049	2	2/09/01 15:00	**0.072**	**1**	**100.00**	**0.990**
0.022	7	1/05/02 16:00	0.049	2	25.00	0.960
0.043	3	2/28/03 3:00	0.043	3	10.00	0.900
0.013	8	8/26/04 2:00	0.042	4	5.00	0.800
0.026	6	1/05/05 8:00	0.038	5	3.00	0.667
0.042	4	1/18/06 16:00	0.026	6	2.00	0.500
0.038	5	11/24/06 4:00	0.022	7	1.30	0.231
0.072	1	1/09/08 9:00	0.013	8	1.10	0.091
Computed Peaks			0.064		50.00	0.980

Figure 5
Predeveloped Conditions Map



LEGEND:

TILL FOREST (0.64 AC)

WETLAND (0.054 AC)

NORTH

GRAPHIC SCALE

0 20 40 60

1 INCH = 40 FT.

D.R. STRONG
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BAKHCHINYAN SHORT PLAT

FIGURE 5: PREDEVELOPED CONDITIONS
9032 116TH AVE NE
KIRKLAND, WASHINGTON

DRAFTED BY: DLR
DESIGNED BY: JSM
PROJECT ENGINEER: LRJ
DATE: 8-27-15
PROJECT NO.: 13125

FIGURE: 5

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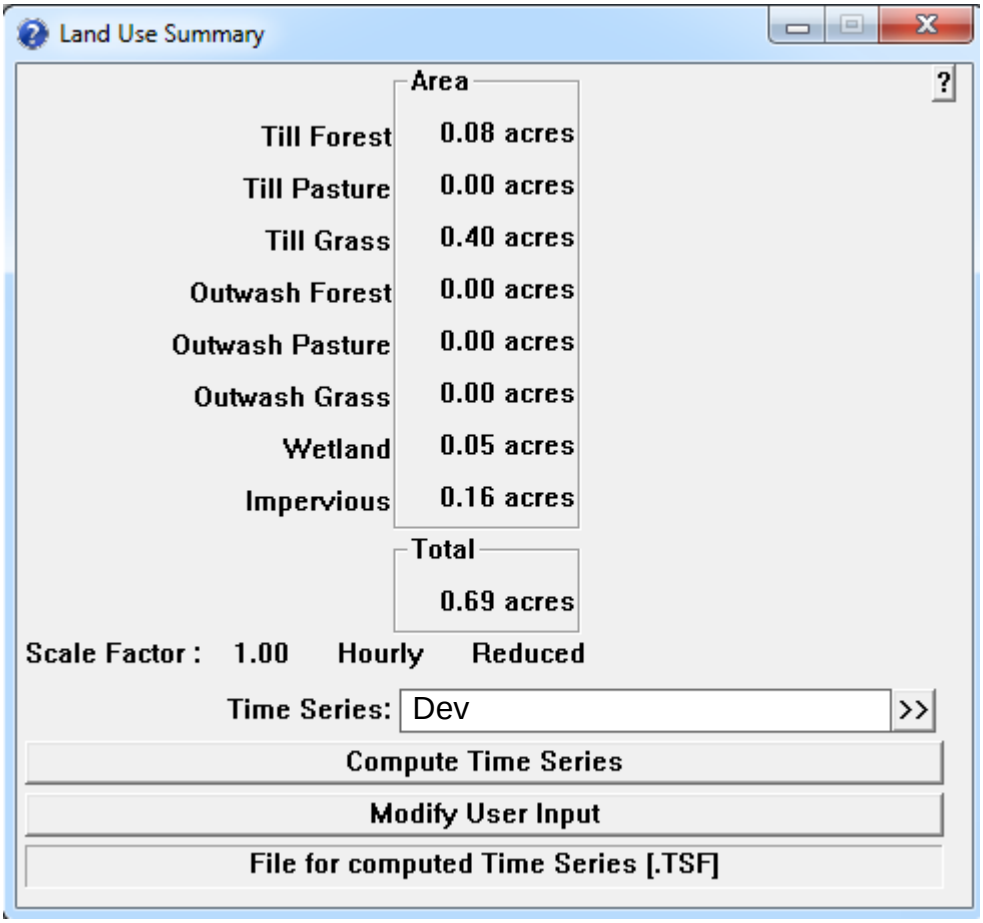
DEVELOPED SITE HYDROLOGY (PART B)

Developed Site Area Hydrology

KCRTS was used to model the developed peak runoffs from the Site. The soil types are unchanged from the pre-developed conditions. The portions of the Site where disturbance is proposed were modeled as Wetland, Till Grass and Impervious as appropriate.

Developed Hourly Time Step Modeling Input:



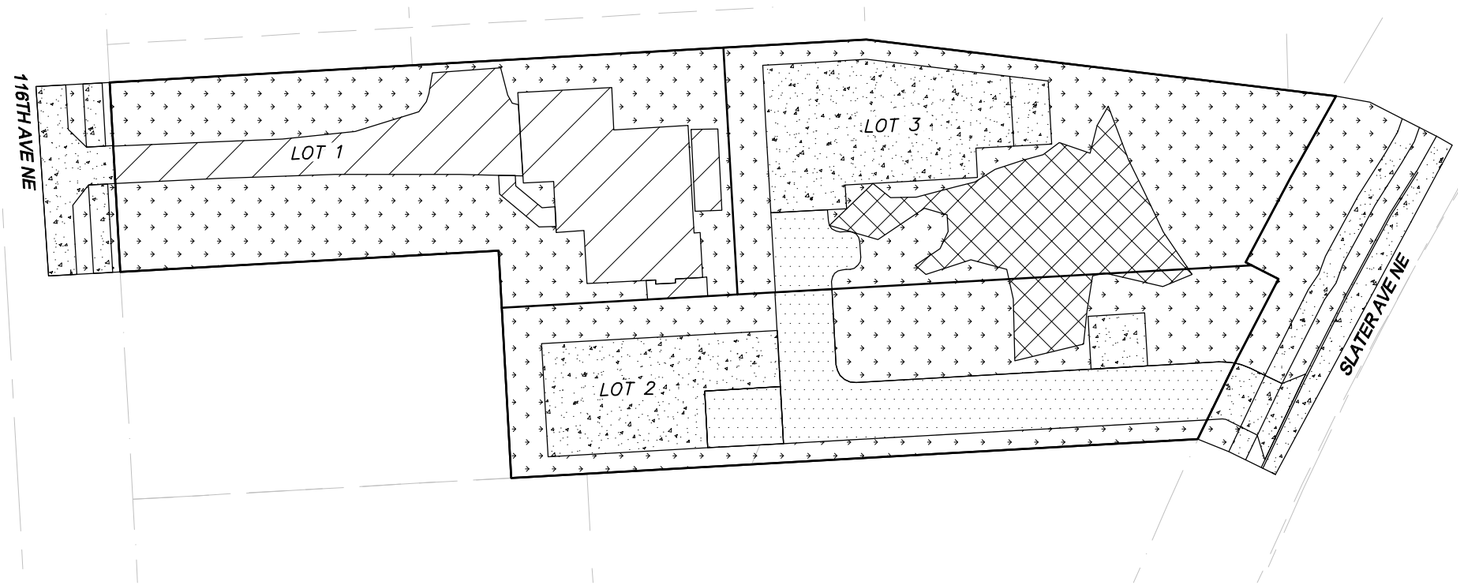
Developed Hourly Time Step Modeling Output:

```
          Flow Frequency Analysis
  Time Series File:dev.tsf
  Project Location:Sea-Tac
```

---Annual Peak Flow Rates---			-----Flow Frequency Analysis-------			
Flow Rate (CFS)	Rank	Time of Peak	- - Peaks - - (CFS)	Rank	Return Period	Prob
0.085	3	2/09/01 2:00	**0.169**	**1**	**100.00**	**0.990**
0.054	7	1/05/02 16:00	0.101	2	25.00	0.960
0.101	2	2/27/03 7:00	0.085	3	10.00	0.900
0.047	8	8/26/04 2:00	0.081	4	5.00	0.800
0.059	6	10/28/04 16:00	0.075	5	3.00	0.667
0.081	4	1/18/06 16:00	0.059	6	2.00	0.500
0.075	5	11/24/06 3:00	0.054	7	1.30	0.231
0.169	1	1/09/08 6:00	0.047	8	1.10	0.091
Computed Peaks			0.146		50.00	0.980

0.169-.072= 0.097cfs < 0.1cfs

Figure 6
Developed Site Map



LEGEND:

- TILL FOREST
- TILL GRASS
- PERVIOUS PAVEMENT
- IMPERVIOUS
- WETLAND

AREA BREAKDOWN

PROPOSED LOT 1:

FULLY DISPERSED IMPERVIOUS (TILL FOREST): 3,616 S.F.
PERVIOUS (TILL GRASS): ..... 5,454 S.F.
TOTAL AREA: ..... 9,070 S.F.

PROPOSED LOT 2:

IMPERVIOUS: ..... 963 S.F.
IMPERVIOUS TO DRY WELL*: ..... 871 S.F.
PERVIOUS PAVEMENT*: ..... 2,520 S.F.
PERVIOUS (TILL GRASS): ..... 4,314 S.F.
WETLAND: ..... 441 S.F.

TOTAL IMPERVIOUS: ..... 4,354 S.F.
TOTAL AREA: ..... 8,709 S.F.

PROPOSED LOT 3:

IMPERVIOUS: ..... 1,566 S.F.
IMPERVIOUS TO DRY WELL*: ..... 855 S.F.
PERVIOUS PAVEMENT*: ..... 400 S.F.
PERVIOUS (TILL GRASS): ..... 3,790 S.F.
WETLAND: ..... 1,934 S.F.

TOTAL IMPERVIOUS: ..... 2,821 S.F.
TOTAL AREA: ..... 8,545 S.F.

PROPOSED ROW IMPROVMENTS:

IMPERVIOUS: ..... 2,096 S.F.
PERVIOUS (TILL GRASS): ..... 1,733 S.F.
TOTAL AREA: ..... 3,788 S.F.

TOTAL NEW/ REPLACED IMPERVIOUS FOR PROJECT:
9,271 S.F.

TOTAL NEW/ REPLACED PGIS FOR THE PROJECT:
4,412 S.F.

TOTALS (KCRTS INPUT):

IMPERVIOUS: ..... 6,947 S.F. (0.159 AC)
PERVIOUS (TILL GRASS): ..... 17,267 S.F. (0.396 AC)
TILL FOREST ..... 3,616 S.F. (0.083 AC)
WETLAND: ..... 2,375 S.F. (0.054 AC)

*MODELED AS 50% TILL GRASS, 50% IMPERVIOUS.
AREAS DRAINING TO DRY WELLS ARE SHOWN AS IMPERVIOUS AND MODELED AS 50% TILL GRASS, 50% IMPERVIOUS

NORTH

GRAPHIC SCALE
0 20 40 60
1 INCH = 40 FT.

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BAKHCHINYAN SHORT PLAT
FIGURE 6: POST-DEVELOPED CONDITIONS
9032 116TH AVE NE
KIRKLAND, WASHINGTON

DRAFTED BY: JSM
DESIGNED BY: JSM
PROJECT ENGINEER: LRJ
DATE: 08/01/2014
PROJECT NO.: 13125

FIGURE: 6

PERFORMANCE STANDARDS (PART C)

The Project is required to meet the Level 2 Flow Control and Basic Water Quality Treatment requirements. The Level 2 performance requires the developed condition discharge rates to match the predeveloped rates ranging from 50% of the two-year peak up to the 50-year peak. The developed Site includes 50% total impervious area with the remainder as landscaping and lawn. The Basic Water Quality Treatment goal is 80% removal of total suspended solids.

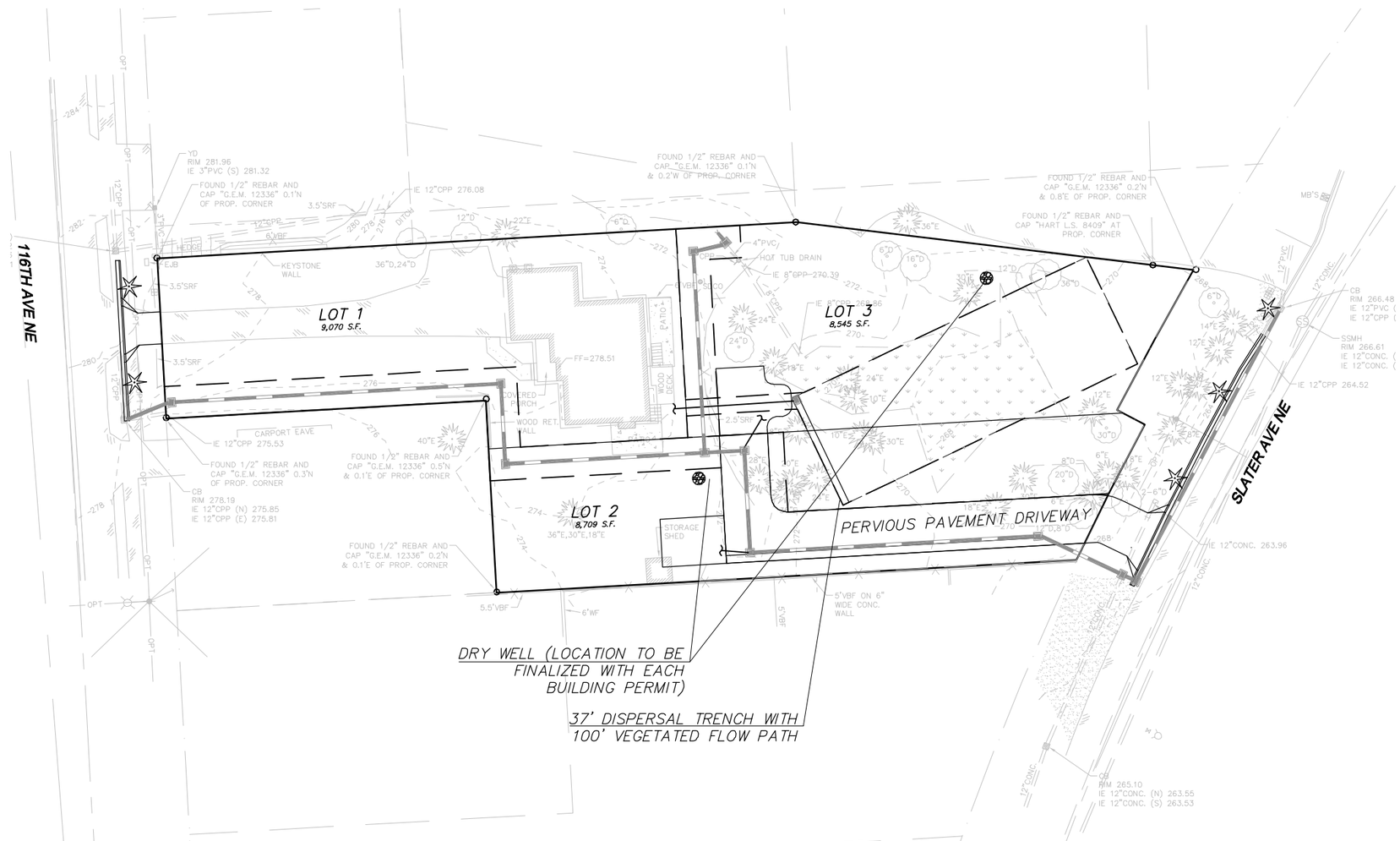
Conveyance criteria for the Project require that all new pipes be designed to convey and contain (at minimum) the 25-year peak flow.

FLOW CONTROL SYSTEM (PART D)

The proposed development to the Site will result in less than a 0.1 cfs increase in peak flows from the predeveloped to developed conditions. Therefore, the project is exempt from providing formal flow control facilities. See KCRTS computations above.

The Project is required to meet the Small Lot BMP requirements for each lot per Section 5.2.1.1 of the Manual. Full dispersion and infiltration are not feasible due to Site restrictions, mainly limited area. The Project proposes to mitigate at least 10% of each new lot area, approximately 907 s.f for lot 1, 870 S.F. for lot 2, and 854 S.F. for lot 3. To meet the Flow Control BMP requirements, lots 2 and 3 will be equipped with an infiltration dry well with overflow connection to the public conveyance system per City of Kirkland Policy L-2. Lot 1 will have a new dispersal trench located on lots 2 and 3. Pervious pavement is also proposed for the driveways. Runoff from remaining impervious areas will be directed to the conveyance system.

Figure 7
Flow Control BMP Sketch



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BAKHCHINYAN SHORT PLAT

FIGURE 7: FLOW CONTROL BMP SKETCH

9032 116TH AVE NE
KIRKLAND, WASHINGTON

DRAFTED BY: DLR
DESIGNED BY: LRJ
PROJECT ENGINEER: LRJ
DATE: 8-27-15
PROJECT NO.: 13125

FIGURE: 7

WATER QUALITY TREATMENT SYSTEM – (PART E)

The Project is located in a Basic Water Quality (WQ) Treatment area, and is proposing less than eight units per acre thus requiring no Enhanced Basic WQ Treatment. However, the Project proposes less than 5,000 s.f. of PGIS and is therefore exempt from the water quality treatment requirements.

SECTION V
CONVEYANCE SYSTEM ANALYSIS AND DESIGN

GENERAL DESIGN PARAMETERS

New pipe systems and ditches/channels are required to be designed with sufficient capacity to convey and contain (at minimum) the 25-year peak flow, assuming developed conditions for onsite tributary areas and existing conditions for any offsite tributary areas. Pipe system structures and ditches/channels may overtop for runoff events that exceed the 25-year design capacity, provided the overflow from a 100-year runoff event does not create or aggravate a severe flooding problem or severe erosion problem as defined in Core Requirement #2. Any overflow occurring onsite for runoff events up to and including the 100-year event must discharge at the natural location for the project site. In residential subdivisions, such overflow must be contained within an onsite drainage easement, tract, covenant or public right-of-way.

Per Core Requirement, #4 of the KCSWDM, the conveyance system must be analyzed and designed for existing tributary and developed onsite runoff from the proposed project. As a conservative assumption and for simplicity, the peak volumetric flow rate for the entire developed Site was calculated using the Rational Method, and applied to each pipe node for analysis using the KCBW program. The flow rate will be calculated during the final engineering stage of the project when the conveyance system is designed.

New Site Drainage Facilities

A conveyance system consisting primarily of pipes and catch basins has been designed for the Project. Onsite runoff will be collected by the multiple catch basins. Pipes are 12-inch diameter PVC material. The pipes will have a minimum slope of 0.50%.

KC Backwater output:

Network 1

```
BACKWATER COMPUTER PROGRAM FOR PIPES
     Pipe data from file:CB1-CB EX SLATER.bwp

     Surcharge condition at intermediate junctions
      Tailwater Elevation:264.84 feet
          Discharge Range:2.44 to 2.72 Step of 0.24 [cfs]
       Overflow Elevation:266.48  feet
                    Weir:NONE
        Upstream Velocity:0. feet/sec


PIPE NO. 1:    5 LF - 12"CP   @  1.00%  OUTLET: 263.84  INLET: 263.89  INTYP: 5
JUNC NO. 1:  OVERFLOW-EL: 266.03  BEND: 90 DEG    DIA/WIDTH: 2.0  Q-RATIO: 0.12

 Q(CFS)   HW(FT)   HW ELEV. * N-FAC   DC    DN    TW    DO    DE    HWO    HWI
*******************************************************************************
   2.44    1.25     265.14  * 0.012  0.67  0.58  1.00  1.00  0.97   1.25   1.11
   2.68    1.31     265.20  * 0.012  0.71  0.62  1.00  1.00  0.97   1.31   1.19
   2.92    1.38     265.27  * 0.012  0.74  0.65  1.00  1.00  0.98   1.38   1.28


PIPE NO. 2:   96 LF - 12"CP   @  0.93%  OUTLET: 263.89  INLET: 264.78  INTYP: 5

 Q(CFS)   HW(FT)   HW ELEV. * N-FAC   DC    DN    TW    DO    DE    HWO    HWI
*******************************************************************************
   2.18    1.03     265.81  * 0.012  0.64  0.56  1.25  1.25  0.65   1.03   0.97
   2.39    1.08     265.86  * 0.012  0.67  0.59  1.31  1.31  0.75   1.08   1.04
   2.61    1.18     265.96  * 0.012  0.70  0.62  1.38  1.38  0.88   1.18   1.11
```

Network 2

```
BACKWATER COMPUTER PROGRAM FOR PIPES
     Pipe data from file:CB1-CB501.bwp

     Surcharge condition at intermediate junctions
      Tailwater Elevation:266.03 feet
          Discharge Range:2.66 to 3.55 Step of 0.35 [cfs]
       Overflow Elevation:272.  feet
                    Weir:NONE
        Upstream Velocity:0. feet/sec

PIPE NO. 1:   29 LF - 12"CP   @  6.41%  OUTLET: 263.84  INLET: 265.70  INTYP: 5
JUNC NO. 1:  OVERFLOW-EL: 268.70  BEND: 29 DEG    DIA/WIDTH: 2.0  Q-RATIO: 0.02

 Q(CFS)   HW(FT)   HW ELEV. * N-FAC   DC    DN    TW    DO    DE    HWO    HWI
*******************************************************************************
   2.66    0.97     266.67  * 0.012  0.70  0.36  2.19  2.19  0.70  *****   0.97
   3.01    1.05     266.75  * 0.012  0.75  0.39  2.19  2.19  0.75  *****   1.05
   3.36    1.15     266.85  * 0.012  0.79  0.41  2.19  2.19  0.79  *****   1.15
   3.71    1.26     266.96  * 0.012  0.83  0.43  2.19  2.19  0.83  *****   1.26
```

PIPE NO. 2: 90 LF - 12"CP @ 0.69% OUTLET: 265.70 INLET: 266.32 INTYP: 5
JUNC NO. 2: OVERFLOW-EL: 271.20 BEND: 90 DEG DIA/WIDTH: 2.0 Q-RATIO: 0.04

Q(CFS)	HW(FT)	HW ELEV.	*	N-FAC	DC	DN	TW	DO	DE	HWO	HWI
2.61	1.17	267.49	*	0.012	0.70	0.69	0.97	0.97	0.70	*****	1.17
2.95	1.34	267.66	*	0.012	0.74	0.76	1.05	1.05	0.90	1.34	1.30
3.29	1.69	268.01	*	0.012	0.78	0.85	1.15	1.15	1.19	1.69	1.46
3.64	2.05	268.37	*	0.012	0.82	1.00	1.26	1.26	1.44	2.05	1.63

PIPE NO. 3: 32 LF - 12"CP @ 0.50% OUTLET: 266.32 INLET: 266.48 INTYP: 5
JUNC NO. 3: OVERFLOW-EL: 271.92 BEND: 90 DEG DIA/WIDTH: 4.0 Q-RATIO: 0.05

Q(CFS)	HW(FT)	HW ELEV.	*	N-FAC	DC	DN	TW	DO	DE	HWO	HWI
2.51	1.44	267.92	*	0.012	0.68	0.76	1.17	1.17	1.15	1.44	1.13
2.84	1.72	268.20	*	0.012	0.73	0.87	1.34	1.34	1.35	1.72	1.25
3.17	2.20	268.68	*	0.012	0.77	1.00	1.69	1.69	1.74	2.20	1.40
3.50	2.72	269.20	*	0.012	0.80	1.00	2.05	2.05	2.16	2.72	1.56

PIPE NO. 4: 12 LF - 12"CP @ 0.50% OUTLET: 266.48 INLET: 266.54 INTYP: 5
JUNC NO. 4: OVERFLOW-EL: 272.38 BEND: 90 DEG DIA/WIDTH: 2.0 Q-RATIO: 0.19

Q(CFS)	HW(FT)	HW ELEV.	*	N-FAC	DC	DN	TW	DO	DE	HWO	HWI
2.39	1.69	268.23	*	0.012	0.67	0.73	1.44	1.44	1.43	1.69	1.09
2.70	2.06	268.60	*	0.012	0.71	0.82	1.72	1.72	1.72	2.06	1.20
3.02	2.64	269.18	*	0.012	0.75	1.00	2.20	2.20	2.22	2.64	1.33
3.33	3.26	269.80	*	0.012	0.79	1.00	2.72	2.72	2.75	3.26	1.48

PIPE NO. 5: 62 LF - 12"CP @ 2.42% OUTLET: 266.85 INLET: 268.35 INTYP: 5

Q(CFS)	HW(FT)	HW ELEV.	*	N-FAC	DC	DN	TW	DO	DE	HWO	HWI
2.01	0.91	269.26	*	0.012	0.61	0.40	1.38	1.38	0.61	*****	0.91
2.27	0.99	269.34	*	0.012	0.65	0.43	1.75	1.75	0.65	*****	0.99
2.53	1.34	269.69	*	0.012	0.69	0.46	2.33	2.33	1.10	1.34	1.08
2.80	2.07	270.42	*	0.012	0.72	0.48	2.95	2.95	1.78	2.07	1.16

Network 3

BACKWATER COMPUTER PROGRAM FOR PIPES
Pipe data from file:CB5-CB EX 116TH AVE.bwp

Surcharge condition at intermediate junctions
Tailwater Elevation:269.36 feet
Discharge Range:0.43 to 0.52 Step of 0.043 [cfs]
Overflow Elevation:276.46 feet
Weir:NONE
Upstream Velocity:0. feet/sec

PIPE NO. 1: 62 LF - 12"CP @ 8.19% OUTLET: 266.54 INLET: 271.62 INTYP: 5
JUNC NO. 1: OVERFLOW-EL: 274.62 BEND: 90 DEG DIA/WIDTH: 2.0 Q-RATIO: 0.00

Q(CFS)	HW(FT)	HW ELEV.	*	N-FAC	DC	DN	TW	DO	DE	HWO	HWI
0.43	0.33	271.95	*	0.012	0.28	0.14	2.82	2.82	0.28	*****	0.33
0.47	0.35	271.97	*	0.012	0.29	0.15	2.82	2.82	0.29	*****	0.35
0.52	0.37	271.99	*	0.012	0.30	0.15	2.82	2.82	0.30	*****	0.37
0.56	0.39	272.01	*	0.012	0.32	0.16	2.82	2.82	0.32	*****	0.39

PIPE NO. 2: 25 LF - 12"CP @ 1.28% OUTLET: 271.62 INLET: 271.94 INTYP: 5
JUNC NO. 2: OVERFLOW-EL: 276.57 BEND: 90 DEG DIA/WIDTH: 2.0 Q-RATIO: 0.09

Q(CFS)	HW(FT)	HW ELEV.	*	N-FAC	DC	DN	TW	DO	DE	HWO	HWI
0.43	0.37	272.31	*	0.012	0.28	0.22	0.33	0.33	0.28	*****	0.37
0.47	0.39	272.33	*	0.012	0.29	0.23	0.35	0.35	0.29	*****	0.39
0.52	0.41	272.35	*	0.012	0.30	0.24	0.37	0.37	0.30	*****	0.41
0.56	0.42	272.36	*	0.012	0.32	0.25	0.39	0.39	0.32	*****	0.42

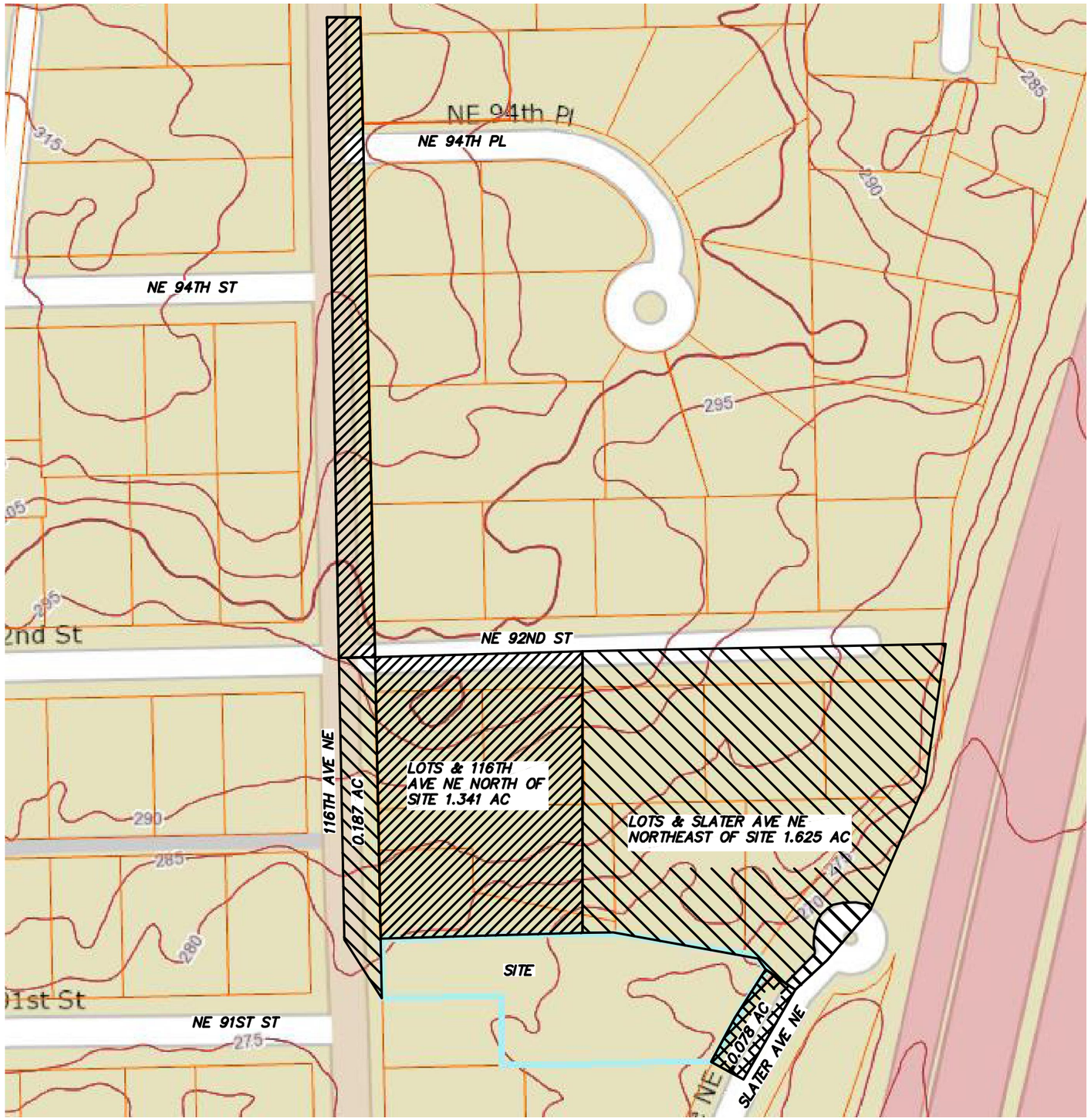
PIPE NO. 3: 104 LF - 12"CP @ 0.50% OUTLET: 271.94 INLET: 272.46 INTYP: 5
JUNC NO. 3: OVERFLOW-EL: 276.46 BEND: 19 DEG DIA/WIDTH: 2.0 Q-RATIO: 0.00

Q(CFS)	HW(FT)	HW ELEV.	*	N-FAC	DC	DN	TW	DO	DE	HWO	HWI
0.39	0.39	272.85	*	0.012	0.26	0.26	0.37	0.37	0.26	0.39	0.35
0.43	0.37	272.83	*	0.012	0.28	0.27	0.39	0.39	0.28	*****	0.37
0.47	0.43	272.89	*	0.012	0.29	0.29	0.41	0.41	0.29	0.43	0.38
0.51	0.45	272.91	*	0.012	0.30	0.30	0.42	0.42	0.30	0.45	0.40

PIPE NO. 4: 16 LF - 12"CP @ 20.94% OUTLET: 272.46 INLET: 275.81 INTYP: 5

Q(CFS)	HW(FT)	HW ELEV.	*	N-FAC	DC	DN	TW	DO	DE	HWO	HWI
0.39	0.26	276.07	*	0.012	0.26	0.11	0.39	0.39	0.26	*****	0.25
0.43	0.28	276.09	*	0.012	0.28	0.11	0.37	0.37	0.28	*****	0.27
0.47	0.29	276.10	*	0.012	0.29	0.12	0.43	0.43	0.29	*****	0.29
0.51	0.30	276.11	*	0.012	0.30	0.12	0.45	0.45	0.30	*****	0.30

Figure 8
Upstream Tributary Areas



NORTH

GRAPHIC SCALE

0 50 100 150

1 INCH = 100 FT.

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DRS

ENGINEERS PLANNERS SURVEYORS
620 - 7th AVENUE KIRKLAND, WA 98033
O 425.827.3063 F 425.827.2423

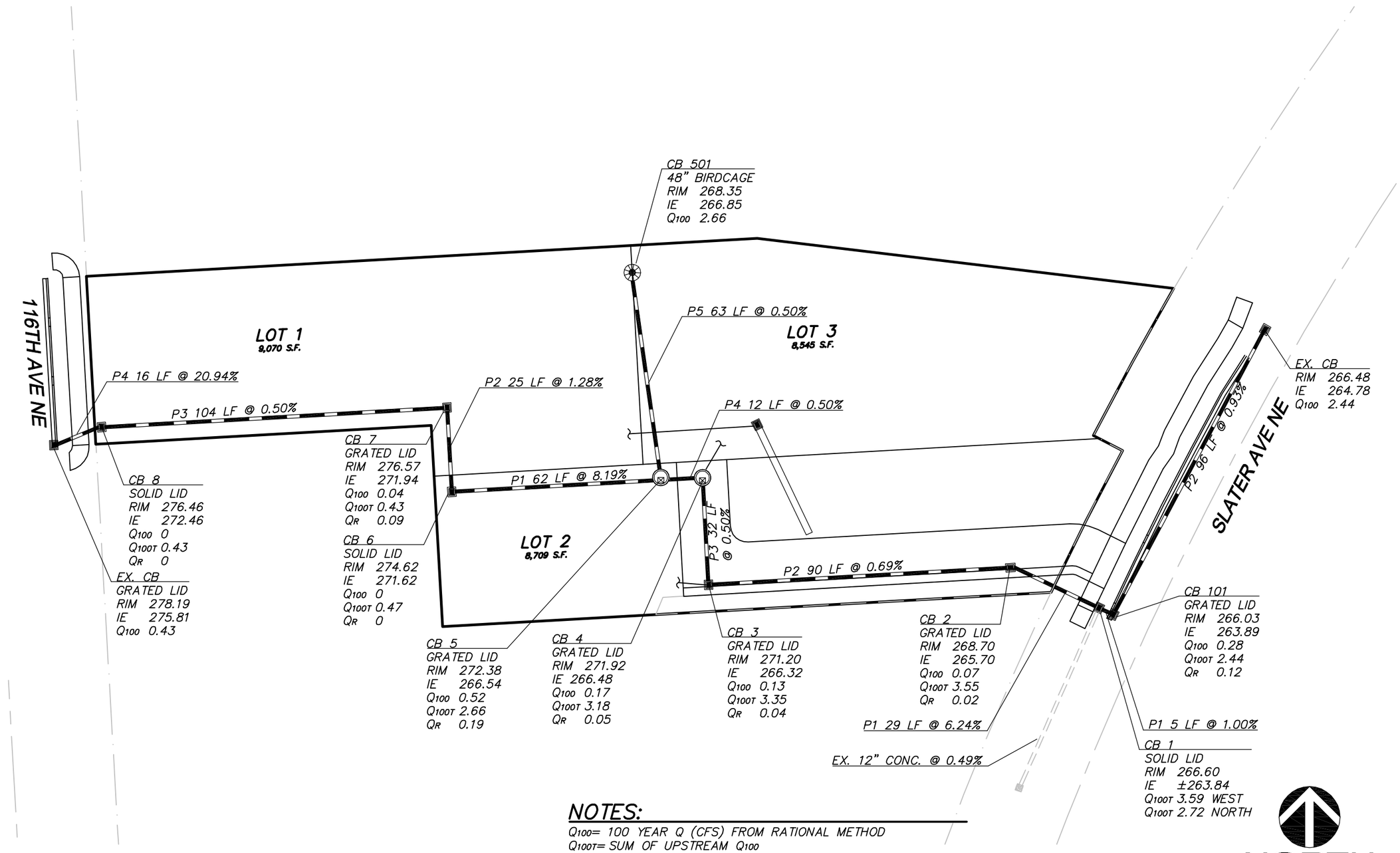
BAKHCHINYAN SHORT PLAT

FIGURE 8: UPSTREAM MAP
9032 116TH AVE NE
KIRKLAND, WASHINGTON

DRAFTED BY: DLR
DESIGNED BY: WJS
PROJECT ENGINEER: LRJ
DATE: 9-3-15
PROJECT NO.: 13125

FIGURE: 8

Figure 9
Backwater Map



NOTES:

Q_{100}= 100 YEAR Q (CFS) FROM RATIONAL METHOD
Q_{100T}= SUM OF UPSTREAM Q_{100}
Q_R= Q RATIO (Q_{100}/Q_{100T})

1. ALL PIPES ARE 12"ø PVC OR DI.
2. ALL CATCH BASINS ARE TYPE 1 UNLESS OTHERWISE NOTED
3. PIPE NUMBERS SHOWN HERE CORRESPOND TO PIPE NUMBERS IN BACKWATER ANALYSIS

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BAKHCHINYAN SHORT PLAT

FIGURE 9: BACKWATER MAP
9032 116TH AVE NE
KIRKLAND, WASHINGTON

DRAFTED BY: DLR
DESIGNED BY: WJS
PROJECT ENGINEER: LRJ
DATE: 9-3-15
PROJECT NO.: 13125

FIGURE: 9

SECTION VI
SPECIAL REPORTS AND STUDIES

1. Bakhchinyan Property Wetland Delineation Report, The Watershed Company, July 18, 2014

July 18, 2014

Ron Hanson
City of Kirkland Planning Department
123 5th Avenue
Kirkland, WA 98033

Re: Bakhchinyan Property Wetland Delineation Report

The Watershed Company Reference Number: 120622.62

Dear Ron:

On July 7, 2014, Ecologist Katy Crandall and I visited the Bakhchinyan property located at 9032 116th Avenue NE in Kirkland (Parcel #1238501180). The purpose of our visit was to conduct a wetland delineation study on the property. 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 Forms (Kirkland and Ecology)

Methods

Public-domain information on the subject properties 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 Ecology (Ecology) interactive mapping program (Washington Coastal Atlas), Washington Department of Fish and Wildlife interactive mapping programs (PHS on the Web and SalmonScape), *Kirkland's Streams, Wetlands and Wildlife Study* (The Watershed Company, 1998) (Kirkland Inventory), City of Kirkland GIS Mapping website, 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. We recorded data at two of these locations.

Delineated wetlands were classified using the *City of Kirkland Wetland Field Data Form* (Kirkland Rating System) and the *Western Washington Wetland Rating System* (Ecology, 2014 Update) (2014 Ecology Rating System). Wetland A is marked with 14 pink- and black-striped flags.

Determining the location of the subject property in relation to the encompassing drainage basin involved a comparison of several different basin maps and an analysis of LIDAR topography depicted on GIS mapping programs.

Findings

The property is located in a residential neighborhood in the Moss Bay Drainage Basin – a secondary basin; Section 22, Township 25 North, Range 5E; Cedar-Sammamish Water Resource Inventory Area (WRIA 8). The Kirkland Inventory and the Washington Coastal Atlas both depict the subject property as located in the Forbes Creek Drainage Basin (a primary basin), while Kirkland GIS mapping and King County iMAP both depict the subject property as located in the Moss Bay Drainage Basin. A review of area topographic maps suggests that beginning just north and east of the subject property all drainage is naturally conveyed towards the southwest, which is directed towards Moss Bay, not Forbes Creek. Therefore, it is our conclusion that the subject property is located in the Moss Bay Drainage Basin.

The approximately 0.6-acre property contains one single-family residence with associated lawn and driveway areas. The developed areas are located on the western portion of the property, while the eastern portion is generally undeveloped. The undeveloped areas contain a forest and scrub-shrub vegetation community, including western red-cedar, bigleaf maple, Himalayan blackberry, and sword fern in the non-wetland areas. One wetland, Wetland A (see below), is located in the eastern portion of the property.

Wetland A

Wetland A is a scrub-shrub wetland dominated by Douglas spirea, twinberry, Himalayan blackberry, lady fern, and reed canarygrass. The indicator soil in Wetland A is a dark greyish brown (10YR 4/2) sandy loam with redoximorphic features. The soil satisfies the criteria for the hydric soil indicator Depleted Matrix (F3). Hydrology for Wetland A is provided by a seasonally-high groundwater table and is supplemented by stormwater discharge from the neighboring residences. The soil was not saturated during the July inspection; however, two primary hydrology indicators – Algal Mat or Crust (B4) and Water Stained Leaves (B9) were observed. Per the Regional Supplement, only one primary hydrology indicator is required to confirm wetland hydrology. These two indicators suggest inundation is present in the wetland for a significant portion of the year. It is common for wetlands of this type to dry out completely by late spring or early summer.

Local Regulations

Wetlands in Kirkland are regulated under Chapter 90 of the Kirkland Zoning Code (KZC). Under KZC, wetlands are classified as one of three types based on the Kirkland Rating System. According to the Rating System, Wetland A does not satisfy any of the criteria specific to Type 1 wetlands. Based on the functional scoring, Wetland A received a total of eight points. This score qualifies Wetland A as a Type 3 wetland.

Wetland buffers in Kirkland are determined based on the wetland type and whether the encompassing drainage basin is a primary or secondary basin. The standard buffer for Type 3 wetlands located in a secondary basin is 25 feet (KZC 90.45.1). However, Type 3 wetlands that are less than 2,500 square feet and located in a secondary basin are exempt from local regulation (KZC 90.20.3). Based on field observations, Wetland A may be less than 2,500 square feet. Following completion of an official survey as required in KZC 90.40 3b, if Wetland A is determined to be less than 2,500 square feet, it will not be regulated by the City of Kirkland, and no buffer shall be applied.

State and Federal Regulations

Wetland A scored a total of 16 points on the 2014 Ecology Rating System. While this system is not currently in use by Kirkland, it was recently adopted for use by Ecology and is suitable for supporting documentation submitted to Corps and Ecology.

Wetlands are also regulated by the Corps under section 404 of the Clean Water Act, regardless of the wetland size. Any filling of Waters of the State, including wetlands (except isolated wetlands), would require notification and permits from the Corps. Wetland A may be considered isolated, as no connection to any other Water of the State was observed, in our opinion. However, if smaller than 2,500 square feet and if changes to this wetland are planned, a formal isolated status inquiry should be requested from the Corps through the Jurisdictional Determination process. Application for Corps permits may also require an individual 401 Water Quality Certification and Coastal Zone Management Consistency determination from Ecology. If Wetland A is determined to be isolated, and therefore not regulated by the Corps, it will still be regulated by Ecology. All direct impacts to Wetland A would require authorization from Ecology.

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. If no direct impacts to Wetland A are proposed, state and federal permits would not be required.

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

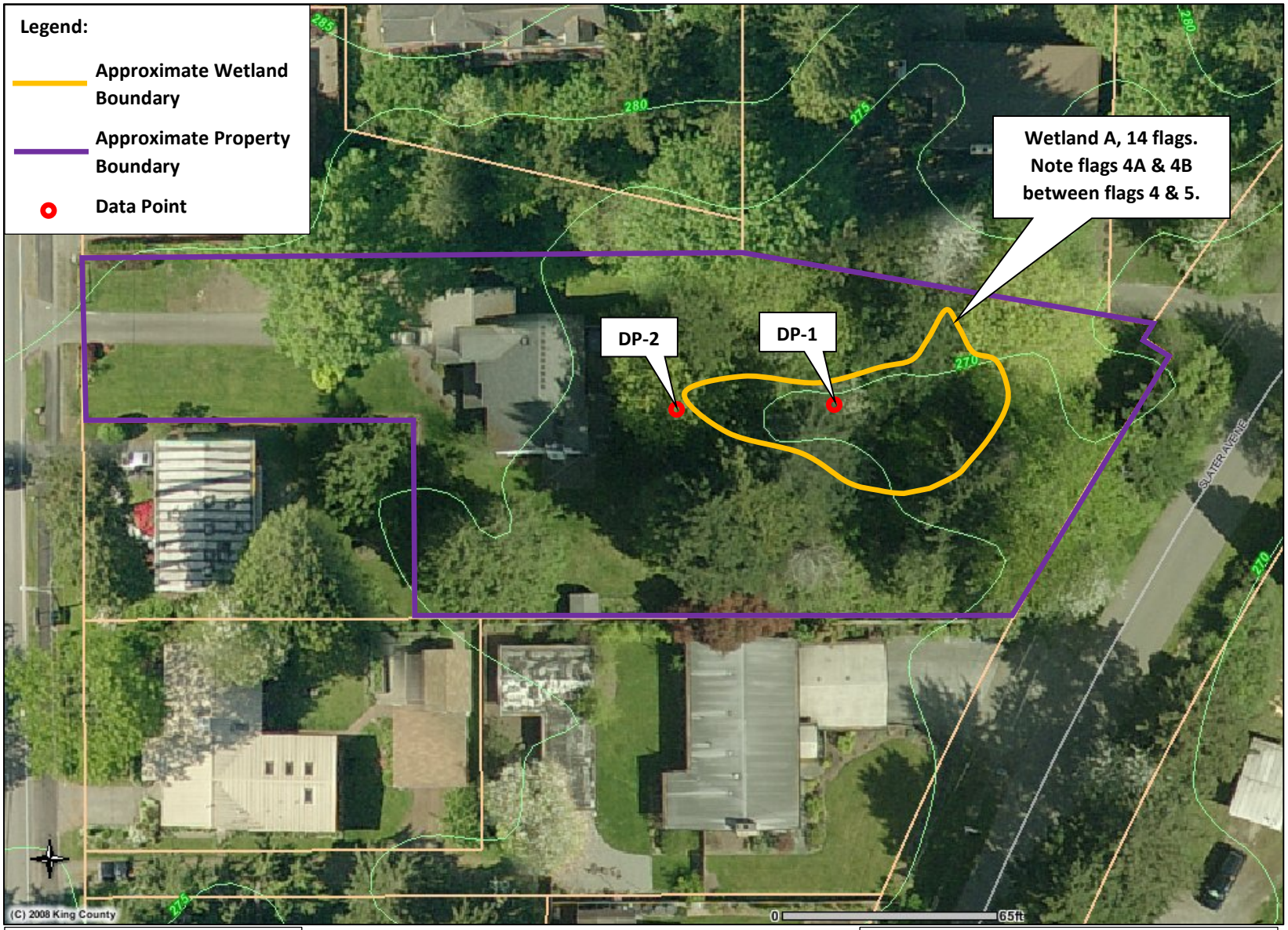
and criteria outlined in the methods section. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available to us at the time the study was conducted. All work was completed within the constraints of budget, scope, and 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,

Ryan Kahlo, PWS
Ecologist

Enclosures



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

Wetland Delineation Sketch
Bakhchinyan Property (Parcel #1238501180)
Prepared for Ron Hanson, City of Kirkland
July 7, 2014
TWC Project #120622.62

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

THE WATERSHED COMPANY
750 Sixth Street South | Kirkland | WA 98033
p 425.822.5242 f 425.827.8136

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THE WATERSHED COMPANY
750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-1

Project Site:	**Kirkland Bakhchinyan**	Sampling Date:	**7/7/2014**
Applicant/Owner:	**Bakhchinyan**	Sampling Point:	DP- **1**
Investigator:	**Kahlo, R Crandall, K**	City/County:	**Kirkland**
Sect., Township, Range	S **4** T **25N** R **5E**	State:	**WA**
Landform (hillslope, terrace, etc)	**Depression** Slope (%) **None**	Local relief (concave, convex, none)	**Concave**
Subregion (LRR)	**A** Lat	Long	Datum
Soil Map Unit Name	**AgC**	NWI classification	**None**

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 this Sampling Point within a Wetland**	☒ Yes ☐ No
Hydric Soils Present?	☒ Yes	☐ No		
Wetland Hydrology Present?	☒ Yes	☐ No		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size 3m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Spiraea douglasii***	**55**	**Yes**	**FACW**
2. ***Populus balsamifera***	**7**	**No**	**FAC**
3.			
4.			
5.			
		= Total Cover	

Herb Stratum (Plot size 1m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Phalaris arundinacea***	**10**	**Yes**	**FACW**
2. ***Solanum dulcamara***	**5**	**Yes**	**FAC**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	

Woody Vine Stratum (Plot size)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

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 =

Hydrophytic Vegetation Indicators

X	Dominance test is > 50%
	Prevalence test is ≤ 3.0 *
	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 ☐

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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	**10YR 2/2**	**95**	**10YR 3/2**	**5**	**C**	**M**	**Silt loam**	
10-14	**10YR 4/2** **10YR 3/1**	**60** **20**	**10YR 3/6**	**20**	**C**	**M**	**Sandy loam**	**Mixed matrix**

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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 Soils[3]

- ☐ 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:

Primary Indicators minimum o one re uired: c eck all t at 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 (**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)

Secondary Indicators 2 or more re uired :

- ☐ 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	Depth (in):
Water Table Present?	☐ Yes	☒ No	Depth (in):
Saturation Present? (includes capillary fringe)	☐ Yes	☒ No	Depth (in):

Wetland Hydrology Present Yes ☒ No ☐

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

Remarks:

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-

Project Site:	**Kirkland Bakhchinyan**	Sampling Date:	**7/7/2014**
Applicant/Owner:	**Bakhchinyan**	Sampling Point:	DP-
Investigator:	**Kahlo, R Crandall, K**	City/County:	**Kirkland**
Sect., Township, Range	S **4** T **25N** R **5E**	State:	**WA**
Landform (hillslope, terrace, etc)	**Hillslope** Slope (%) **10**	Local relief (concave, convex, none)	**Concave**
Subregion (LRR)	**A** Lat	Long	Datum
Soil Map Unit Name	**AgC**	NWI classification	**None**

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
Wetland Hydrology Present? ☐ Yes ☒ No

Is this Sampling Point within a Wetland ☐ Yes ☒ No

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Acer macrophyllum***	**55**	**Yes**	**FACU**
2. ***Thuja plicata***	**80**	**Yes**	**FAC**
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size 3m diam.)			
1. ***Ilex aquifolium***	**5**	**Yes**	**FACU**
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size 1m diam.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	
Woody Vine Stratum (Plot size)			
1. ***Hedera helix***	**50**	**Yes**	**FACU**
2.			
		= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**25**	(A/B)

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 =

Hydrophytic Vegetation Indicators

- ☐ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ 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 ☒

Remarks: **Presumed FAC**

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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	**10YR 2/2**	**100**					**Sandy loam**	
5-12	**10YR 3/4**	**100**					**Gravelly sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: 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 Soils[3]

- ☐ 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:

Primary Indicators minimum o one re uired: c eck all t at 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 (**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)

Secondary Indicators 2 or more re uired :

- ☐ 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	Depth (in):
Water Table Present?	☐ Yes	☒ No	Depth (in):
Saturation Present? (includes capillary fringe)	☐ Yes	☒ No	Depth (in):

Wetland Hydrology Present Yes ☐ No ☒

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

Remarks:

WETLAND FIELD DATA FORM – Backchinyan property located at 9032 116th Avenue NE, Kirkland, WA 98033.

Rating done on July 7, 2014, by The Watershed Company.

WETLAND FIELD DATA FORM

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

a. The wetland is contiguous to Lake Washington;

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils;

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water;

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or

e. The wetland contains state or federally listed threatened or endangered plant species.

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

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

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

1. Total wetland area

Estimate wetland area and score from choices	Acres		Point Value	**Points**
	>20.00	=	6	
	10-19.99	=	5	
	5-9.99	=	4	
	1-4.99	=	3	
	0.1-0.99	=	2	
	<0.1	=	1	**1**

(1 point)

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

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

(1 point)

3. Plant species diversity.

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

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

Class	# of Species	Point Value	Class	# of Species	Point Value
Aquatic Bed	1-2	= 1	Scrub-Shrub	1-2	= 1
	3	= 2		3-4	= 2
	>3	= 3		>4	= 3
Emergent	1-2	= 1	Forested	1-2	= 1
	3-4	= 2		3-4	= 2
	>4	= 3		>4	= 3

(3 points)

4. Structural diversity.

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

Trees >50′ tall = 1

Trees 20′ to 49′ tall = 1

shrubs = 1

Herbaceous ground cover = 1

(0 points)

5. Intersperesion between wetland classes.

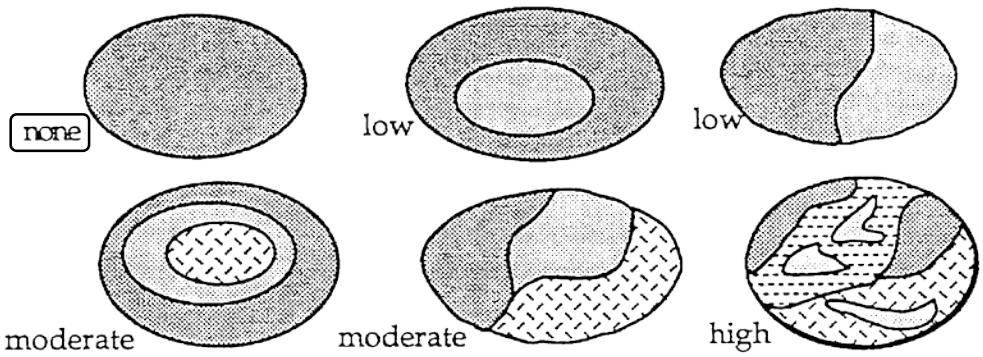
Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3 = High

2 = Moderate

1 = Low

0 = None



(0 points)

6. Habitat features

Add points associated with each habitat feature listed:

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

(0 points)

7. Connection to streams

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

Is the wetland connected at any time of the year via surface water?	
To a perennial stream or a seasonal stream *wit* fish	= 5
To a seasonal stream *wit out* fish	= 3
Is not connected to any stream	0

(0 points)

8. Buffers

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

	% of Buffer		Step 1	Width Factor		Step 2
Roads, buildings or parking lots	10%	X 0 =	_____	_____	=	0
Lawn, grazed pasture, vineyards or annual crops	_____ %	X 1 =	_____	_____	=	_____
Ungrazed grassland or orchards	_____ %	X 2 =	_____	_____	=	_____
Open water or native grasslands	_____ %	X 3 =	_____	_____	=	_____
Forest or shrub	90%	X 4 =	360	1	=	360
				Add buffer total		360

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

By 1 if buffer width is 25-50′

By 2 if buffer width is 50-100′

By 3 if buffer width is >100′

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3

300-599 = 2

100-299 = 1

(2 points)

9. Connection to other habitat areas:

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

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

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

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

(1 point).

10. Scoring

Add the scores to get a total: 8

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

Answer:

Yes = Type 2

No = Type 3

Wetland name or number A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Bakhchinyan Wetland A Date of site visit: 7/7/14

Rated by R. Kahlo, PWS Trained by Ecology? [Yes] No Date of training 3/2009

HGM Class Used for Rating: Depressional Unit 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 King County iMAP

OVERALL WETLAND CATEGORY III (based on functions X or special characteristics _)

1. Category of wetland based on FUNCTIONS

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

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the	*appropriate*	*ratings*	
Site Potential	H [M] L	H [M] L	H M [L]	
Landscape Potential	H [M] L	[H] M L	H M [L]	
Value	H [M] L	H M [L]	H [M] L	**TOTAL**
Score Based on Ratings	6	6	4	16

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 with 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	NA

Wetland name or number A

Maps and figures required to answer questions correctly (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	3
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D1.4	NA
Boundary of 150 ft buffer *(can be added to another figure)*	D 2.2, D 5.2	1
Polygon of area 1km from wetland edge - Including polygons for accessible habitat and undisturbed habitat	H 2.1, H2.2	2
Screen capture of map of 303d listed waters in basin (from Ecology web site)	D 3.1, D 3.2	4
Screen capture of list of TMDL's for WRIA in which unit is found (from web)	D 3.3	5

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of 150 ft buffer *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Polygon of area 1km from wetland edge -Including polygons for accessible habitat and undisturbed habitat	H 2.1, H2.2	
Screen capture of map of 303d listed waters in basin (from Ecology web site)	R 3.1	
Screen capture of list of TMDL's for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake-fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of 150 ft buffer *(can be added to another figure)*	L 2.2	
Polygon of area 1km from wetland edge (Including polygons for accessible habitat and undisturbed habitat)	H 2.1, H2.2	
Screen capture of map of 303d listed waters in basin (from Ecology web site)	L 3.1	
Screen capture of list of TMDL's for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
Polygon of area 1km from wetland edge (Including polygons for accessible habitat and undisturbed habitat)	H 2.1, H2.2	
Screen capture of map of 303d listed waters in basin (from Ecology web site)	S 3.1, S 3.2	
Screen capture of list of TMDL's for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number A

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)?

YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)

*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 acres (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 two years.

Wetland name or number 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.*

.

Wetland name or number _____

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality.

D 1.0 Does the wetland unit have the potential to improve water quality?	
D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression or "flat depression" (QUESTION 7 on key) with no surface water leaving it (no outlet) points =3 Unit has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Unit is a "flat" depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	3
D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES: points = 4 NO: points = 0	0
D 1.3 Characteristics of persistent plants (emergent, shrub, and/or forest Cowardin class) Unit has persistent, ungrazed, plants ≥ 95% of area points = 5 Unit has persistent, ungrazed, plants ≥ 1/2 of area points = 3 Unit has persistent, ungrazed plants ≥ 1/10 of area points = 1 Unit has persistent, ungrazed plants <1/10 of area points = 0	3
D 1.4 Characteristics of seasonal ponding or inundation *This is the area of the wetland unit that is ponded for at least 2 months. See description in manual.* 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	4
Total for D 1 Add the points in the boxes above	10

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 at the site?	
D 2.1 Does the Wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2 Is > 10% of the buffer within 150 ft of wetland unit in land uses that generate pollutants Yes = 1 No = 0	1
D 2.3 Are there septic systems within 250 ft of the wetland unit? 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_____ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	2

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 unit discharge directly (i.e.. within 1 mile) to a stream, river, or lake that is on the 303d list? Yes = 1 No = 0	0
D 3.2 Is the unit 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 unit is found*) Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	1

Rating of Value If score is: **2-4 = H** **1 = M** **0 = L** *Record the rating on the first page*

Wetland name or number _____

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation.

D 4. 0 Does the wetland unit have the potential to reduce flooding and erosion?	
D 4.1 Characteristics of surface water flows out of the wetland: Unit is a depression or "flat depression" with no surface water leaving it (no outlet) points =4 Unit has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1 Unit has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	4
D 4.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units 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 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 Unit is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 inches) points = 0	0
D 4.3 Contribution of unit 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 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 unit is in the FLATS class points = 5	3
Total for D 4 Add the points in the boxes above	7

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 at the site?	
D 5.1 Does the unit receive any stormwater discharges? Yes = 1 No = 0	1
D5.2 Is >10% of the land use within 150 ft of the wetland in a land use that generates runoff? Yes = 1 No = 0	1
D 5.3 Is more than 25% of the contributing basin of the wetland unit covered with intensive human land uses (residential at >1 residence/acre, 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** **1,2 = 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 downgradient into areas where flooding has damaged human or natural resources (e.g., salmon redds),
  ○ Damage occurs in sub-basin that is immediately down-gradient of unit. points = 2
  ○ Damage occurs in a sub-basin further 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*_____ points = 0
• There are no problems with flooding downstream of the unit. points = 0
	0

D 6.2 Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	0

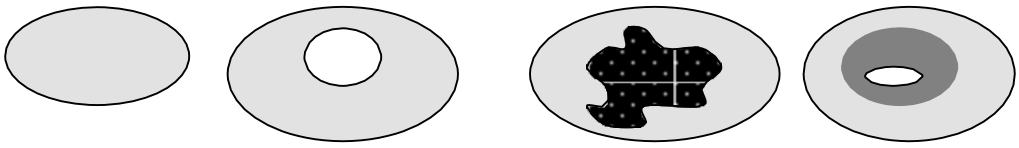
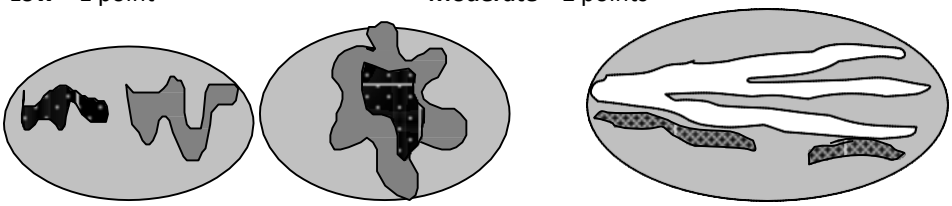
Rating of Value If score is: **2 -4 = H** **1 = M** **0 = L** *Record the rating on the first page*

Wetland name or number _____

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat.

H 1. Does the wetland unit have the potential to provide habitat for many species?

H 1.1 Structure of plant community – *indicators are Cowardin classes and layers in forest.* Check the Cowardin plant classes in unit – *Polygons for each class must total ¼ acre, or more than 10% of the unit if it is smaller than 2.5 acres. Add the number of structures checked* ____Aquatic bed — 4 structures or more — points = 4 ____Emergent plants — 3 structures — points = 2 _X__Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures — points = 1 ____Forested (areas where trees have > 30% cover) — 1 structure — points = 0 *If the unit has a forested class check if:* ___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	0
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 acre to count (*see text for descriptions of hydroperiods*). ____Permanently flooded or inundated — 4 or more types present — points = 3 _X__Seasonally flooded or inundated — 3 types present — points = 2 _X__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**	1
H 1.3. Richness of Plant Species Count the number of plant species in the wetland unit that cover at least 10 ft^2. *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: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0	1
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion between Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none. NOTE: If you have four or more classes or three plants 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 = 3points** 	0

Wetland name or number _____

H 1.5. Special Habitat Features: Check the habitat features that are present in the wetland. *The number of checks is the number of points* ____Large, downed, woody debris within the unit (>4 inches diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) within the unit ____Undercut banks are present for at least 6.6 ft (2m) **and/or** overhanging plants extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ acre of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)* ____Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
H 1. TOTAL Score - potential for providing habitat	2

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 habitat at the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat **+** [(% moderate and low intensity land uses)/2] **=** _____ If total accessible habitat is: > 1/3 (33.3%) of 1 km circle *(~100 hectares or 250 acres)* points = 3 20 - 33% of 1 km circle points = 2 10 - 19% of 1 km circle points = 1 <10% of 1 km circle points = 0	0
H 2.2 Undisturbed habitat in 1 km circle around unit. Undisturbed habitat > 50% of circle points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of circle points = 0	1
H 2.3 Land use intensity in 1 km circle. If: > 50% of circle is high intensity land use points = (- 2) < =50% of circle is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

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?	
H3.1Does the site provides habitat for species valued in laws, regulations or policies? *(choose only the highest score)* Site meets ANY of the following criteria: points = 2 • It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) • It is a "priority area" for an individual WDFW species • It is a Wetland With a High Conservation Value as determined by the Department of Natural Resources • It has 3 or more priority habitats within 100m (see next page) • 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 within 100m (see next page) points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is **2 = H** **1 = M** **0 = L** *Record the rating on the first page*

Wetland name or number _____

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)

Count how many of the following priority habitats are within 330 ft (100m) 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 0.4 ha (1 acre).

___**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 p. 152*).

___**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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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:** Woodlands 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 7.6 m (25 ft) high and occurring below 5000 ft.

___**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

X_____**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 > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

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

Wetland name or number _____

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands Does the wetland unit 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 unit 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 acre in size and meets at least two of the following three conditions? **YES = Category I** **NO = Category II** — 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 *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II**
SC 2.0 Wetlands with High Conservation Value (WHCV) SC 2.1 Has the Department of Natural Resources updated their web site to include the list of Wetlands with High Conservation Value? **YES - Go to SC 2.2** **NO – Go to SC 2.3** SC 2.2 Is the wetland unit you are rating listed on the DNR database as having a High Conservation Value? **YES = Category I** **NO = not a WHCV** SC 2.3 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf **YES – contact WNHP/DNR and go to SC 2.4** **NO = not a WHCV** SC 2.4 Has DNR identified the wetland within the S/T/R as a wetland with High Conservation value and is listed on their web site? **YES = Category I** **NO = not an WHCV**	**Cat. I**
SC 3.0 Bogs Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1 Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? YES - go to Question SC 3.3 NO - go to Question 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 inches 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 Question 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 Question 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" deep. If the pH is less than 5.0 and the "bog" plant species are present in Table 4, 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, Englemann's 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 bog**	**Cat. I**

Wetland name or number _____

SC 4.0 Forested Wetlands Does the wetland unit have at least 1 contiguous acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* — **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 inches (53cm). **YES = Category I** **NO - not a forested wetland for this section**	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* **YES = Go to SC 5.1** **NO- not a wetland in a coastal lagoon** SC 5.1 Does the wetland meets all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 99). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than 1/10 acre (4350 square feet) **YES = Category I** **NO = Category II**	**Cat. I** **Cat. II**
SC 6.0 Interdunal Wetlands Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? **YES - go to SC 6.1** **NO - not an interdunal wetland for rating** ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 **SC 6.1** Is the wetland one acre or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? **YES = Category I** **NO – go to SC 6.2** **SC 6.2** Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? **YES = Category II** **NO – go to SC 6.3** **SC 6.3** Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? **YES = Category III** **NO – Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered NO for all types enter "Not Applicable" on Summary Form	NA

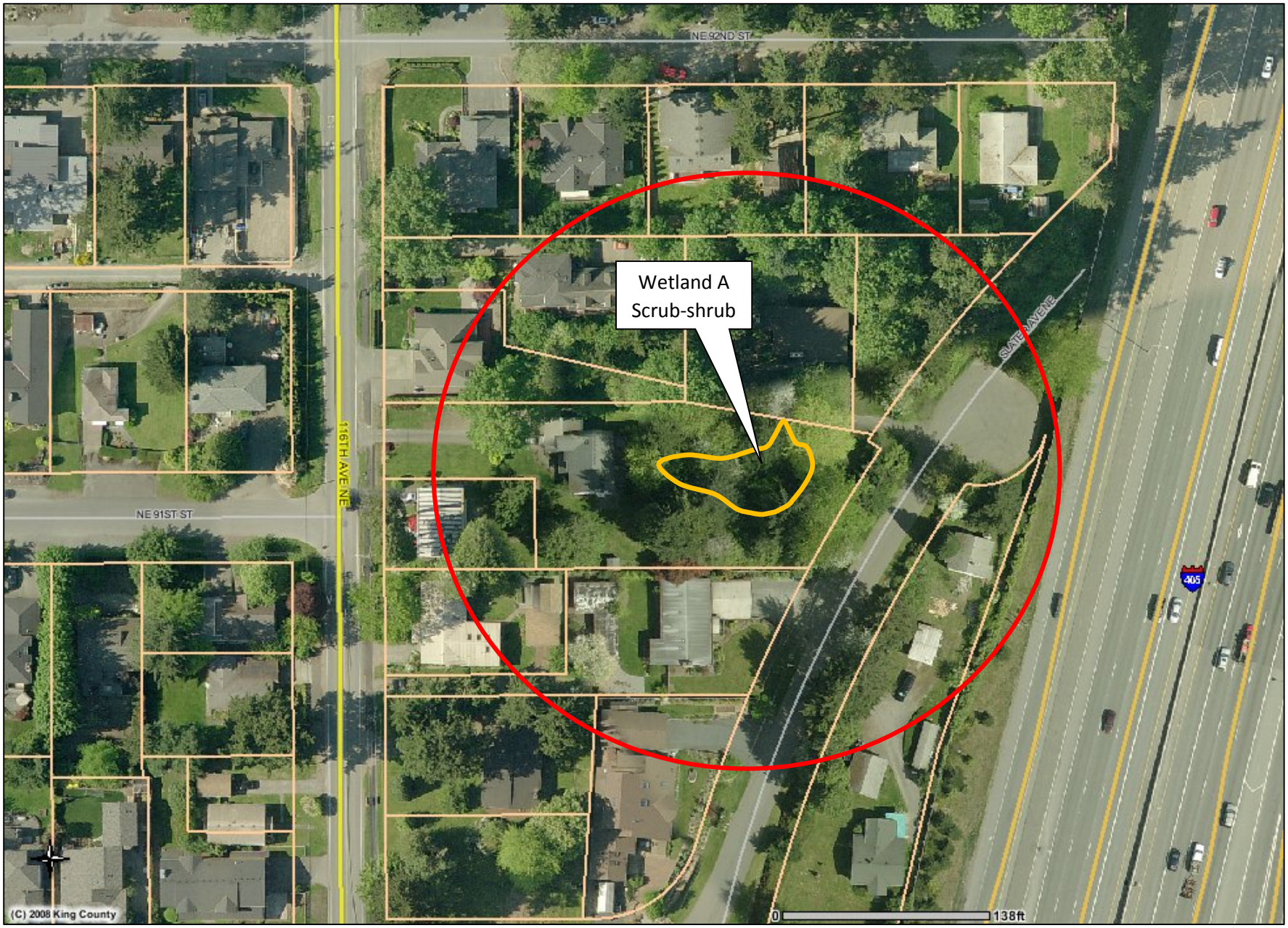


Figure 1: 150-foot Radius

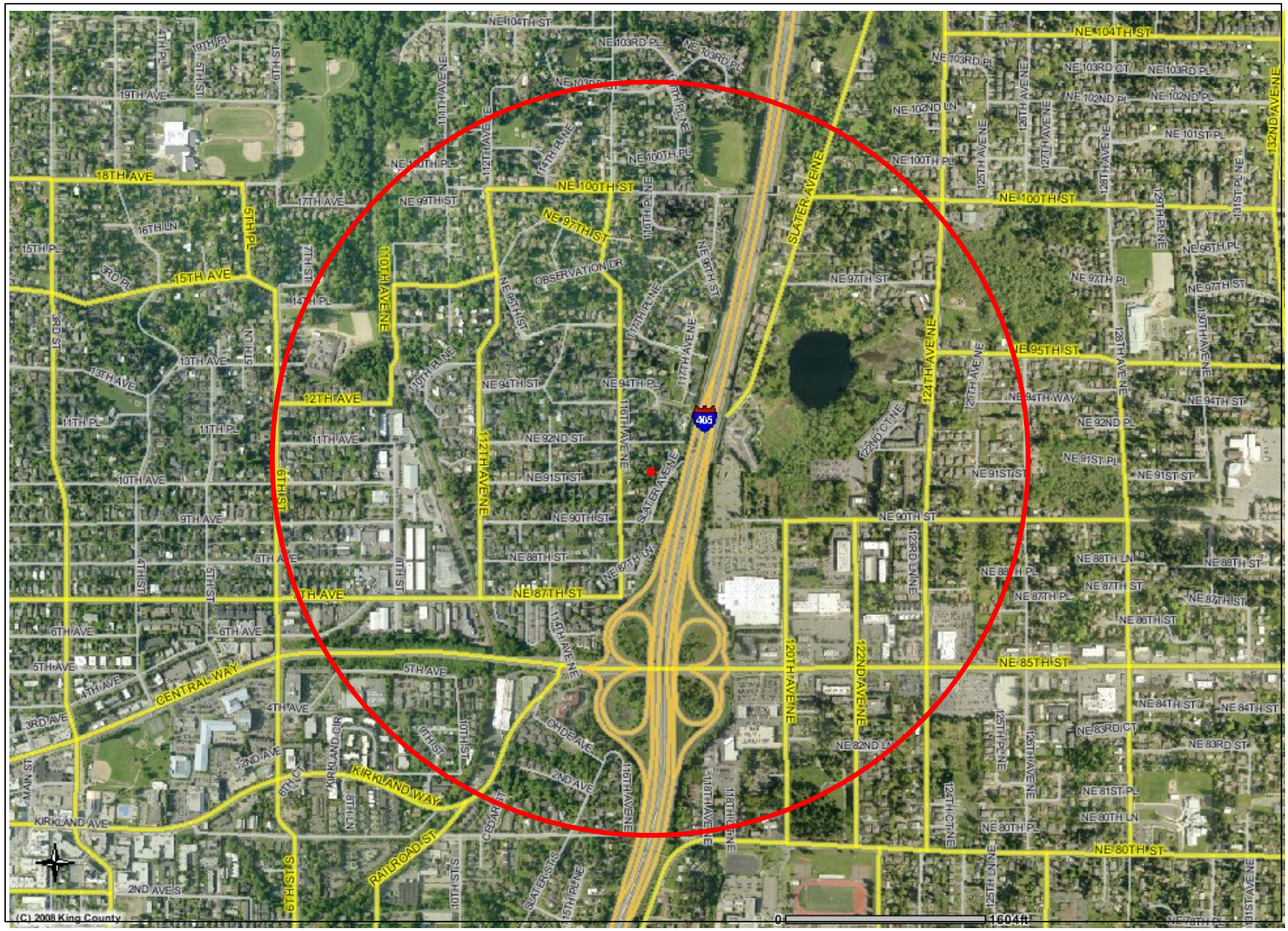


Figure 2: 1km Radius

Figure 3: Hydroperiods

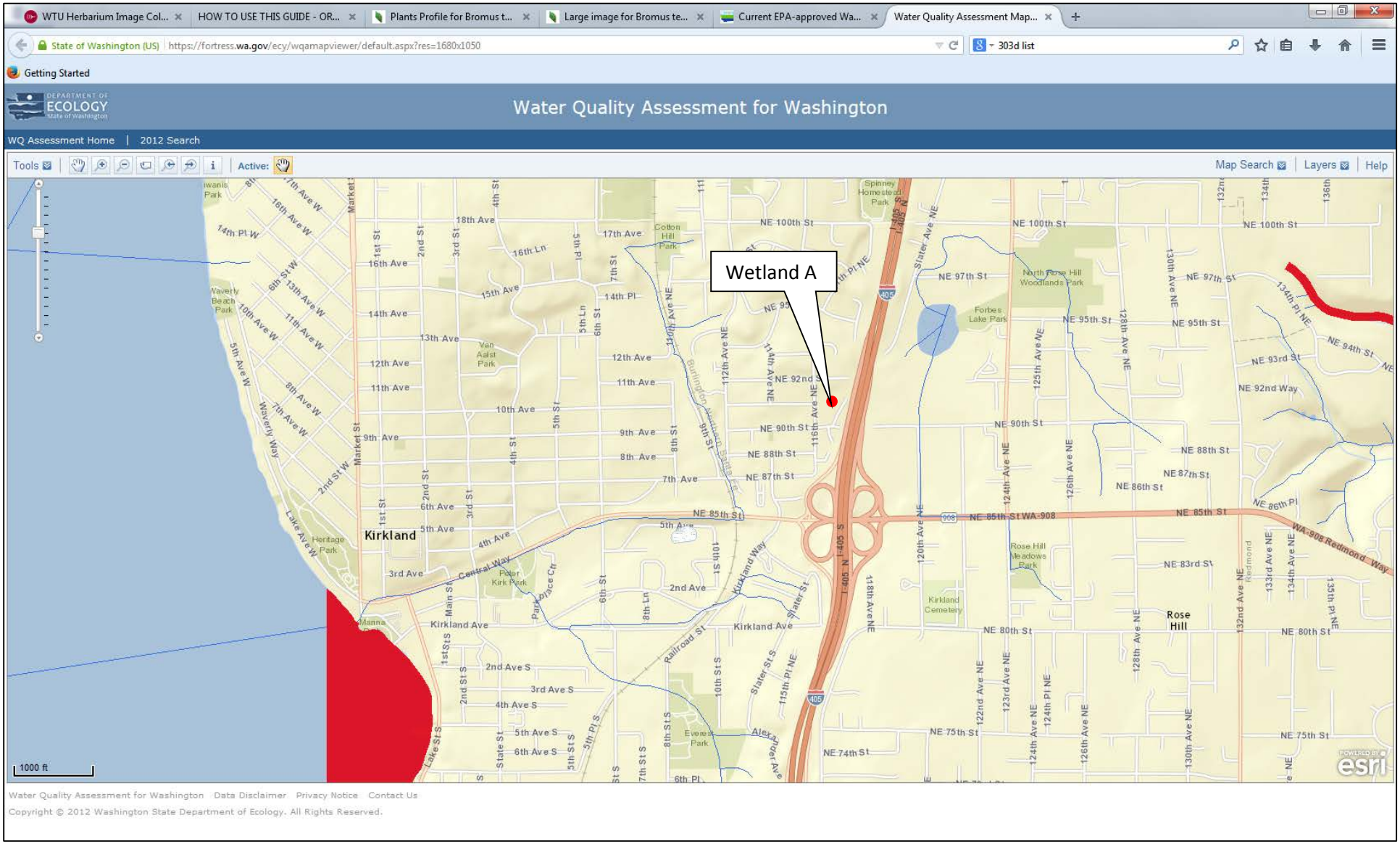


Figure 4: 303d Basin Map

Water Quality Improvement Projects (TMDLs)

WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

Overview of the process
Project Catalog
- by WRIA
- by County

Funding Opportunities
Project Development Priority Lists
Related Information
TMDL Contacts

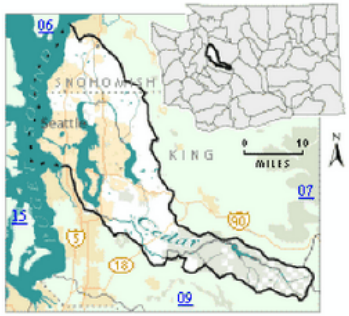
RELATED ECOLOGY PROGRAMS

Water Quality

Water Quality Improvement > Water Quality Improvement Projects by WRIA > WRIA 8: Cedar-Sammamish

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 Svricek 425-649-7036
North Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svricek 425-649-7036
Pipers Creek	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Swamp Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svricek 425-649-7036

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

For more information about WRIA 8:
- Waterbodies in WRIA 8 - using the Water Quality Assessment Query Tool
- Watershed Information for WRIA 8

Figure 5: TMDL List for WRIA 8

SECTION VII
OTHER PERMITS, VARIANCES AND ADJUSTMENTS

No other permits are required as of the date of this report.

SECTION VIII
CSWPPP ANALYSIS AND DESIGN

ESC PLAN ANALYSIS AND DESIGN (PART A)

The Erosion and Sedimentation Control Design meets the nine minimum requirements:

1. Clearing Limits **Areas to remain undisturbed shall be delineated with a high-visibility plastic fence prior to any site clearing or grading.**
2. Cover Measures **Disturbed Site areas shall be covered with mulch and seeded, as appropriate, for temporary or permanent measures.**
3. Perimeter protection **Perimeter protection shall consist of a silt fence down slope of any disturbed areas or stockpiles.**
4. Traffic Area Stabilization **A stabilized construction entrance will be located at the point of ingress/egress.**
5. Sediment Retention **Sediment retention will be provided with the use of silt fence perimeter protection.**
6. Surface Water Control **Surface water control will be provided by providing silt fences prior to runoff leaving the Site. A Baker Tank may be required.**
7. Dewatering Control **If dewatering is required for this project (not anticipated), a sediment tank may be required due to limited area available for a sediment trap on the Site. See C.O.K. Pre-approved Plans Policy E-1 concerning temporary sediment settling tanks and discharge requirements.**
8. Dust Control **Dust control shall be provided by spraying exposed soils with water until wet. This is required when exposed soils are dry to the point that wind transport is possible which would impact roadways, drainage ways, surface waters, or neighboring residences.**
9. Flow Control **Flow Control will be provided with the use of silt fence perimeter protection.**

SWPPS PLAN DESIGN (PART B)

Construction activities that could contribute pollutants to surface and storm water include the following, with applicable BMP s listed for each item:

1. Storage and use of chemicals: Utilize source control, and soil erosion and sedimentation control practices, such as using only recommended amounts of chemical materials applied in the proper manner; neutralizing concrete wash water, and disposing of excess concrete material only in areas prepared for concrete placement, or return to batch plant; disposing of wash-up waters from water-based paints in sanitary sewer; disposing of wastes from oil-based paints, solvents, thinners, and mineral spirits only through a licensed waste management firm, or treatment, storage, and disposal (TSD) facility.

2. Material delivery and storage: Locate temporary storage areas away from vehicular traffic, near the construction entrance, and away from storm drains. Material Safety Data Sheets (MSDS) should be supplied for all materials stored, and chemicals kept in their original labeled containers. Maintenance, fueling, and repair of heavy equipment and vehicles shall be conducted using spill prevention and control measures. Contaminated surfaces shall be cleaned immediately following any spill incident. Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other potentially hazardous materials.
3. Building demolition: Protect stormwater drainage system from sediment-laden runoff and loose particles. To the extent possible, use dikes, berms, or other methods to protect overland discharge paths from runoff. Street gutter, sidewalks, driveways, and other paved surfaces in the immediate area of demolition must be swept daily to collect and properly dispose of loose debris and garbage. Spray the minimum amount of water to help control windblown fine particles such as concrete, dust, and paint chips. Avoid excessive spraying so that runoff from the site does not occur, yet dust control is achieved. Oils must never be used for dust control.
4. Sawcutting: Slurry and cuttings shall be vacuumed during the activity to prevent migration offsite and must not remain on permanent concrete or asphalt paving overnight. Collected slurry and cuttings shall be disposed of in a manner that does not violate ground water or surface water quality standards.

SECTION IX
BOND QUANTITIES, FACILITY SUMMARIES, AND DECLARATION OF COVENANT

BOND QUANTITY WORKSHEET

A draft worksheet is included. Final to be submitted prior to final plat recording.

STORMWATER FACILITY SUMMARY SHEET

No formal stormwater facilities are proposed.

DECLARATION OF COVENANT

No formal stormwater facilities are proposed.

PUBLIC WORKS DEPARTMENT
IMPROVEMENT EVALUATION SUMMARY

Type of project: [X] **Subdivision** [ ] **Commercial** [ ] **Single Family**
[ ] **Multi-Family** [ ] **Muni/Gov't** [ ] **Miscellaneous**

Project Name: Bakchinyan Short Plat

Project Location: 9032 116th Ave NE

Permit No.:

Contact:

Phone No.:

** FOR CITY USE ONLY **

1. **Total Value of Public Work Required:**
2. **Review & Inspection Fee * :**
3. **Total Value of Private Work Required:**
4. **Performance Security (Recording) ** :**
5. **Maintenance Security Value:**

*The Review and Inspection Fee is 10% of Total Value of Public Work Required (column 1), plus value of private storm (column 2, #5)

** 17.5% of the total construction value will be added to the Performance Security for Mobilization, Traffic Control, Surveying, Engineering, and

IMPROVEMENT EVALUATION

This form must be completed by the developer (or representative) and shall inclu work required by the official Notice of Approval or conditions on the permit. Quantity take-offs shall be from documents approved by the City of Kirkland.

PUBLIC WORK will be owned and maintained by the City after the appropriate maintenance period and will be subject to review and inspection fees per KMC Section 5.74.040. For subdivision work, this will include the on-site detention sy

PRIVATE WORK will be owned and maintained by the property owner(s), and is subject to the above fees. For subdivisions, include the remainder of the on-site drainage system (excluding the detention system) and any easement road pavin all other types of projects, include the on-site storm drainage system only.

	Column 1	*Column 2*	*Column 3*
Items Required	**Value of Public Work**	**Value of Private Work**	**Total Value**
1. Constr. Storm Drainage	$2,540		$2,540
2. Clearing and Grading	$4,292		$4,292
3. Water System	$3,200		$3,200
4. Sanitary Sewer System	$16,920		$16,920
5. Storm Drainage System	$39,900	$1,200	$41,100
6. LID - Storm Drainage	$560	$15,250	$15,810
7. Paving	$4,085	0	$4,085
8. Curb and Gutter	$4,830		$4,830
9. Sidewalks	$5,031		$5,031
10. Landscaping	$2,250		$2,250
11. Miscellaneous	0		
12. Other Agency Improvements	0		
13			
TOTALS	$83,608	$16,450	$100,058

I hereby certify the above to be an accurate representation of the required construction for the above referenced project.

Agent/Owner	DRAFT	Date
City		Date

CONSTR. STORM DRAINAGE - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
Silt Fence, Installed	LF		$6.00	
Grading for Drainage Swales	LF		$6.00	
Sod for Drainage Swales	SY		$6.00	
Hydroseeding	SY		$3.00	
Construction Entrance	EA	1	$1,500.00	1,500
Inlet Protection	EA	13	$80.00	1,040

Construction Storm Drainage - Total	$2,540

CLEARING AND GRADING - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
Half-Street Improvements	LF	146	$12.00	1,752
Full Street Improvements	LF		$24.00	

Clearing and Grading - Total	$4,292

WATER SYSTEM - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
Water service - 3/4" to 1"	LS	2	$1,600.00	3,200
Water service - 1 1/2" to 2"	LS		$3,400.00	
4" Pipe	LF		$65.00	
6" Pipe	LF		$70.00	
8" Pipe	LF		$100.00	
2" Gate Valve (G.V.)	EA		$300.00	
4" G.V.	EA		$600.00	
6" G.V.	EA		$800.00	
8" G.V.	EA		$1,000.00	
Connection to ex. Main	EA		$4,500.00	
Fire Hydrant Assembly	EA		$3,600.00	
2" Blow Off	EA		$2,200.00	
Air and Vacuum Assembly	EA		$2,500.00	
Valve Marker Post	EA		$200.00	

Water System - Total	$3,200

SANITARY SEWER SYSTEM- PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
6" PVC pipe	LF	162	$100.00	16,200
8" PVC pipe	LF		$120.00	
12" PVC pipe	LF		$150.00	
Extra Depth Excav. (over 12' dee	FT*LF		$8.00	
Manhole, 48"	EA		$3,600.00	
Manhole, 54" (for drop MH's only)	EA		$4,000.00	
Internal Drop Structure	EA		$970.00	
Rechannel Existing MH	EA		$2,660.00	
Cast Iron Clean-Out Cover	EA	2	$160.00	320
Clean Out Assembly	EA	2	$400.00	800

Sanitary Sewer System - Total	$16,920

STORM DRAINAGE SYSTEM - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
8" Pipe	LF		$40.00	
12" Pipe	LF	525	$50.00	26,250
18" Pipe	LF		$60.00	
24" Pipe	LF		$75.00	
30" Pipe	LF		$80.00	
36" Pipe	LF		$90.00	
48" Pipe	LF		$100.00	
Detention Pipe	LF			
Detention Vault	LS			
Extra Depth Excav. (over 12' dee	FT*LF		$6.00	
Curb Inlet	EA		$880.00	
Type I Catch Basin	EA	11	$1,200.00	13,200
Type IL Catch Basin	EA		$1,400.00	
Type II CB - 48"	EA		$3,900.00	
Type II CB - 54"	EA		$4,000.00	
CMP Access Riser	EA		$1,600.00	
Connection to Existing CB	EA	2	$1,100.00	2,200
Restrictor/Pollution Control - 8"	EA		$900.00	
Restrictor/Pollution Control - 12"	EA		$900.00	
Pollution Control Tee	EA		$500.00	
Debris Barrier	EA	1	$250.00	250
Biofiltration Swale	LF		$15.00	

Storm Drainage System - Total	$39,900

Low Impact Development - Public Storm Drainage

Item	Unit	Quantity	Unit Price	Amount
Pervious Concrete (5' wide)	LF		$60.00	
Porous Asphalt	SY		$80.00	
Rain Gardens	SY		$120.00	
Infiltration Trench (10 ft)	EA		$300.00	
Porous Pavers	SY		$50.00	
Soil Amendment	SY	80	$7.00	560

LID Drainage (Public) - Total	$560

PAVING - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
AC Pavement Patching	SY	3	$40.00	120
4" Crushed Rock	SY	57	$10.00	570
Bank Run Gravel: 3" minus, in pla	CY		$30.00	
4" Asphalt Treated Base (ATB)	SY	57	$35.00	1,195
2" Class B Asphalt Pavement	SY	30	$20.00	600
Saw Cut AC Pavement	LF	225	$2.00	450
Cold Planing (Grinding) & Hauling	SY		$12.00	
Adjust Existing Utility	EA	1	$350.00	350

Paving - Total	$4,085

CURB AND GUTTER - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
Concrete Extruded Curb	LF		$8.00	
Asphalt Extruded Curb	LF		$8.00	
Conc. Curb & Gutter, Type A	LF	138	$35.00	4,830

Curb and Gutter - Total	$4,830

SIDEWALKS - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
5' Concrete Sidewalk	LF	146	$30.00	4,380
Concrete Sidewalk (other than 5')	SF		$6.00	
5' Concrete Driveway	LF	15	$35.00	525
Asphalt Walkways, Class B	SY	7	$18.00	126
Wheel Chair Ramps	EA		$1,400.00	
Steel Pipe Handrail	LF		$80.00	
Vinyl Fencing	LF		$40.00	
Speed Hump Restoration	EA		$1,500.00	
5' Pervious Sidewalk	LF		$40.00	

Sidewalks - Total	$5,031

LANDSCAPING - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
Street Trees	EA	5	$450.00	2,250
Sod	SY		$10.00	
Rockery Wall	SY		$400.00	

Landscaping - Total	$2,250

MISCELLANEOUS - PUBLIC WORK

Item	Unit	Quantity	Unit Price	Amount
Monuments	EA		$380.00	
Street Signs	EA		$220.00	
Pavement Marking	LF		$1.00	
Mailbox Structure	EA		$700.00	
Type III Fixed Barricade	EA		$400.00	
Bollards	EA		$700.00	
Thermoplastic Crosswalk Marking	LF		$2.85 or $500 min	
Street Light	EA		$4,000.00	
PED Light	EA		$5,000.00	

Miscellaneous - Total	0

PAVING - PRIVATE WORK

Item	Unit	Quantity	Unit Price	Amount
4" Crushed Rock	SY		$10.00	
4" Asphalt Treated Base (ATB)	SY		$35.00	
2" Class B Asphalt Pavement	SY		$20.00	

Paving - Total	0

MISCELLANEOUS - PRIVATE WORK

Item	Unit	Quantity	Unit Price	Amount
Property Corners	EA	4	$300.00	1,200
Street Signs	EA		$220.00	
Fire Lane Marking	LF		$2.00	
UG Utilities to Existing House	EA		$2,500.00	
Tight-Line ex. House Roof Drains	LF	220	$15.00	3,300

Miscellaneous - Total	$4,500

STORM DRAINAGE SYSTEM - PRIVATE WORK

Item	Unit	Quantity	Unit Price	Amount
4" - 6" Pipe	LF		$15.00	
8" Pipe	LF		$40.00	
12" Pipe	LF		$50.00	
18" Pipe	LF		$60.00	
24" Pipe	LF		$75.00	
Detention Pipe	LF			
Detention Vault	LS			
Yard Basin	EA		$265.00	
Curb Inlet	EA		$880.00	
Type I Catch Basin	EA	1	$1,200.00	1,200
Type IL Catch Basin	EA		$1,400.00	
Type II CB - 48"	EA		$3,900.00	
Type II CB - 54"	EA		$4,000.00	
CMP Access Riser	EA		$1,600.00	
Connection to Existing CB	EA		$1,100.00	
Restrictor/Pollution Control - 8"	EA		$900.00	
Restrictor/Pollution Control - 12"	EA		$900.00	
Pollution Control Tee	EA		$500.00	
Debris Barrier	EA		$250.00	
Biofiltration Swale	LF		$15.00	

Storm Drainage System - Total	$1,200

Low Impact Development - Private Storm Drainage

Item	Unit	Quantity	Unit Price	Amount
Pervious Concrete (5' wide)	LF		$60.00	
Porous Asphalt	SY	120	$80.00	9,600
Rain Gardens	SY		$120.00	
Infiltration Trench (10 ft)	EA	3.7	$300.00	1,110
Porous Pavers	SY		$50.00	
Soil Amendment	SY	650	$7.00	4,550

LID Drainage (Private) - Total	$15,250

Other Agency Improvements

Item	*Unit*	*Quantity*	*Unit Price*	*Amount*
Northshore Utility District	LS			
Woodinville Water District	LS			
Puget Sound Energy	LS			

Other Agency - Total	0

STORMWATER FACILTY SUMMARY SHEET

Development **Bakhchinyan Short Plat** Date **September 11, 2015**

Location **9032 116th Ave NE - Kirkland - King County, Washington**

ENGINEER	DEVELOPER
Name **Luay R. Joudeh, P.E.**	Name **Maxim Lissak**
Firm **D.R. STRONG Consulting Engineers, Inc.**	Firm
Address **720 6th Ave**	Address **11121 NE 53rd St**
Kirkland, WA 98033	**Kirkland, WA 98033**
Phone **(425) 827-3063**	Phone **(425) 672-5079**

Developed Site: **0.60 acres**

Number of lots **3**

Number of detention facilities on site:
_____ ponds
_____ vaults
_____ tanks

Number of infiltration facilities on site:
_____ ponds
_____ vaults
_____ tanks

Flow control provided in regional facility (give location) _____
No flow control required_____ Exemption number _____

Downstream Drainage Basins

Immediate	Major Basin
Moss Bay	**Cedar River/Lake Washington**

Number & type of water quality facilities on site:

_____ biofiltration swale (regular/wet/ or continuous inflow?)
_____ sand filter (basic or large?)
_____ combined detention/WQ pond
_____ combined detention/wetvault
_____ compost filter
_____ filter strip
__X__ flow dispersion
_____ farm management plan
_____ landscape management plan
_____ oil/water separator (baffle or coalescing plate?)
_____ catch basin inserts: Manufacturer_____
_____ pre-settling structure: Manufacturer_____

_____ sand filter, linear (basic or large?)
_____ stormfilter
_____ sand filter vault (basic or large?)
_____ stormwater wetland
_____ wetpond (basic or large?)
_____ wetvault
_____ pre-settling pond
_____ flow-splitter catchbasin

DESIGN INFORMATION		INDIVIDUAL BASIN		
Water Quality design flow		**n/a**		
Water Quality treated volume				
Drainage basin(s)				
Onsite area				
Offsite area				
Type of Storage Facility				
Live Storage Volume				
Predev Runoff Rate	2-year			
	10-year			
	100-year			
Developed Runoff Rate	2-year			
(Including Bypass Rate)	10-year			
	100-year			
Type of Restrictor				
Size of orifice/restriction	No. 1			
	No. 2			
	No. 3			
	No. 4			

SECTION X
OPERATIONS AND MAINTENANCE MANUAL

The Type 1 catch basins have a one-foot deep sump, and the Type 2 catch basins have a two-foot deep sump for sediment accumulation. These sumps should be periodically checked and the sediment removed when accumulated to more than 1/3 of the depth from the bottom of the basin to the invert of the lowest pipe into or out of the basin. Grates should be cleaned when trash or debris of more than ½ cubic foot is located immediately in front of the basin opening, or is blocking capacity of the basin by more than 10%. Conveyance pipes should be periodically checked and cleaned when more than 20% of the pipe diameter is obstructed by accumulated sediment or debris.

Perform inspections of all components quarterly during the first year of operation, then annually thereafter. For more detailed maintenance instructions, refer to the standards contained at the end of this section.

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